**COMBATING TERRORISM TECHNICAL SUPPORT OFFICE/**

**Technical Support Working Group**

**(CTTSO/TSWG)**

**BROAD AGENCY ANNOUNCEMENT (BAA)**

**18-S-3001**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Due Date for Receipt of Phase 1 Quad Charts:**

**No Later Than February 5, 2018**

**All submissions are due by 3:00 p.m.**

**Eastern Time (ET) on the above date**

**AAC – Advanced Analytic Capabilities**

**CBRNE – Chemical, Biological, Radiological, Nuclear, and Explosives**

**IDD/EC – Improvised Device Defeat/Explosives Countermeasures**

**IFS – Investigative and Forensic Science**

**IW/ET – Irregular Warfare and Evolving Threats**

**PP – Personnel Protection**

**PS – Physical Security**

**SCOS – Surveillance, Collection, and Operations Support**

**TOS – Tactical Operations Support**

**TTD – Training Technology Development**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**The Broad Agency Announcement Information Delivery System (BIDS) is the system in which all submissions and communications will flow. Communications outside of BIDS may result in expulsion from the competition.**

**TABLE OF CONTENTS**

[1. INTRODUCTION. 5](#_Toc502755585)

[1.1. Approach. 5](#_Toc502755586)

[1.2. Small Business Set Aside. 5](#_Toc502755587)

[1.3. Limitation of Funds. 5](#_Toc502755588)

[1.4. Technical Evaluation Support. 6](#_Toc502755589)

[1.5. BAA Package Download. 6](#_Toc502755590)

[1.6. BAA Contractual and Technical Questions. 6](#_Toc502755591)

[1.7. BIDS Website Help Requests. 6](#_Toc502755592)

[1.8. BIDS Frequently Asked Questions (FAQs). 6](#_Toc502755593)

[2. GENERAL INFORMATION. 7](#_Toc502755594)

[2.1. Eligibility. 7](#_Toc502755595)

[2.2. Procurement Integrity, Standards of Conduct, Ethical Considerations. 7](#_Toc502755596)

[2.3. Reserved. 7](#_Toc502755597)

[2.4. Restrictive Markings on Proposals. 7](#_Toc502755598)

[2.5. Submission Handling/Rights in Technical Data and Computer Software/Patent Rights. 7](#_Toc502755599)

[2.5.1. Procurement Integrity. 7](#_Toc502755600)

[2.5.2. Submission Information and FOIA. 7](#_Toc502755601)

[2.5.3. Rights in Technical Data and Computer Software. 8](#_Toc502755602)

[2.5.4. Patents. 8](#_Toc502755603)

[2.6. Product and Deliverable Requirements. 8](#_Toc502755604)

[2.7. Distribution/Release Limitations. 9](#_Toc502755605)

[2.8. Subcontracting. 9](#_Toc502755606)

[2.9. Animal or Human Testing Compliance. 9](#_Toc502755607)

[2.9.1. Animal Testing. 9](#_Toc502755608)

[2.9.2. Human Subjects Testing. 9](#_Toc502755609)

[3. PROPOSAL PREPARATION. 10](#_Toc502755610)

[3.1. BAA Information Delivery System (BIDS). 10](#_Toc502755611)

[3.1.1. Submitter Registration. 10](#_Toc502755612)

[3.1.2. User Accounts and Password Resets. 10](#_Toc502755613)

[3.1.3. Registration and Account Help. 11](#_Toc502755614)

[3.1.4. Document Identifier. 11](#_Toc502755615)

[3.1.4.1. Constructing Document Identifiers. 11](#_Toc502755616)

[3.1.4.2. Creating Submitter Internal Tracking (SIT) Numbers. 11](#_Toc502755617)

[3.2. BIDS Security and Access Control. 12](#_Toc502755618)

[3.3. Submission Changes. 12](#_Toc502755619)

[3.4. Special Handling Procedures for Classified Information. 12](#_Toc502755620)

[3.5. Phase 1 Quad Chart Submissions. 12](#_Toc502755621)

[3.5.1. Phase 1 Due Date and Time. 13](#_Toc502755622)

[3.5.2. Electronic File Format. 13](#_Toc502755623)

[3.5.3. Quad Chart Content. 13](#_Toc502755624)

[3.5.3.1. Header Information. 13](#_Toc502755625)

[3.5.3.2. Top Left Quadrant, Graphical Depiction. 13](#_Toc502755626)

[3.5.3.3. Top Right Quadrant, Operational and Performance Capabilities. 13](#_Toc502755627)

[3.5.3.4. Bottom Left Quadrant, Technical Approach. 14](#_Toc502755628)

[3.5.3.5. Bottom Right Quadrant, Cost and Schedule. 14](#_Toc502755629)

[3.5.4. Phase 1 Notification to Offeror. 14](#_Toc502755630)

[3.5.5. Phase 1 Status and Inquiries. 14](#_Toc502755631)

[3.6. Phase 2 White Paper Submissions. 15](#_Toc502755632)

[3.6.1. Phase 2 Due Date and Time. 15](#_Toc502755633)

[3.6.2. Electronic File Format. 15](#_Toc502755634)

[3.6.3. Phase 2 Document Upload. 15](#_Toc502755635)

[3.6.4. White Paper Content. 15](#_Toc502755636)

[3.6.4.1. Cover Page. 15](#_Toc502755637)

[3.6.4.2. Technical Approach. 16](#_Toc502755638)

[3.6.4.3. Tasks and Deliverables. 16](#_Toc502755639)

[3.6.4.4. Schedule. 16](#_Toc502755640)

[3.6.4.5. Cost. 16](#_Toc502755641)

[3.6.4.6. Intellectual Property, Technical Data, and Software. 16](#_Toc502755642)

[3.6.4.6.1. Patents and Patent Applications. 17](#_Toc502755643)

[3.6.4.6.2. Rights in Technical Data and Software. 17](#_Toc502755644)

[3.6.4.7. Transition from Prototype to Production. 17](#_Toc502755645)

[3.6.4.8. Organizational Capability Statement. 17](#_Toc502755646)

[3.6.6. Phase 2 Status and Inquiries. 17](#_Toc502755647)

[3.6.5. Phase 2 Notifications to Offeror. 18](#_Toc502755648)

[3.7. Phase 3 Full Proposal Submissions. 18](#_Toc502755649)

[3.7.1. Phase 3 Due Date and Time. 18](#_Toc502755650)

[3.7.2. Electronic File Format. 18](#_Toc502755651)

[3.7.3. Phase 3 Document Upload. 19](#_Toc502755652)

[3.7.4. Full Proposal Components. 19](#_Toc502755653)

[3.7.5. Technical Proposal Content. 19](#_Toc502755654)

[3.7.5.1. Reserved. 19](#_Toc502755655)

[3.7.5.2. Abstract. 19](#_Toc502755656)

[3.7.5.3. Executive Summary. 19](#_Toc502755657)

[3.7.5.4. Technical Approach. 20](#_Toc502755658)

[3.7.5.5. Project Plan. 20](#_Toc502755659)

[3.7.5.5.1. Phases. 20](#_Toc502755660)

[3.7.5.5.2. Tasks within a Phase. 20](#_Toc502755661)

[3.7.5.5.3. Products and Deliverables. 20](#_Toc502755662)

[3.7.5.6. Master Schedule. 20](#_Toc502755663)

[3.7.5.7. Government Furnished Equipment. 20](#_Toc502755664)

[3.7.5.8. Project Risks and Mitigation. 21](#_Toc502755665)

[3.7.5.9. Organizational Capability Statement. 21](#_Toc502755666)

[3.7.5.10. Organizational Resources. 21](#_Toc502755667)

[3.7.5.11. Intellectual Property, Technical Data, and Software. 21](#_Toc502755668)

[3.7.5.11.1. Patents and Patent Applications. 21](#_Toc502755669)

[3.7.5.11.2. Rights in Technical Data. 21](#_Toc502755670)

[3.7.5.12. Transition from Prototype to Production. 21](#_Toc502755671)

[3.7.5.12.1. Transition Strategy. 22](#_Toc502755672)

[3.7.5.12.2. Transition Approach. 22](#_Toc502755673)

[3.7.5.12.3. Test and Evaluation. 22](#_Toc502755674)

[3.7.5.12.4. Operational Support. 22](#_Toc502755675)

[3.7.5.13. Human Subjects and Animal Testing. 22](#_Toc502755676)

[3.7.5.14. Environmental Impact. 23](#_Toc502755677)

[3.7.5.15. Classification and Security. 23](#_Toc502755678)

[3.7.5.16. Subcontracting Plan. 23](#_Toc502755679)

[3.7.6. Cost Proposal. 23](#_Toc502755680)

[3.7.6.1. Cost Summary Section. 23](#_Toc502755681)

[3.7.6.1.1. Other Funding Sources. 23](#_Toc502755682)

[3.7.6.2. Detailed Cost Estimate. 24](#_Toc502755683)

[3.7.6.2.1. Direct Labor Costs. 24](#_Toc502755684)

[3.7.6.2.2. Indirect Costs. 25](#_Toc502755685)

[3.7.6.2.3. Other Direct Costs. 25](#_Toc502755686)

[3.7.6.2.4. Materials and Subcontractors. 25](#_Toc502755687)

[3.7.6.2.5. Government Furnished or Contractor Acquired Equipment. 25](#_Toc502755688)

[3.7.6.2.6. Fee. 26](#_Toc502755689)

[3.7.6.2.7. Competitive Methods. 26](#_Toc502755690)

[3.7.6.2.8. Established Catalog or Market Prices/Prices Set By Law or Regulation. 26](#_Toc502755691)

[3.7.6.2.9. Royalties. 26](#_Toc502755692)

[3.7.6.2.10. Facilities Capital Cost of Money. 26](#_Toc502755693)

[3.7.7. Phase 3 Notifications to Offerors. 27](#_Toc502755694)

[3.7.8. Phase 3 Protests. 27](#_Toc502755695)

[3.7.9. Phase 3 Status and Inquiries. 27](#_Toc502755696)

[3.8. Clarification Requests. 27](#_Toc502755697)

[3.9. Instructions for Offeror “No-bid” and Submission Withdrawal. 27](#_Toc502755698)

[4. PROPOSAL EVALUATION. 27](#_Toc502755699)

[4.1. Evaluation Criteria. 28](#_Toc502755700)

[4.1.1. Basic Requirement. 28](#_Toc502755701)

[4.1.2. Technical Performance. 28](#_Toc502755702)

[4.1.3. Cost. 28](#_Toc502755703)

[4.1.4. Schedule. 28](#_Toc502755704)

[4.1.5. Contractor Past Performance. 29](#_Toc502755705)

[5. TECHNOLOGY DEVELOPMENT REQUIREMENTS AND OBJECTIVES. 30](#_Toc502755706)

[5.1. Advanced Analytic Capabilities (AAC) 30](#_Toc502755707)

[5.2 Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) 33](#_Toc502755708)

[5.3 Improvised Device Defeat/Explosives Countermeasures (IDD/EC) 35](#_Toc502755709)

[5.4 Investigative and Forensic Science (IFS) 38](#_Toc502755710)

[5.5 Irregular Warfare and Evolving Threats (IW/ET) 42](#_Toc502755711)

[5.6 Personnel Protection (PP) 46](#_Toc502755712)

[5.7 Physical Security (PS) 49](#_Toc502755713)

[5.8 Surveillance, Collection, and Operations Support (SCOS) 53](#_Toc502755714)

[5.9 Tactical Operations Support (TOS) 54](#_Toc502755715)

[5.10 Training Technology Development (TTD) 67](#_Toc502755716)

**Remainder of this page intentionally left blank.**

# 1. INTRODUCTION.

This is a Combating Terrorism Technical Support Office (CTTSO) Broad Agency Announcement (BAA) issued under the provisions of paragraph 6.102(d)(2)(i) of the Federal Acquisition Regulation (FAR) to provide for the competitive selection of research proposals. Contracts based on responses to this BAA are considered to be the result of full and open competition and in full compliance with the provisions of Public Law (PL) 98-369 Section 2701, “The Competition in Contracting Act.” **Awards for submissions under this BAA are planned for Fiscal Year (FY) 2019. Funds may not be available for all requirements under this BAA. No contract awards will be made until appropriated funds are available from which payment for contract purposes can be made.**

## 1.1. Approach.

A three-phased proposal selection process will be used for this BAA to minimize cost and effort for prospective offerors:

* Phase 1 will consist of the solicitation, receipt, and evaluation of a one-page Quad Chart.
* Phase 2 will consist of the solicitation, receipt, and evaluation of a White Paper and applies to only those submissions that have been accepted in Phase 1.
* Phase 3 will consist of the solicitation, receipt, and evaluation of a Full Proposal and applies to only those submissions that have been accepted in Phase 2. Based on the priority of critical requirements and the availability of funding, Phase 1 submissions can be selected for Phase 3 without a Phase 2 submission.

Clarifications to White Papers and Full Proposals may be requested.

## 1.2. Small Business Set Aside.

The Government encourages nonprofit organizations, educational institutions, small businesses, small disadvantaged business (SDB) concerns, Historically Black Colleges and Universities (HBCU), Minority Institutions (MI), women-owned businesses, and Historically Underutilized Business zone enterprises as well as large businesses and Government laboratories to submit research proposals for consideration and/or to join others in submitting proposals; however, no portion of the BAA will be set aside for these special entities because of the impracticality of reserving discrete or severable areas of research and development (R&D) in any specific requirement area.

## 1.3. Limitation of Funds.

The Government intends to incrementally fund Cost Reimbursable contracts awarded from this BAA as provided by FAR 52.232-22, “Limitation of Funds.” Most contracts awarded are anticipated to be 6 to 24 months in duration. To facilitate incremental funding, submissions shall include the cost and schedule by a task-phased structure with clear exit criteria, and shall be inclusive of all work to complete the effort including any options. It is anticipated that the entire effort will be negotiated with the initial contract award.

[Note: Based upon the availability of funding, the Government may have to partially fund Fixed Price contracts in accordance with DFAR 252.232-7007, “Limitation of Government’s Obligation.” In such cases, milestone payments will need to be a part of the full proposal. Applicability of this issue will be stated in the email asking for a Phase III proposal.]

## 1.4. Technical Evaluation Support.

It is the intent of this office to use contractor support personnel in the review, evaluation, and administration of all submissions for this BAA. All contractor support personnel will have access to proprietary data and shall certify that they: (1) will not disclose any information pertaining to this solicitation including any submissions, the identity of any submitters, or any other information relative to this BAA; and (2) have no financial interest in any submissions evaluated, reviewed, and administered. Submissions and information received in response to this BAA constitutes permission to disclose that proposal data to certified evaluators under these conditions.

## 1.5. BAA Package Download.

This BAA Package can be downloaded electronically in its entirety from the [BIDS Homepage](https://bids.cttso.gov) under BAA Information**.** Registration is not required to download the BAA package; however, a BIDS registration is required to upload a response to the BAA.

## 1.6. BAA Contractual and Technical Questions.

All contractual and technical questions regarding this BAA, including the published requirements and instructions, must be posted via either the BAA Questions feature, accessible from the BIDS Homepage via [Online Help](https://bids.cttso.gov/tswg/tswghelp.nsf/xpOnlineHelp.xsp?OpenXPage), or emailed to [BIDSHelp@cttso.gov](mailto:BIDSHelp@cttso.gov). No other office personnel will acknowledge, forward, or respond to any inquiries received in any manner concerning the BAA. Contractual questions and answers will be posted periodically under BAA Questions. All questions must be received at least 72 hours prior to close of the submission.

## 1.7. BIDS Website Help Requests.

For technical help using BIDS, submit questions to the BIDS administrators at [BIDSHelp@cttso.gov](mailto:BIDSHelp@cttso.gov) or by using the [Request Help](https://bids.cttso.gov/tswg/tswghelp.nsf/HelpRequest?OpenForm) link located on the BIDS Homepage. Include a valid email address, your BIDS username, and a detailed description of the question or concern in the comments block. The BIDS Homepage provides other valuable resources under Useful Links, such as [Prerequirements for Working with the Government](https://bids.cttso.gov/tswg/bids.nsf/DoBusiness?OpenPage), and [Online Help](https://bids.cttso.gov/tswg/tswghelp.nsf/xpDisplayHelp.xsp?OpenXPage).

Reference documents including the *BIDS Submitter QuickCard* and *Quad Chart Sample* are available for download under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp). Information regarding compliance requirements for using humans and animals in testing is also available under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp).

## 1.8. BIDS Frequently Asked Questions (FAQs).

FAQs are a list of questions and associated responses for general and specific topics. Offerors are encouraged to periodically review BAA Questions, accessible from the BIDS Homepage via [Online Help](https://bids.cttso.gov/tswg/tswghelp.nsf/xpOnlineHelp.xsp?OpenXPage).

**NOTE: *Persons submitting proposals are advised that only the Contracting Officer can obligate the Government to any agreement involving expenditure of Government funds.***

# 2. GENERAL INFORMATION.

This section includes information applicable to all awards under this BAA.

## 2.1. Eligibility.

To be eligible for contract award, a responsible offeror must meet certain minimum standards pertaining to financial solvency and resources, ability to comply with the performance schedule, prior record of satisfactory performance, integrity, organization, experience, operational controls, technical skills, facilities, and equipment. See FAR 9.104.

* All offerors must be registered in the System for Award Management (SAM) database at <https://www.sam.gov/portal/public/SAM/>.

These and other helpful links are provided under [Prerequirements for Working with the Government](https://bids.cttso.gov/tswg/bids.nsf/DoBusiness?OpenPage)located on the BIDS Homepage under Useful Links.

## 2.2. Procurement Integrity, Standards of Conduct, Ethical Considerations.

Certain post-employment restrictions on former federal officers and employees exist including special Government employees (Section 207 of Title 18, United States Code (U.S.C.)). If a prospective offeror believes that a conflict of interest exists, the offeror should make this known to the Contracting Officer for resolution before time and effort are expended in preparing a proposal.

## 2.3. Reserved.

## 2.4. Restrictive Markings on Proposals.

All proposals should clearly indicate content disclosure limitations. Submissions can be marked as “Proprietary” or words to that effect; however, markings such as “Company Confidential” or other phrases that could be confused with national security classifications shall not be used. All paragraphs that contain proprietary information must be clearly marked. The Contracting Officer may challenge proprietary markings if they are not substantiated.

## 2.5. Submission Handling/Rights in Technical Data and Computer Software/Patent Rights.

### 2.5.1. Procurement Integrity.

The Government shall comply with FAR 3.104 in its treatment of information submitted in response to this BAA solicitation and marked with the individual’s or company’s legend.

### 2.5.2. Submission Information and FOIA.

Records or data bearing a restrictive legend can be included in the proposal. However, the offeror is cautioned that portions of the proposal are subject to release under the terms of the Freedom of Information Act (FOIA), 5 U.S.C. § 552, as amended. In accordance with FOIA regulations, the offeror will be afforded the opportunity to comment on, or object to, the release of proposal information.

### 2.5.3. Rights in Technical Data and Computer Software.

Rights in technical data and computer software and software documentation provided in the proposal are treated in accordance with the Department of Defense Federal Acquisition Regulation Supplement (DFARS) 252.227-7016, “Rights in Bid and Proposal Information.” Rights in technical data, and computer software and computer software documentation in the resultant contract shall be in accordance with DFARS 252.227-7013 (regarding technical data) and DFARS Section 252.227-7014 (regarding computer software and software documentation). Both clauses (DFARS sections 252.227-7013 and 252.227–7014) will be included in any noncommercial contract exceeding the simplified acquisition threshold. Table 1 contains these and related clauses that may be included in the contract.

|  |  |
| --- | --- |
| **Table 1. Contract Clauses** | |
| **DFARS** | **Title** |
| 252.227-7013 | Rights in Technical Data – Noncommercial Items |
| 252.227-7014 | Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation |
| 252.227-7016 | Rights in Bid and Proposal Information |
| 252.227-7017 | Identification and Assertion of Use, Release, or Disclosure Restrictions |
| 252.227-7019 | Validation of Asserted Restrictions - Computer Software |
| 252.227-7025 | Limitations on the Use or Disclosure of Government-Furnished Information Marked with Restrictive Legends |
| 252.227-7027 | Deferred Ordering of Technical Data or Computer Software |
| 252.227-7028 | Technical Data or Computer Software Previously Delivered to the Government |
| 252.227-7030 | Technical Data - Withholding of Payment |
| 252.227-7037 | Validation of Restrictive Markings on Technical Data |

### 2.5.4. Patents.

Patents in existence and patent applications pending at the time of the proposal, which relate to the proposed effort, shall be identified in the White Paper and Full Proposal in accordance with the clauses above.

## 2.6. Product and Deliverable Requirements.

All proposal phases shall include the costs for products and data deliverable requirements. Minimum data (report) requirements include Monthly Status Reports (MSRs) and a Final Technical Report even if the research is to be continued under a follow-on contract or contract option. MSRs document program, technical, and financial status. The Final Technical Report summarizes the project and associated tasks at the conclusion of each contract. Include MSRs, the Final Technical Report, and any products and deliverables specific to the performance of the proposed effort (e.g., system specification). The Government will provide the offeror with a full listing of data deliverables (i.e., Contract Data Requirements List) in the request for Phase 3 Full Proposal. Additional products and deliverables could include prototype hardware, software, or systems; test plans; test and technical reports; technical data; specifications; requirements documents; computer programs or software; user manuals; drawings; or other products and data. The number, types, and preparation instructions for products and deliverables will be specified in the contract.

