NATIONAL SECURITY AGENCY
Fort George G. Meade, Maryland

Release – BAA-IMC-15

(U//FOUO) [Revised] Broad Agency Announcement (BAA)

For

Innovative Mission Capabilities

FY2015

04/10/2015

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1 (U) POINTS OF CONTACT

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(U//FOUO) Proposals shall be submitted via the ARC in accordance with instructions described Section 5.7 Electronic Proposal Submission. Proposals will not be accepted in hardcopy to include submission via CD/DVD. E-mail submissions may be allowed under extreme circumstances, but prior coordination and authorization from the Contracting Officer is required. Please see the Milestone letter for instructions.

2 (U) GENERAL

(U//FOUO) This Broad Agency Announcement (BAA) sets forth research areas of interest to the National Security Agency (NSA). This BAA is issued under Section 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of basic research proposals, and FAR 35.016, “Broad Agency Announcements.” Proposals submitted in response to this BAA that are selected for award are considered to be the result of competition in compliance with the Competition in Contracting Act of 1984 (CICA), 41 U.S.C. 253. The type of research solicited under a BAA attempts to increase knowledge in science and/or to advance the state of the art as compared to practical application of knowledge.

(U//FOUO) The National Security Agency (NSA) would like to increase its partnership with industry and as part of this initiative, is seeking industry partners who can conduct original research in new, game-changing technologies and strategies or conduct applied research in adapting and repurposing existing technologies in new or more effective, efficient, or creative ways, use that research to develop functional research prototypes relevant to NSA, and demonstrate the applicability and effectiveness of the prototypes to NSA’s mission needs. Since the intention of this effort is to explore new and innovative areas of research and discovery, prototypes based on evaluating existing commercial hardware devices or software products are not appropriate for this effort. Commercial hardware or software can be used in developing the prototype but evaluating commercial products should not be the focus of the proposed research and prototype. The proposals and the functional prototypes should focus on ways to stabilize, improve, or enhance current NSA systems as well as foster technical innovation by incorporating new technologies or utilizing existing technologies in innovative ways that can be applied to NSA’s mission.

Solutions from industry experts are being sought that can be demonstrated as functional prototypes to assess the feasibility and viability of the technology and/or approach.

(U//FOUO) NSA considers development of the functional research prototype to be a risk reduction activity and understands that the prototype may not be a complete and operational capability. Instead, the Vendor's in-depth understanding of the technology should be reflected by identification of the critical technical risk areas. The prototype of those areas will reduce risk by showing those critical technical areas can be effectively implemented should NSA decide to pursue the technology further.

(U//FOUO) Section 7 contains a list of topics of interest to NSA. A formal Request for Proposals regarding this announcement will not be issued.

(U//FOUO) Please refer the Milestone Letter for the specific date and time of the submission deadline as well as specific instructions for submitting proposals electronically. Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the Milestone Letter no later than the exact time specified in the Milestone Letter. Offerors are strongly encouraged to not wait until the last minute to submit proposals to avoid any potential technical issues with the receipt of the proposal by the Government.

3 (U) PROTOTYPE REVIEWS

(U//FOUO) Prototypes are to be completed within three (3) months of contract award. For any resultant contract, NSA will review and assess the functional prototype upon completion. The project's Contracting Officer's Representative (COR) and select persons from NSA will attend the prototype review. Other Government Agencies are also invited and typically attend prototype reviews according to their technology needs. The review will focus on assessing the viability and feasibility of the specific technology/approach by demonstrating the functional prototype along with a discussion of the applicability of the technology/approach to NSA's mission. Project specific technical, financial, and administrative issues, as well as any other pertinent issues will also be discussed as necessary. The prototype review will provide an opportunity for more in-depth discussions of subsequent evolution of the prototype into a potential production capability.

4 (U) FOREIGN OWNERSHIP CONTROL OR INFLUENCE (FOCI)

(U//FOUO) Research proposals are sought from Industry for prototype development in the topics specified in Section 7. Foreign owned, controlled, or influenced vendors are advised that security restrictions may apply that could

affect their participation in this effort. Please refer to Appendix A for additional information. Although proposals and prototypes are unclassified, U.S. Citizenship is **REQUIRED** for all persons working on, or participating in, the proposals and/or prototypes in any capacity.

5 (U) PROPOSALS

(U//FOUO) The Contracting Officer is the only individual authorized to obligate or commit the government.

(U//FOUO) Any costs generating, publishing, or delivering proposals in response to this BAA are not allowable direct charges to any award resulting from this BAA. They may be allowable expenses to the normal bid and proposal indirect cost specified in FAR 31.205-18 to the extent those costs are allocable and reasonable.

(U//FOUO) This BAA calls for applied Research and Development proposals to address technical needs in a variety of interest areas by developing functional prototypes (See Section 7). The interest areas are reflected in topics that are grouped into tracks. Multiple awards may be made in the track areas described in Section 7. Proposals may range from solutions aimed at a particular aspect of the topic posed, to a solution that comprehensively addresses an identified topic area.

(U//FOUO) All Offerors submitting proposals must be registered in the System for Award Management (SAM) prior to submission. The System for Award Management is a free website that consolidates the former CCR/Fedreg, ORCA, and EPLS systems. Note to former Central Contractor Registration (CCR) registrants: If you have an active record in CCR, you have an active registration in SAM. You do not need to do anything in SAM at this time, unless a change in your business circumstances requires a change in SAM in order to be paid or to receive an award. The Defense Finance and Accounting, and Director, Defense Procurement, has required all contractors to be registered in the SAM to receive solicitations, awards, or payment. To register in the SAM, you may use any one of the following methods: (1) mail a completed application to the U.S. Federal Contractor Registration, 9400 4th Street N STE 11, Saint Petersburg, FL, 33702, telephone 1-877-252-2700, EXT 2; (2) fax a completed application to U.S. Federal Contractor Registration: 727-388-1371; or (3) input directly to the CCR through the Internet at www.uscontractorregistration.com. If you should need additional information, send an e-mail to customerservice@usfcr.com or visit their home page at www.uscontractorregistration.com. The DOD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days.

5.1 (U) REQUIRED ACQUISITION RESOURCE CENTER (ARC) REGISTRATION (OCT 2003)

a. (U) Definitions. As used in this clause –

1. (U//FOUO) "Acquisition Resource Center (ARC) Business Registry" means the primary Maryland Procurement Office (MPO) repository for contractor information required for the conduct of business with MPO.

2. (U//FOUO) "Registered in the ARC Business Registry" means that all mandatory information is included in the ARC Business Registry.

b. (U//FOUO) By submission of an offer, the Offeror acknowledges the requirement that a prospective awardee must be registered in the ARC Business Registry prior to award, during performance, and through payment of any contract resulting from this solicitation, except for awards to foreign vendors for work performed outside the United States.

(U//FOUO) Lack of registration in the ARC Business Registry shall make an Offeror ineligible for award.

1. (U//FOUO) MPO established a goal of registering all contractors in the ARC Business Registry to provide a market research tool and to facilitate communication between the MPO and the contractor community. Offerors that are not already registered in the ARC should apply for registration immediately upon receipt of this solicitation.

c. (U//FOUO) The Contractor is responsible for the accuracy and completeness of the data within the ARC, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. The Contractor agrees to periodically update information when previously provided information changes. To remain registered in the ARC Business Registry after the initial registration, the Contractor is required to confirm annually on or before the anniversary of the initial registration that the information is accurate and complete.

d. (U//FOUO) Offerors that are not already registered in the ARC Business Registry shall register via the Internet at: http://www.nsaarc.net/

(End of clause)

(U) 352.204-9000 DISCLOSURE OF INFORMATION – BAA (OCT 1993)

a. The recipient organization of this BAA shall not, unless authorized elsewhere in this BAA, disclose any information concerning the request or its sponsorship to anyone other than those officers and employees of the recipient organization who require the information to prepare and submit a proposal or a response.

b. The recipient organization may obtain necessary subcontracting and purchasing data from prospective vendors or subcontractors, provided that: sponsorship of this BAA is not disclosed; and, where required, the appropriate security regulations are observed.

c. Any disclosure, other than that described in Paragraphs (a) and (b) above, considered necessary by the recipient organization may be made only with the written consent of the Contracting Officer.

(End of Provision)

(U) Language deleted in Amendment 0005

(U) Section 508

(U//FOUO) Any proposed solution that involves the acquisition of electronic and information technology (EIT) supplies and/or services must meet the applicable accessibility standards at 36 CFR Part 1194, unless an exception at FAR 39.204 applies.

5.2 (U) CONTRACT TYPES AND FUNDING LEVELS

(U//FOUO) Awards of efforts as a result of this BAA will be in the form of firm fixed price, fixed duration contracts. All contracts resulting from this BAA will incorporate the most current FAR, DFARS, and agency contract clauses. Any Amendments will be posted on the ARC. The Government reserves the right to make multiple awards as a result of this BAA. The Government may make award of some, none, or all proposals submitted based upon the cost and quality of the offers received in the different tracks. The government reserves the right to shift funding across tracks based on the quality of proposals as well as add additional funds if additional funds become available.

(U//FOUO) Individual base awards will not exceed 3 months in duration and will not exceed $50,000. (Actual duration of the contracts will be 4 months but the fourth month will be reserved to schedule the prototype demonstrations at the Government's convenience.) Total funding for the BAA is currently $1,600,000.00; additional funds may become available to fund proposals selected as *Recommended for Award and Fund if Funds are Available*. Funding for follow-on development of the prototypes into potential production capabilities will depend on the performance of the program, the needs of the production systems, and availability of funding. All follow-on development will be treated as new procurements and will not be subject to the limitations of the IMC program.