## 2.7. Distribution/Release Limitations.

The offeror should be aware that all resulting contracts or other awards will contain release limitations for all data resulting from the effort in accordance with DFARS 252.204-7000. This includes products, data, information, and services to be performed. The contractor shall protect all data and information from disclosure, and shall not release any data or information by any method of dissemination without prior Government approval.

## 2.8. Subcontracting.

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)), it is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to assure that prime contractors and subcontractors carry out this policy.

## 2.9. Animal or Human Testing Compliance.

The contractor shall comply with all laws and regulations governing the use of animals or human subjects in research projects.

### 2.9.1. Animal Testing.

Any contract resulting from this BAA that potentially involves the testing of animals shall include the following language:

Any contractor performing research on warm blooded vertebrate animals shall comply with the Laboratory Animal Welfare Act of 1966, as amended, 7 U.S.C. §§ 2131 - 2159, and the regulations promulgated thereunder by the Secretary of Agriculture in 9 C.F.R. Parts 1 through 4, pertaining to the care, handling, and treatment of vertebrate animals held or used for research, teaching, or other activities supported by Federal contract awards. In addition, the contractor shall comply with the provisions of Department of Defense Instruction (DoDI) 3216.01, as implemented by SECNAVINST 3900.38C, and DFARS 252.235-7002, “Animal Welfare,” which is incorporated into this contract.

### 2.9.2. Human Subjects Testing.

Any contract resulting from this BAA that potentially involves the use of Human Subjects in the research or study shall include the following language:

The contractor shall comply with all regulations promulgated by the Office of the Secretary of Defense in 32 C.F.R. Part 219, pertaining to the protection of human subjects. In addition, the contractor shall comply with the provisions of DoDI 3216.02. If human subjects are to be used at any time during the project, the contractor shall have a Federal assurance that is acceptable to CTTSO before involving human subjects. Additionally, the protocol shall be approved by a Federally-assured Institutional Review Board (IRB) office named in the institution’s assurance. The contractor shall prepare these documents and shall ensure that they are on file with CTTSO prior to the start of research involving human subjects. Collaborators with the contractor, to include IRBs, shall also comply with regulations to protect human subjects for both classified and unclassified research. The contractor shall report all changes in the protocol or consent form to the CTTSO Contracting Officer’s Representative as they occur. Release of initial and follow-up funding will be contingent upon initial and continuing reviews, and to other IRB and component requirements.

# 3. PROPOSAL PREPARATION.

This section provides information and instructions for the preparation and submission of all phases under this BAA. All submissions must meet these requirements including format, content, and structure, and must include all specified information to avoid disqualification, submission rejection, or delays in evaluation.

## 3.1. BAA Information Delivery System (BIDS).

BIDS at <https://bids.cttso.gov/> is used: (1) to provide public access to the BAA package; (2) to collect all unclassified submissions; and (3) to collect placeholder records for all classified submissions. BIDS also provides submission progress tracking, evaluation comment collection, and results notification back to the submitter.

### 3.1.1. Submitter Registration.

A BIDS submitter registration is required to respond to this BAA. Existing BIDS accounts are acceptable for a new BAA *if the company contact information is the same* or is corrected. Registrations should reflect the offeror’s contracting or business authority. The username, created by the offeror, must be unique and is used for BIDS login and submission tracking. Registration acceptance for submitters is automatic, but takes several seconds to be recognized by BIDS. A success email will be sent to indicate that the username and account are accepted. BIDS is email dependent and uses the registration email as the single point of contact (POC) for all notifications associated with the BAA. This email address should be monitored frequently during the BAA process for the notices. Submitters should periodically check status in their account, not receiving a notification email does not constitute grounds to appeal an evaluation decision. Spam blockers and other email security software may cause a notification email to be rejected; check your account. Email addresses included in the submissions or any other data field in BIDS will not be used for contact and notification purposes.

### 3.1.2. User Accounts and Password Resets.

Registration account information such as the POC, email, and password can be updated after login. The “Forgot Password?” link on the BIDS Homepage allows registered users with a valid email address to automatically reset a password. The system will verify the account username and email to send a new password to that email.

### 3.1.3. Registration and Account Help.

BIDS Help requests can be emailed to BIDS administrators at [BIDSHelp@cttso.gov](mailto:BIDSHelp@cttso.gov) or submitted via the [Request Help](https://bids.cttso.gov/tswg/tswghelp.nsf/HelpRequest?OpenForm) link located on the [BIDS Homepage](https://bids.cttso.gov/).

### 3.1.4. Document Identifier.

The offeror shall include the document identifier in the header of each submission. Document identifiers must match the BIDS submission record and should be constructed *before* upload to BIDS.

#### 3.1.4.1. Constructing Document Identifiers.

Document identifiers, auto-generated in part by BIDS, are based on Subgroup, the requirement number, the username, and a Submitter Internal Tracking (SIT) number. The underlined portion of the sample shown in Table 2 depicts the segment automatically formed by BIDS.

|  |  |
| --- | --- |
| Table 2. Sample Document Identifier and Components Definition | |
| **CB-1112-ABCCORP-10703JT-QC** | |
| **From Sample** | **Document Identifier Component** |
| CB | subgroup designation - from BAA |
| 1112 | requirement number - from BAA |
| ABCCORP | username - from BIDS registration |
| 10703JT-**QC** | SIT number - any alphanumeric combination (with no special characters or spaces) created by the submitter for (*submitter*) tracking purposes along with the **document type suffix** |

#### 3.1.4.2. Creating Submitter Internal Tracking (SIT) Numbers.

SIT numbers are unique identifiers created by submitters and entered in the submission record during the upload process. SIT numbers can be any alphanumeric combination (no special characters or spaces) chosen by the submitter plus a suffix indicating the document type. BIDS enforces unique SIT numbers and will not allow the submission record to be saved if the SIT number has already been used. Table 3 provides sample SIT numbering formats for each document type.

|  |  |  |
| --- | --- | --- |
| Table 3. Sample SIT Numbers for an Accepted Submission | | |
| **Document Type** | **Auto-generated by BIDS** | **SIT#** |
| Quad Charts | CB-1112-ABCORP | 10703JT-QC |
| White Papers | CB-1112-ABCORP | 10703JT-WP |
| Full Proposals | CB-1112-ABCORP | 10703JT-FP |

Offerors uploading more than one submission to the same requirement shall create unique identifiers by adding a numbered sequence to the document type suffix. Table 4 offers sample SIT number formats for multiple submissions to the same requirement.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 4. Sample SIT Numbers for Multiple Submissions to the Same Requirement | | | |
| **Submission #** | **Auto-generated by BIDS** | **SIT# Sample 1** | **SIT# Sample 2\*** |
| Submission 1 | CB-1112-ABCORP | 10703JT-QC1 | QC1 |
| Submission 2 | CB-1112-ABCORP | 10703JT-QC2 | QC2 |
| Submission 3 | CB-1112-ABCORP | 10703JT-QC3 | QC3 |
| \* NOTE: If the submitter does not require an internal tracking number, use the document type designation. | | | |

## 3.2. BIDS Security and Access Control.

All data uploaded to BIDS is secure from public view and download. All submissions will be considered proprietary/source selection sensitive and protected accordingly. The documents can only be reviewed by the registrant and authorized Government and contractor representatives with no conflict of interest.

## 3.3. Submission Changes.

Changes to uploaded submissions are permitted up to the closing date and time. If a modification is required, update the original file in the source application and save. Convert to an acceptable format if applicable. In BIDS, open the submission record, click **Edit Proposal**, and update the record information. Click on the trash can icon to delete the old file. Use **Browse** to select the revised document. Click **Submit Proposal** to save the changes. Documents cannot be edited online through the BIDS web interface. File names must contain no spaces or special characters. Ensure the file size does not exceed the prescribed limits. To completely remove a submission from consideration, select **Delete Proposal**. Changes after the requirement due date and time are not permitted.

## 3.4. Special Handling Procedures for Classified Information.

If a submission contains classified information, the offeror must first create a placeholder record in BIDS with an unclassified cover page attachment. Identify in the placeholder document that the submission cannot be uploaded due to classification and include the method of delivery (hand-carried, secure fax, secure mail, etc.) as well as the tracking number, if applicable. The BIDS Document Identifier must be clearly identified on the mailed document(s). Classified responses (up to SECRET) must be appropriately and clearly marked (including all paragraphs and pages containing the subject data), packaged, and shipped in accordance with classified material handling procedures and security regulations pertaining to the level of classification for that document.

To obtain mailing instructions for classified submissions, email:[BIDSSecurity@cttso.gov](mailto:BIDSSecurity@cttso.gov).

Classified submissions must be received by the applicable due date and time. Classification in no way eliminates the offeror’s requirement to comply with all BAA instructions.

## 3.5. Phase 1 Quad Chart Submissions.

Offerors shall prepare and upload a one-page (8 ½ by 11 inches) Quad Chart in response to Phase 1 of this BAA. Use font sizes of 10 point or greater. If more than one page is submitted, only the first page will be evaluated. Quad Charts do not require a Cover Page.

### 3.5.1. Phase 1 Due Date and Time.

All unclassified Quad Charts *must be received electronically through BIDS* **no later than** **1500 (3:00 p.m.) Eastern Time (ET) on the date specified on the cover of this document**. Likewise, classified submissions must be received by the same due date and time. Offerors must create a placeholder record in BIDS with an unclassified cover page attachment. Refer to the “Special Handling Procedures for Classified Information” in this document for instructions on classified submissions. BIDS does not allow proposals to be uploaded or classified placeholders to be created after the closing date and time. Any proposal, regardless of classification, submitted by any other means, **or that is late, will not be considered** by the Government. Avoid the last minute rush; submit early.

### 3.5.2. Electronic File Format.

The Quad Chart shall be submitted in Microsoft Office (Word or PowerPoint), or Adobe Acrobat (PDF – portable document format). ZIP files and other application formats are not acceptable. The document must be print-capable, without password, and no larger than 1024 KB. File names must contain the appropriate file name extension (.doc/.docx, .ppt/.pptx, or .pdf). File names cannot contain spaces or special characters. Apple users must ensure the entire file name and path are free of spaces and special characters. Submissions that cannot be opened, viewed, or printed will not be considered.

### 3.5.3. Quad Chart Content.

A Quad Chart conveys the essence of the proposed solution for a single requirement. When preparing a submission, the offeror shall ensure that the specific criteria of the requirement are addressed, the solution is clear, and can be accomplished with the proposed technology, cost, and schedule. The Quad Chart includes a document header and four quadrants. The Quad Chart format and sample are provided at the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp).

#### 3.5.3.1. Header Information.

Header information shall include the BAA Announcement number, the Document Identifier, and the Proposal Title. The date and company name should be included along with the appropriate document markings.

#### 3.5.3.2. Top Left Quadrant, Graphical Depiction.

The top left quadrant is a graphical depiction, photograph, or artist’s concept of the proposed solution or prototype. Include labels or brief descriptive text as needed for clarification. Ideally, this will convey the prototype concept, use, capability, and any relevant size or weight relationships based on the published requirement.

#### 3.5.3.3. Top Right Quadrant, Operational and Performance Capabilities.

The top right quadrant contains the operational and performance capabilities summary. Describe any basic, new, or enhanced capabilities the system will provide to meet the published requirement. In bullet form, list key aspects of performance, capability, operational use, relevant software or hardware specifications, and planned interface and/or compatibility. The offeror is only required to submit past performance information in response to a request for Full Proposal.

#### 3.5.3.4. Bottom Left Quadrant, Technical Approach.

The bottom left quadrant contains the proposed technical approach. Specifically, describe the technology involved, how it will be used to solve the problem, actions done to date, and any related ongoing efforts. Briefly describe the tasks to be performed for each phase. A bullet list is acceptable.

#### 3.5.3.5. Bottom Right Quadrant, Cost and Schedule.

The bottom right quadrant contains the Rough Order of Magnitude (ROM) and Schedule, Products and Deliverables, and Corporate Contact Information. ROM and Schedule shall be proposed by phase and include the cost, period of performance (POP), and exit criteria for each phase. A total cost and POP that combines all phases shall also be included. Products and Deliverables shall include, by phase, a list of all prototype hardware and software along with the required data as described in “Product and Deliverable Requirements” in section 2 of this document. Corporate Contact Information shall include the submitter’s company name, POC, phone number, and email address. Include any significant teaming partner (contact information) relevant to the evaluation. (Note that the contact information in the BIDS registration is used for all notices and contact purposes.)

### 3.5.4. Phase 1 Notification to Offeror.

The Government will notify the offeror when a submission has been accepted or rejected. Notification of acceptance with a request to submit the next phase document will be emailed to the offeror’s contracting authority as entered in the BIDS registration and will indicate the next submission type, clarification requests, and due date and time. Likewise, rejection notifications will be emailed to the address provided in the BIDS registration. **Debriefings for Quad Charts will not be conducted due to the nature of BAAs.** In general, submissions are not considered for further review when they do not meet the basic requirement, are too costly, or do not fit the mission. All Quad Charts are evaluated in accordance with Section 4, Proposal Evaluation, of this BAA. Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

### 3.5.5. Phase 1 Status and Inquiries.

Phase 1 is complete when all submissions have been accepted or rejected in accordance with this BAA. Inquiries by phone concerning the status of Quad Charts will not be accepted. After log in to the BIDS website, submitters are able to check the status of their submission(s) under **Check My Current Proposals.**

## 3.6. Phase 2 White Paper Submissions.

Offerors shall prepare and upload a White Paper with no more than twelve (12) pages plus a cover page in response to Phase 2 of this BAA. All submission pages shall be 8 ½ by 11 inches, double-spaced with fonts no smaller than 10 point; all margins shall be one inch. Each page of the submission shall contain the document identifier in the document header. If the White Paper contains more than 12 pages including tables, charts, and figures, only the first 12 pages will be evaluated. All White Paper submissions must include a cover page. The cover page template is provided at the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp). The cover page is excluded from the White Paper page count.

### 3.6.1. Phase 2 Due Date and Time.

All unclassified White Papers must be received electronically through BIDS no later than the due date and time specified in the Phase I Quad Chart acceptance email. Likewise, classified submissions must be received by the same due date and time. Offerors must create a placeholder record in BIDS with an unclassified cover page attachment. Refer to the “Special Handling Procedures for Classified Information” in this document for instructions on classified submissions. BIDS does not allow proposals to be uploaded or classified placeholders to be created after the due date and time. Any proposal, regardless of classification, submitted by any other means, **or that is late, will not be considered** by the Government.

### 3.6.2. Electronic File Format.

The White Paper shall be submitted in Microsoft Office (Word), or Adobe Acrobat (PDF– portable document format) format. ZIP files and other application formats are not acceptable. The document must be print-capable, without password, and no larger than 2048 KB. File names must contain the appropriate file name extension (.doc/.docx or .pdf). File names cannot contain spaces or special characters. Apple users must ensure the entire file name and path are free of spaces and special characters. Submissions that cannot be opened, viewed, or printed will not be considered.

### 3.6.3. Phase 2 Document Upload.

To upload a next phase document use the link back to BIDS provided in the acceptance email, or log in to BIDS under **Proposals Due** to open the accepted record. Select **Create Next Proposal** and follow the instructions.

### 3.6.4. White Paper Content.

White Papers shall provide a description of the technical approach, the specific tasks and deliverables by phase, schedule and cost estimate by phase, intellectual property and government rights, transition planning for production, and a capability statement. The offeror shall incorporate all clarification data requests from the acceptance email into the submission. Indicate clarification entries by footnote and reference the requested item(s) in the footer area. The following White Paper sections and details are required.

#### 3.6.4.1. Cover Page.

A cover page template is provided on the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp). The cover page includes necessary contractual information including the offeror’s contracting POC (name, telephone number, email address, facsimile number, mailing address) and business information (Data Universal Numbering System (DUNS) number, Commercial and Government Entity (CAGE) code, business type. Include the proposed contract type, total cost, and the duration of all phases/tasks. The cover page is excluded from the page count.

#### 3.6.4.2. Technical Approach.

Describe the proposed solution relative to the requirement. Focus content on operational capabilities required to address the problem, the underlying theory that supports the operational capability, and suggested concept of operations. Identify end users that could be interested in the proposed solution and describe how the solution will be a benefit. Include drawings, diagrams, charts, and tables needed to explain the effort. Describe if, and where, the proposed technology/solution has been, or is being used. Identify sponsoring agency and funding resources; or if none, so state.

#### 3.6.4.3. Tasks and Deliverables.

Identify the proposed tasks by phase in the order of occurrence. A phase must have clear exit criteria to serve as a “go” or “no-go” decision point to proceed to the next phase. Identify work that will be performed by other organizations or agencies. Identify anticipated technical risks along with planned mitigation efforts. Indicate any Government furnished material (GFM), equipment (GFE), or information (GFI) that will be required with the task and need date; or if none, so state. For each phase include the exit criteria and all products and deliverables as defined in “Product and Deliverable Requirements” in section 2 of this document. If a phase is proposed as an option, so state.

#### 3.6.4.4. Schedule.

Develop a master project schedule preferably in Gantt chart format. The schedule shall indicate the planned start and stop point for each phase with top level subordinate tasks, estimated delivery dates, and completion dates. Indicate the total project POP in months using January 2nd as a notional start date through the completion date.

#### 3.6.4.5. Cost.

Provide the proposed, task-phased budgetary estimate inclusive of any proposed options. At a minimum, this estimate shall detail estimated labor hours and costs, anticipated material costs, product and deliverable costs (see section 2 General Information, “Product and Deliverable Requirements” in this document) and other costs (e.g., subcontracts, indirect rates, fee rate) for each phase/task. Costs allocated to other organizations (e.g., Government testing) shall be clearly shown; or if none, so state. Changes in cost greater than 10 percent from those proposed in the prior submission shall be explained.

#### 3.6.4.6. Intellectual Property, Technical Data, and Software.

Disclose/discuss all intellectual property, technical data, and/or software rights that are intended to be used in connection with this submission. See section 2 General Information, “Submission Handling/Rights in Technical Data and Computer Software/Patent Rights” in this document. For additional information on this topic, see the DoD Intellectual Property Guide, available for download on the Technology Transition web page at [www.cttso.gov](http://www.cttso.gov/) and DFARS 252.227-7013 and DFARS 252.227-7014.

##### 3.6.4.6.1. Patents and Patent Applications.

Identify any existing, applied for, or pending patents that will be used in the conduct of this effort. Provide patent number with date of issue and title or patent application number with filing date and title. Any patent or patent application that resulted from prior government funding should be identified. If no patents or patent applications are relevant, so state. See section 2 General Information, “Submission Handling/Rights in Technical Data and Computer Software/Patent Rights” in this document.

##### 3.6.4.6.2. Rights in Technical Data and Software.

Identify any technical data and/or computer software that will be delivered with less than unlimited rights as prescribed in DFARS 252.227-7013 and DFARS 252.227-7014. If unlimited rights in technical data are proposed, so state. See section 2 General Information, “Submission Handling/Rights in Technical Data and Computer Software/Patent Rights” in this document.

#### 3.6.4.7. Transition from Prototype to Production.

Describe the overall strategy to transition the results of this development effort to production once the funded effort is concluded. Briefly describe the overall strategy for transition, potential partners, transition issues to include any obvious regulatory, liability, interoperability, or financing issues. Discuss the interaction with representative users and the concept for test and evaluation by those users and follow on support of a product resulting from this effort.

#### 3.6.4.8. Organizational Capability Statement.

Describe the offeror’s capability and/or experience in doing this type of work. Identify technical team members or principal investigators and associated expertise. If applicable, include a description of co-participants’ capabilities and/or experience. State whether an agreement has been reached (or not) with the co-participants. The offeror is only required to submit past performance information in response to a request for Full Proposal.

### 3.6.6. Phase 2 Status and Inquiries.

Phase 2 is complete when all submissions have been accepted or rejected in accordance with this BAA. Inquiries by phone concerning the status of White Papers will not be accepted. After log in to the [BIDS website](https://bids.cttso.gov), submitters are able to check the status of their submission(s) under **Past Proposals.**

### 3.6.5. Phase 2 Notifications to Offeror.

The Government will notify the offeror when a submission has been accepted or rejected. Notification of acceptance with a request to submit the next phase document will be emailed to the offeror’s contracting authority as *entered in the BIDS registration* and will indicate the next submission type, clarification requests, and due date and time. Likewise, rejection notifications will be emailed to the address provided in the BIDS registration. **Debriefings for White Papers will not be conducted due to the nature of BAAs**. In general, submissions are not considered for further review when they do not meet the basic requirement, are too costly, do not fit the mission, or funding is not expected. All White Papers are evaluated in accordance with Section 4, Proposal Evaluation, of this BAA.

## 3.7. Phase 3 Full Proposal Submissions.

Offerors shall prepare and upload a Full Proposal, consisting of a Technical Proposal and a Cost Proposal, plus a cover page, in response to Phase 3 of this BAA. All pages shall be 8 ½ by 11 inches, double-spaced with fonts no smaller than 10 point; all margins shall be one inch. Each page of the submission shall contain the document identifier in the document header. The Technical Proposal must be no more than 50 pages including tables, charts, and figures. If the document contains more than 50 pages, only the first 50 pages will be evaluated. All paragraphs containing proprietary information must be clearly marked. The Cost Proposal has no page limit; however, unnecessarily elaborate or information beyond those sufficient to present a complete and effective response is not desired.

**Disclaimer -** To minimize the cost and effort for submitters, Phase 3, Full Proposals, will only be requested for qualifying solutions that have a high probability of award; however, the Government reserves the right to cancel requirements, or any request for proposals for this solicitation, at any time prior to award and shall not be liable for any cost of proposal preparation or submission.

### 3.7.1. Phase 3 Due Date and Time.

All unclassified Full Proposals must be received electronically through BIDS no later than the due date and time specified in the acceptance email. Likewise, classified submissions must be received by the due date and time. Offerors must create a placeholder record in BIDS with an unclassified cover page attachment. Refer to the “Special Handling Procedures for Classified Information” in this document for instructions on classified submissions. BIDS does not allow proposals to be uploaded or classified placeholders to be created after the due date and time. Any proposal, regardless of classification, submitted by any other means, **or that is late, will not be considered** by the Government.

### 3.7.2. Electronic File Format.

The Full Proposal shall be submitted in Microsoft Office (Word), or Adobe Acrobat (PDF – portable document format). The cost proposal may be submitted in Microsoft Office Excel, Word, and PDF formats. See specific cost proposal sections below for specific file requirements. ZIP files and other application formats are not acceptable. The document must be print-capable, without password, and no larger than 2048 KB. File names must contain the appropriate file name extension (.doc/.docx, .xls/.xlsx, or .pdf). File names cannot contain spaces or special characters. Apple users must ensure the entire file name and path are free of spaces and special characters. Submissions that cannot be opened, viewed, or printed will not be considered.

### 3.7.3. Phase 3 Document Upload.

To upload a next phase document, locate and open the accepted record in BIDS and select **Create Next Submission.**

### 3.7.4. Full Proposal Components.

Full Proposals shall consist of two major sections described in this document, and can be uploaded to BIDS in two separate files each limited to 2048 KB each. The first section is the Technical Proposal and shall include all information related to the proposal as specified in this BAA including figures, charts, and tables plus the cover page. The second section is the Cost Proposal to include all cost data as well as an explanation of changes in cost greater than 10 percent from those proposed in the prior submission. Additionally, the offeror will include a cover page as follows:

A cover page template is provided at the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp). The cover page includes necessary contractual information including the offeror’s contracting POC (name, telephone number, email address, facsimile number, mailing address) and business information (DUNS number, CAGE code, business type). Include the proposed contract type, total cost, and the duration of all phases/tasks.

### 3.7.5. Technical Proposal Content.

The Technical Proposal shall provide a technically detailed solution of the problem addressed in the requirement and fully expand the technology proposed in the prior submissions. The following sections and associated data are required. The offeror shall incorporate all clarification data requests in the Phase 2 acceptance email. Indicate clarification entries by footnote and reference the requested item(s) in the footer area.

#### 3.7.5.1. Reserved.

#### 3.7.5.2. Abstract.

The abstract is a one page (or less) synopsis of the proposal that includes the title and the basic approach to satisfy the requirement. Describe the overall scope of work to be performed for the entire POP inclusive of options. The abstract shall stand alone and be suitable for release under the Freedom of Information Act, 5 U.S.C. § 552, as amended.

#### 3.7.5.3. Executive Summary.

An executive summary is a concise description of the technology and solution being proposed. Include key information that demonstrates how the proposed solution meets the published requirement. The executive summary should not introduce any new information not covered in the subsequent content.

#### 3.7.5.4. Technical Approach.

Describe the technical approach for the proposed solution to meet the requirement. Include technical details of the solution and fully expand the technology proposed in the prior phase submission. Include the methodology, underlying theory, system components, and operational scenario for the intended users. Include drawings, diagrams, charts, and tables needed to explain the effort. Describe relevant prior application of the proposed technology and/or solution, how it is being used, and by whom. Identify sponsoring agency and funding resources; or if none, so state. If subcontractors are proposed, include a detailed description of the effort that they will be performing in support of or in addition to the prime.

#### 3.7.5.5. Project Plan.

The project plan shall be organized by phase and describe the work to be performed along with all associated requirements to successfully complete the proposed effort. Include a summary of the individual phases to follow.

##### 3.7.5.5.1. Phases.

Phases shall be defined by the subset of tasks to be performed, phase objectives to be accomplished, and the required POP to completion. Phases shall be listed in order of occurrence. Identify phases that are optional. Each phase must contain clear exit criteria that is measurable evidence of completion and serves as a “go” or “no-go” decision point. Each phase shall include a total cost.

##### 3.7.5.5.2. Tasks within a Phase.

For each task, provide a detailed description of the work to be performed. Identify any work that will be performed by other organizations or agencies; or if none, so state. Indicate if an agreement is in place for the resources.

##### 3.7.5.5.3. Products and Deliverables.

Identify all deliverables - products as well as documentation and reports - for each Task/Phase. Refer to section 2.6 of this document“Product and Deliverable Requirements” for the minimum report requirements, and additional products and deliverables in performance of the effort proposed.

#### 3.7.5.6. Master Schedule.

Develop a master project schedule that includes phase start and stop dates as well as major milestones, critical tasks, and report and product delivery dates. Assume a start date of January 2nd. Indicate any optional phases.

#### 3.7.5.7. Government Furnished Equipment.

Reasonably identify all Government furnished equipment (GFE), materials, facilities, or information with the need date and suggested source at the time of proposal submission. GFE includes, but is not limited to: Government email accounts, SIPRNET access, Common Access Cards (CACs), and/or space at a CTTSO facility (either permanent residence, temporary residence, or testing). Upon identifying GFE, if an offeror’s proposal is selected for contract award, the proposed GFE will be identified in the resulting contract. Failure to adequately identify necessary GFE may result in contract termination due to the offeror’s inability to perform under this competitive source selection. If Government equipment, materials, facilities, or information are not required, so state.

#### 3.7.5.8. Project Risks and Mitigation.

Identify anticipated technical and management risks along with planned mitigation efforts. Indicate the risk assessment as high, medium, or low.

#### 3.7.5.9. Organizational Capability Statement.

Include a brief description of the offeror’s organization. Describe the offeror’s capability and/or experience in doing the type of work being proposed. If applicable, include a description of co-participants’ capabilities and/or experience. State whether an agreement has been reached with the co-participants. Provide at least three references, to include points of contact, for like or similar work.

#### 3.7.5.10. Organizational Resources.

Identify key technical personnel and principal investigator(s) including alternates and co-participants, if applicable. Include a brief biography, relevant expertise, and a list of recent publications for each. Identify any team members with potential conflicts of interest. Possible conflicts of interest include personnel formerly employed by the federal Government within the past two years from the date of proposal submission. Provide name, duties, employing agency, and dates of employment; or if none, so state.

#### 3.7.5.11. Intellectual Property, Technical Data, and Software.

All anticipated intellectual property, technical data or software rights shall be disclosed. See section 2 General Information, “Submission Handling/Rights in Technical Data and Computer Software/Patent Rights” in this document.

##### 3.7.5.11.1. Patents and Patent Applications.

Identify any existing, applied for, or pending patents that will be used in the conduct of this effort. Provide patent number or application number and title. Any patent that resulted from prior Government funding should be identified. State if no patents or patent applications are relevant.

##### 3.7.5.11.2. Rights in Technical Data.

Identify any technical data and/or computer software that will be delivered with less than unlimited rights as prescribed in DFARS 252.227-7013 and DFARS 252.227-7014. When less than unlimited rights are proposed, a data rights assertion table shall be provided as prescribed in DFARS 252.227-7017.

#### 3.7.5.12. Transition from Prototype to Production.

Describe the approach and issues related to transition or commercialization of the results of this effort to an operationally suitable and affordable product for the intended users to include the following. The cost to prepare the Transition Plan should be included in the proposed costs. The cost to prepare the Transition Plan should be detailed in accordance with BAA Section 3.7.6.1. Additional information regarding the Technology Transition Guidance can be found at http://www.cttso.gov

NOTE – If the specific requirement will not reasonably result in a prototype (e.g., study, service requirement) so state “Not Applicable to this Requirement” and justify why.

##### 3.7.5.12.1. Transition Strategy.

Provide the overall strategy for transition to production (licensing, partnering, or venturing) along with the associated timelines for actions associated with the transition. Describe the roles of current development partners, subcontractors, or other organizations that will be leveraged. If the offeror is not a commercial entity, indicate if a commercial partner has been identified. Discuss barriers to commercialization, such as anticipated regulatory issues (such as environmental, safety, health, and transportation), liability issues, interoperability, and financing, and planned steps to address these barriers.

##### 3.7.5.12.2. Transition Approach.

Describe the type and level of effort envisioned to take the technology from its state at the end of the development effort to a production ready, affordable, operationally suitable product (such as size and/or weight reduction, packaging, environmental hardening, integration, additional test and certification). Provide an estimate of any costs to transition the prototype to low rate initial production. Provide the estimated production unit price for the end users.

##### 3.7.5.12.3. Test and Evaluation.

Describe the plan to involve representative users during the design and development process and the general plan for test and evaluation by representative end users. If the phases of performance include representative user test and evaluation: (1) ensure coordination of user participation is thoroughly discussed in the technical approach; and (2) state “Representative User Participation will occur during contract performance.”

##### 3.7.5.12.4. Operational Support.

Describe the estimated level of training needed to prepare users to utilize the product in an operational environment. Discuss the anticipated support concept such as level(s) of repair, spare parts, warranties, operation and maintenance technical manuals, simulators, and other logistics considerations.

#### **3.7.5.13. Human Subjects and Animal Testing.**

The proposal shall provide a statement regarding the anticipated use of human subjects or animals in testing; or if none, so state. If yes, procedures for complying with all laws and regulations governing the use of animals or human subjects in research projects shall be included in the technical proposal. See section 2.9, “Animal or Human Testing Compliance” in this document for details.

#### 3.7.5.14. Environmental Impact.

The proposal shall provide a statement regarding the impact of the work proposed on the environment. State if no impact exists.

#### 3.7.5.15. Classification and Security.

If the offeror is proposing to perform research in a classified area, indicate the level of classification of the research and the level of clearance of the potential principal investigator and all proposed personnel. The contractor shall include facility clearance information. Also, the contractor shall indicate the Government agency that issued the clearances. State if the proposed effort is unclassified.

#### 3.7.5.16. Subcontracting Plan.

If the total amount of the proposal exceeds $700,000 and the offeror is not a small business, the offeror shall submit a subcontracting plan for small business and small socially and economically disadvantaged business concerns. A mutually agreeable plan will be included in and made a part of the resultant contract. The contract cannot be executed unless the contracting officer determines that the plan provides the maximum practicable opportunity for small business and small disadvantaged business concerns to participate in the performance of the contract. The Subcontracting Plan/information is excluded from page count.

### 3.7.6. Cost Proposal.

The offeror and each significant subcontractor, if any, shall prepare and submit cost or pricing data, and supporting attachments in accordance with Table 15-2 of FAR 15.408. All spreadsheet formulas will be accessible. As soon as practicable after agreement on price, but before contract award, the offeror shall submit a Certificate of Current Cost or Pricing Data as prescribed by FAR 15.406-2 for contracts exceeding $750,000.

[NOTE: To determine the reasonableness of the cost proposal, the Government may request additional supporting documentation for proposed costs.]

#### 3.7.6.1. Cost Summary Section.

Provide a narrative discussing/substantiating elements of the cost proposal. Provide a separate summary of the total cost for each phase and for the total of the entire effort proposed. Indicate optional phases. Explain changes in cost greater than 10 percent from those proposed in the previous submission. The Cost Summary may be submitted in Microsoft Office Word or PDF with font no smaller than 10 point.

##### 3.7.6.1.1. Other Funding Sources.

The proposal shall provide the names of other federal, state, or local agencies, or other parties receiving the proposal and/or funding or potentially funding the proposed effort. State if no other funding sources or parties are involved.

Additional information/documents to be included in the Cost Summary:

* *Business/Cost Checklist.* The offeror shall complete and include a copy of the Business/Cost Checklist found at the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp). Information and documents required in the Business/Cost Checklist shall be included in this proposal.
* *Terms & Conditions.* The offeror shall identify any anticipated/proposed contract terms and conditions in the proposal summary.
* *Proposal Validity.* The proposal shall remain valid for a period of no less than 180 days from submission.
* *Forward Pricing Rate Agreement.* If the offeror has an applicable rate agreement with DCAA (or another Federal Agency, e.g., HHS), please include a copy of the agreement and provide a point of contact to your cognizant DCAA office. If the offeror has not previously been audited by DCAA, the procuring office may request an audit to verify the proposal labor direct and indirect rates. This applies to both prime contractors and subcontractors.
* *ACH Form.* The offeror will submit a completed ACH Form. (Found at the BIDS website under [Reference Materials](https://bids.cttso.gov/tswg/bids.nsf/xpReferenceMaterials.xsp).).
* *VETS-4212.* The offeror will submit the most recent VETS-4212 filing confirmation.
* *Subcontracting Plan.* If the offeror is a large business and work will be performed in the United States, a Small Business Subcontracting Plan shall be submitted if the contract is expected to exceed $700,000.
* *Past Performance.* The offeror shall provide information on previous Federal Government prime or subcontracts featuring endeavors relevant (i.e., within the past three years and of similar size and complexity) to the specific requirement.

#### 3.7.6.2. Detailed Cost Estimate.

Provide, in table format, a detailed cost breakdown by phase, of all items identified in the technical portion of the proposal for the following cost elements. Include all options. Submission of Detailed Cost Estimate spreadsheets and tables shall be in Microsoft Office (Excel) format with Font no smaller than 10 point.

##### 3.7.6.2.1. Direct Labor Costs.

Detail the direct labor cost estimate by showing the breakdown of labor hours, rates, cost for each category, and furnish the basis for the estimates.

* *Labor Category.* Include a detailed description of the category.
* *Labor Hours.* Include a Basis of Estimate for the proposed hours. Detail hours to be worked by each labor category proposed per each task, per each fiscal year and cumulatively.
* *Labor Rates.* Rates shall be in accordance with established rate agreements. If no rate agreement exists, use payroll data with actual rates to substantiate the proposed rates. If fully loaded rates are proposed, the offeror shall identify the base rate and build up.
* *Escalation.* Identify the escalation rate, how the rate is applied, and provide justification for the rate used.

##### 3.7.6.2.2. Indirect Costs.

Indicate how the offeror has computed and applied offeror’s indirect costs (e.g., overhead, G&A, material burden). Indicate the rates used and provide an appropriate explanation.

##### 3.7.6.2.3. Other Direct Costs.

Identify all other costs directly attributable to the effort and not included in other sections (e.g., special tooling, travel, computer and consultant services, preservation, packaging and packing, spoilage and rework) and provide the basis for pricing.

* *Travel.* The basis for travel estimates will include trip purpose, departure site and destination, number of persons traveling, number of days, ground transportation requirements, and detailed costs for airfare, hotel, rental cars, and per diem allowances per Federal Travel Regulations (FTR).

##### 3.7.6.2.4. Materials and Subcontractors.

* *Materials.* Submit a detailed Bill of Materials identifying each discrete material component. Backup documentation must be submitted to explain the basis of estimate for at least 80 percent of the total material cost proposed. Backup documentation may include: actual production costs, catalog listings, supplier quotes, actual invoices, or other documentation from a third-party source which verifies the proposed price.
* *Consultants.* If any consultants are to be used, the offeror shall submit consultant quotes for hourly rates, estimated number of hours required, and justification.
* *Subcontractors.* If any subcontractors are to be used, the offeror shall submit complete subcontractor quotes or proposals as part of the proposal. Subcontractor proposals will be evaluated along with the prime’s proposal, and they are expected to contain the same level of detail as a prime proposal. Subcontractors providing commercial items may submit a commercial quote instead of a detailed proposal. [NOTE: In order to protect proprietary data, subcontractors may submit their detailed cost proposals directly to the Contracting Officer instead of submitting to the prime contractor. If this occurs, the prime is responsible for ensuring subcontractor’s submission is timely and is completed in accordance with these instructions.

##### 3.7.6.2.5. Government Furnished or Contractor Acquired Equipment.

Identify the external property or materials required to perform the task in the summary. Separate items to be acquired with contract funds and those to be furnished by the Government. Reasonably provide the description or title and estimated unit and total costs of each item (i.e., manufacturer, catalog price, or previous purchase price). When such information on individual items is not available, the items should be grouped by class and estimated values indicated. In addition, the offeror shall include a statement of the extent to which the offeror is willing to acquire the items. NOTE: The FAR generally prohibits providing an industrial contractor with facilities (including plant equipment and real property) with a unit acquisition cost of less than $10,000.

##### 3.7.6.2.6. Fee.

Include the fee proposed for this effort. State if no fee is proposed. Include a discussion, in the summary, of risk, technical difficulty, need for management/oversight, exceptional circumstances, etc.

##### 3.7.6.2.7. Competitive Methods.

For those acquisitions (e.g., subcontract, purchase orders, material orders) over $150,000 priced on a competitive basis, also provide data showing degree of competition and the basis for establishing the source and reasonableness of price. For inter-organizational transfers priced at other than cost of the comparable competitive commercial work of the division, subsidiary, or affiliate of the contractor, explain the pricing method (See FAR 31.205-26(e)).

##### 3.7.6.2.8. Established Catalog or Market Prices/Prices Set By Law or Regulation.

When an exemption from the requirement to submit cost or pricing data is claimed, whether the item was produced by others or by the offeror, provide justification for the exemption.

##### 3.7.6.2.9. Royalties.

If more than $250, provide the following information on a separate page for each separate royalty or license fee:

* Name and Address of Licensor
* Date of the License Agreement (*See Note 1 below*.)
* Patent numbers, Patent Application Serial Numbers, or other basis on which the royalty is payable
* Brief description (including any part or model numbers of each contract item or component on which the royalty is payable)
* Percentage or dollar rate of royalty per unit
* Unit price of contract item
* Number of units
* Total dollar amount of royalties

**Note 1:** A copy of the current license agreement and identification of applicable claims of specific patents shall be provided upon request by the contracting officer. See FAR 27.204 and FAR 31.205.37.

##### 3.7.6.2.10. Facilities Capital Cost of Money.

When the offeror elects to claim facilities capital cost of money as an allowable cost, the offeror must submit Form CASB-CMF and show the calculation of the proposed amount. See FAR 31.205-10.

### 3.7.7. Phase 3 Notifications to Offerors.

Notification of acceptance or rejection of a Phase 3 submission will be sent via email to the offeror’s principal contact as entered in the BIDS registration. Acceptance of a Full Proposal does not guarantee a contract will be awarded. If the Government does not accept the Phase 3 proposal, the offeror may request a formal pre-award debriefing in accordance with FAR 15.5.

### 3.7.8. Phase 3 Protests.

Offerors are encouraged to see resolution within the agency before filing a protest. Offerors who choose to submit any protest, must do so directly to the CTTSO Contracting Officer. All such protests will be resolved promptly in accordance with FAR 33.103. Should the offeror choose to submit a protest to the GAO, the Offeror must clearly label protests to GAO as such and submit only to the CTTSO Contracting Officer who will then transmit the protest to GAO. The Government will deem receipt of the protest by the Contracting Officer as constituting receipt by the GAO for purposes of determining timeliness. Addresses for receipt confirmation can be requested via the BIDS Help function.

### 3.7.9. Phase 3 Status and Inquiries.

Phase 3 is complete when the Government concludes technical evaluations of all submissions and awards any contracts considered under this BAA. Inquiries by phone concerning the status of Full Proposals will not be accepted. After log in to the BIDS website, submitters are able to check the status of any submission under **Past Proposals.**

## 3.8. Clarification Requests.

Should the offeror be asked to submit clarifications to a Phase 2 White Paper or a Phase 3 Full Proposal, the BIDS email from the Contracting Officer will contain instructions on the specific request and associated requirements. BIDS will use CL (Clarification) instead of WP (White Paper), or FP (Full Proposal) as the Document Identifier designation (e.g., ***CL*** CB-1112-ABCORP–xxxx-CL; where xxxx-CL is the SIT entered by the submitter).The request will contain the due date and time and *can be less than the standard 30-day response* time depending on the nature of the request.

## 3.9. Instructions for Offeror “No-bid” and Submission Withdrawal.

From time to time an offeror decides not to submit a subsequent Phase 2 or Phase 3 submission. If this is the case, the offeror shall indicate in BIDS that they are not providing the subsequent submission. The offeror shall follow the steps identified in BIDS to upload a submission and attach a document to indicate the withdrawal of the previous submission(s) and the intent to not participate in further submissions. If possible, the Document Identifier should reflect the submission status (e.g., CB-1112-ABCORP–xxxx-WD or xxxx-NoBid). To withdraw a submission after the due date and time, notify the contracting officer at BIDSHelp@cttso.gov.

4. PROPOSAL EVALUATION.

This section describes the criteria that will be used to evaluate each submission. The phase of the submission will determine the extent that each criterion applies based on the information requirements described in Section 3. Criteria are not weighted, and submissions are not ranked.

## 4.1. Evaluation Criteria.

The criteria used to evaluate and select proposals for projects are described as follows. Each proposal will be evaluated on its own merit and relevance to the program requirements rather than against other proposals in the same general research area.

### 4.1.1. Basic Requirement.

The proposed solution must meet the letter and intent of the stated requirement; all elements within the proposal must exhibit a comprehensive understanding of the problem and the requirements of intended end users. The proposed solution must meet multiple user (U.S. Government or commercial) needs and be fully compliant with all elements of the solicitation including format, content, and structure as well as all BAA instructions.