(U//FOUO) Under FAR part 35, agencies may utilize BAAs to fulfill their requirements for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding rather than focusing on a specific system or hardware solution. Agencies may not use BAAs for the acquisition of services related to the development of a particular system or

hardware procurement. **Therefore, NSA will not use this BAA for the acquisition of scientific, engineering, or technical support services.**

(U//FOUO) Unsuccessful Offerors will be notified with a brief written synopsis of the Government's evaluation of the Offeror's proposal. The Government will not conduct formal in-person debriefings.

5.3 (U) CLASSIFICATION

(U//FOUO) All documents shall be classified at UNCLASSIFIED//FOR OFFICIAL USE ONLY. Company proprietary information shall be clearly designated at the paragraph level. In addition, each page and the cover page of the document that contains the proprietary information shall be clearly labeled.

(U//FOUO) Prototypes will be unclassified and it is the Offeror's responsibility to ensure that the prototypes remain unclassified.

5.4 (U) USE OF COMPANY INTERNAL RESEARCH AND DEVELOPMENT (IR&D) FUNDING

(U//FOUO) The use of Company IR&D funding to support prototype development for any resultant award under this BAA is permitted. However, if the Company intends to assign the government with other than unlimited or government purpose rights to all technical data and software developed as part of this effort and utilized in the prototype in accordance with guidance in DFARS 252.227-7017 as a result of utilizing IR&D funding, it could affect the applicability of the prototype to NSA's mission during the proposal evaluation process. The Offeror's failure to submit, complete or sign the notification and identification with its offer may render the offer ineligible for award.

(U//FOUO) NSA complies with the FAR and DFARS with regards to the handling of Intellectual Property (IP) and Government Usage Rights. Offerors with questions regarding the handling of IP and Government Usage Rights should refer to the applicable sections of the FAR and DFARS.

5.5 (U) ESTABLISHMENT OF A SMALL BUSINESS SET-ASIDE

(U//FOUO) In accordance with FAR 52.219-1

> (1) The North American Industry Classification System (NAICS) code for this acquisition is 541712 (Research and Development in Physical Engineering and Life Sciences (except Biotechnology))
> (2) The small business size standard is 500 employees.
> (3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(U//FOUO) This acquisition is a total small business set-aside. In accordance with section 1651 of the National Defense Authorization Act for Fiscal Year 2013, by submission of an offer and execution of a contract, the Offeror agrees that in performance of the contract in the case of a contract for services, at least 50 percent (50%) of the amount paid to the concern under the contract shall be expended by employees of the concern or a subcontractor that is a similarly situated entity. The term "similarly situated entity" means a contractor that –

(1) if a subcontractor for a small business concern, is a small business concern;
(2) if a subcontractor for a small business concern eligible to receive contracts under section 8(a), is such a concern;
(3) if a subcontractor for a small business concern owned and controlled by women, is such a concern;
(4) if a subcontractor for a small business concern owned and controlled by women that is not less than 51 percent owned by 1 or more women who are economically disadvantaged, is such a concern;
(5) if a subcontractor for a qualified HUBZone small business concern, is such a concern; or
(6) if a subcontractor for a small business concern owned and controlled by service-disabled veterans is such a concern.

(U//FOUO) By submission of an offer, the Offeror certifies that it is a Small Business under NAICS CODE 541712.

5.6 (U) DELETED.

5.7 (U) ELECTRONIC PROPOSAL SUBMISSION

(U//FOUO) All proposals must be submitted electronically through the ARC using the below instructions. Hard copy submission – to include submission via CD/DVD – of proposals is not authorized. E-mail submission of proposals to the Contracting Officer may be allowed under extreme circumstances, but prior coordination and authorization from the Contracting Officer is required. Please see the Milestone letter for instructions.

(U//FOUO) ARC Proposal Submission Instructions:

- Go to the ARC home page and under Acquisitions select RFI's
- Select the Innovations Mission Capabilities (IMC – BAA FY15) RFI
- On the left under RFI links, select "Upload Response"
    - Keep in mind that only individuals with the "M" role in the company's profile will see the "Upload Response" link.
- Note the information provided before the Document Type "This RFI allows your company to upload up to 5 response documents. We currently have received 0 documents from your company." Please only upload two (2) documents, the Technical and Cost volumes.

- Select the document type, which will be an “RFI response”
- Select the classification, which should be “UNCLASSIFIED”
- Upload the file and click upload document. Please only upload one (1) document at a time.

Offerors are strongly encouraged to submit all materials as .pdf files.

(U//FOUO) A password shall not be required for opening the materials and the Government must have the ability to print and copy text, images, and other content from the material.

5.8 (U) HARDCOPY PROPOSAL SUBMISSION

(U//FOUO) Hardcopy proposals shall not be accepted.

5.9 (U) CLASSIFIED PROPOSAL SUBMISSION

(U//FOUO) All proposals shall be submitted unclassified.

5.10 (U) ORGANIZATIONAL CONFLICTS OF INTEREST

(U//FOUO) All Offerors and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any NSA office or offices through an active contract. All affirmations must state which offices and contract numbers the Offeror supports and identify the contract number. Affirmations shall be included in the Program Proposal volume of the proposal submissions. All relevant facts and circumstances included in FAR part 9.5 shall be disclosed, and the statement shall include a description of any action the Offeror has taken to mitigate, avoid, or neutralize any actual or potential conflict of interest. The Government will evaluate such disclosures in determine awards. Proposals which fail to include this statement or fully disclose actual or potential conflict will be rejected as nonresponsive.

6 (U) PROPOSAL PREPARATION INSTRUCTIONS

(U//FOUO) This section specifies the instructions for proposal preparation to ensure a consistent sequence and content of information, and to ensure that all proposals set forth full and sufficient information to facilitate timely and complete evaluation. Non-compliance with these instructions can result in a proposal being deemed “Non-Compliant” and excluded from evaluation.

(U//FOUO) Please note that the following items will automatically result in a proposal being deemed Non-Compliant and excluded from evaluation:

- Proposing a cost to the Government that exceeds $50,000
- Proposing a project schedule that exceeds 3 months

- Submitting duplicate proposals under different tracks
- Proposing the use of non-U.S. Citizens in any capacity associated with the project (note: U.S. Green Card holders are not considered U.S. Citizens)
- Failure to disclose the citizenship of all persons proposed for involvement with the prototype
- Failure to propose the development and demonstration of a functional research prototype during this effort
- Proposing to solely conduct a study, develop an architectural design, perform a requirements analysis, or any other activity that does not also include developing a prototype for the project (note: proposing to perform any of these activities as part of the effort to develop the prototype is fine)
- Failure to describe the capabilities to be included in the prototype (note: saying that the prototype's capabilities will be determined post award after discussions with the Government is not sufficient)
- Failure to provide full details on all hardware, software, or other equipment proposed to be purchased with Government funding in accordance with Section 6.7.1

6.1 (U) MULTIPLE SUBMISSIONS BY AN OFFEROR

(U//FOUO) Each Offeror may submit multiple proposals for either different tracks or under the same track; however, each proposal shall only be submitted under one track. Each proposal must be complete and stand by itself. Each proposal shall not have dependencies on any other proposal submitted by the Offeror.

6.2 (U) MARKING OF SENSITIVE INFORMATION

(U//FOUO) All documents shall be classified at UNCLASSIFIED//FOR OFFICIAL USE ONLY. Company proprietary information shall be clearly designated at the paragraph level. In addition, each page and the cover page of the document that contains proprietary information shall be clearly labeled.

6.3 (U) DOCUMENT AND SECTION COMPLETENESS

(U//FOUO) Each document and major section within each document shall stand alone and shall contain all information necessary to evaluate that portion of the response, including complete coverage of and responses to relevant BAA instructions. Appendices will be included in the page count limits. Pages that exceed the page count limits will not be read by the evaluator. References will be treated as auxiliary information that will not be read by the evaluator; therefore, the ability to evaluate a section must not depend upon the content of

the material contained within the references. A brief description of the content of these sections is provided below.

6.4 (U) DOCUMENT PAGE LIMITS

(U//FOUO) The Offeror's proposal shall not exceed the following page limits. Page limits exclude the covers, title pages, and table of contents. Additional pages will not be read or evaluated in any way by the evaluators. The Offeror is urged to minimize unnecessary elements and to seek brevity where it does not sacrifice completeness. Figures, diagrams, charts, tables, and appendices will be included in the page count.

- Technical Proposal: no more than 15 pages
- Cost Proposal: unlimited

6.5 (U) PROPOSAL FORMAT

(U//FOUO) The technical proposal shall include a title page with the following information:

- BAA Number
- Name of Offeror
- Track Number
- Topic Number(s)
- Proposal Title
- Technical Point of Contact including: name, telephone number, e-mail address, fax number, and mailing address
- Contracts Point of Contact including: name, telephone number, e-mail address, fax number, and mailing address

(U//FOUO) A table of contents shall be provided to allow ready reference to key sections, figures, tables, and illustrations.

(U//FOUO) The proposals shall be formatted for 8 1/2" x 11" paper. Illustrations must be legible and no fold out shall exceed 11"x 17". Fold outs will count as two pages. Narrative text shall be of size 12 font or larger. Tables shall use fonts no smaller than size 10 font or 10 characters per inch (whichever is larger).

6.6 (U) TECHNICAL PROPOSAL CONTENT

(U//FOUO) The Technical portions of the proposal document shall be divided into sections that follow the organization described in the BAA. The evaluation

factors described in Section 6.8 should be reflected throughout the proposal. A brief overview of the contents of these sections is provided below. Proposals must adequately describe the technical objectives and approaches, all of which will be evaluated by technical reviewers in accordance with the evaluation criteria and selection process.

6.6.1 (U) ABSTRACT

(U//FOUO) Offerors shall include a concise abstract, not to exceed 300 words, that describes the primary functionality of the new technical capability and its purpose/benefit. The abstract should answer the following questions: What does the Offeror propose to do and how is this of benefit to the Government? The Offeror is encouraged to include relevant technical details, as the readers will have the necessary background.

6.6.2 (U) STATE-OF-THE-ART

(U//FOUO) Offerors shall describe the state-of-the-art concerning the proposed technology/approach to be implemented as a prototype. This discussion should describe products, technologies, and/or approaches that are similar to what the Offeror is proposing or that provide comparable capabilities.

6.6.3 (U) DESCRIPTION OF PROTOTYPE

(U//FOUO) Offerors shall introduce the research idea to be addressed, identify key challenges, outline the proposed solution, detail the research plan and technical approach to implement the functional prototype within the specified timeframe, and identify the investigators and resources. Offerors shall explain how the prototype will demonstrate the effectiveness of the product, technology, and/or approach and how the capabilities represented by the prototype are applicable to NSA's mission. Each proposal should include an approach that is explicitly related to the appropriate Agency context. Proposals shall succinctly describe any innovative claims of the above research in relation to the current state-of-the-art.

(U//FOUO) Proposals shall contain a detailed description of the proposed technology. It should show the potential performance benefits, and identify technology risks. It should explain whether the technology improves performance, or enables something not presently achievable. It should contain a description of the underlying theory, application of that theory, results if experimental data have been obtained to date, and results of simulations or experimental data against accepted industrial benchmarks, if available. If industry accepted benchmarks do not exist, the proposals may contain self-defined test benchmarks and identify test results.

(U//FOUO) Since the objective of this effort is to produce functional prototypes in a fixed timeframe, Offerors should clearly identify all hardware, software, data,

and other resources needed to produce the prototype and describe their plan to ensure these resources are in place in time to support prototype development.

6.6.4 (U) PERSONNEL

(U//FOUO) Offeror shall clearly identify the citizenship of all persons involved in the project. Please note that U.S. Citizenship is **REQUIRED** to work on the prototypes or to be involved with the project in any capacity.

(U//FOUO) The personnel section shall describe the qualifications of the principal investigator and other key researchers involved in the project. For all proposals, one individual shall be the designated principal investigator/program manager for the purposes of technical responsibility and contact. Please note that any resumes included in the proposal are included in the 15 page limit.

6.6.5 (U) FACILITIES, SOFTWARE FRAMEWORKS/ DATA SETS & GFI

(U//FOUO) All work will be done at the Offeror's facilities and the facilities used to support prototype development must be located in the U.S. The use of commercially leased utility Clouds to provide development environments has become a popular option, so for purposes of this BAA, the Amazon EC2 utility cloud or other similar facilities are considered to be in compliance with the requirement to perform all work in a U.S. facility.

(U//FOUO) A description of the facilities available, including any equipment purchase required or planned for acquisition under the proposed project must be provided. All hardware, software, data, and/or documentation items requested from the Government must be identified in the proposal. Please keep in mind that the short timeframe of the prototype development effort may preclude providing certain items due to the government approval processes that must be followed. Should any requested items require a lengthy approval process, the assessment of the feasibility of prototype development could be impacted.

(U//FOUO) Please note that certain tracks may explicitly include the provision of certain software items/licenses as Government Furnished Information (GFI). Section 8 describes test data available for use in all tracks if the use of this test data is appropriate to the Offeror's prototype. Offerors can assume that the test data identified in Section 8 as GFI will be available upon contract award if the data is available through NSA. If Offeror plans to use data from the PREDICT program, it is the Offeror's responsibility to ensure that all agreements and arrangements are made with the PREDICT organization prior to contract award.

(U//FOUO) Due to the short timeframe of the prototype development effort, the Government will not sponsor contractor personnel clearance requests, request facility clearances, nor sponsor DD Form 254 requests as part of any awards made under this BAA.

6.6.6 (U) TECHNICAL DATA OR COMPUTER SOFTWARE

(U//FOUO) Include a list all technical data or computer software that will be furnished to the Government with other than unlimited or government purpose rights in accordance with DFARS 252.227-7017, Identification and Assertion of Use, Release, or Disclosure Restrictions. Also, include a list of all technical data or computer software that will be furnished to the Government with unlimited or government purpose rights.

(U//FOUO) Include in this section all proprietary claims to results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are no proprietary claims, it should be stated.

6.6.7 (U) SUB-CONTRACTS OR RELEVANT COLLABORATIONS

(U//FOUO) Describe in detail any proposed sub-contracts or relevant collaborations (planned or in place) with industry, government organizations, universities, or other institutions. The proposal shall describe how the particular collaborations are expected to facilitate the research plan and implementation of the functional prototype. If subcontracts are proposed, it shall make clear the division of the research activities. Please note that per Section 5.5, the prime contractor and similarly situated entity subcontractor must perform a minimum of 50% of the amount paid under the contract.

(U//FOUO) Offerors are advised that it is acceptable to partner with academic institutions where appropriate.

6.6.8 (U) OTHER PARTIES

(U//FOUO) Identify other parties to whom the proposal has been/will be sent. Identify any other Government or Military organizations to whom the proposal has been/will be sent, including foreign Government or Military organizations.

6.6.9 (U) DELIVERABLES AND GOVERNMENT MEETINGS

(U//FOUO) Describe all deliverables associated with the proposed research and the plans. The contractor shall submit reports in accordance with the Contract Data Requirements List DD Form 1423 dated 5 January 2015. Offeror will be provided Form 1423 at time of contract reward. Deliverables shall include monthly project status reports, which shall be submitted via e-mail to the Government, and the computer software product described in section 6.6.9.1. A demonstration of the functional prototype will be conducted upon completion of the effort at a Government facility within a 25-mile radius of NSA, Fort Meade, Maryland. The Government facility has unclassified Internet connections and can support VPN access.

6.6.9.1 (U) COMPUTER SOFTWARE PRODUCT:

The minimum set of deliverables for the prototype under the Computer Software Product is:

1) A functional prototype that, at a minimum, performs the basic functions of the system it is supposed to represent to the degree necessary to clearly and unambiguously demonstrate the effectiveness of the approach. It is understood that the time and funding constraints of this program may preclude development of a robust and fully operational prototype but the portions of the system pertaining to the specific technology or approach being proposed as a solution will need to be developed to the extent necessary to clearly show the viability and feasibility of the technology/approach.

2) A description of all simulators, data generators, interface mock-ups, or simplifications that were used in the prototype because the systems or components they represented were not available for use in the prototype due to classification issues or other external factors. The intention of this deliverable is to provide comprehensive and full disclosure of which components in the prototype are fully functional and which components would require additional development prior to a production deployment.

3) List of any required 3rd party support tools or software used in the prototype or necessary for a potential production deployment of the prototype.

4) Source code for all non-commercial software used in the prototype along with the installable executables for the prototype sufficient to allow the Government to install and demonstrate the prototype in a Government Research lab.

5) Installation instructions, basic user instructions, and any other materials needed to allow the Government to install and demonstrate the prototype in a Government Research lab.

(U//FOUO) Software and documentation deliverables shall be provided in soft form on physical media of either data CD or DVD. Flash drives, USB drives, thumb drives, or other types of removable media shall not be used.

6.6.9.2 (U) LICENSING:

(U//FOUO) For all delivered goods that are or are derivative(s) of goods that are sold by the selected Offeror(s) or third parties with licenses, these items shall include (as part of the deliverables) all appropriate licenses per DFARS 252.227-7013, 252.227-7014, and 252.227-7103-9(a)(2). The licenses shall be valid for a minimum of one year from the date of delivery for the respective product(s). Licenses may not be based on or limit use as a function of system size. If free trial licenses are used in the prototype and available publically, then those licenses are not required to be delivered to the Government.

(U//FOUO) The Offeror shall clearly identify all licenses that are applicable to the prototype.

6.7 (U) COST PROPOSAL

(U//FOUO) The cost proposal shall include a title page with the following information:

- BAA Number
- Name of Offeror
- Track Number
- Topic Number(s)
- Proposal Title
- Contracts Point of Contact including: name, telephone number, e-mail address, fax number, and mailing address
- Total Fixed Price Cost (not to exceed $50,000)
- Investment of Offeror IR&D Funding (if planned to be applied to prototype effort)
- Period of Performance (not to exceed 3 months)

(U) Body of Cost Proposal

(U//FOUO) In order to evaluate the proposal for cost realism, completeness, and reasonableness, the following information shall be submitted: a separate breakout of the amounts, types, and cost of labor, materials, travel, invoicing schedules, and subcontracts.

(U//FOUO) Specifically, cost shall be attributed to specific technical tasks and shall be broken down in labor categories, labor hours, direct labor rates, and indirect rates. Material costs are especially important, and therefore, vendor quotes and/or historical information, if available, shall be provided to support these proposed costs. For travel costs, trip purpose, number of people traveling, destination, and trip length shall be provided. The Contracting Officer will need enough information to complete a price/cost analysis and establish the total amount as reasonable and fair.

(U//FOUO) The cost proposal shall also contain a schedule of invoicing for the contract. Offerors awarded contracts shall submit three (3) invoices during contract execution and the invoices shall be associated with the following technical deliverables:

- Invoice #1: Due when Status Report #1is due (see DD1423 dated 5 January 2015).
- Invoice #2: Due when Status Report #2 is due (see DD1423 dated 5 January 2015).
- Invoice #3: Due upon completion of demo and delivery of final report

(U//FOUO) Offerors shall identify the amount of the fixed-price to be allocated to each of the three invoices. The amount of each invoice should correspond to the amount of actual expenses expected to be incurred during the time period covered by the invoice.

(U//FOUO) Proposals must be valid for a minimum of 120 days.