### 4.1.2. Technical Performance.

The proposed technical approach must be feasible, achievable, complete, and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements are to be complete and in a logical sequence. All proposed deliverables must clearly define a final product that meets the requirement and can be expected as a result of the award. The proposal must identify and clearly define technical risks and planned mitigation efforts. Those risks and the associated mitigation must be defined, feasible, and reasonable. The roles of the prime and other participants required must be clearly distinguished and precoordination with all participants (including Government facilities) fully documented. The requirement for and the anticipated use or integration of Government Furnished Equipment/Information (GFE/GFI) including all equipment, facilities, and information, must be fully described including dates when such GFE/GFI will be required. Intellectual property ownership and the planned transition to production must be adequately addressed, including a support concept for the product described. Similar efforts completed by the offeror in this area must be fully described including identification of other Government sponsors.

### 4.1.3. Cost.

The proposed costs must be both reasonable for the work proposed and achievable. The proposal must document all anticipated costs including those of associate, participating organizations. The proposal must demonstrate that the offeror has fully analyzed budget requirements and addressed resulting cost risks. The proposal must indicate all cost-sharing and leveraging opportunities explored and identified and the intellectual property expectations associated with that cost-sharing. Other sponsors who have funded or are funding this offeror for the same or similar efforts must be identified by agency, program manager name, phone number and email address.

### 4.1.4. Schedule.

The proposed schedule must be reasonable, achievable, and complete. The proposal must indicate that the offeror has fully analyzed the project’s critical path and has addressed the resulting schedule risks.

### 4.1.5. Contractor Past Performance.

Past performance is a risk assessment based upon the probability of successfully performing the requirement. The offeror’s past performance in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance requirements within the proposed budget and schedule. The proposed project team must have demonstrated expertise to manage the cost, schedule, and technical aspects of the project. The Government’s evaluation, at all phases of the BAA, of past performance will rely on evidence provided directly by offerors as well as independent sources of information. If applicable, the offeror shall state if it has no relevant past performance.

**Remainder of this page intentionally left blank.**

# 5. TECHNOLOGY DEVELOPMENT REQUIREMENTS AND OBJECTIVES.

This section provides the requirement descriptions and overall technical objectives. CTTSO is interested in submissions in the following mission areas of combating terrorism (CbT). The intent of this BAA is to identify technologies and approaches that provide near-, mid-, and long-term solutions that enhance the capabilities of the U.S. Government to combat or mitigate terrorism. The main objective is to provide rapid prototype development focused on current and future critical multi-agency counterterrorism and antiterrorism requirements. The level of detail and order of appearance for a given requirement are not intended to convey any information regarding relative priority.

## 5.1. Advanced Analytic Capabilities (AAC)

**R4235 Smart Pixel**

Develop a computer vision algorithm in order to provide a capability to tag and track a region of interest, such as targeted individuals, vehicles, and/or friendly forces. The algorithm processing will occur at the Joint Terminal Attack Controller (JTAC) level via Android Tactical Assault Kit (ATAK) mobile device. This capability will maintain positive identification for JTACs on the ground – when target egresses into a crowded environment where positive identification is often lost by human vision.

Smart Pixel shall detect and track objects and meet the following objectives:

* Develop and test computer vision algorithm to tag and track via full-motion-video (FMV) data feed.
* Design with open standard programming languages (not proprietary).
* Leverage available tag-and-track open-source computer vision algorithms for testing and development.
* Determine the feasibility of FMV touchscreen on ATAK.
* Allow a JTAC to hard press on ATAK FMV to color a target (Red, Yellow, Green, and Blue).
* Must be compatible with aircraft targeting pods and sensor balls (i.e., Litening, Sniper, MX15, MX20 and MTS-A/B).
* Develop training as part of the software/algorithm delivery.

**R4236 Strategic Atmospheric Tool (SAT)**

The dynamics by which regional events unfold are affected by the rate and sources of information that a given population may respond to. As a result the decision making process to respond to events to help influence and shape the outcomes has become more challenging to both policy makers and strategists. This is particularly important with respect to efforts to diagnose and formulate critical assumptions about the local and regional dynamics that give rise to non-state political violence such as insurgency and terrorism. In each case potential plans and strategies are based on a theory of change derived from an understanding of population atmospherics. As the environment is never static, potential strategies need to be adaptive in response to gathered local information that allows progress to be assessed in order to make choices about strategic next steps. In the case of non-state political violence, the attainment of sustainable long-term strategic objectives requires us to create a change in the environment that positively influences a set of local actors and populations. These are the same actors and populations that our adversaries are attempting to influence as well. Currently, traditional methodologies for assessing the effectiveness of our strategies do not properly account for information available only through engaging these affected populations.

The requirement will leverage anthropological field networks in regions of high national security interest that can produce data and insights to augment more traditional and common forms of information and analysis. The levels of analysis will draw on the tactical interaction with the field networks to offer strategic insights on how to best shape strategies within the regions of interest.

Design a software capability for in-country feedback, i.e., deployment of an in-country software-enabled human network that interacts with and queries the local population. Develop and test software tool and data visualization to display said software-enabled human domain networks, and their perception of and sentiment towards the U.S.

SAT shall apply innovative social analysis to ascertain strategic measures of effectiveness (MOEs) in theaters of interest. This development shall include the following:

* Create software to visualize and provide access to data and provide a roadmap for transition with the goal of creating the broadest possible access to the information by government stakeholders, academics and others. Transition into an academic environment, such as a Center of Excellence (CoE) for development and sustainment of software capability and the field networks is a preferred option to meet this goal of broad accessibility. Other options will be considered.
* Engage a future sustainment site, and analyze the appropriate IT environment and estimate funding requirements for future sustainment.
* Explore the technical approach required to deploy such a capability to a cloud environment such as Amazon Web Services, compliant with FedRAMP, and Google Cloud Platform or Microsoft Azure.

**R4237 Custom Analytic Tools for Law Enforcement Organizations (LEOs)**

Criminal networks are relational, adapt rapidly, and also use social media platforms in criminal-related activity. Law enforcement organizations (LEOs) need user-friendly analytical tools to efficiently understand criminal networks spatially and temporally.

Develop automated software tools for data exploration and extrapolation to derive insight. Consider use of the R programming language, custom tailored for LEO and National Capital Region (NCR) clients use cases. The software shall be capable of enhancing existing Naval Postgraduate School (NPS) software tools by customizing user workflows to automate the Social Network Analysis (SNA) Processing, Exploitation and Dissemination (PED) process and derive more meaningful insight in R or other programming language.

Government SNA software such as the NPS CORE Lab SNA software that conducts automated analysis in accordance with LEO operator workflows and case management will be provided for development and enhancement.

**R4238 Smart Edge Asset**

Identify and apply an existing processor that can be used in an existing smartphone form factor, such as an Android device. This processor shall have the computational capability to run object detection algorithms on premises, and smartly collect (e.g., motion-activated recording) and store high-resolution content without the need to reach back to the cloud or other computing environments.

Smart Edge shall:

* Identify commercial-off-the-shelf (COTS) and potential government-off-the shelf (GOTS) processors capable of processing machine learning algorithms on a smartphone form factor.
* If a suitable processor is identified, the chip will be integrated and tested with commercially available smartphones.

**R000-AAC-FY19 Unspecified Requirement - Advanced Analytic Capabilities**

Develop new or improved technologies or emerging technological capabilities pertaining to advanced analytics that may be of interest to CTTSO, but were not specifically requested in this BAA and are not commercially available. Proposals submitted shall be timely and relevant, and further combating terrorism.

Although not limited to the following concepts, the Government is interested in the following:

1. Big Data applications for operational planners

Big data technology is rapidly maturing, and DARPA and others are demonstrating the technology’s potential. However, the promise of this technology has not yet been realized in the end-user community. This R000 seeks to identify and implement new, possibly game changing applications for operators. Applications of particular interest are those that can inform end-users of the presence of actual, emerging, and potential threats, and assist them in planning and executing counter-threat operations. The applications sought should take a step past the usual keyword, social network analysis (SNA), social media analysis (SMA), pattern matching approaches, and be capable of leveraging, via big data and auto-inferencing, combinations of secondary and tertiary signatures that currently go unexploited. All manner of signatures should be considered – those retrieved directly from text, as well as those derived from other high volume, high velocity sources such as audio, video, messaging, broadcasting, and advertising. Methodologies to extract the specific data required (e.g., modeling) from ‘big data’ are also of interest.

1. Anticipatory Analytics

Simple, customized analytic tools that allow end users to quickly compute and analyze information. The model should perform calculations during live transactions to evaluate the risk or opportunities of a given scenario or event, in order to guide a decision. Submitters to this area should have access to their own set of data. Follow on work may include ingestion of Government data. Specific focus should be in areas involving “Gray Zone” operations and Geopolitical Forecasting. “Gray Zone” refers to a space in the peace-conflict continuum.

1. Blockchain technology for national security applications.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.**2 Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE)**

**R4199 CBRNE Detector Selection Database**

Develop an online database containing feedback on field performance of CBRNE detector systems, test data on detector performance, and where or who can be contacted to receive a report depending on the data’s sensitivity. The database shall cover a comprehensive inventory of commercial-off-the-shelf (COTS) and government-off-the-shelf (GOTS) systems, including vendor stated such as those found in the Weapons of Mass Destruction (WMD) Detector Selector (https://www.wmddetectorselector.army.mil) and government verified data not currently available at an interagency level. The multi-layer graphical user interface (GUI) shall be tailored for different levels of expertise to allow users to make informed decisions. The responder community will be provided qualitative data in a format that narrows the field of candidate detectors down to meet a deployment scenario or concept of operations (CONOPS) based on validated information, layered over vendor provided data. The interface provided for the technical community will include government reported data and full reports. The technical interface shall have the capability to query, compare, and sort systems based on physical properties, libraries, CONOPS, threat lists, and detection limits. The database shall have the capability to upload multiple reports linked to an existing list of detectors or easily add new detectors based on a defined set of parameters. The developer must be able to handle classified documents and be adept at required security protocols for transition to Department of Defense and/or Department of Homeland Security (DHS) unclassified and classified networks.

**R4200 Enhanced Explosives Vapor Detection**

Develop a man-portable system weighing no more than 25 pounds that can reliably detect explosives through continuous monitoring of the gas phase. The system shall have a battery life of at least 4 hours. The system shall have the sensitivity and selectivity required for detecting explosives at their low vapor pressures. The system shall be able to detect both military and commercial explosives, but it is permissible to detect other signature chemicals present in the explosive mixture rather that the explosive molecule itself where applicable. The system must also have a false alarm rate of less than 1%. It is desirable for the technology solution to be transferable into a handheld system should the U.S. Government decide to further develop it in the future.

The system must be operational in a temperature range of 32 °F to 122 °F and up to 95% relative humidity (non-condensing) and be able to be stored in temperatures ranging from -4 °F to 140 °F and up to 95% relative humidity (non-condensing).

**R4202 Man-Portable Biological Warfare Agents (BWA) Detection**

Develop a lightweight, portable, passive system for the detection, characterization, and sample preparation of aerosolized Biological Weapon Agents (BWAs). The system shall provide continuous monitoring of the surrounding atmosphere and provide a timely alert to the operator if an agent is detected. While this is the required, it is desired that the system also perform identification capabilities.

The system shall offer hands-free operation and easily attach to tactical vests (MOLLE, etc). The system shall weigh no more than 2 pounds and shall not exceed 25 cubic inches in volume. Total battery life shall be at least 8 hours under normal conditions and the device shall operate at a noise level quieter than 45 dB at 3 feet. The operator shall be able to easily toggle between visual, tactile (e.g., vibration) and audible alerts and easily perform all critical functions while wearing gloves.

Each individual system shall function autonomously to detect, characterize, and prepare samples. Characterization should differentiate bacteria, viral, and toxin molecules from other biologicals (e.g., mold). It is desired that any BWA Identification capability be integrated into the same platform. However, if necessary the BWA Identification function can be performed with a complementary man-portable platform. No approach to any required or desired capability shall include communication with a central base station (i.e., reach back).

Identification should focus on *B. anthracis* (anthrax) and Ricin (Threshold), with an objective of identifying other known BWAs: *Yersinia pestis* (plague), *Franscisella tularensis* (Tularemia), *Brucella melintensis*, *Coxiella burnetii*, Orthopoxvirus, Alphavirus, Botulinum toxin, and/or *Staphylococcus aureus* enterotoxin.

The system must be operational in a temperature range of 32 °F to 122 °F and up to 95% relative humidity and be able to be stored in temperatures ranging from -4 °F to 140 °F and up to 95% relative humidity. The system shall be 810G shockproof and IP67 waterproof.

**R4203 Alpha Contamination Training Aid Material**

Develop a field dispersible, short-lived, alpha radiation training aid material for a variety of training applications. The training aid material shall consist of robust, non-friable particles that are easily dispersed, wet or dry. The particles must not pose an internal hazard and be non-respirable (greater than 10 µm diameter). The training aid will be compatible routine hand-held alpha-beta-gamma probes, including AN/PDR-77, AN/PDQ-2, FH-40, RadEye-B20, Ludlum model 26-2, Ludlum model 2241-3 with alpha probe, and DigiAlert 200. The dispersible training aid must be low cost and have simple disposition after use.

**R000-CB-FY19 Unspecified Requirement – Chemical, Biological, Radiological, Nuclear, and Explosives**

Develop new or improved technologies or emerging technological capabilities pertaining to CBRNE that may be of interest to CTTSO, but were not specifically requested in the BAA and are not commercially available. Proposed projects shall be timely, relevant, and further worldwide combating terrorism efforts. Areas of particular interest include next generation materials for personal protective clothing and respiratory protection; novel detection capabilities; decision support tools and mobile learning and performance support applications.

Medical applications (vaccines, pharmaceuticals, and clinical diagnostics) will not be considered. These areas and other areas that do not directly relate to CBRNE will be rejected without consideration of comment.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.3 Improvised Device Defeat/Explosives Countermeasures (IDD/EC)

**R4208 IED Instant Notification System**

Develop a smartphone/tablet-based software application by which bomb technicians can generate and receive real-time, geo-located alert information regarding improvised explosive device (IED) incidents. Incorporating an intuitive user-friendly graphic user interface (GUI) as the primary method of input, the IED Instant Notification System (INS) will allow the user to input and disseminate alerts regarding new bomb incidents, update ongoing incident information, resolution of the incident, and technical information regarding the device. The application will map information concerning bomb threats, suspect packages, hoax devices, and real IEDs. The INS application development shall have a multi-platform development architecture that includes Android and iOS, and take the user no more than 30 seconds to input and send initial response information, updates, or incident resolutions. Where immediate access to Wi-Fi or cellular service is not available, the INS will retain user input, and deliver notifications upon reconnection. The application should not place such a burden on the smartphone or tablet that battery life is significantly diminished when the application is used or operating in the background. Technical information input will be based on the IED Technical Exploitation Lexicon and use a drop-down interface for information input. The INS will depend primarily on symbols for user input. However, the system will give users the option of choosing English, French, or Spanish for overall system instructions, textual information input, and alerts/notifications in the initial version. The user will also have the ability to create and save distribution lists in the system. To prevent information overload and continual notification, users will be able to select from whom they receive notification information. This will be accomplished by giving users the ability to select bomb disposal units/squads, individuals, or geographic areas. An option to override individual settings will be incorporated into the application, so that if a bomb technician deems an incident to be of “National Significance,” an alert will be sent to all INS users.

**R4209 Low Cost Obstacle Avoidance for Robotic Platforms**

Develop a low cost obstruction avoidance and proximity alert system for robotic platforms. The system should consist of an adapter for camera that outputs a video overlay for distance estimation and includes standard sensors used in automobiles. The final product will be similar to overlays used in vehicle backup cameras and should not involve spatial mapping of any kind. The proposed system should be Operator Control Unit (OCU) agnostic and able to operate on multiple manufacturer’s robotic platforms. The video overlay must be integrated into the standard robot camera input, and thus must be compatible with standard analogue or digital video systems. The video overlay system must be universally compatible with current robot systems used by Public Safety Bomb Technicians (PSBT) and Explosive Ordnance Disposal (EOD) Technicians. The system must be weather resistant to rain and extreme temperature conditions (minus 30 degrees F to 130 degrees F). The system can be designed to receive power from the robot’s onboard power source or have an independent rechargeable lithium-ion battery. The unit must be low power and draw minimal continuous amperage from the platform’s power system. In the case of an independent power source, the overlay must operate continuously for four hours. The unit should display a colorized distance estimation and orientation guides in both the forward and reverse direction. The guides should bend to display the robot’s predicted path of travel. The selected sensors must be mountable on the front, rear, and sides of the robot through universal mounting brackets. The sensors must not interfere with any existing robot capabilities. There should be an audible and video proximity alert when the robot is 12” from an obstruction and there must be an option to deselect the audible alarm. Use of commercial-off-the-shelf automobile back-up sensor and overlay systems as part of the robotic system is acceptable. If the system is integrated with the robot’s cameras rather than its own camera the colorized ranging guides must be scalable to work with the zoom feature of the robot or work at a specific magnification which is obvious to the robot operator.

**R4210 Circuit Identification and Comparison Tool**

Develop an electronic searchable library of IED circuits that will allow bomb technicians to quickly compare or identify circuits to known IED circuits. The library shall be downloadable to any device used by bomb technicians in their work and will be cross-platform compatible. A circuit search will return a list of circuits, with thumbnails, that match known, partial, or complete IED circuits. Selecting a circuit from the search results list will present users with a large picture of the circuit, and specific information about the circuit, such as known uses and associated hazards (e.g., RC, time, light sensitive, vibratory, etc.). The tool will use image analytics to compare circuit components that are contained in the library to uploaded images or X-rays. Circuit selection may use artificial intelligence, machine learning algorithms, or other programming necessary to make quick, relevant identification of similar circuits. The library will be searchable by uploading a photo or X-ray and letting the algorithm identify components or entering a list of components from a dropdown menu; entering a single component, if very specific and/or rarely used (e.g., thyristor, e-cell, avalanche photodiode, etc.). Searches should also be able to be conducted for specific types of circuits, or their operational use (e.g., RC circuits, or “Circuits used in VBIEDs,” etc.). The tool will have a distance measuring tool that allows the user to measure distance between two points. The distance measuring tool will generate a colored line between the measured points allowing the user to take multiple measurements using color-coded lines to distinguish between measurements. Users will have the option of selecting standard or metric system measurements. The tool will have a clipboard-type feature and snipping tool to allow the user to easily copy/paste images or information to other areas in the tool or to other programs. The tool will also give the user the ability to compare circuit information/images side by side. Additionally, the tool must have a magnification feature. Must be able to utilize .TIF, JPG, X-ray and RAW image format files.

**R4212 sUAS Identification Guide**

Develop an electronic small unmanned aerial system (sUAS) Guidebook that is searchable and user-updatable and can be used as a quick reference guide during response operations for identification and analysis of downed sUAS platforms for EOD/Public Safety Bomb Technician community. Using the guidebook, a technician can identify the make/model of the sUAS platform and any modifications to the platform. The guidebook shall include:

* make
* model
* manufacturer
* country of origin
* military and civilian drones
* pictures of sUAS/fixed wing platforms
* internal/external dimensions
* max range/max ceiling
* launch method
* imagery systems
  + system specifications: infrared, thermal, focus range, size
  + memory card types
* operating frequencies of RC-enabled components
* power source to include:
  + battery
  + liquid or solid fuels
  + alternative sources
* schematics/wiring diagrams
* types of platform modifications

The guidebook shall also include a feature that allows a technician in the field to capture information regarding a first seen platform, components, or modified sUAS, and send that information out to other users. The guide shall be downloadable and compatible with a variety of operating systems.

**R4215 Backscatter X-ray for Small Robotic Platforms**

Develop a rapidly mountable, backscatter X-ray system for robots with an arm lifting capacity of no less than 15 lbs. The system will be mountable in the jaws of a small to medium-sized robot. The unit will have a mount that will allow the operator to pan and tilt the X-ray while the robot arm remains stationary. The system must be able to image threats through a minimum of 2.5 mm steel or its equivalent, weigh no more than 8 lbs., and include a rechargeable, commercially available battery pack having a minimum battery life of 4 hours with back up AC power. The backscatter X-ray will be human safe during operation and not exceed an X-ray dose rate of 2 mR/hr. The backscatter X-ray system will be capable of scanning for concealed explosives, narcotics and other contraband with a minimum scanning speed of 6 inches per second. The image system will be designed to be removed easily from the robot, preferably without tools. The system will have a handheld mode and be ergonomically balanced to allow for single-handed operation in confined spaces. A high-resolution LCD, viewable in direct sunlight, will be built in to the unit displaying real time images transmitted from the backscatter X-ray. Real-time backscatter images will also be transmitted and made compatible to the platform’s robotic OCU. The system will be fully integrated in the body of the backscatter system, include Wi-Fi/ Bluetooth communication and a USB port for image, data, and scan record transfer. An image stitching capability, creating a single image from multiple scans of the same target, will be available, as well as the ability to transfer images for offline viewing via desktop, tablet, or smartphone. A complete set of image analysis tools, including touch screen zoom, scrolling, auto-enhancement, dynamic contrast, and colorization will be included, as well as the ability to append notes. An image management capability shall be included to support mission reporting, and include image thumbnails, search, exporting, and a backup capability. The system shall be dust-proof and weather-sealed with an ingress protection rating of IP 54. The system will have two extra batteries, a battery charger, and power cable.

**R000-IDDEC-FY19 Unspecified Requirement – sUAS Tools and Technologies for Bomb Disposal**

Develop new technological capabilities enabling sUAS platforms to perform bomb disposal operations. These capabilities must be of interest to the IDD/EC Subgroup, but were not requested as a specific technology requirement by TSWG end users, and must not be commercially available. Proposed projects shall be timely, relevant, and further worldwide combating terrorism efforts. Areas of particular interest include:Small UAS VBIED Access Payloads; Small UAS Disruptor Payloads; Small UAS Explosives Diagnostics Payloads; and a Small UAS Universal Payload Mount. Proposals may also be considered for unique methods to use sUASs to enhance communications between:

* personnel
* personnel and UGVs/ sUASs
* UGVs/sUASs, to other UGVs/sUASs

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.4 Investigative and Forensic Science (IFS)

**R4193 Rapid Ground Truth Collection Tool for Computer Vision Artificial Intelligence**

Design and develop a simple, standard database structure for ground-truth verified image data that can be used for artificial intelligence (AI) training and develop a tool integrated within it capable of populating that database structure. The overall system shall provide law enforcement and intelligence agencies the ability to automatically exploit large volumes of image and video data to detect, classify and identify people, vehicles, and other objects such as firearms, backpacks, footwear, and headwear with high accuracy. The system shall enable users to identify the types and classes of the objects to be included in the database and select the objects for which searches shall be performed.

The database structure shall be extensible to allow for continually increasing the sets and types of objects and classes that can be contained within it. The database shall contain a set of common classes that can be further subdivided. These shall, at a minimum, include people with the subclass of faces and vehicles with the subclasses of automobiles, motorcycle, and bicycles. The database shall have the flexibility to provide the real-time addition of attributes or metadata such as vehicle color or subject demographics such as age range, gender, and other physical features and traits. Although the performer must develop the database structure, no data collection shall be required.

Other capabilities and functions that the database structure shall perform include:

1. Incorporate multiple objects and classes within a single image and annotate multiple objects within a single image, and include these annotations in the database.
2. Ingest and store images in the most common image formats such as JPEG, BMP, TIFF, PNG, GIF while retaining all metadata which was appended to these images prior to ingest.
3. Store images simultaneously in an open JPEG format, which can used as the default mode for the export of images (e.g., when used to build classifiers).
4. Use a JPEG Quality Factor of 90 or better when converting ingested images to the JPEG standard.
5. Search the database and create reports from it that allow users to see and record quickly what objects and classes are contained within it and how many images correspond to each class and subclass.
6. Include an export capability which shall do the following:
7. Include tags for classes, subclasses, attributes and metadata in JSON format.
8. Allow users the option to extract only a subset of the database to include one specific object class or set of object classes.
9. Permit users to select whether they will export only the bounding box regions of the image or the entire image when exporting includes images containing multiple objects or object classes, and which have bounding box annotations regarding those different objects.
10. Have a relational database structure or a NoSQL structure.
11. Allow users to merge easily two or more instances of this image database in an automated fashion with only limited user interaction.

The collection tool of the system shall include the following:

1. A database query capability to see if the user is going to be adding to an existing corpus of images or creating a new corpus.
2. Batch ingest for existing datasets that enables the user to identify the class of objects being ingested and identify a folder containing images of interest.
3. Interactive on-line image collection that provides for the collection, annotation and organization of images of specific objects within a given class or set of classes.
4. Capability of ingesting still images from videos, whether online or within a specific video player.
5. Ability to enhance the tool through the use of artificial intelligence approaches to locate and ingest the target data more rapidly.
6. Capability to operate with Chrome, Firefox, Internet Explorer, and Microsoft Edge.
7. User interface that is easy to use and requires no more than ten minutes training time to learn.

All software shall be capable of running within a standalone network disconnected from the internet. The installation and deployment of the entire system shall be as simple as possible, with minimal training following industry standard practices and technologies such as Docker. Extensive testing shall be required that provides the proof-of-concept and affirms that all functions and capabilities are fully operational. The performer shall provide the U.S. Government with full intellectual property rights to the final product.

**R4195 Extensible Vehicle Image Search and Clustering**

Develop an application that is completely compatible with and can be inserted into the Vehicle Image Search Tool, also known as Vehicle Search and Exploration Engine (VeSEE). The application shall enable its operators to ingest new vehicle make-models into the database and adapt the system to handle these new instances. VeSEE is a CTTSO-sponsored application that can search digital files of various types, especially video files, to detect vehicles and then identify the make and model of the vehicle. The system can additionally make comparisons to specific vehicles in established databases for matches or exclusions. VeSEE allows for the automated ingest of multiple image and video files, from which individual vehicles are detected in individual frames in image and video files. Once vehicles are detected, the VeSEE system attempts to group the detections into clusters of the same make and model vehicle. The new application shall enable users to add new vehicles to system’s database that are of any new make, model, or type and shall train the system to recognize those new makes and models in any files that it searches. The new application shall provide the capability for the continual extension of the VeSEE database with images of new makes and models and their associated metadata to ensure that the system is continually updated and performance is maximized. The U.S. Government shall provide the original VeSEE system to the performer upon award of the contract.

The new application shall make the overall system adaptable to handle any new make-model instances and overcome a closed system trained for a known, limited dataset. The new application shall provide the following:

1. New algorithms and approaches that shall enable the end users to provide the system with a number of instances, at least 20, covering various viewpoints, for each desired make-model, and enable the system to categorize and identify these new categories.
2. Machine learning based on directions such as transfer learning and domain adaptation that enable learning a category with fewer training examples (less than 20). This capability shall reduce the workload of the user/analyst to curate training examples and also shall provide better search and clustering for vehicles that are not part of the original VeSEE reference database using visual characteristics.
3. An updated user interface that shall enable the user to specify folders with a number of training images for each category. The user must be able to click on an ingest/retrain type button to generate automatic updates of the system to handle any new category. The user must be able to handle multiple training datasets to allow the user to go back to an older version.

The final deliverable shall include:

1. Updated software for vehicle image search and clustering that can handle new make-models of vehicles.
2. A system for complete and thorough system documentation.
3. A full technical report capability detailing the testing done by performer when adding new vehicles to the database.
4. All capabilities and functions of the original VeSEE system.

The U.S. Government must receive full intellectual property rights to the final product.

**R000-IFS-FY19 Unspecified Requirement - Investigative and Forensic Science**

Develop new, advanced, or improved technologies or capabilities related to investigative science, forensic science, and forensic-enabled identity intelligence that are not specifically requested in this BAA and are not commercially available. Any proposals shall directly relate to and advance combating terrorism efforts within agencies of the federal government. These may include any one or more of the following:

1. Multimedia Forensic Examination and Exploitation
   1. More technically advanced or inclusive detection, retrieval, extraction, analysis, authentication, and interpretation of permanent, perishable, or temporary information and digital data within computer and automated systems, communication systems, embedded computer systems, and cloud-base data and systems and their storage media.
   2. Faster, more effective, comprehensive, accurate, low-cost methods of video and audio forensic analysis which significantly advance present technological capabilities.
   3. Rapid data extraction and full imaging from portable electronic data devices and their storage media. Any proposed tool or technique shall fully function in austere, severe, or remote physical environments; be suitable for employment by covert entry personnel; be undetectable by the device user; and, be compatible with commonly used digital forensic hardware and software platforms.
2. Expeditionary Investigative and Forensic Science
   1. Faster, more reliable, more widely applicable, more rugged, less costly, or less labor-intensive tools for identification, collection, exploitation, forensic analysis, and preservation of evidence from persons, items, incident scenes, sensitive sites and other locations where operations may be restricted for any reason. Of special interest are technologies involving the forensic analysis of homemade/improvised explosives, their materials and related trace evidence, their precursors, and pre-incident or post-blast residues.
   2. Advanced field expedient methods and systems for rapid DNA analysis.
   3. Fast, low-cost methods for profiling and analyzing DNA, including nuclear DNA, mitochondrial DNA, rDNA, short tandem repeats, Y-chromosomal, and single nuclear polymorphisms from mixed multiple or contaminated sources.
   4. New methods and technologies which relate to forensic applications in a maritime environment and shipborne operations.
   5. Technologies which provide information beyond that obtained from genomic methods including those related to proteomics.
3. Forensic-Enabled Identity Intelligence
   1. Develop advanced scientifically validated technologies and processes for the collection, analysis, exploitation and management of identity attributes.
   2. Develop advanced technologies and processes that reveal identification attributes, such as fingerprints, palm prints, iris, facial, DNA, other phenotypical traits of individuals or groups which distinguish persons-of-interest, terrorists, criminals, and anyone posing a potential threat to the United States.
   3. Non-DNA related technology that can identify, individualize, categorize, or compare biological evidence, materials, or organisms for forensic-enabled intelligence activities.
   4. Other areas of interest are data collection and integration of evidence and other sample collection with all-source intelligence to locate, track, and follow unidentified persons and activities geographically and through cyberspace. This includes a continual analytic capability in near-real time evidence collection response and remote support.

Proposals pertaining to data mining; report writing; data compilation; detection of concealed bombs, explosives, or weapons; intrusion detection or access control; cybersecurity; or any other technical solutions that are not objective, repeatable, and verifiable should not be submitted and will be rejected without consideration. Solutions and proposals which are proprietary and require the government to pay licensing fees are not desired and shall be rejected.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.5 Irregular Warfare and Evolving Threats (IW/ET)

**R4224 Identifying Disinformation Efforts**

As digital disinformation continues to proliferate, the ability to not only detect, but also understand the cognitive conditions for it to occur are critical to achieving control of the information environment. This project shall advance our understanding of identifying disinformation efforts and ultimately produce a prototype to do so:

* Detect online communities and characterize how they react to information;
* Identify actors or accounts involved in propagating disinformation, responding to disinformation, and characterize their influence;
* Predict the probability that an actor/account is a bot;
* Among disinformation-pushing actors, predict the probability that an actor/account is a witting vs. unwitting agent of an adversary;
* Automatically detect emerging disinformation campaigns and narratives, prioritizing ones related to U.S. national security interests and foreign policy; and
* Measure and predict the resonance of narratives within various psychographics.

To achieve this, two elements are needed in order to validate U.S. Government efforts in this space.

1. First, the project will involve conducting research to determine how, when, and why disinformation and adversary narratives reach and influence people online. The research will determine the strategy and design of the prototype.

2. Second, a prototype will be built to identify adversary disinformation efforts in a manner that is consistent with research findings. This tool will detect influence efforts and provide a comprehensive view of actors/narratives within targeted social media ecosystems. Design decisions and their motivations should not only be justified, but also well documented. The details of how the prototype works, and a rigorous evaluation of its performance, must be recorded.

Both the research and the proposed solution should consider 1) relevant behavioral science, psychology, and cognitive frameworks for explaining and detecting digital message resonance, and ultimately behavior shifts, 2) variations in audience responses based on demographics and psychographics. All research and documentation should be at an academic level.

**R4225 Air Dropped Target Focusing Platform**

Current capabilities for air deliverable Military Information Support Operations (MISO) information exists but do not provide MISO operators the capability to use more advanced technology or visual audible recognition for tailored messaging to specified target audiences. This requirement is to develop the capability to use small electronic media devices that contain pertinent content that can be safely air dropped and gain the attention to various target audiences on the ground.

Units must be delivered in a safe manner and allow an appropriate amount of descent time to enable the target audience to identify the units and:

1. Deploy approximately 250 of these units at a time.
2. Be delivered as part of a larger payload of similar and dissimilar devices.
3. Be deliverable via standard military letter canister (PDU-5B/M129) with an objective of 250 units and a threshold of at least 100 units fitting in a canister.
4. Be deliverable via non-standard canister such as a Meals Ready to Eat (MRE) box or trash bag.
5. Payload must carry but not be limited to SD cards, mp3 players, or miniature toys.
6. Hold up to 5 ounces of material.
7. Overall size not to exceed 50 cubic inches.
8. Hit a target area of 140,000 square feet in zero wind.
9. Capture the attention of the targeted populace on the ground.
   1. While descending and upon contact with the ground.
   2. During both day and night.
   3. Continue for an objective of 1 hour and a threshold of 15 minutes upon landing.
   4. Does not cause harm to the target populace upon direct contact with the device.
10. Have an entanglement free deployment, opening, and descent from other devices.
11. Force of impact must not cause inadvertent harm to a human (must assess the Head Injury Criterion and the Neck Injury Criteria for the device).
12. Maintain buoyancy and remain watertight for at least one hour in the event of a maritime delivery.
13. A failure rate not to exceed a desired 1 in 250 with a threshold of 1 in 100.

**R4227 Joint Operations Center for the Tactical Assault Kit**

The Joint, Interagency, Intergovernmental, and Multinational (JIIM) operational environment increasingly requires dynamic responses to emerging problems. A rapidly formed, secure, digital collaborative environment with standardized Common Operational Pictures, Command, Control, Communications, Computers, Intelligence Surveillance and Reconnaissance (C4ISR), and planning tools is required to permit JIIM forces to operate with increased agility in the dynamic, and fluid operational environment. Once operations move beyond the unilateral or single agency realm, the capability to collaborate for planning and mission command becomes increasingly difficult. For instance, Counter Weapons of Mass Destruction (CWMD) currently poses significant JIIM challenges where stakeholders are inherently joint and multinational.

The Advanced Digital Advisor Partnering Technologies (ADAPT) concept and Tactical Assault Kit (TAK) system currently provide excellent command and control at the tactical level during partnered operations. However, TAK currently does not provide a comprehensive operational level planning and Command, Control, Communications, Computers, Intelligence (C4I) tool. TAK’s use in the JIIM environment is limited to a common operational picture (COP) and communications platform. TAK is integrated into ad hoc mission command systems by end users in conjunction with other commercial-off-the-shelf (COTS) and government-off-the-shelf (GOTS) applications such as mIRC chat, Easy TV, RaptorX, and google earth with varying levels of effectiveness.

This requirement is to design a plug-in for TAK applications in order to (IOT) act as a mission planning/C4ISR tool and shall include:

1. Surveying Special Operations Forces (SOF) units and deployed commands for examples of planning formats and Standard Operation Procedures (SOPs) IOT develop standard templates for end user modification.
2. Surveying mission planning standards for CWMD from JIIM partners.
3. Developing a software plug-in in partnership with U.S. Special Operations Command (USSOCOM) Special Operations Mission Planning Environment (SOMPE).
4. Validation through field tests in unilateral, joint, and multinational exercises.

The JOCTAK plugin shall:

1. Provide a mission Planning/C4ISR tool in a secure digital collaborative environment that is:
   1. Rapid: Creation of secure episodic network with tailorable permissions.
   2. Scalable: From one operator with a computer, to fully staffed JOC.
   3. Flexible: Reusable templates for Planning, CONOP, Order, Annex/Appendix development.
   4. Simple: Single program, limited technical support.
   5. Collaborative: Planning and product creation in real time.
2. Run on Android, Windows and iOS devices.
3. Seamless communication between iOS, Android and Windows platforms via Wireless Local Area Network (WLAN) and designated TAK server access.
4. Control TAK server access.
5. Build a layout to fit the current mission set.
6. Provide a common set of symbols, icons, and templates for JIIM CWMD planning.
7. Collaborate with SOMPE to build common symbols, icons, and templates other SOF missions.
8. Access all TAK plugins from a centralized hub.
9. Retrieve and send data to several TAK servers.
10. Manage visible layers for enhanced COP and SA in the Joint Operations Command (JOC).
11. Accelerate time-sensitive operations by providing automatic updates to staff planning documents.
12. Integrate auto-translation for multinational partners.
13. Integrate a secure digital archiving method that allows remote access in real time.

**R000-IWET-FY19 Unspecified Requirement - Irregular Warfare and Evolving Threats** CTTSO seeks proposals for the research and demonstration of technologies to detect, disrupt, degrade, and dismantle adversarial influence on the U.S. and partner countries. Many areas of the world are plagued by adversaries who survive in some measure due to problems of poor governance, corruption, militant resistance, ethnic conflicts and criminality. The global web of adversary activity requires concepts and technologies that enhance and innovate strategies, unlock new value, and provide actionable insights to respond to evolving threats.

Proposals should include solutions that not only counter and degrade the ability for adversaries to influence, persuade, and recruit, but also to enhance the ability for operators to achieve mass influence and agility in both the physical and the information environment. These projects should advance high-technology readiness level (> TRL-6) prototypes, demonstrate new concepts and solutions that reduce risk to the U.S. and partner forces while eroding adversary sanctuaries, motivation, organizations, and enterprises.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.6 Personnel Protection (PP)

**R4206 U.S. Body Armor Fit and Coverage**

Soft body armor is the most important protective equipment used by law enforcement, but a single round exploiting a gap in a poorly-fitting vest could have devastating results. FBI Uniform Crime Reports show that, for the past 10 years, 28% of officers killed while wearing body armor were killed by rounds hitting unprotected areas of the torso. While FBI data only indicates the general area of the torso that was struck and does not indicate whether gaps in coverage were an issue, improving vest fit and coverage may provide a means to reduce that number in the future. Interviews, observations, workshops, and small studies indicate that many users do not understand proper coverage or how vests should fit; that users are wearing vests that do not fit; and that users do not know the steps to take if a vest fits poorly. Poor fit may not only result in more exposed areas of the torso but may also affect mobility and may result in discomfort/pain and reluctance to wear the vest.

The proposer shall facilitate the collaboration with end users, manufacturers, measurers, fitters, purchasers, agency leadership, and law enforcement professional associations (e.g., International Association of Chiefs of Police (IACP), National Security Agency (NSA), National Tactical Officers Association (NTOA)) to understand the extent of poor vest fit and coverage across agencies in the United States. The proposer shall determine and deliver a report on the root causes of poor vest fit and coverage (from measuring the wearer, to manufacturing, to delivery, to other possible causes), and identify solutions that will result in every officer wearing body armor that fits properly and provides as much coverage as possible without restricting mobility.

Products resulting from this work shall include a full data and analysis report, findings, conclusions, and solutions that lead to developing new documentary standards (e.g., a standard for fitters that may be used for certification, standardized soft body armor sizes).

**R4211 Tethered Sensor**

U.S. Forces lack the capacity to provide force protection, situational awareness, and targetable grids to mounted elements in support of global operations. Current small unmanned aerial systems (sUAS) supporting these operations are not always available, come with a large administrative burden, large training requirements, and require extensive deconfliction. These assets also have many operational issues to include the impact of weather on operations, susceptibility to electronic attack and direction finding, and have size, weight, and power (SWaP) constraints. Complex terrain and persistent enemy UAS and indirect fire threats require elevated observation platforms with a variety of payloads to enhance mission effectiveness.

Develop a tethered sensor that can be mounted on a tactical vehicle. The system shall be capable of rapid launch and recovery while at a halt and be deployed and used while on the move. The system shall be capable of operation while the vehicle is moving 10 mph (threshold), 30 mph (objective). The system shall provide force protection intelligence, surveillance, and reconnaissance (ISR) during extended duration operations. The system shall not be reliant on any RF signals to transmit data to the operator. The sensor shall be capable of operations with a variety of payloads. The system shall be mounted to a tactical vehicle such as the Ranger Fire Support System (RFSS), MRZR, Stryker, or GMV. The system shall be capable of carrying a variety of payloads and sensors to facilitate ISR missions such as electronic warfare, signals intelligence, precision geo locating, tagging, tracking, and locating, communications, mobile ad hoc network (MANET), and counter UAS. The system shall be capable of a variety of optical combinations, including but not limited to: High Definition, Infrared, Thermal, and Short Wave Infrared. The optical system shall be capable of detecting a human-sized target at 2 km (threshold), 3 km (objective). The system shall require minimal logistical support. The system shall interface with CREW, weapons, and equipment located on the tactical vehicle. The system shall be capable of flying up to 100 ft above ground level (AGL) in all environments and extreme weather conditions. The vehicles charging system shall power the system. The system can use military batteries to assist during high power draw segments of flight. The system shall be capable of connecting to a generator for standalone operations. The system shall interface with other systems on the vehicle and provide data based on the payload. This data can include, but is not limited to accurate grids and laser designation for fire support, slew-to-cue interface with the vehicle weapons and CREW systems, and act as a relay for C5ISR infrastructure. Command and control (C2) and video connections shall not rely on external satellites or signals, nor be subject to enemy direction finding or attack. This system shall be developed with an open architecture so new payloads can be added as new technologies are developed. The system shall be capable of integrating into the Android Tactical Assault Kit (ATAK). The end unit cost per system shall not exceed $100,000.00. The base effort shall include a demonstration of the system with (1) a high definition, infrared, thermal optical system capable of (T) producing accurate grids for fire support at 2 km and (O) laser designation at 3 km. (2) Signal intelligence collection payload capable of (T) intercept and precision geo locating of UHF/VHF push-to-talk (PTT) and (O) full radio frequency spectrum range (30 MHz to 6 GHz). (3) Electronic Warfare payload capable of C-UAS load set for force protection (T) 2.4 GHz and 5 GHz range (O) full radio frequency spectrum of RC control UAS and delivery of three tethered sensor systems with the high definition optical payload.