6.7.1 (U) PURCHASE OF HARDWARE OR SOFTWARE

(U//FOUO) Offeror shall clearly and fully identify all hardware or software Offeror plans to purchase with Government funding for this effort and shall include the following information for each item:

- Name of the hardware/software item
- Model/version number
- Cost of the item
- Manufacturer of the item
- Full address, phone number, and web site for the manufacturer
- Reseller of the item (if being purchased from a reseller)
- Full address, phone number, and web site for the reseller

(U//FOUO) Please note that laptops, cell phones, and other mobile/wireless devices cannot be purchased for this effort using Government funding. Also, all hardware, software, or other equipment items purchased using Government funding must be delivered to the Government at the end of the contract.

(U//FOUO) Offerors are welcome to use any company-owned hardware, software, and/or equipment for this effort, including laptops, cell phones, and other mobile/wireless devices owned by the company. Upon completion of the contract, only the prototype is delivered to the Government and all company-owned hardware, software, and equipment remains the property of the company. It is not necessary to provide the bulleted information listed above for company-owned hardware, software, or equipment.

6.8 (U) PROPOSAL EVALUATION CRITERIA AND CONTRACT AWARD:

6.8.1 (U) CONTRACT AWARD

(U//FOUO) The IMC BAA is conducted under the requirements of FAR 35.016, a "One Step" award process. The government does not plan to develop a "competitive range", issue requests for clarifications, or conduct discussions with Offerors as those terms are understood in FAR part 15 negotiated acquisition. Use of this terminology does not indicate that this is a FAR part 15 acquisition or apply the rules of FAR 15.

(U//FOUO) The Government reserves the right to ask questions to allow receipt of additional information with one, some, all, or none of the Offerors if determined to be in the best interests of the Government. Because of the unique nature of each proposal, the Contracting Officer may select one or more individual proposals to seek additional information. Selection of one or more proposals for additional information will not obligate the Government to enter into "discussions" or to ask questions of any other Offeror.

(U//FOUO) The research areas of interest for the BAA are organized into tracks and each track contains multiple topics. Each track will be evaluated independently of the other tracks. Offerors will submit proposals to address one or more topics within a track.

(U//FOUO) The Government anticipates multiple awards as a result of this BAA. However, the Government reserves the right to select for award all, some, or none of the proposals received, if it is determined in the best interest of the Government.

(U//FOUO) The Government also reserves the right to shift funding across tracks and/or add additional funding based on the quality of the proposals. Award(s) resulting from this BAA will be made to the responsible Offerors whose offers, conforming to the BAA, represent in aggregate the greatest potential for contributing to the Government's current technical research needs as described in the BAA. The Government may select proposals for award that have lower technical or overall rankings if it is determined that the mix of topics represented by the awarded proposals represents the best value to the Government by providing a balanced program.

(U//FOUO) Neither lowest cost nor highest technical ranking will be an absolute determining factor in making an award. Rather, where rankings are used they will function merely as guides for the evaluation committee. The intention of the prioritization is to select the proposals that provide the Government with the best mix of topics to maximize the potential impact the prototypes have on the Government's systems and missions.

(U//FOUO) The Government, however, may:

1. Reject any or all offers if any action is in the public's interest;
2. Accept other than the lowest offer; or
3. Waive informalities and minor irregularities in offers received.

6.8.2 (U) BASIS FOR AWARD

(U//FOUO) The evaluation criteria are listed below. Any contract resulting from this solicitation will be awarded to the Offeror(s) who submits the most advantageous proposal based on the factors listed below and on the government's interest in having a balanced program as described in section 6.8.1. An Offeror may not receive consideration for award if a rating of UNACCEPTABLE is received in any evaluation factor or sub-factor. Non-compliance with the Proposal Preparation Instructions in Section 6 of the BAA may result in the proposal being considered NON-COMPLIANT.

(U//FOUO) Proposals shall be subject to a scientific review process. Scientific or technical judgment will be prominent in determining the awardees. Pursuant to FAR 35.016, the basis for selecting proposals for acceptance shall be technical merit, potential contribution to agency programs, and cost (cost realism and fund availability).

- (U//FOUO) **Technical**: This section includes the overall scientific technical merit, innovativeness, viability of the approach, and deliverables of the proposal made by the Offeror. This section also includes the feasibility of the Offeror's plan to implement a functional prototype within the allotted time. Elements that will be considered are:
    - Scientific and technical merit
    - Innovativeness and uniqueness
    - Viability and practicality of technical approach
    - Prototype capabilities
- (U//FOUO) **Potential Contribution**: This section includes the relevance, applicability, and usefulness of the capability represented by the prototype to the National Security Agency's mission. Elements that will be considered are:
    - Relevance and importance
    - Applicability and validity
    - Usefulness and effectiveness
- (U//FOUO) **Cost and Schedule Realism, and Fund Availability**: The Government shall perform a cost realism analysis of all proposals. The Offeror's cost proposal will be analyzed and compared to the technical effort proposed by the Offeror to determine the extent to which the

Offeror has proposed a realistic price and schedule. Fund availability will factor into the number of awards that can be made. Elements that will be considered are:

- Schedule feasibility
- Risk management
- Cost realism

(U//FOUO) Technical will be given the highest consideration while Potential Contribution, Cost and Schedule Realism and Fund Availability will be given equal weight. Potential Contribution, Cost and Schedule Realism and Fund Availability together are more important than Technical Merit. Once proposals have been evaluated, proposals with an overall rating of ACCEPTABLE or higher will be reviewed by a technical review committee to determine which proposals represent the best value to the Government per Section 6.8.1.

(U//FOUO) Table 1 lists the adjectival ratings that will be used:

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Table 1: (U//FOUO) Adjectival/Color Rating Definitions	
Rating	**Definition**
Exceptional (Purple)	(U//FOUO) Exceeds specified minimum performance or capability requirements in a way clearly and exceedingly beneficial to the Government; proposal may contain minor weaknesses, but the strengths significantly outweigh weaknesses; proposal must have one or more significant strengths and no deficiencies to receive an Exceptional.
Very Good (Blue)	(U//FOUO) Exceeds specified minimum performance or capability requirements in a way beneficial to the Government; proposal may contain minor weaknesses, but the strengths outweigh the weaknesses; proposal must have one or more major strengths and no deficiencies to receive a Very Good.
Acceptable (Green)	(U//FOUO) Meets specified minimum performance or capability requirements for acceptable contract performance; proposal rated Acceptable must have no deficiencies, but may have one or more minor weaknesses.
Marginal (Yellow)	(U//FOUO) Meets specified minimum performance or capability requirements; however, the proposal has significant weaknesses or significant aggregation of minor weaknesses. Proposal rated as Marginal must have no deficiencies.
Unacceptable (Red)	(U//FOUO) Fails to meet specified minimum performance or capability requirements; proposal has one or more deficiencies. Proposals with an unacceptable rating are not awardable.
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(U//FOUO) Table 2 lists the definitions of strengths and weaknesses:

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Table 2: (U//FOUO) Degrees of Strengths and Weaknesses	
Rating	**Definition**
+ + +	**Significant Strength** – An exceptional aspect of an offeror's proposal that has merit and

	exceeds specified performance or capability requirements in a way beneficial to the Government, and either will be included in the contract or is inherent in the offeror's process.
+ +	**Major Strength** – An outstanding aspect of an offeror's proposal that has merit and exceeds specified performance or capability requirements in a way beneficial to the Government, and either will be included in the contract or is inherent in the offeror's process.
+	**Strength** – An aspect of an offeror's proposal that has merit and exceeds specified performance or capability requirements in a way beneficial to the Government, and either will be included in the contract or is inherent in the offeror's process.
	Neutral - An aspect of an offeror's proposal that meets specified performance or capability requirements. Neither a strength nor a weakness.
-	**Weakness** – A flaw in the proposal that increases the risk of unsuccessful contract performance.
- -	**Major Weakness** – A flaw in the proposal that appreciably increases the risk of unsuccessful contract performance.
- - -	**Deficiency** – A material failure of a proposal to meet a government requirement or combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.
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(U//FOUO) Each proposal can only be submitted under one track but a proposal can reference multiple topics within that track if appropriate. Proposals in each track will be evaluated independently of proposals in the other tracks. Once the proposal evaluation is complete, the Offeror will be notified if its proposal is:

- Recommended for Award and Funded
- Recommended for Award and Fund if Funds are Available
- Not Recommended for Award

(U//FOUO) Proposals *Not Recommended for Award* will be destroyed in accordance with normal Government procedures. If additional funds become available at a later date the Government reserves the right to fund any *Recommended for Award and Fund if Funds are Available* up to 12 months after the Offeror's submission date. Offeror may reserve the right to update their proposal upon the Government subsequently funding any proposal Recommended for Award and Fund if Funds are Available.

7 (U) REASEARCH AREAS OF INTEREST

(U//FOUO) NSA is looking for breakthrough, game changing technologies and approaches that will disrupt the status quo with radically different ways to address NSA mission requirements. NSA wants to leverage research done by commercial and academic organizations to provide technology solutions that can significantly enhance the current systems, provide novel and breakthrough technology innovations, or make significant improvements in performance and security. NSA is particularly interested in proposals for early-stage innovation and technology that can make an order of magnitude improvement over current state-of-the-art or commercially available products. However, because NSA has critical dependencies upon a massive investment in existing hardware and software infrastructures, replacing everything and starting over is not an option. New technologies and capabilities must be able to co-exist and integrate with existing systems.

(U//FOUO) The specific topics of interest are organized into tracks. Each track also includes an option which allows Offerors to recommend a new topic in the track and submit a proposal if the proposal concerns improvements to an area not already covered by a topic. The Offeror can choose to submit multiple proposals, however, each proposal can only be submitted under one track and each proposal must standalone and must not have dependencies on other proposals.