**R4214 Non-pneumatic Limb Tourniquet Test Fixture**

Active-shooter events and improvised explosive devices are increasing concerns within the United States. According to the FBI, 486 victims died from 160 U.S. active shooter events between 2000 and 2013, and the number of active shooter events rises each year. More than 260 people were injured during the 2013 Boston Marathon bombing, with 16 victims suffering amputation. Life-threatening blood loss from extremity wounds is a major concern in such events, and one of the most important tools in stopping bleeding in the pre-hospital environment is a non-pneumatic limb tourniquet. There are known incidents of tourniquets failing and reports of counterfeit tourniquets being sold. There is currently no standard by which to verify the performance of non-pneumatic limb tourniquets. A standard test fixture and operating instructions are needed to validate the claimed performance by manufacturers.

Develop a standard, low-cost test fixture and operating instructions to assess the performance and efficacy of non-pneumatic limb tourniquets. The test fixture must not leak any fluid medium that it may use to quantify the tourniquet performance. The test fixture must return to its original shape when the tourniquet is removed after the test. The test fixture must be capable of measuring occlusion pressures from 200 mmHg to 500 mmHg. All sensors and measuring devices used in the test fixture, as well as the overall system, must be capable of being calibrated to ensure accurate test results. The test fixture must be capable of accepting and testing tourniquets covered in simulated blood or tourniquets at temperatures between -51 °C (-60 °F) and 71°C (160 °F). The performance of the test fixture must be independent of the strap width of the tourniquets to be tested, providing accurate measurements regardless of strap width. The test fixture must be capable of being fabricated in two extreme sizes for simulating limb circumferences of 6.125 in to 27.75 in, respectively.

**R4240 Heads Up Display and Optics System**

Military personnel tasked with breaching enemy structures require a high level of protection for the initial breach into a facility. The breachers, or the first man in the door, is typically wearing armor and protection systems that provide additional coverage and are thicker and heavier than standard forces. This armor includes helmet systems with maximum coverage area (helmet, mandible, visor) for ballistic protection which can reduce operational situational awareness for the wearer. There is a need for state-of-the-art technologies to increase situational awareness for the first man in the door.

Develop a heads up display (HUD) and optics system that can be integrated and operational on current commercial-off-the-shelf transparent ballistic visors utilized by the United States military. Optionally, the contractor may design a transparent ballistic visor attachable to existing helmet platforms, operational with the HUD and optics system, and is capable of providing a minimum V50 ballistic protection limit (BL(P)) of 1850 feet per second when tested against a 17-grain Fragment Simulating Projectile (FSP). The system shall display information in a monochromatic scheme with the objective of displaying in full color. The system shall be capable of displaying a minimum of three (3) differing data types such as, warning signals, indicator arrows, and a desire for high resolution full motion video. The system shall operate in a wide range of lighting conditions from direct sunlight to overcast starlight. To maintain optimal situational awareness, the system shall maximize the heads up display field of view (FOV) with an objective to provide a 156 (H) × 33 (V) degree FOV. The system shall be powered through a standard electrical connector. The system shall not weigh more than 1 pound. The latency of the system shall be less than 10 milliseconds.

**R000-PP-FY19 Unspecified Requirement - Personnel Protection**

Develop novel material solutions to enhance the survivability of personnel to include both military and civilian communities involved in combating terrorism. CTTSO is interested in any innovative technologies or capabilities that will enhance individual protection and survivability, which a vendor believes would be of interest to the Personnel Protection Subgroup. Specific areas of interest for the Personnel Protection Subgroup are: new materials and or manufacturing techniques to improve ballistic and blast protection, reducing the areal density of ballistic materials, enhancing mechanical properties of materials for defensive applications, and metamaterials and their interactions with the electromagnetic spectrum.

Proposed technologies, not directed toward enhancing personnel survivability and recovery are not desired.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.7 Physical Security (PS)

**R4230 EVA Laminated Glazing**

Ethylene-vinyl Acetate (EVA) laminated glass is being marketed as the same or better protection performance as Polyvinyl Butyral (PVB) laminated glass under blast loading. However, there is no information available for the blast community to make a determination on when a rigid requirement for PVB must be adhered to in a design, or when the lower cost EVA laminated glass is an acceptable substitution for PVB.

The performer shall determine/develop the following to inform design and construction personnel as to the applicability of using EVA laminated glass in a facility designed for blast protection:

1. Conduct literature search and review of any testing involving performance of EVA under standard loads or extreme (blast) loads.
2. ? Determine if there are different ways of producing EVA laminated glass and, if so, if each method needs to be categorized and the EVA laminated glass included in the below test/efforts.
3. Investigate and subsequently validate through physical testing the performance of 48-inch by 48-inch glazing system designed for and with PVB laminate. Determine how industry substitutes EVA for PVB. Investigate and compare EVA laminate to PVB laminate with respect to blast loads and impulse combinations ranging from 4 psi to 42 psi and 20 psi-ms to 300 psi-ms.
4. If EVA laminated glass is not suitable for use as a glass laminate under blast loading, create a technical reference to inform U.S. Government procurement personnel that EVA is not a suitable substitute for PVB.
5. If EVA is found to be a suitable substitute for PVB in blast resistant laminated glazing, determine through literature study or testing how EVA laminated glass responds to weather effects over its lifecycle (hot/cold cycle, humidity, etc.) and how those effects impact blast protection properties over time.
6. Write a construction guidance document that identifies the blast performance of EVA laminated glass and compares it to PVB laminated glass currently on the market. This guidance should be written with the intent to inform the design and construction community and address, at a minimum, the following questions:
   * What are the different types (if any differences in manufacturing process) of EVA laminated glass and what are their blast performance specifications?
   * How does the climate affect the different types of EVA laminated glass blast protection over time?
   * How does EVA laminated glass compare to PCB laminated glass for the above two questions?

**R4232 Terrorist Bombing Trend Analysis**

Compile an unclassified bombing trend analysis targeted at informing physical and facility security personnel on past and current blast threats. The analysis will inform the community on current and future blast threats that they need to mitigate and prepare for to ensure the safety of the personnel and property under their charge. The study shall reach back six (6) years for a comprehensive review of terrorist bombing events and fifteen (15) years for a more general overview of terrorist bombing events.

The output of the study will be an electronic report and excel spreadsheet that shall:

* Detailed examination of all person, vehicle, and water borne, and emplaced IEDs, (e.g. placed in a bag, suitcase, etc.) that occurred in the past six (6) years.
* Examine events going back seven to fifteen (15) years.
* Examine failed attempts and successful attacks worldwide. Analysis of each incident will include:
  + Properties of IED:
    - Explosive used
    - Amount of explosive material
    - Method of initiation (suicide, remote, command, victim, etc.)
    - Method of concealment or casing
    - Delivery method
  + Type of target (e.g., people, property, infrastructure)
  + Mitigating and exacerbating physical and environmental factors (e.g., protective concrete, berms, laminated glass or confinement, reflected, flammable materials)
  + Successful and failed, factors contributing to failure (e.g. detection and protection countermeasures, poorly designed IED)
  + Level of damage and effects of successful attacks:
    - Number of casualties and injuries, with types if injury where available
    - Level of property damage
    - Level of infrastructure damage
  + Resulting change in security or TTPs after successful or failed attack
  + Terrorist groups affiliated with the attempt or attack

Government Furnished Information (GFI) will be provided in the form of two (2) reports. A Person-Borne IED Event report and a Vehicle-Borne IED Event report will be provided in electronic format as needed. These reports contain information on terrorist bombing events prior to August 2007 and February 2007, respectively.

**R4233 Blast Measurement Standards and Best Practices**

Blast testing employs a variety of tools and techniques that vary across testing bodies. The resulting data from different tests may not be comparable because of variations in setup, instrumentation, test procedure, methodologies, and data collection techniques. Understanding how all these variables effect test results is critical, especially when comparing explosive energies between ideal and non-ideal explosives. Developing a technical reference and test standards would reduce variation and increase comparability and efficiency across the field of blast testing. The performer shall create a technical reference that will inform those conducting blast testing (engineers, scientists, labs) on how to conduct their tests to ensure the accuracy of the data and best practices. The following work shall be performed under this effort:

1. Develop a comprehensive report/guide addressing blast testing considerations and recommendations, as well as a separate report detailing the actions/discussions taken during this effort in order to provide historical context for any follow-on work. The guide should be of academic quality for use by a variety of scientific and engineering institutions.
2. Identify various gauges typically used in blast testing (e.g., strain, pressure, thermal imaging, image correlation) Identify limiting factors in their use, reliability, and best practices. Examine the performance variability of different gauges by type and define parameters for optimal performance during explosive testing.
3. Identify mechanisms to ensure quality assurance/quality control (QA/QC) during the testing event to ensure data is properly captured and relatable to similar applications.
4. Suggest placement (distance, angle, height) of gauges for measuring blast properties that would allow/assist comparability between different tests.
5. Evaluate specific differences related to the type of energetic material employed, standoff, charge configuration detonator location, height of burst, detonation location, substrate, construction of reaction structure to reduce clearing pressure reductions, instrumentation and data capturing and analysis.
6. Incorporate guidance for very near-field as well as far-field blast testing. Address small and large charge sizes, and the considerations affecting how instrumentation is used to collect blast and energy data from both spectrums.
7. Suggest methods to standardize testing setup (common explosive shape, initiation, height of burst, priming and boosting, etc.) to reduce variability and increase constants, allowing easier comparison of different explosive tests.

The following work is optional and may be pursued upon completion of all tasks above.

1. Suggest placement (standoff, height, etc.) of gauges and sensors to collect general information about blast pressure that would be applicable to blast scenarios other than the test objective. Testers will use this guidance to gather general data that can be shared across multiple organizations.
2. Identify procedures to enable testing community to replicate the pressure and impulse levels of “TNT Equivalent” design guidance that is typically associated with a blast design or countermeasure utilizing other energetic materials.
3. Develop and execute a transition plan to have any resultant standards that are developed, transferred to an appropriate agency to manage. This may include organizations such as: ISO, ANSI, military or other regulating bodies as appropriate.
4. Develop an outreach plan to ensure results from this effort are provided to domestic and international partners for use and incorporation into their testing efforts. Outreach effort should include, but is not limited to; publications in appropriate scientific/engineering journals, as well as appropriate scientific conferences.

**R000-PS-FY19 Unspecified Requirement - Physical Security**

Develop new or improved physical security technologies that may be of interest to CTTSO, but were not specifically requested in the BAA and are not commercially available. Proposed projects shall be timely, relevant, and further worldwide combating terrorism efforts.

Areas of particular interest include the following Physical Security focus areas:

* 1. Blast Effects and Mitigation

1. Improved blast mitigation materials and construction techniques.
2. Anomaly detection technologies for detecting threat objects, people, vehicles, etc.
3. Technology solutions and countermeasures to protect personnel, property, and infrastructure.
   1. Screening, Observation, Detection, and Protection
4. Advanced technologies and techniques to detect, identify, and locate threats, along with capabilities to alert security personnel and law enforcement officials.
5. Novel access control capabilities for government buildings and secure facilities.
   1. Maritime Security
6. Novel technologies to protect ships, ports, and waterside or offshore maritime facilities.
7. Technologies to detect, track, and counter maritime threats including swimmers, divers, unmanned surface vehicles (USV) or unmanned underwater vehicles (UUV).

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.8 Surveillance, Collection, and Operations Support (SCOS)

**R4191 Ultra High Frequency (UHF) Antenna Miniaturization**

Commercial-off-the-shelf (COTS) UHF antennas are physically large and have low or negative gain. There are limited high gain, low profile UHF antennas available for field communications.

The U.S. Government has a requirement for an ultra-mobile, low profile UHF antenna for field communications applications to include a small form factor antenna fully integrated into circuit card assemblies and/or body worn applications.

Proposed Specifications and Key Performance Parameters:

1. Frequency: UHF 290-375 MHz TX/RX.
2. Dimensions: <2.5" (W) × 2.5" (L) × 0.150" (H)
3. Gain: >3 dB
4. Weight: <1.5 lbs.

**R000-SC-Biometrics Unspecified Requirement – Biometrics**

The intelligence community (IC) realizes there may be new, improved or emerging technologies or technological capabilities in the field of biometrics, specifically in the area of iris, facial or ocular recognition with new or novel approaches to determine, collect or collate this data. This includes either verification or identification of physiological or behavioral traits, qualities and characteristics in both offensive and defensive formats.

This unspecified requirement is for determining unique or unidentified technologies in the biometric field. Capabilities should respond to the emerging needs for biometric collection solutions in the operational environment, including smaller, lightweight, and/or moldable sensors. Advances in human factors and data subject usability are of interest as well. New approaches to analyze biometric data in order to increase actionable intelligence at all levels of an operational mission will also be considered.

Submissions that do not directly relate to biometric collections and analysis will be rejected without consideration or comment.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

**R000-SC-HLT-MEDEX Unspecified Requirement - Human Language Technologies and Media Exploitation (HLT/MEDEX)**

The intelligence community (IC) realizes there may be new, improved or emerging technologies or technological capabilities in the field of Human Language Technology (HLT) and Media Exploitation (MEDEX).

Future anticipated needs are such that the current level and ability of HLT/MEDEX products are projected to fall short of requests. CTTSO is interested in any innovative technologies or capabilities within the Surveillance, Collections, and Operations Support (SCOS) focus area of Human Language Technology/Media Exploitation which a vendor believes would interest the SCOS Subgroup. This includes such fields as anticipatory intelligence, activity based intelligence (ABI), or text analytics as strictly HLT or in conjunction with MEDEX, for both offensive and defensive purposes.

This unspecified requirement is for determining unique or unidentified technologies in the HLT/MEDEX fields. Human Language Technologies include, but are not limited to, Speaker Activity Detection (SAD), Speaker Identification Detection (SID), Speech Recognition (SR), Language Identification Detection (LID), and Gender Identification Detection (GID). Also of importance to HLT/MEDEX is the ability to rapidly compress and store for future processing the data.

Submissions that do not directly relate to HLT/MEDEX will be rejected without consideration or comment.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

## 5.9 Tactical Operations Support (TOS)

**R4115 Lightweight Ammunition Packaging (LAP)**

Current tactical operators require lightweight weapons, small arms ammunition, and small caliber ammunition packaging to reduce the weight burdens on personnel and vehicles that must transport Class V (CL V) materials into battle. Lightweight weapons and polymer-cased ammunition are entering the battlefield and provide appreciable weight savings to the operator while facilitating viable solutions to address small arms capability gaps and potential overmatch by adversaries. Weight reduction improves mobility and thus enhances operator survivability and performance. However, this lightweight ammunition is being stored and transported in legacy packaging that is unsuitable for combat operations in austere environments or in heavy metal boxes (MB) that increase the overall system weight, transport costs, and ammunition costs. The tactical operator needs lightweight ammunition packaging (LAP) for small caliber ammunition, to include ammunition cans which reduce packaging weight, thus improving operational and cost efficiency while eliminating unnecessary waste. LAP must also provide sufficient long-term ammunition protection-in-storage, robust durability, and longevity in all operational environments.

While desirable for all small caliber ammunition, the priority requirement is for lightweight ammunition packaging for heavy machine gun ammunition, specifically the .50 Cal Browning Machine Gun (BMG). The Department of Defense Identification Code (DODIC) for the ammunition is A576. The LAP shall consist of lightweight stackable interlocking ammunition cans (Threshold - T). The cans must fit within the current U.S. and NATO-issue ammunition can cradles (MK93 MOD 1 and similar systems) that accommodate the US M2A1/2 series MB (T). The LAP ammunition can should be no smaller than the current US M2 series (Objective - O). The LAP ammunition can shall weigh 30% less than the US M2 series MB (T), 65% less than the US M2 series MB (O). The LAP ammunition can shall hold no-less-than 100 rounds of linked .50 BMG (T/O) without exceeding the dimensions of the US M2 series MB (T).

The linked ammunition shall be positioned within the LAP ammunition can perpendicular to the length of the LAP ammunition can (T). The LAP ammunition can shall include a top lid that is removable without tools (T), a stowable top side carrying handle on the lid (T), and a means to remove the LAP ammunition can from the ammunition can cradle/holder (MK93 MOD 1 or similar systems) when the top lid is not present (T). The lid of the LAP ammunition can shall latch securely to the container body (T) and include the means to lock the lid to the ammunition can with a seal (T). The LAP ammunition can shall be of a non-reflective Olive Drab (OD) Green color (T). The exterior of the LAP ammunition can shall include identifying information to include quantity, caliber, nomenclature, description/configuration, DODIC, manufacture code and lot number in accordance with current legacy marking systems and ML-STD-129R (2014) (T). Identifying information should be easily editable/replaceable without degrading the container performance in order to facilitate logistical repack and recirculation by the ammunition support activity (O). The LAP ammunition can shall operate within a temperature range of -25 degrees F to 160 degrees F (T); -65 degrees F to 160 degrees F (O). The LAP ammunition can shall meet waterproof requirements to one (1) meter of water at 1.5 psi (T); or the standard stated in MIL-STD-1904B (O).

The LAP ammunition can shall protect the contents from damage caused by transport, rough handling, shock, drop and impact damage in a manner that preserves ammunition types, including legacy or polymer-cased ammunition, in a safe and serviceable condition utilizing protocols promulgated in ITOP 4-2-602 (Rough Handling Test) and ITOP 1-2-601 (Laboratory Vibration Schedules) (T) and should meet MIL-STD-1904B requirements (Test Method Standard Design and Test Requirements for Level A Ammunition Packaging) (O) with the exception of the reduced -25 degrees F to 160 degrees F temperature range (T) and 1.5 psi seal (T). The LAP ammunition can should be sand and dust resistant to the same extent as the legacy MB in accordance with MIL-STD-1904B and MIL-STD-810 Method 510.6 requirements (O). The LAP can may be integrated into an outer packaging, or other modular/sub-pack/intermediate container configuration, for theater logistical movement, in order to meet objective requirements IAW MIL-STD-1904B. Any modular or sub-component design must ensure that the stand alone LAP sub-pack(s) (individual) meets threshold requirements for ammunition preservation utilizing ITOP 4-2-602 and ITOP 1-2-601.

The LAP ammunition can shall minimize the need for excessive intermediate packaging within the container or pallet stack (T). The LAP ammunition can in single-pallet, unit load configuration shall be capable of being assembled with metal banding and adjustable strapping as per DAC drawings for general 1.4S munitions load-out (T), should be assembled without metal banding using reusable tensioning straps or mechanisms (O).

The LAP ammunition can shall meet the unitization performance and test standards as outlined in MIL-STD-1660A when packed in wire-bound boxes at the threshold temperature range (T), or when packed in wire-bound boxes at the objective temperature range (O) in order to facilitate inter and intra theater movements of CL V utilizing established DoD assets and processes. The LAP ammunition can shall minimize the impact by fire (T), or meet the burning characteristics of MIL-STD-1904B (O). The LAP ammunition can shall be easily destroyed in the field as required to facilitate quick and easy movement, transport logistics and prevent nefarious use by adversary forces (T), economically disposable to the same end (O).

The Government will require prospective vendors to submit concept drawings and price quotations for sufficient LAP ammunition cans to pack and palletize 30,000 rounds of linked .50 Cal BMG rounds during White Paper and Full Proposal phases.

Summary of Deliverables:

The Contractor shall deliver:

* 150 lightweight ammunition packaging cans for .50 Cal BMG ammunition for Government verification and qualification testing.
* 150 lightweight ammunition packaging cans for .50 Cal BMG ammunition for Government end user test and evaluation.

A Firm Fixed Price proposal is preferred.

**R4116 Lightweight Intermediate Caliber Cartridge (LICC) and Individual Weapon System (IWS)**

Tactical operators require an integrated, user-tailorable, lightweight shoulder-fired individual weapon and lightweight intermediate caliber cartridge (LICC) that can overmatch the current maximum effective range and terminal effects of peer, near peer, and future threat individual weapons and ammunition, while also defeating current and emerging threat individual protective equipment out to 800 meters. This weapon system shall be comprised of four main components: a lightweight .264 inch (6.5 mm) intermediate caliber projectile loaded in a lightweight polymer cartridge case; a lightweight purpose-built caliber .264 USA detachable box-magazine; a purpose-built lightweight modular weapon platform. The LICC IWS weapon system shall be developed, tested, and delivered for developmental and operational testing by a single contractor who shall develop/obtain and integrate all subcomponents into a fully mature, safe, and reliable system.

**LICC Ammunition**

The US Army Marksmanship Unit developed .264 USA (6.5×48 mm) cartridge shall be used for LICC IWS development, test, and evaluation. This cartridge is available in a polymer case from MAC LLC in Bay St Louis, Mississippi. Two (2) lightweight .264 USA rounds shall be required as deliverables loaded with the following projectile types:

Phase 1 Proof of Concept evaluations.