7.1 (U) TRACK 1: DATA DISCOVERY, ANALYSIS, EXPLOITATION, AND MANAGEMENT

(U//FOUO) The ever increasing amounts of data being processed necessitate the use of a variety of tools and approaches to make sense out of the data and uncover relevant data hidden in the masses of non-relevant data. We are seeking innovative and new approaches to address data discovery, analysis, exploitation, and management issues along with new ways of conceptualizing the analytic task. We are not looking for small or incremental improvements nor are we looking for another Commercial-off-the-Shelf (COTS) product that is marginally better than other similar COTS products. Additionally, since the focus of this effort is on applying original research and developing new approaches, we are not interested in proposals centered primarily on evaluation of commercially available products.

(U//FOUO) As the amounts and types of data continue to increase, it also becomes necessary to utilize different types of analytics and acknowledge that no one analytic tool fulfills all purposes. Instead, it is necessary to understand how different types of analytics can identify elements of the answers and other analytics can be used to coalesce these individual elements into a meaningful context.

(U//FOUO) Security is a fundamental aspect of data discovery and involves balancing the need to provide users with all relevant data versus the need to only allow authorized users access to the data. Analytics and data discovery techniques need to be able to work in a multi-level security environment. Ideally, the capability would draw from multiple classification levels but the derived data would be classified as low as possible.

(U//FOUO) The topics listed below are deliberately broad in scope so as to impose minimal constraints on creativity. The topics are also not all-inclusive and important approaches for these problems may have been left out which is why the last topic is included asking for Offeror provided topics in this area. Proposals for prototypes can address a portion of a topic or an entire topic.

(U) Not Interested In:

(U//FOUO) Any search or analytical techniques claiming to be better than current state-of-the-art search techniques must demonstrate a direct comparison between the new technique and the most relevant current state-of-the-art technique(s) during the prototype demonstration. There are a lot of analytic and discovery tools currently on the market and many claims about their capabilities which is why a direct comparison is required for demonstrations of prototypes in these areas.

(U//FOUO) Because analytic techniques can often function or perform differently when processing very large volumes of data, we are not interested in techniques that are demonstrated on trivial amounts of data. Section 8 describes several sources of test data but it is the Offeror's responsibility to obtain a meaningful amount of test data to demonstrate the prototype's potential to operate effectively on very large amounts of data. Additionally, since many search and analytical techniques function differently when faced with "dirty" data – data that is incomplete, inconsistent, sparse, missing, etc. – new techniques and approaches should also address the impact of dirty data on the techniques and approaches.

(U) Constraints:

(U//FOUO) The Government already has an abundance of stovepiped systems, applications that can only access their own discrete data repository, and special-purpose data repositories. The technologies and capabilities prototyped will need to be compatible with existing industry standard infrastructures and able to interoperate with existing systems built using industry standard hardware and software. All technologies and capabilities should be configurable to utilize data in existing data repositories and not require data to reside in a proprietary format or repository. Technologies and capabilities should have a modular and open architecture design that can be plugged into existing infrastructure frameworks and allow different analytic components to be assembled into different workflows as needed to support operational needs. All software development should be

done using standard libraries included with common languages such as Python, Java, C++, or C.

(U) Topics:

1. (U//FOUO) Behavioral Analytics – When dealing with very large amounts of data that may not explicitly contain the information of interest, it often is possible to derive the information of interest indirectly by assessing characteristics of the existing data. Behavioral analytics attempt to identify, characterize, and infer new data based upon an understanding and assessment of available data and the context in which it exists. Some key features of behavioral analytics relevant to large scale data are:

- Accommodates the fact that the data is constantly changing and can automatically adapt as the data undergo normal change
- Incorporates multi-criteria and fuzzy decision making
- Operates effectively on multiple disparate types and sources of data
- Utilizes unsupervised techniques with minimal to no training and are able to start from almost zero knowledge
- Relies on strong statistical correlations
- Facilitates integration of domain knowledge
- Aggregates small local phenomena into large scale phenomena
- Provides understandable explanations of why something was identified and provides the data trail that led to the reported conclusions
- Reports a degree of confidence in the assessments

(U//FOUO) Developing behavioral analytics able to function effectively on very large scale data is a complex and difficult problem. The primary purpose of this topic is to explore different approaches towards behavioral analytics, assess the effectiveness of the analytics on different types of problems, and discover how these analytics can integrate with other types of analytics to produce more understandable information. Prototypes under this topic can focus on general approaches or explore specific techniques.

2. (U//FOUO) Contextual Discovery – These are tools, algorithms, methods, and approaches that focus on putting discovered information into relevant contexts to facilitate better understanding of the data. This could include a variety of techniques to identify and extract relevant objective and subjective information from the data. For example,

- Sentiment analysis attempts to determine the attitude of the speaker or writer with respect to some topic
- Pattern discovery attempts to discover new patterns or to match incomplete data against templates for known patterns of interest
- Statistical inference is a process that draws conclusions from data containing random variation

- Concept drift describes how properties of the data change over time in unforeseen ways making future predictions and assessments less reliable
- Temporal relevance links or decouples events and potential components of events based on their associations in time

(U//FOUO) Effective contextual discovery in very large collections of dirty and incomplete data is nascent field and the focus of this topic is to explore and understand how these technologies function and can be applied to realistic problems.

3. (U//FOUO) Alternate Data Exploration Techniques – While statistical analytics continue to be important to data analysis and discovery, other mathematical approaches to analytics can also be effective at discovering or deriving new types of information. The focus of this topic is on discovering and applying other approaches to analytics, such as Graph Mining Analytics, Matrix Analytics, Spatial Analytics, etc. Approaches using these alternate data exploration techniques need to demonstrate the improved effectiveness at discovery over standard statistical analytics. Additionally, when dealing with very large data repositories, it often is not practical to reformat existing data into alternate formats to support new types of analytics. Any approaches demonstrated for this topic must use data formatted for standard data repositories, e.g., relational databases, cloud databases, etc., and not require large scale data transformations into new formats in order to use the new types of analytics.

4. (U//FOUO) Predictive Analytics – These are tools, approaches, and techniques that enable analysis of current and historical data to make predictions about future events. These predictions can fill in incomplete data, discover risks, or identify likely outcomes. Predictive analytics can be used to identify data that is likely to match expected or previously known patterns. Predictive analytics can also be used to identify data that forms the basis of new, unexpected, or previously undiscovered patterns. Any approaches demonstrated for this topic must use data from at least two different types of disparate data from at least two sources to show how data from different sources can effectively be combined to support the predictions as well as provide the analysis trail explaining how the system reached the predictions it made.

5. (U//FOUO) Data Discovery Capabilities – These are tools, algorithms, methods, etc. that derive and extract meaning and relevance from structured, semi-structured, and unstructured data. These capabilities need to operate on data stored in multiple data repositories and in multiple formats and support the inclusion of new data formats as a routine and quick activity. These could also be capabilities to automatically enrich new data with information derived from existing data or new data indexing strategies that facilitate data discovery or manipulation.

6. (U//FOUO) Data Exploitation Capabilities – These are tools, algorithms, methods, etc. that allow users to visualize data, collaborate with other users, fuse data from multiple sources, or to otherwise manipulate the data and the results from analytics to produce a more complete and comprehensive understanding of the data and its implications in the context of the wider operational environment. These capabilities need to be easily customizable by the users to reflect multiple workflows and usage requirements.

7. (U//FOUO) Multi-source Data Fusion – Fusing together disparate data sources to develop a consolidated understanding of the data is a long-standing problem that has become even more complicated by the ever increasing amounts and types of data available. The problem is made more difficult when the disparate data sources do not contain unique identifiers or even combinations of weak identifiers that can be used reliably to identify and match data across multiple data sources. This topic is looking for tools, methods, and/or approaches that can fuse data from disparate data sources into meaningful information.

8. (U//FOUO) Subject Domain Detection – These are tools, methods, and approaches to automatically find and tag domain-specific terminology found in textual data. Only tags relevant to the specific domain would be applied but they would be applied using the appropriate context for the domain. For example, if the domain was “Cyber Attack”, terminology specific to cyber attacks would then be found in the text and tagged to show actors, victims, infrastructure, methods, damage, etc., to support an understanding of the entities and relationships between the entities.

9. (U//FOUO) Entity Disambiguation and Correlation – These are tools, methods, and approaches to automatically disambiguate various pieces of structured and unstructured data elements and determine whether one block of information is related to another set of information based on the connection points being people. This would then automatically generate a set of relationships and associations for multiple persons.

10. (U//FOUO) Predictive Inferences – Often when tracking objects, data about the object’s location is relatively sparse. However, the context in which the object is moving (e.g., boat, plane, walking, etc.) constrains the potential future locations where the object can occur. Based on the type of object and the context in which the object is moving, are there tools, methods, or approaches that can effectively predict or infer possible future locations for the object to increase chances of successful tracking of the object?

11. (U//FOUO) Governance and Management of Large Scale Data and Analytics – These are tools, methods, and/or procedures to manage and provide governance for software platforms and frameworks that support multiple

and diverse analytical tools operating on very large amounts of data. Some examples of this type of management and governance are:

- Tracking data provenance throughout multiple processing steps
- Tracking variable data ingest rates and processing resource availability to dynamically throttle the rate of data being sent to different analytical processes
- Dynamically adjusting processing priorities based on data content
- Dynamically allocating processing resources based on data volume and priority
- Metrics collection and management regarding data, processing activities, and system resources
- Configuration and deployment management for tracking, updating, and deploying software modules in a configurable distributed environment

(U//FOUO) These capabilities need to be flexible, scalable, highly efficient, and easily integrate with existing systems (i.e., we can't start over with a clean slate).

12. (U//FOUO) Data Sanitization Risk Analysis - Multiple sources of data often provide a level of content overlap but at different classification levels. Also, external sources may provide additional data. Sanitization guidelines allow for the lowering of classification level to serve the customer better under a variety of conditions. There is a need to be able to assess risks associated with an objective to sanitize data. Given a data set that outlines the availability of data and the given classification levels of individual data sets within, how can an analyst understand the potential to apply guidelines for reducing classification levels to expand the amount of data that can be made available to the customer at a lower classification level? How does that risk change over time for the data in question?

13. (U//FOUO) Offeror provided topic related to Data Discovery, Analysis, Exploitation, and Management.

7.2 (U) TRACK 2: MULTI-LINGUAL ANALYTICS

(U//FOUO) In a world that is increasingly diverse and at the same time increasingly interconnected, the ability to automatically and effectively process, analyze, and interact with multi-lingual data is of growing importance.

(U) Not Interested In:

(U//FOUO) Due to the nature of our missions, foreign languages are very important. Any approaches proposed to derive information or understanding from data need to be demonstrated using at least one hard foreign language

(e.g., Arabic, Farsi, Chinese, etc.). We are not interested in approaches that only work on English.

(U//FOUO) Any techniques claiming to be better than the current state-of-the-art techniques must demonstrate a direct comparison between the new technique and the most relevant current state-of-the-art technique(s) or benchmarks during the prototype demonstration.

(U//FOUO) Because analytic techniques can often function or perform differently when processing very large volumes of data, we are not interested in techniques that are demonstrated on trivial amounts of data. Section 8 describes several sources of test data but it is the Offeror's responsibility to obtain a meaningful amount of test data to demonstrate the prototype's potential to operate effectively on very large amounts of data.

(U) Constraints:

(U//FOUO) The Government already has an abundance of stovepiped systems, applications that can only access their own discrete data repository, and special-purpose data repositories. The technologies and capabilities prototyped will need to be compatible with existing industry standard infrastructures and able to interoperate with existing systems built using industry standard hardware and software. All technologies and capabilities should be configurable to utilize data in existing data repositories and not require their data to reside in a proprietary format or repository. Technologies and capabilities should have a modular design that can be plugged into existing infrastructure frameworks and allow different analytic components to be assembled into different workflows as needed to support operational needs. All software development should be done using standard libraries included with common languages such as Python, Java, C++, or C.

(U) Topics:

1. (U//FOUO) Multi-lingual, Multi-genera Data Analysis – These are tools, algorithms, methods, etc. that allow users to effectively and transparently perform analysis, data discovery, or visualization across data in multiple languages and/or data from multiple genera (e.g., image, text, video, audio, etc.). These capabilities need the ability to be easily expanded to incorporate new languages or new genera of data in response to changing mission requirements.

2. (U//FOUO) Speech Analytics – These are tools, algorithms, methods, etc., supporting the analysis of speech data. This can include activities such as speech to text conversion, speaker recognition, language/dialect recognition, gender/age determination, etc. These capabilities will need to be able to be easily expanded to apply to multiple languages.

3. (U//FOUO) Accent Recognition – These are tools, algorithms, methods, etc. that can, in real-time, recognize and identify accents within a language. Approaches should be demonstrated on at least two non-English languages and show they can distinguish between at least three well-documented accents within each language.

4. (U//FOUO) Machine Translation – Chinese and other hard languages such as Pashto and Urdu present several technical difficulties for machine translation and many machine translation approaches rely heavily on the use of lexicons and grammatical models. This topic focuses on tools, methods, and approaches to improve the lexicons and grammatical models for Chinese Machine Translation by harvesting vocabulary and sentence patterns from existing human translations to enhance and expand lexicons and grammatical models.

5. (U//FOUO) Translation Management for the Intelligence Community - The Intelligence Community requires a Translation Memory management system that is deployable in the emerging IC IT Enterprise (IC ITE) Desktop Environment to support community-wide collaboration on classified and unclassified translation tasks. Information on IC ITE can be found on ODNI's website (http://www.dni.gov/files/documents/IC ITE Fact Sheet.pdf).

(U//FOUO) The solution must be integrated easily with other tools for multi-lingual analytics, either as a browser plug-in or by exposing an Application Program Interface to other content-authoring tools (such as MS Office). The tool must support the following capabilities:

- markup of individual Translation Units (TU), such as agency-defined classification and legal authority markings
- sourcing of individual TUs to original material
- purging of all TUs associated with a single source document
- IC ITE-compliant user identity management, with the capability to expose to each user (or community of users) all and only the TUs he or she is authorized to view (based on classification markup or legal authority codes)
- time-stamping of TUs to support systematic age-offs of accumulated data
- user-defined markups (such as hash tagging for high-interest topics)
- retrieval/editing/storage transaction management for multiple concurrent users
- translation task management (task prioritization/queuing, assignment, document check-out, translation turn-in)

(U//FOUO) Although full implementation of these capabilities is not expected, a successful prototype must demonstrate a strategy and supporting mechanisms to implement them in the future. The tool must be compliant with international Translation Memory exchange standards. Capabilities that are desirable but not essential for the prototype include:

- integrated TU alignment

- file format conversion (MS Word/PDF conversion to plain text, etc)

(U//FOUO) Documentation should describe approaches to support these two capabilities as well as any other TM-related capabilities deemed desirable but not directly supported by the prototype.

6. (U//FOUO) Topic Detection and Tracking Analytics - These are tools, algorithms, methods, etc., supporting the categorization of natural language content by topic. This can include activities such as topic clustering, topic/event tracking, keyword extraction, and word cloud navigation. These capabilities will need to be able to be easily expanded to apply to multiple languages.

7. (U//FOUO) Offeror provided topic related to Multi-Lingual Analytics.

7.3 (U) TRACK 3: STREAMING DATA PROCESSING AND ANALYTICS

(U//FOUO) In order to effectively identify and respond in real-time to events and items of interest in very large amounts of data – essentially acting inside "cyber-time", streaming data processing must be utilized because analytics on static data are orders of magnitude too slow for responses in "cyber-time". Many streaming data applications to date have focused on performing basic calculations on small, structured records with well-formed, consistent, and complete data, e.g., financial applications that process stock market trades in real-time to determine a company's position regarding particular stocks. Many of these streaming data applications do exactly what a nightly batch process did on static data only the streaming data applications deliver the answers faster and on a more frequent basis (e.g., a report provided every 10 minutes instead of once a day). To obtain a deeper understanding of events in cyber space, new paradigms for streaming data are needed that can, in cyber-time:

- Handle incomplete data
- Handle dirty data
- Quickly derive information that is very time consuming to derive from static data
- Use static data to enrich streaming data
- Merge multiple streams of disparate data to derive meaning
- Support mixed initiative analysis and response
- Dynamically adjust processing based on data volume or data content
- Compare streaming data against one or more models describing expected data
- Provide methods of rapidly incorporating and processing new and diverse data sources

(U//FOUO) Streaming data analytics also need to be able to work in a multi-level security environment. Ideally, the capability would draw from multiple classification levels but the derived data would be classified as low as possible.

(U) Constraints:

(U//FOUO) All solutions proposed and prototypes developed for this track will need to be demonstrated on a streaming data engine. Additionally, the prototype needs to actually run as modules inside the streaming engine and it is not sufficient to only utilize the streaming engine for a trivial part of the prototype such as a data parser.

(U//FOUO) The Government will not provide test data for this track and it is the responsibility of the Offeror to identify and acquire suitable, unclassified test data of a sufficient volume to demonstrate the effectiveness of their prototype.

(U//FOUO) Scalability is a fundamental aspect of this track so prototypes should be designed around system architectures that are able to scale to 10x, 100x, 1000x, and higher amounts of data without requiring significant redesign or rework of the system architecture. The key architectural features that support extreme scalability should be highlighted in the prototype description.

(U) Topics:

1. (U//FOUO) Automated Decision Making in Streaming Analytics – These are innovative methods and mechanisms to automatically assess streaming data, evaluate the data against some sort of decision criteria, make a decision about executing a change, and then feed that change back into a command and control system to modify future processing – all in real-time and at line speeds on large volumes of data. The decision making engines could be rule based, algorithm based, agent based, or utilize any other technology able to make real-time decisions using large amounts of streaming data and produce actionable information. The assessments need to be made on non-trivial or compound factors. For example, (a trivial factor = if keyword X seen in data, take action A) versus (a non-trivial factor = if amount of data seen in past 5 minutes is more than 20% higher than average and the origin of data is heavily skewed towards a small number of sources, then take action B). Also, when dealing with very large amounts of streaming data, there will be normal variations and various reoccurring cycles (e.g., morning versus night, weekday versus weekend, etc.) in addition to evolution of the system towards new normal baselines. The processing and decision making approaches need to accommodate this normal level of change.

2. (U//FOUO) High-speed Automated Filtering and Selecting – These are new methods to perform high-speed automated filtering and selecting of data in very large data streams to make rapid binning decisions about the expected value and

importance of the data. However, the selecting and filtering approaches cannot use trivial assessment methods, e.g., comparing the incoming data against a list of keywords. Instead, the selecting and filtering approaches must use non-trivial or complex assessment methods based upon multiple factors or the interaction of several factors. The key focus is to rapidly identify and extract the high value information as well as identify and eliminate data of no value. It is likely that a significant amount of data will remain that is not high value or no value and that data will need to undergo additional processing. However, it is more important to minimize the number of false positives in the high value data and the number of false negatives in the no value data than it is to reduce the size of the data left over for additional processing. Additionally, it is important that the selection criteria for high value and no value data be easily modifiable since it is expected that these criteria will change on a regular basis.