1. 108 grain Scenar Open Tip Match (OTM) round (Qty: 5,000 rounds) with a muzzle velocity from an 11.5 inch test barrel of 2650 feet per second (fps) (Threshold - T) 2750 (Objective - O) with an extreme spread of +/- 50 fps (T) 25 fps (O). 10-shot extreme spread dispersion from an 11.5 inch test barrel shall not exceed 2 Minutes of Angle (MOA) (T) 1.5MOA (O) at 100 m and 300 m.
2. .264 USA MK255 MOD 1-style frangible training round with Reduced Ricochet Limited Penetration (RRLP) projectiles for Close Quarters Battle testing. (Qty: 3000 rounds)

Phase 2 Optional Development if phase 1 is successful

1. 108 grain Scenar Open Tip Match (OTM) round (Qty: 5,000 rounds) with a muzzle velocity from a 11.5 inch test barrel of 2650 fps (T) 2750 fps (O) with an extreme spread of +/- 50 fps (T) 25 fps (O). 10-shot extreme spread dispersion from an 11.5 inch test barrel shall not exceed 2 Minutes of Angle (MOA) (T) 1.5MOA (O) at 100m and 300m.
2. .264 USA Combat Barrier rounds loaded with Special Operations Science and Technology (SOST-style) projectiles (Qty: 25,000 rounds) (T).
3. US M855A1 Enhanced Performance Round (EPR-style) projectiles (Qty: 5,000 rounds) (O). The .264 USA Special Operations Science and Technology (SOST-style) and US M855A1 EPR-style Combat Barrier rounds shall continue on the original shot line after barrier penetration (T), shall be barrier blind out to 225m (T) 450m (O), and shall limit fragmentation (T).
4. .264 USA MK255 MOD 1-style frangible training round with Reduced Ricochet Limited Penetration (RRLP) projectiles for Close Quarters Battle testing. (Qty:10,000 rounds)
5. The .264 USA SOST-style and US M855A1 EPR-style Combat Barrier rounds shall penetrate no less than (NLT) 12-inches (T) of 10% ordnance gelatin at 800m (T); no greater than (NGT) 18 inch at 25m-150m (T); 25m-450m (O) when fired from a 14.5 inch barrel (T), 11.5 inch barrel (O). The .264 USA SOST-style and US M855A1 EPR-style Combat Barrier rounds shall be tested in accordance with current FBI Ballistic Research Facility (BRF) test protocol (T) shall pass all current FBI Ballistic Research Facility (BRF) test protocol (O). A .264 USA MK255 MOD 1-style frangible training round with Reduced Ricochet Limited Penetration (RRLP) projectiles (Qty: 36,000 rounds) with non-toxic primer shall also be required (T). All .264 USA LICC ammunition shall be corrosion resistant (T); water proof (T); and loaded with reduced flash and temperature stable propellant (T) and non-toxic primer (O). Each .264 USA LICC round shall contain markings to include caliber, year of manufacture and manufacturer identification (T). All LICC ammunition should be packaged in 10-round stripper clips (O).

**LICC IWS .264 USA Detachable Box Magazine**

A purpose-built detachable box magazine holding NLT 25 rounds (T) > 25 rounds (O) shall be delivered with the .264 USA caliber LICC IWS (Qty: 238). The box magazine shall be no-longer-than the current US M4 5.56mm box magazine (T). The LICC IWS magazine shall utilize a self-lubricating non-tilt follower and high-quality corrosion resistant magazine spring (T). Each LICC IWS variant shall be provided with seven (7) magazines (T). The LICC IWS magazine should be fillable using ammunition on stripper clips (O) using speed loaders (O). Modular Lightweight Load-carrying Equipment (MOLLE) 2 and 3- magazine pouches shall be available for use with the LICC IWS magazine for operational evaluation (T).

**LICC IWS**

Phase 1 Proof of Concept Evaluations

1. Close Quarter Battle (CQB) Carbine with 11.5 inch barrel and 5-position collapsible stock (Qty: 4);

Barrel length changes shall be made by operator exchange of upper receivers (T) or by the exchange of barrels in a common receiver (O). Buttstock changes should be made by the operator within 120 seconds and without special tools (O).

Weapon system operation will not be specified, but gas shall not vent directly back into the shooter’s face. The gas settings shall be rapidly adjustable by the shooter. LICC IWS operating controls shall mirror those of the Colt Canada C8 Special Forces Weapon (SFW) (T) and shall be ambidextrous (T). LICC IWS trigger mechanisms shall provide semiautomatic and fully automatic modes of fire (T); provide a 2 stage consistently smooth and crisp 4.50 pound +/- .5 pound trigger pull (T). The safety/selector switch should move from safe to fully automatic position within 90 degrees of rotation (O). The bolt lock/release should be operable with the firing index finger with the firing hand on the pistol grip (O). Sight and accessory attachment at the 12 o’clock position shall be via a monolithic MIL-STD-1913 (Picatinny) rail that ends .39 inch from the rear edge of the flash suppressor (T) on all LICC IWS variants. Accessory attachment at the 9, 6, and 3 o’clock positions shall be via Modular Locking (M-Lok™) (T). The LICC IWS CQB Carbine variant shall weigh < 7.0 pounds (T) < 6.5 pounds (O) without sights, magazine or signature suppressor. The LICC IWS CQB Carbine variant shall be no-longer-than the Colt Canada C8 Special Forces Weapon (SFW) with 11.5 inch barrel and Ops Inc. signature suppressor. Each LICC IWS barrel shall be fitted with a flash suppressor for use with a quick connect/disconnect signature suppressor (T). The LICC IWS barrel shall be lightweight in nature (T); employ lightweight materials or relieved (i.e., fluted, ball milled) profile (O). The LICC IWS should reduce felt recoil to the operator (O). The LICC IWS should reduce felt recoil to the operator to levels ≤ the 5.56mm Colt Canada C8 SFW (O). Reliability, durability and safety of the LICC IWS shall be equal to (T=O) better than the Colt Canada C8 SFW with 14.5 inch barrel fitted with Ops Inc. suppressor firing 5.56mm MK318 MOD 1 SOST ammunition. Each LICC IWS shall be provided with a field cleaning kit and operator’s manual in the English language (T).

Phase 2 Optional modifications and Enhancements based on Phase 1 successful development

.264 USA caliber LICC Individual Weapons Systems shall be available in three (3) variants (T):

1. Close Quarter Battle (CQB) Carbine with 11.5 inch barrel and 5-position collapsible stock (Qty: 20);
2. Carbine with 14.5 inch barrel and 5-position collapsible stock (Qty: 10);
3. Recon “Recce” Rifle with 16.0-18.0 inch barrel and 5-position collapsible stock with adjustable cheek piece and butt plate (Qty: 4).

Barrel length changes shall be made by operator exchange of upper receivers (T) or by the exchange of barrels in a common receiver (O). Buttstock changes should be made by the operator within 120 seconds and without special tools (O). The weapon operating system shall be piston operation (T) and include an adjustable gas regulator (T) to optimize weapon function for ammunition, barrel and signature suppressor variables. The adjustable gas regulator shall provide settings for off position (no gas), combat barrier ammunition, frangible training ammo and suppressed use (T). LICC IWS operating controls shall mirror those of the Colt Canada C8 Special Forces Weapon (SFW) (T) and shall be ambidextrous (T). LICC IWS trigger mechanisms shall provide semiautomatic and fully automatic modes of fire (T); provide a 2 stage consistently smooth and crisp 4.50 pound +/- .5 pound trigger pull (T). The safety/selector switch should move from safe to fully automatic position within 90 degrees of rotation (O). The bolt lock/release should be operable with the firing index finger with the firing hand on the pistol grip (O). Sight and accessory attachment at the 12 o’clock position shall be via a monolithic MIL-STD-1913 (Picatinny) rail that ends .39 inch from the rear edge of the flash suppressor (T) on all LICC IWS variants. Accessory attachment at the 9, 6, and 3 o’clock positions shall be via Modular Locking (M-Lok™) (T). The LICC IWS CQB Carbine variant shall weigh < 7.0 pounds (T) < 6.5 pounds (O) without sights, magazine or signature suppressor. The LICC IWS CQB Carbine variant shall be no longer than the Colt Canada C8 Special Forces Weapon (SFW) with 11.5 inch barrel and Ops Inc. signature suppressor. The LICC IWS Carbine variant shall weigh < 8.0 pounds (T) < 7.0 pounds (O) without sights, magazine or signature suppressor. The LICC IWS Carbine variant shall be no-longer-than the Colt Canada C8 SFW with 14.5 inch barrel and Ops Inc. signature suppressor. The LICC IWS Recce Rifle variant shall weigh < 9.0 pounds (T) < 8.0 pounds (O) without sights, magazine or signature suppressor. The LICC IWS Recce variant shall be no-longer-than the Colt Canada C8 SFW with 16.0-18.0 inch barrel and Ops Inc. signature suppressor. Each LICC IWS barrel shall be fitted with a flash suppressor for use with a quick connect/disconnect signature suppressor (T). The LICC IWS barrel shall be lightweight in nature (T); employ lightweight materials or relieved (i.e., fluted, ball milled) profile (O). The LICC IWS should reduce felt recoil to the operator (O). The LICC IWS should reduce felt recoil to the operator to levels ≤ the 5.56 mm Colt Canada C8 SFW (O). Reliability, durability and safety of the LICC IWS shall be equal to (T=O) better than the Colt Canada C8 SFW with 14.5 inch barrel fitted with Ops Inc. suppressor firing 5.56mm MK318 MOD 1 SOST ammunition. Each LICC IWS shall be provided with a field cleaning kit and operator’s manual in the English language (T).

**LICC IWS Signature Suppressor**

A quick-connect/disconnect LICC IWS signature suppressor shall be provided with each LICC IWS variant (T). The LICC IWS signature suppressor shall be no longer than the US SOPMOD suppressor (T=O). The LICC IWS signature suppressor shall weigh no more than the US SOPMOD suppressor (T=O). When fitted to any LICC IWS variant the sound signature shall be no greater than 140 dB(A) (T) less than 140 dB(A) (O) when measured at the operator’s ear firing .264 USA SOST-style ammunition. The LICC IWS signature suppressor shall reduce backpressure and blow-back into the weapon (T). The LICC IWS signature suppressor shall provide a minimal point-of-impact (POI) shift when mounted (T). The LICC IWS signature suppressor should provide no point-of-impact (POI) shift when mounted (O). The LICC IWS signature suppressor shall allow the firing of all LICC ammunition types to include USA MK255 MOD 1-style frangible training ammunition (T).

**Documentation and Test Support Materials**

Each LICC IWS shall include an operator’s manual in the English language covering all subsystems within the weapons system (T). The vendor shall provide new equipment training (NET) for ten (10) students each at two (2) North America locations (T). The vendor shall provide armorer’s maintenance and repair training for five (5) students at two (2) North America locations (T). The vendor shall provide weapon and signature suppressor maintenance and repair manuals in the English language at the ratio of one (1) per every five (5) weapons (T). The vendor shall provide .264 USA LICC cartridge and LICC IWS chamber drawings (T), .264 USA LICC cartridge and LICC IWS specifications (T), and .264 USA LICC energetic data (T). The vendor shall provide test results on the LICC IWS barrel twist and bore profile as optimized and selected for LICC ammunition types (T). The vendor shall provide two (2) LICC IWS Test Support Packages (TSP) each including enough spare parts, tools and gauges sufficient to support five (5) weapons firing 10,000 rounds each, one (1) 16.7” accuracy test barrel, one (1) 16.7” pressure test barrel and two (2) pressure transducers for the polymer-cased .264 USA LICC ammunition (T). The contractor shall be responsible for obtaining US government approval for exporting and delivering all test articles to the Canadian Department of Defense (T).

The vendor is responsible for delivering contractor test results for this effort after each spiral iteration (phase). Two phases of development are anticipated (Phase 1 - Proof of Concept, Phase 2 – Product Improvement). Government test and verification shall occur after receiving the final contractor test report and required documentation (T). No government furnished equipment shall be provided for this effort. However, Government furnished information can be provided if requested and reasonable. All ammunition should meet MIL-STD­1461E, MIL-STD-1168, MIL-STD-709D, and MIL-STD-636 specifications (O). Post development, and if the research, development, test, and evaluation effort is successful, the Government may also request the vendor to provide test articles and subject matter expert support, as required, in Government safety and operational testing for transition under a contract modification.

A Firm Fixed Price proposal is preferred. Vendor should provide options in their proposal for economies of scale.

| **Summary of Deliverables** | **Quantity Phase 1**  **Proof of Concept** | **Quantity Phase 2**  **optional** |
| --- | --- | --- |
| **CQB Carbine with 11.5” Barrel and 5-position collapsible stock** | **4** | **20** |
| **Carbine with 14.5” Barrel and 5-position collapsible stock** |  | **10** |
| **Recce Rifle with 16.0-18.0” Barrel and 5-position collapsible stock with adjustable cheek piece and butt plate** |  | **4** |
| **LICC IWS Signature Suppressor** | **4** | **8** |
| **Rounds, Polymer, .264 USA 108 grain OTM (Scenar)** | **5,000** | **25,000** |
| **Rounds, Polymer, .264 USA SOST MOD 1 Combat** |  | **25,000** |
| **Rounds, Polymer, .264 USA EPR Combat** |  | **5,000** |
| **Rounds, Polymer, .264 USA MK255 MOD 1 RRLP Frangible** | **3,000** | **36,000** |
| **LICC IWS .264 USA detachable box magazine** | **28** | **238** |
| **Test Barrel, 16.7” Accuracy Test** |  | **1** |
| **Test Barrel, 16.7” Pressure Test** |  | **1** |
| **Transducers, pressure** |  | **2** |
| **Armorers (maintenance and repair) training for five students at two North America locations** | **1** | **2** |
| **Drawings, .264 USA LICC Cartridge (TAA for Canada)** | **1** | **1** |
| **Drawings, .264 USA LICC IWS Chamber (TAA for Canada)** | **1** | **1** |
| **Specifications, .264 USA LICC Cartridge and LICC IWS (TAA for Canada)** | **1** | **1** |
| **Data, .264 USA LICC Energetic Data** | **1** | **1** |
| **Test Support Package (10,000 round support)** |  | **2** |

**R4171 Long Range Machine Gun Direct View Optic (LRMG-DVO)**

Tactical operators require a machine gun Direct View Optic (DVO) with increased magnification, to identify and accurately interdict targets to maximum range of the weapon systems (1800 m point, 2400 m area). The DVO needs to have a large field-of-view and large ocular exit pupil so the gunner can first identify the target and then maintain situational awareness under recoil. Medium weight and heavy weight machine guns have outpaced available optics, thus preventing accurate day and night interdiction at the maximum range of the weapon system being used.

Existing sights are too long, not designed for machine guns, and at high magnification both the field-of-view and exit pupil are too small for use on machine guns. Field-of-view is important for gunners in a support-by-fire capacity (i.e., knowing where friendlies are located) and for engaging moving targets. A large exit pupil is necessary to be able to see through the scope under a sustained rate of fire. Tactical operators need the ability to interdict at long range and keep target situational awareness as well as they can at short range using iron sights.

Developers will have to take a novel approach to solve these problems as standard scope engineering cannot accomplish high power, large exit pupils, and large fields of view in one scope.

The DVO will also require an internal display that can display data provided from exterior devices via direct cabling (T) or Bluetooth Low Energy (O) inclusive of laser range finder, ballistic data for a shooting solution (T) disturbed reticle, and Augmented Reality data (O).

This requirement is unique to machine guns.

The following attributes are required to meet this requirement:

1. Dimensions ≤ 10.5 inches overall length, and ≤ 2.0 inches diameter.
2. Weight: 2.5 pounds or less (T); 1.5 pounds or less (O).
3. Variable Magnification:
   1. 5-10x (T)
   2. 6-12x (O)
   3. Binary adjustment (T) / Continuous adjustment (O) zoom
4. Exit pupil diameter greater than 8mm at all magnifications (T=O)
5. Field of View (FOV):
   1. 3-degree FOV at 6x, 1.5-degree FOV at 12x (T)
   2. 6-degree FOV at 6x, 3-degree FOV at 12x (O)
6. Compatible with existing night vision systems (SOCOM INOD Block III, ARMY PVS30, USMC PVS27).
7. Data display and receive capable: factored into the design to support spiral development (T). Data/Augmented Reality display integrated with port communications module (O). Government Interface Control Document available on request.
8. Power: device display will draw power from data source components attached to the scope.
9. Recoil impulse: DVO shall withstand the recoil impulse of the following weapon systems: 7.62mm M240 Machinegun, .50 caliber M2 machine gun, General Dynamics .338NM machine gun.

Recoil profile data available on request.

Summary of Deliverables:

* Minimum of four (4) LRMGDVO

A Firm Fixed Price proposal is preferred.

**R4173 Novel Small Unmanned Aerial Systems (sUAS)**

The Tactical Operations Support (TOS) Subgroup seeks novel small Unmanned Aerial Systems (sUAS) to enhance the capabilities of small tactical teams in expeditionary environments through the entire evolution of their missions (infiltration, execution, and exfiltration). Airframes may be of any configuration not greater than 55 lbs. including payload. All systems shall be man-portable. These technologies should augment the situational awareness, lethality, or communications capabilities of the team with as little impact as possible on the end-users for deployment, control, and maintenance of the systems. The systems should focus on the augmentation of tactical teams engaging in Direct Action, Special Reconnaissance, Counterterrorism, Counter-Proliferation, Unconventional Warfare, and Information Support Operations.

TOS is particularly interested in, but submissions are **not** limited to, the following areas:

* Low-cost systems (hundreds or thousands of dollars, not tens of thousands or hundreds of thousands).
* Novel use of off-the-shelf technology or modified off-the-shelf technology.
* Novel use of additive manufacturing technologies to enhance sUAS capabilities.
* Novel form factors that enhance performance, endurance, or camouflage systems.
* Novel accessories for off-the-shelf systems that improve flight or sensor performance and reduce audible, visual, and electronic detection.
* Novel control interfaces that reduce operator input, control multiple systems at once, or interface with other defense systems for augmentation of weapon platforms or sensor packages.
* Novel navigation systems.
* Technologies that enable autonomous or assisted flight in tunnels, complex urban terrain, and other GPS-denied areas.
* Defeat of counter-UAS technologies.
* Self-launching systems with no requirement for rails, tubes, or external launch interfaces are preferred.

Submissions are encouraged to be unique and novel technologies that advance the state of sUAS capabilities. We are not interested in incremental improvements of existing systems. Technologies identified under this requirement are intended to be operationalized and are expected to perform in operational environments. These environments include land, maritime, and high altitude launch areas. Any system developed under this effort must have an application programming interface (API) for integration with Government-developed control interfaces such as Centralized Command of Commercial Drones (C3D).

A Firm Fixed Price proposal is preferred.

**R4197 Assault Vertical Take-Off and Landing (VTOL) Loitering Munition**

The current loitering aerial munitions are limited in their ability to engage targets in defilade, behind cover, as well as screen and concealment. They are also limited in the ability to engage targets that are surrounded by substantial vertical obstacles (trees, walls, etc.), or that are maneuvering in complex channelized terrain found in urban environments which include structures and subsurface terrain. Current solutions are not capable of launch by an individual on the move – they require a temporary fixed launch area, control site, as well as an increase in setup time normally requiring an assistant. In addition, there are no current fielded VTOL loitering munition solutions for tactical operators designed to launch, identify, and engage targets. A true VTOL loitering munition should possess enough endurance and adequate sensors to find, fix, and finish targets in a single man-portable platform.

Through this capability, Special Operations Forces (SOF) seek an increase in lethality, range, precision and survivability of small maneuver elements across the range of military operations.

Desired characteristics:

* Shall weigh less than 20 pounds (T); less than 5 pounds (O).
* Size shall allow a single operator to transport on foot using only a rucksack or assault backpack. Launched and operated in all modes / functionalities by a single operator during dismounted maneuver (T=O).
* Shall utilize a fire controller in the form of a small laptop or tablet (T); wearable handheld device (O).
* Shall allow for Vertical Takeoff or Landing (VTOL) with no external launching or recovery mechanism/device and capable of direct attack, mid-course navigation based on target coordinates and direct controller input, and hover (T=O).
* Shall be able to loiter on station for 15 minutes (T); 1 hour (O).
* Shall be capable of engagement from 50 meters to 10 kilometers stationary and moving (T); 20 meters to 20 kilometers (O).
* Platform shall be expendable with an abort and safe ditch ability allowing the operator to cancel/abort an attack (T); platform shall be recoverable, reloadable, reusable, and capable of return to base if engagement not required (O).
* Shall utilize an EO/IR optic (T); multispectral optic (O).
* Shall be capable of updating or switching targets after launch (T=O).
* Shall have the ability to operate autonomously and/or employ artificial intelligence to operate in intelligent swarms (O).

A Firm Fixed Price proposal is preferred.

**R4198 Long Range Machine Gun In-line Mid-Wave IR (MWIR) Sight**

Emerging machine guns with range capabilities to engage point targets to 1800m and area targets to 2400m have outpaced current inventory MWIR in-line scope capabilities, severely limiting the ability for small units to utilize the full capability of weapon systems at night. Tactical operators require a MWIR in-line sight that can identify the difference between man and animal out to 2400m. This capability would enhance current machine gun systems, current and emerging sniper systems, and meet small Unmanned Aerial System (sUAS) detection requirements.