3. (U//FOUO) Combining and Correlating Disparate Data Streams to Identify Events of Interest – These are methods and algorithms to identify events of interest detected by multiple sensors when each different type of sensor only detects a part of the event and there are no unique identifiers associated with the event. For example, consider a large data center equipped with numerous sensors for recording temperature, power usage, voltage fluctuation, accelerometers, etc. There is normal variation in the readings of each sensor and the sensors are likely to have different reporting cycles and not necessarily be synchronized. When events of interest do occur, different sensor streams may report on parts of the events but there are no unique identifiers describing the events. The key challenge is then to assemble the data from the different sensor streams to identify the events of interest in real-time and as they are beginning to occur making it possible to take meaningful actions. Additionally, the data streams may be processed by separate streaming instances. In these cases, the frequency and detection rate of each individual event is high but it is not of interest until an entire sequence is discovered across the multiple streaming instances. Events may chain through data elements in different data streams, e.g., interesting only if event A is detected between points 1 & 2, event B is detected between points 2 & 3, and event C is detected between points 3 & 4. However, high traffic volumes prevents sending all data to a central point for correlation or exchanging anything but a trivial amount of data between remote systems. Any of the observations can take place on any of a set of distributed systems but a potential time sequence (e.g., A, then B, then C) is required for the consolidated event to be of interest.

4. (U//FOUO) Complex Streaming Data Analytics – These are methods and mechanisms to conduct complex analytics on streaming data. The complexity could be introduced by combining and cross-analyzing multiple streams of data, dealing with multiple streams of data that are out of step temporally, attempting discovery of multiple reports on the same event/object in multiple streams when there is no unique primary key associated with the event/object, utilizing data streams from multiple locations, utilizing data streams from multiple sensors

cooperating to make a stronger detection, or by any of the other issues that arise when analyzing multiple streams of data. Complexity could also be due to the algorithms/analytics that must be run on the data to extract the desired information. Complex processing approaches could be required to adapt to data volume or to compare streaming data against various models of expected or target characteristics or behaviors.

5. (U//FOUO) Decision Making with Incomplete Data – These are methods and mechanisms to determine the confidence rating of the likelihood of probable outcomes when the data in the stream is incomplete. These approaches should consider what types of analytics are appropriate to have confidence ratings (i.e., when are confidence ratings meaningful?), and whether multiple low confidence ratings can be combined to produce relevant overall confidence ratings. These approaches should also consider possible feedback mechanisms to improve the processes of generating confidence ratings over time as well as which specific aspects of the data are relevant to producing meaningful confidence ratings.

6. (U//FOUO) Converting Static Data Analytics to Streaming Data Analytics – These are methods and mechanisms to migrate and adapt static data analytics, algorithms, and models to operate on streaming data. These approaches should consider the types or classes of static data analytics that are appropriate for conversion to streaming data analytics and whether the streaming data analytics can be broken into multiple steps to improve parallelism and throughput. These approaches should also consider the impact of the resulting streaming analytics on storage, performance, and throughput. It may be necessary to assess whether the analytic needs can still be met if the streaming analytic produces somewhat different results from the static analytic rather than producing exactly the same results due to the constraints and/or advantages of the streaming data environment.

7. (U//FOUO) Self Learning Streaming Analytics – These streaming analytics look at patterns of complex, multi-variable behavior over time to determine what is a normal variant of the behavior, have the streaming application build its own model of “normal” over time, automatically adapt and evolve the model to reach a new “normal” as natural changes occurs, and alert on activity that does not conform to the “normal” variation. This all needs to be done within the streaming engine and cannot be dependent upon an external data store or external analysis. Multiple definitions of “normal” also need to be supported because certain aspects of the data may be “normal” while other aspects of the data may not be “normal” so the definition of “normal” needs to support multiple nuances.

8. (U//FOUO) Visualization and Integrated Analysis of Streaming Data Outputs – These are methods and approaches to interface the outputs of streaming data analytics into visualization and other analytics tools. For example, this could include integrating common graphing toolkits into the outputs

from streaming engine processing to support subsequent analysis and integration with other analytical results.

9. (U//FOUO) Command and Control of Multiple Streams Processing Instances – This includes methods and approaches to manage multiple streaming engine instances across multiple locations and likely on different hardware platforms. Each streaming engine instance would process different data sources and possibly different data types. It could include a GUI to facilitate easy management of remote systems and include some basic monitoring of data flow and hardware status. The objective is to have a Command and Control GUI that could display the status of streaming system by mission or data type for stakeholders and then support further drilling down by system administrators to access and manage the instances running on a specific hardware platform.

10. (U//FOUO) Innovative Hardware for Streaming Data – The objective of this topic is to discover new hardware approaches that reduce power, space, and cooling demands while significantly increasing performance and is more cost effective at scaling streaming data processing than using standard server memory. The issue streaming data applications generally encounter is that they use quite a bit of memory to process data and server memory is an expensive and limited resource. However, if hardware alternatives to server memory are utilized, any latency introduced to the processing must be shown to be minimal.

11. (U//FOUO) Streaming Data in an OpenStack-based Amazon EC2 Utility Cloud model – Streaming data processing in a utility cloud presents several challenges including: measuring the overhead when running on OpenStack-based virtual servers, monitoring instances and spinning them up or down as load increases or decreases, coordinating with OpenStack/utility cloud monitoring which may wish to spin up or down virtual servers as different times than the streaming instances, network bandwidth requirements of the virtual servers, and effective command and control / monitoring and alerting to ensure systems administrators have effective and comprehensive situational awareness and control of the total system and environment.

12. (U//FOUO) Offeror provided topic related to Streaming Data Processing and Analytics.

7.4 (U) TRACK 4: CLOUD ANALYTICS

(U//FOUO) As data volumes continue to increase, Cloud technologies offer an effective approach to handle and process these very large data volumes. However, Cloud technologies also have to interoperate with other systems to enable the results of Cloud analytics to be effectively utilized.

(U) Constraints:

(U//FOUO) Because Cloud analytics are focused on handling very large amounts of data, prototypes should be demonstrated using non-trivial amounts of data to be considered realistic. The Government will not provide test data for this track and it is the responsibility of the Offeror to identify and acquire suitable, unclassified test data of a sufficient volume to demonstrate the effectiveness of their prototype. The Government will also not provide hardware to run the Cloud. NSA uses the open source Accumulo software for many of our Cloud activities. Any new enhancements developed to the Accumulo software must comply with the open source licensing agreements for Accumulo.

1. (U//FOUO) Integrated Cloud and Streaming Data Analytics – Streaming data systems can apply a model to new data to select data of interest. However, when data changes occur or an analyst's interests change, the models may no longer be effective at selecting data of interest. The objective of this topic is to discover ways to integrate cloud and streaming data analytics so analytics can run repeatedly in the cloud to process recently received data and then use the results of those analytics to update data selection models for streaming data. As new data comes in to the system, the cloud analytics continue to process the new data and continue to send a steady flow of updates to the selection models for the streaming data processing.

2. (U//FOUO) Efficient Streaming Analytics in the Cloud – As cloud technologies continue to mature and expand, there is increasing interest in moving operations such as streaming data processing off of dedicated hardware and into cloud environments, both data and utility clouds, where hardware can be shared and dynamically reallocated. However, streaming engines have complex workloads and can have unique processing requirements. This topic focuses on exploring and demonstrating the feasibility and usage potential of integrating and performing high efficiency streaming data processing in cloud environments.

3. (U//FOUO) Cloud Indexing Strategies – A key benefit of relational databases has been the variety of specialized indexing techniques available to accommodate different data characteristics, for example, B-Tree indexes for general data access; Bitmap indexes to rapidly access multi-valued, sparse data; function-based indexes to rapidly access derived values; etc. We are looking for new types of cloud-based indexing strategies to facilitate more rapid access to data and to more effectively handle data with unique characteristics, e.g., sparseness, combinations of values, derived information, etc.

4. (U//FOUO) Improved MapReduce – MapReduce operates by sending the analytic processing to operate where the data is located (the "Map" phase) and then results are collected in a centralized location to finalize the processing (the "Reduce" phase). This process works very effectively when the Map phase results in a relatively small amount of data to be transmitted to the Reduce process. However, when the Map phase results in a lot of data or when

additional processing steps need to be done prior to the Reduce phase, the processing can become constrained by limited bandwidth and connectivity between the nodes. We are looking for new approaches to operate complex and large scale analytics using the MapReduce concept that can also effectively accommodate significant connectivity and bandwidth limitations between nodes.

5. (U//FOUO) Distributed Cloud Analytics – Multiple clouds are often used for security or logistical purposes instead of consolidating all data and processing in a single very large cloud. We are looking for approaches that will support analytic processing and data discovery across multiple clouds regardless of whether the clouds are physically co-located or geographically distributed. Approaches for distributed cloud analytics also need to address the concept of multi-level security.

6. (U//FOUO) Advanced Cloud Analytics – Legacy systems using older database technology often utilize complex analytical applications developed to work very effectively and efficiently in a specific database technology or RDBMS software package. But as data is migrated from these legacy systems into data clouds, it can be difficult to adapt these legacy applications and analytics to operate effectively under cloud technologies. We are looking for approaches to facilitate the transfer, conversion, or adaption of complex analytical applications built on other database technologies to be able to operate effectively on data in the cloud.

7. (U//FOUO) Next Generation Cloud Architecture – As the use of both data and utility clouds continue to increase and these technologies continue to mature, additional requirements and optimizations such as speed, performance, agility, privacy, and security also increase in importance. The focus of this topic is on identifying tools, methods, and approaches able to integrate with existing cloud architectures to provide enhanced and next generation capabilities for cloud architectures.

8. (U//FOUO) Security in the Cloud – These are tools, methods, and approaches to provide end-to-end security in the cloud and across multiple clouds that can secure data and ensure compliance during processing, ingest, storage, query/access, archival, and deletion. Security in the cloud goes beyond typical data security labels and in addition to traditional multi-level security can also include:

- Protection of secret or private crypto keys when stored in cache memory on a cloud server.
- Protection of proprietary information in a multi-user environment where some data is visible to all users but other data is only visible to users according to rapidly changing group affiliations. These proprietary information protections are in addition to typical security classification and need-to-know controls.