The following attributes are required to meet this requirement:

1. Dimensions: < 12 inches long, < 3.5 inches wide, < 4 inches tall
2. Weight: < 5 pounds (T), < 3.5 pounds (O)
3. Wavelength: Mid-Wave Infrared (MWIR) 3-5 ‎μm
4. Sensor Resolution: large format FPA with small pixel pitch
   1. Example: 1280 × 720 pixels 8 nm pitch
5. Field of View (FOV)
   1. 3-degree (T)
   2. 6-degree (O)
   3. Interchangeable lens with a 30-degree field-of-view for UAS detection (O)
6. Display: high resolution micro display with sub 10 nm pixel pitch
7. Durability: withstand shock and vibration of the 7.62mm M240 machine gun, .50 caliber M2 machine gun, General Dynamics .338NM machine gun, SOCOM ASR, MK19, and MK47. Recoil profile data available on request. Housing shall withstand external shock without image shift (parallelism).
8. Range: resolve a human at 1800 m (T=O), resolve a vehicle at 2400 m (T=O)
9. Power Source: DL123 as primary and 5590 batteries as an auxiliary (T=O)
   1. Battery hot swap capable (T=O)
   2. Power endurance of 3 hours (T) 6+ hours (O)
10. Data display and receive capable: factored into the design to support spiral development (T). Data/Augmented Reality display integrated with port communications module (O). Interface Control Document available on request.
11. User adjustable point of aim to point of impact (T=O)
12. Shall have digital video output connection
13. Shall provide true unity with no image shift for use with a direct view optic optimized to 6x magnification through greater than 15x magnification.
14. Shall manually focus from a distance of 50 meters to infinity (T=O)
15. Shall have a manual and auto-shutter non-uniformity compensation (NUC) capability.
16. Ready to shoot from power-on in five (5) minutes (T) 150 seconds (O).

Summary of Deliverables:

* Minimum of four (4) Long Range Machine Gun In-Line Night MWIR Prototype Optics

A Firm Fixed Price proposal is preferred

**R4250 Confined Spaces small Unmanned Aerial System (CSsUAS)**

Develop a non-tethered, remotely controlled small unmanned aerial system (sUAS) or a hybrid small unmanned aerial/ground system to safely conduct reconnaissance and mapping of discovered illicit tunnels and underground infrastructure.

The system shall:

* Enter horizontally or vertically and navigate without degradation within structures with an opening diameter no greater than 20 inches (T); 12 inches (O).
* Provide non-line-of-sight (NLOS) high definition color imagery (T) or high definition color imagery and infrared imagery (O) from the point of insertion through the entire structure.
* In one deployment, provide non-line of sight imagery from the point of insertion for distances of 300 feet one way and 600 feet round trip (T); 500 feet one way and 1,000 feet round trip (O).
* Shall render a three-dimensional model of the tunnel structure and layout (circumference, diameter, elevation changes), path, and obstacles for use as a map layer in a common geospatial information system (T).
* Shall be self-propelled, self-contained, and autonomously capable of traversing NLOS while avoiding collisions with walls or objects while in user-controlled and autonomous flight modes
* The system shall store data for manual export (T), transmit the data in near real time (O).
* Be capable of surviving and operating in environments where ambient and subterranean relative humidity range from 50 to 95 percent.
* The system shall be IP-65 rated (T), IP-67 rated (O).
* Shall utilize an encrypted data link.
* Shall automatically return to the point-of-origin in both user-controlled and autonomous flight modes when approaching levels of limited power.
* System set up, operation, and recovery shall not require skill sets beyond those currently required for typical military and law enforcement personnel.
* Shall interface with the Government-developed Centralized Control of Commercial Drones (C3D) / Tactical Assault Kit (TAK) for command, control, and mission tasking.The system should allow modular sensor payloads with a defined standard for interface on data and power for follow-on sensor development (O).

Develop & deliver four (4) each field ready deployable prototype systems and new equipment troop training package in 12 months; additional individual OT&E prototypes up to ten (10) each as an option.

A Firm Fixed Price proposal is preferred.

**R000-TOS-FY19 Unspecified Requirement - Tactical Operations Support**

Develop new, innovative technologies that enhance the capabilities of DoD and interagency special operations tactical teams engaged in finding, fixing, and finishing terrorists. This includes the development of capabilities for state and local law enforcement agencies to combat domestic terrorism.

Technologies for the following focus areas:

*Offensive Systems*

Develop advanced equipment and capabilities that enhance the effectiveness of small tactical units engaged in direct action operations. Develop specialized weapons, munitions, detonators, distraction/diversion devices and other unique tactical equipment.

*Unconventional Warfare, Counter-Insurgency Support*

Develop advanced tools and equipment specifically for small tactical units conducting a broad spectrum of military, paramilitary, special warfare, and digital operations focused on force protection, assisted and unassisted recovery, and operational preparation of the environment.

*Tactical Communications*

Develop flexible, enhanced, full spectrum communications capabilities specifically designed for tactical forces, with emphasis on reducing operational load while improving operator mobility and efficiency. Develop secure and assured tactical communications connectivity in challenging complex urban, subterranean, and maritime environments.

*Tactical* *Reconnaissance, Surveillance*, *and Target Acquisition Systems*

Develop technologies to assist small tactical teams in conducting organic reconnaissance, surveillance, and target acquisition missions by tactical operators. Develop systems that enhance the visual perception or other imaging capabilities of tactical operators in all conditions and environments.

*Specialized Infiltration, Access, and Exfiltration Systems*

Develop technologies that assist tactical assault forces in gaining rapid insertion, access and egress to and from objectives. Improve evaluation of tactical options, and support efficiency and stealth, including remote operations. Develop enhanced target analysis, manual and dynamic breaching technologies for small tactical assault teams.

*Survivability Systems*

Develop man portable tools and equipment to enhance operator survivability during the conduct of tactical missions.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.

Firm Fixed Price proposals are preferred.

## 5.10 Training Technology Development (TTD)

**R4218 Divers Closed Circuit Underwater Breathing Apparatus Simulator**

The MK-16 Underwater Breathing Apparatus (MK-16 UBA) is a computer controlled, closed-circuit, mixed gas constant partial pressure rig used by operational and training units. This requirement is for the design, development, and evaluation of an MK-16 UBA training capability consisting of an immersive virtual reality (VR) or mixed reality (MR) simulator focusing on scenarios to train emergency procedures (EPs) consistent with the MK-16 Operation & Maintenance manual and United States Navy Dive manual. This advanced training technology is required to build muscle memory and cognitive skills necessary to survive real world diving malfunctions. The simulator will be used on dry land and is intended to provide critical practice prior to applying the skills in an underwater environment.

The Divers Closed Circuit Underwater Breathing Apparatus Simulator shall adhere to the following specifications:

* Utilizing the MK-16 diving rig, or a replicated version, develop an attachable system of haptic sensors to realistically simulate an operational MK-16 diving rig complete with all its components to include: full face mask, primary and secondary displays, dive computer, O2 and diluent gauges to as realistically as possible replicate the sensations and responses during an emergency procedure.
* Durable enough for 500+ students to use annually.
* Mobile man-portable standalone system that is wireless and accessible via Government end user electronics (i.e., computers, mobile devices, etc.).
* Gather diver performance data automatically and provide performance analytics via a customized student and instructor interface with real-time visual display and recorded feedback capabilities.
* Preloaded with developed virtual underwater emergency scenarios during two standard dive operation profiles (daytime and nighttime) requiring the user to apply any or all emergency procedures associated with the MK-16 UBA in accordance with Government end user training standards.
* Integrate multi-sensory feedback features (e.g., visual display components, breathing resistance, taste, and auditory signals) designed to induce stress and simulate the dangers of improper emergency procedures.
* Be “plug and play” with minimal setup time.
* Require minimal training to implement.
* Hardware and software designed with an open architecture to support future updates and the flexibility to expand future UBAs beyond the MK-16.

The performer shall include a testing phase to ensure 100 percent functionality at the Government end user site. The performer shall support an evaluation period not to exceed three months to evaluate the training simulator in terms of instructor and student usability and perceived effectiveness for achieving the training objective. The performer shall work with the Government to coordinate instructor and student participation in the evaluation.

The Government will provide Subject Matter Experts through the duration of the project to guide development and transition to desired IT delivery platforms. At the conclusion of the contract, all training simulators and all software required to conduct the training shall be transitioned to the Government. The final products meeting the above specifications shall be delivered to the Government, along with training and support materials for system use, maintenance, and storage.

The delivered instruction and materials shall sufficiently enable end users to properly assess individual and team profiles as well as operate and troubleshoot the system.

**R4220 Synthetic Internet for Training and Exercises (SITE)**

Develop a “sandbox” training capability that replicates key aspects of the Internet. The purpose of the Synthetic Internet for Training and Exercises (SITE) is threefold: (1) provide large-scale training exercise designers, planners and participants with the ability to realistically replicate the unique impacts of online publicly available information (PAI) and other social media into training scenarios; (2) to replicate an environment in which methodologies and tools for collecting and analyzing online information can be practiced and refined; and (3) to ensure online exercise activities do not impact the general public and remain strictly within the exercise environment.

SITE shall be developed to the following minimum threshold requirements:

* Software, servers and architecture capable of supporting up to 500 simultaneously logged-in users throughout a six- to eight-week exercise
* Password protected applications with multiple user account-types that replicate a realistic restrictive online environment
* Overall SITE account-types to restrict and permit accesses based on role in exercise (e.g., White cell personnel permissions and access would be greater than that of a regular exercise role player)
* Appearance, features, and full functionality of the following:
  + Five (5) social media sites (e.g., Facebook, Twitter, Snapchat, Instagram, and VK) with realistic features and functions, including geo-location data where it aligns with the replicated application’s capability
  + A search engine capable of conducting internet searches which will return realistically broad search results
  + A dark web capability with at least one (1) virtual marketplace, three (3) forums, and three (3) chat rooms
  + An email capability (Gmail-like)
  + A video sharing site (e.g. YouTube)
  + An online auction site
  + A crowdsource funding site
  + Multi-player gaming communication with peer-to-peer encrypted chat (working game is unimportant)
  + Discussion blogs
  + Multiple major news media services, including websites complete with RSS feeds and ability to host/enumerate emerging crises (breaking news relevant to the training scenario) AND user-created news content (independent scenario-specific news websites)
  + Business, government and non-government organization websites as relevant to the exercise scenario
* Integration of specific COTS and/or GOTS PAI collection and analysis tools to be used in SITE just as they are on the real Internet by analysts
* Automated scraping feature to pull PAI content from the Internet for injection as haystack/noise for concealing scenario-specific scripted content
* Automatic sentiment-driving content generation capability able to realistically generate social media responses and activity around a topic to drive “population” sentiment as desired by exercise scenario developers
* Allow for the construction of virtual audiences associated with specific user-defined themes that drive sentiment from the start of an exercise and enable sentiment shifts as dynamic injects are made
* Dynamic injection of data/content during scenarios to meet shifting training and exercise objectives, including social media posts, large video, photo, and audio files produced by exercise role players
* Securely access SITE from unclassified Government networks and ‘dirty internet’ and interact within environment from mobile and desktop platforms using a government server-based and/or cloud-based configuration
* Ability by exercise leadership and scenario developers to monitor overall system performance, view activity logs, and pull volumetric data as well as filter and sort data based on administrator information analysis needs
* Ability to monitor and track sentiment shifts for each defined population demographic
* Network emulator to support “cyber range” activities, such as identifying network access points, conducting network reconnaissance, etc.
* Protection of exercise scenarios by ensuring residual data from them cannot be found on the commercial systems or hardware used to run SITE once exercises are complete

The performer shall include a testing phase to ensure 100 percent functionality on applicable systems within the training and exercise environment and a system stress test to ensure sustainable system performance throughout long-duration (6- to 8-week long) exercises. The performer will also need to provide personnel cleared up to TS/SCI and have access to classified (SIPR) government IT systems.

The Government will provide Subject Matter Experts through the duration of the project to guide development and the transition of SITE. The performer will have access to Government owned software to facilitate SITE development as Government Furnished Information. At the conclusion of the contract, all equipment and software required for the Government to run, support, and further develop SITE shall be transitioned to the Government.

Firm Fixed Price proposals are preferred.

**R4221 Joint Exploitation and Dissemination Instruction and Simulator (JEDIS)**

Analysts conducting Full Motion Video (FMV) Processing, Exploitation, and Dissemination (PED) require realistic training that prepares them for SOF-specific forward missions where they are typically conducting the work of four to six analysts with only one to two analysts. Additionally, these one to two analysts often alternate between several operation types during one mission. In light of the differences between the training model that currently exists and the manpower available for most real world SOF missions, an interactive and dynamic FMV PED desktop training simulation system, used in conjunction with and as part of a program of instruction (POI) for instructor-led training, is required.

FMV PED System Simulator:

Develop, implement, evaluate, refine, and deliver a desktop training simulator that replicates the features, functions, and user interface of real world operational FMV PED systems. The simulator shall:

* Employ realistically replicated, tailorable, multi-environment (desert, maritime, mountainous, urban, etc.) FMV (leveraging real-world ISR feed and/or open-source maps made to look like ISR feeds) with virtual actors, vehicles, ships, buildings, etc. These characters and assets shall be injected/overlaid into the simulated feeds in two ways:
  + As pre-programmed characters, assets, and activities playing out unpredictable behaviors and scenarios
  + Dynamically as characters, assets, and activities represented in real time by live actors/role players
* Utilize open architecture to allow updating and creation of scenarios by end users
* Be easily customizable for the simulation of multiple types of ISR platforms, payloads, and missions based on evolving course scenario needs and learning objectives
* Incorporate replicated multi-platform communication (chat, radio, etc.) to allow for interaction with air, ground, and maritime ISR assets, as well as other elements of a mission with which an analyst would need to communicate
* Contain multiple mission-type scenarios to ensure exposure to a variety of specific, SOF relevant operation types and mission sets (e.g., Force Protection, Kinetic, Pattern Development)
* Function as a standalone system so analysts can independently use the simulator to remain practiced and current both pre and post deployment
* Collect and process simulation data and produce comprehensive reports of trainee's performance on various tasks, products, errors, and missions throughout the simulation session
* Using machine learning, automatically adjust scenario complexity according to student performance
* Simulate or integrate with existing technologies and tools used to conduct FMV PED analysis, such as Maven and the Automated Information Discovery Environment (AIDE) suite of applications. For example, video source will need to be transmitted as multicast to be ingested into AIDE.
* Be tested with Government end users to ensure functionality on and with applicable systems

Program of Instruction:

Design, develop, implement, evaluate, refine, and deliver a minimum of four (4) 10- to 14-day, instructor led courses, with up to 10 students per course. The purpose of this course is to teach task management of multiple responsibilities associated with conducting FMV PED in forward environments with fewer analysts than in the existing training model. Potential tasks include: Monitoring multiple ISR feeds; identifying activity in feed; communication with Ground Force Commander, HQ, and relevant other agency partners; communication with ISR or AISR operator; ensure properly working communication and PED systems; and produce analysis products to standard. The course shall:

* Be tailorable according to mission requirements and analyst skillset (i.e., intel analyst vs. UAV operator – intel analyst would get more in-depth training and practical exercises while operator would receive more general overview)
* Center around the three phases of PED and PED product standards in accordance with U.S. Air Force Special Operations Command standards for production
* Provide tailored guidance on information interpretation, TTPs, methodologies, and product standards to ensure analysts are ready for independent work done to standard
* Incorporate use of the FMV PED system simulator. For example, beta test and evaluation of the simulator could take place in conjunction with first delivery of the instructor-led course.

This project is UNCLASSIFIED. However, because contractors will require access to classified information and have discussions up to the SECRET level, contractor personnel will need to have minimum SECRET clearances. Storage and generation of classified information is not required.

The Government will provide Subject Matter Experts through the duration of the project to guide development and transition of the FMV PED simulator and POI. The Government will also provide Government Furnished Information and relevant government-off-the-shelf (GOTS) systems required for integration with JEDIS. At the conclusion of the contract, all equipment and software required to run and support the final JEDIS POI and FMV PED simulator, as well as associated simulator user manuals, installation and maintenance guides, and other reference materials shall be transitioned to the Government.

**R4222 Advanced Tactical Decision Making (TDM) Immersive Training Capability**

Tactical decision making, such as use of force, training should be as realistic and immersive as possible to promote transfer to real world scenarios. Simulations capable of fully interactive/reactive characters and supporting a full range of decisional applications of force are required for developing the most capable personnel. Current operational demands and resultant throughput necessitates TDM simulation systems be portable and able to work in a multitude of physical environments. Current training simulators for developing tactical decision making skills are “two-dimensional” with limited ability for interaction and physical mobility within the system’s environment. Portability is also limited with current TDM simulator configurations.

This requirement is to leverage the latest simulation technology (e.g., Virtual Reality or Mixed Reality) to develop a TDM system that is visually and auditorily immersive with realistic character representation and interaction, responds completely to all force application devices and methods, allows for unhindered use of tactical positioning, and is portable. The Advanced TDM Simulator shall provide an easily operated training medium that is realistic, safe, and effective for optimizing critical TDM skills such as those employed by law enforcement during use of force decision making. The final product shall be a working prototype capable of supporting at least five students and one instructor station. The following are the specific requirements for the Advanced TDM Simulator:

* Training equipment associated with the system shall replicate end user duty gear. Additional system hardware weight added to the user, beyond their typical protective gear and equipment, shall not exceed two (2) lbs. System hardware shall not further restrict the mobility of the user in a manner as to cause altered applications of force due to limited mobility.
* The system’s simulated firearms and less lethal devices shall replicate, as closely as possible, live fire versions. This includes marksmanship accuracy, weight, dimensions, and weapon functionality (e.g. recoil, drawing, racking, loading, and swapping magazines). The system shall accommodate new firearms and less lethal devices as the user needs evolve. The system shall automatically determine the effectiveness of deployed devices and weapons to include aim, distance, velocity, and point of impact.
* The system shall be portable and able to work in a multitude of physical environments (i.e., different size rooms, temporary warehouse, etc.) while incorporating the user’s physical environment automatically into the scenario. Users shall have the ability to utilize cover and concealment, and barriers existing in their immediate physical surroundings during a training session.
* The system shall have the ability to detect shots from simulated non-player characters and from all students participating in an active simulation from all angles and distances. The system shall detect shots from various directions, such as “friendly-fire” and positions, such as standing, kneeling, and prone. The system shall simulate ballistics and other physical characteristics of real-world use of force interactions. System shall provide approximately realistic haptic feedback stimulus and well as three-dimensional (3D) audio for realistic spatial sound including the sound of weapon firing and explosions.
* The system shall support multiple use of force training scenarios. The scenarios shall be developed using an engine, such as Unity, that makes it easy to change and edit by Government end user developers so that the scenarios remain up to date and relevant to current trends. The system shall also be developed to allow for optional integration into other commercial gaming software such as Virtual Battle Space (VBS) where technically and economically feasible. The system shall allow for branched scenarios that can change upon the agents or officers’ actions. The system shall support two modes of branching: automatic (e.g., artificial tutoring/artificial intelligence) and manual with the ability for instructors to drive the scenarios and interject challenges into scenarios as they unfold. The scenarios shall simulate a variety of environmental conditions including weather, time of day, and levels of lighting. The system shall allow for low light training, to include the utilization of a hand held or weapon mounted flashlights and simulated night vision devices.
* The system shall contain a wide variety of preloaded realistic characters with the ability to react to agents and officers’ actions and commands, with instructor prompts or independent of instructor input. The system shall have fully automated actions and reactions dependent on student verbal commands, officer presence, use of tactics, and application of lethal and less-lethal devices.
* The system shall have the ability to immediately playback scenarios from multiple perspectives for immediate instructor feedback. Instructors shall have the ability to monitor and evaluate a scenario as it is taking place. During the after action review, the instructor shall have access to data from the scenario including reaction times, hits or misses if engagement occurs, devices used, and the length of the interaction.
* System shall provide the option to turn on or off the following scoring items:
  + Force Applied
  + Rounds Fired
  + Shot Placement

The Advanced TDM Simulator shall be a standalone solution capable of being integrated into any Government end user secured wireless local network.

The final product meeting the above specifications shall be delivered with training provided at the Government end user site to train instructors, support staff, and end users on proper operation of the system as well as all training manuals and job-aids for starting, running, maintaining, and storing the system. The delivered instruction shall sufficiently enable end users to properly operate and trouble shoot the system, and assess individual and team profiles.

**R000-TTD-FY19 Unspecified Requirement – Training and Human Performance Technology Development**

Develop training technologies and human performance improvement solutions to increase mission readiness and enhance the operational capabilities of all elements, to include both military and civilian communities involved in combating terrorism. The technologies shall provide valuable and innovative approaches to enhancing knowledge, skills, and abilities to deter, defeat, prevent, protect, mitigate, and respond to terrorist threats. This includes the development of new or improved training technologies, human performance improvement and performance support capabilities, training delivery architectures, training aids, devices and simulations. The proposed training and/or performance improvement technologies shall support the life cycle of research and development to include: analysis, research, design, development, implementation, evaluation, verification and validation testing, and technology transition.

All submissions shall identify the anticipated end user and/or supporting organization. This information should be placed in the bottom right quadrant of the quad chart submission.

Areas of interest include, but are not limited to:

* Subterranean detection and operations training, especially leveraging virtual, augmented, and/or mixed reality.
* Automated instruction and intelligent performance support capabilities, especially for creating measures of effectiveness for influence programs and military information support operations (MISO).
* Immersive training technology such as virtual reality, augmented reality, and mixed reality.
* Wearable technology applications and associated human performance analytics.
* Human factors / usability principles applied to training.

Unspecified requirements (R000s) are for proposing unique innovations that have not yet been identified by CTTSO. Submissions against an unspecified requirement should be responsive to the topics noted in the requirement. Proposed technologies from the unspecified requirements will be competing against proposed technologies for identified and prioritized interagency requirements. Because CTTSO does not budget for unspecified requirements, awards may not be made against the unspecified requirements. Note: Quad charts submitted in response to a Subgroup’s R000 may be shared with other CTTSO Subgroups if the submission demonstrates relevance to more than one focus area.