9. (U//FOUO) Object Data Stores in the Cloud – As cloud technologies mature and the usage of cloud technology expands, there is a growing need to utilize the cloud as a platform for different types of data and data storage. Object data stores provide some significant advantages for certain types of analytical processing so this topic focuses on exploring and demonstrating the feasibility and usage potential of integrating object data stores with cloud technologies. Examples of potential object data stores can be found with Swift (http://docs.openstack.org/developer/swift) and Ceph (http://ceph.com).

10. (U//FOUO) Efficient Dataflow Services in Heterogeneous Multi-tenant Environments – As mission requirements continue to evolve and a growing amount of data, applications, and users transition into cloud-based environments, there is an increasing need to establish and manage efficient dataflow services among a wide variety of applications and technologies in support of the diverse requirements of multiple tenants occupying the shared environment. However, because available resources are finite, the management of the dataflow services must also be able to handle resource sharing issues such as load balancing, prioritization, scheduling, etc.

11. (U//FOUO) Offeror provided topic related to Cloud Analytics.

7.5 (U) TRACK 5: NETWORK ANALYTICS

(U//FOUO) In addition to the analytics described above, the Government is also interested in identifying approaches specific to network analytics.

(U) Constraints:

(U//FOUO) Scalability is a fundamental aspect of this track. Prototypes need to be designed to easily scale into larger systems and to handle a wide variety of data types and formats. Section 8 contains information regarding potential sources of test data. Additionally, the tools SNORT (http://www.snort.org) and SURICATA (http://suricata-ids.org) are frequently used as real-time packet processing signature based tools and the use of these tools may be beneficial to several of the topics described below. Analysis of IP flow data and the analysis of IPfix records are also standardized using the IETF (RFC 5655) and Cisco's Netflow V9 protocols.

(U) Topics:

1. (U//FOUO) Temporal Multivariate Anomaly Detection – While many analytics can detect simple anomalies in a single aspect of a data collection (e.g., a value that is too big, too small, too late, etc.), detecting complex anomalies depends upon the ability to analyze multiple variables/fields (e.g., 10 variables, 40 variables, etc.) in data concurrently and holistically as well as to understand

the interactions and interdependencies between the different variables within the data. Once the complex anomalies are detected, they need to be transformed into a form that is easily understood by human analysts (e.g., by mapping multivariate data onto a reduced space such as a histogram, describing the complex anomalies with a layered series of metrics, etc.). Additionally, systems to detect complex anomalies also need to utilize some sort of adaptive and automatic training to provide constant updates to the behavioral training models since the data volumes and evolving nature of these systems preclude establishing human-driven training data sets. NetFlow data is widely available and generally is a good fit to support development and testing of multivariate analytics.

2. (U//FOUO) Watch Office Analytics and Visualizations – Watch Offices are responsible for monitoring the activity of many systems as well as the interconnections and data flows between systems. Unfortunately, many of the system monitoring tools are designed more for system administrators and troubleshooting failing systems rather than providing a consolidated and easily understandable picture of the overall status of the mission environment and overall operational capability. Watch Officers need new types of analytics and visualizations that can provide, at a glance, a simple, yet concise view of system availability and the status of the feeders that drive those systems (e.g., the DC Metro Map (http://www.wmata.com/rail/maps/map.cfm) is an example of an effective visualization of a complex system that is easy to understand at a glance). If these visualizations can be made interactive and show status in real-time of the system/data pathway availability, Watch Officers would be able to quickly identify problems and understand the impact of the problem on the overall operational capability and mission readiness.

3. (U//FOUO) Impact of IPv6 - The IPv6 next generation protocol represents a small but growing share of global network traffic. The tools and techniques developed for the traditional IPv4 space may become obsolete or ineffective if they cannot accommodate the characteristics of IPv6. Tools are needed that demonstrate new and innovative IPv6 based threat vectors/exploits within the cyber domain. Current research into IPv6 security focuses on local area network issues and very few open source tools focus on using IPv6 as an exploit vector from the Internet. Tools are needed to: 1) determine how IPv6 could be used to access a node behind a filtering device; 2) determine how IPv6 be used to prevent detection; 3) identify what vulnerabilities are unique in dual stack network cards (NICs that support both IPv6 and IPv4); and 4) determine how can IPv6 (i.e., Teredo/6to4) can be used to establish hop points to conduct interactive malicious activity and obfuscate the source.

4. (U//FOUO) Behavior Based Signature Correlation - Develop an adaptive behavior based modeling tool that correlates existing weak signatures or metadata to develop a ranked list of indicators of malicious network activity for in depth analysis. IDS systems like Snort currently have a significant number of

signatures that provide indicators of suspicious activity; however, the result of the output from a single query is too noisy to be useful. By correlating these weak signatures with behavior patterns fitting malware profiles, actual malicious activity should be more easily identified among the noise of inherent in an abundance of weak signatures.

5. (U//FOUO) Router Exploit Mitigation - Router exploits are problematic and can be difficult to detect and mitigate. Once a router is compromised, an adversary can maintain persistence almost indefinitely because users pay very little attention to these devices and manufacturers are generally slow to issue patches through manual update processes. Approaches are needed to: 1) detect compromised routers and determine if different types of information are needed to identify different types of compromises; 2) identify if different approaches are being used to compromise enterprise-class routers versus standard routers; and 3) identify anomalous behavior resulting from a compromised router.

6. (U//FOUO) Intrusion Detection System (IDS) Evasion - Demonstrate new and innovative intrusion detection system evasion techniques and propose mitigation solutions. There are a number of publically known and easily exploitable IDS evasion techniques and few acceptable solutions. The focus of this topic is to develop and demonstrate new techniques to evade an IDS and propose a feasible solution to prevent it from being effective. Or develop a mitigation solution to a known IDS evasion technique with no known solution.

7. (U//FOUO) Precise Geolocation - The ability to pinpoint the geographic location of IP hosts is compelling for applications such as network visualization and network attack diagnosis. While some methods can accurately identify the location of hosts in some regions of the Internet, they may produce erroneous results when the delay or topology measurement on which they are being based is limited. Many of the existing geolocation services are based on databases which store organizational information assigned to IP domains, or try to infer information from DNS names. Approaches are needed to develop new methods of determining the geolocation of IP hosts that go beyond the current approaches using stored organizational information about IP domains or inferring information from the DNS names. These approaches should identify and consider a potentially broad set of features including both active measures and more realistic characteristics associated with locations to improve the accuracy of estimates of the physical layer location of the nodes in the virtual layer (i.e., Internet).

8. (U//FOUO) Identifying Collateral Effects for Cyber Attacks – Although Cyber attacks may be targeted against a specific organization or network, the interconnectedness of networks and imprecision in the Cyber attack itself may result in spillover and secondary impacts beyond the original Cyber attack. Approaches are needed to identify primary (direct) Cyber effects affecting

systems targeted by a Cyber attack, identify or predict secondary (internally cascading) Cyber effects affecting distributed services, and identifying or estimating tertiary (externally cascading) Cyber effects impacting other systems and services.

9. (U//FOUO) N-variants with Majority Voting to Secure Software – Automate the creation of two (2) or more versions of an application from existing source or binary that differ such that an attempt to exploit a vulnerability in one would be detected by the other versions as their results would differ. Insert decision logic for read and write applications to detect possible compromise of a variant, and limit actual writes to a single copy. A minimum of two (2) variants should be capable of detecting an attack and preventing it. Three or more variants may be needed to recover from an attack.

9. (U//FOUO) Cyber Situational Awareness – System administration tools provide volumes of information about the status of computers and systems but the focus of these tools is often too narrow to put the information into perspective and context to provide complete situational awareness. The military has the concepts of Unity of Command, end-to-end Situational Awareness and Battle Command on the Move to provide a comprehensive and shared picture of the activities occurring, the effect of those activities, and the overall impact on operations. Approaches are needed to go beyond the information provided by system administration tools and to incorporate information from other sources to provide broader, correlated and risk assessed views of cyber situational awareness across networks.

10. (U//FOUO) Predictive Analytics Projecting Intent – These are tools, methods, and approaches that utilize predictive analytics to project intent through the identification and tracking of precursor events associated with possible exploitation and/or malicious activity. The hypothesis is that, within collectable data from either metadata of network traffic or artifacts from secondary exploitation activities once some malicious capability has gained a foothold within the network, the mapping of precursors will enable a net defender to apply mitigation techniques to prevent the activity from achieving its objective. Prototypes should address some or all of the following aspects:

- What data sources are necessary to identify and track precursor events
- Define specific precursor events, their associated malicious activity, and the end state they map to or hope to achieve
- Identify the “node” being targeted and the “node” that is doing the initiation.
- Attribution of precursor techniques to a specific adversary
- Categorization or identification of the “malicious activity” to include category of the activity (e.g., traffic, malware, application, etc.) and indicators (e.g., traffic or data associated with the activity, common initiators, common purpose, etc.)

- Identify and address outliers that may occur during the analysis
- Estimate the confidence or accuracy of the associations and conclusions based on the research and dataset used

11. (U//FOUO) Use of Multi-nodal Network Control Information for Alerting – One of the challenges in Cyber defense is the ability to discover, analyze, and understand activities occurring in real-time that may provide timely indications of and alerts for malware attacks and other undesirable cyber attacks. Real-time processing and analytics done on multiple network control information data streams and correlating the derived data against assigned thresholds or alert triggers may provide a means of understanding the ongoing activities and providing alerts fast enough to allow effective responses to be taken. This topic focuses on tools, methods, and approaches to apply streaming data processing to network control information to identify and trigger relevant alerts of potential malicious activity in real-time.

12. (U//FOUO) Fast Network Scanning and Mapping – A key aspect of network defense involves the ability to quickly understand and perform discovery on the network being defended. This includes approaches to automatically find undocumented network bridging at speed and scale as well as perform discovery on, and display of, defended networks at speed and scale. It also includes the ability to discover and map items connected to the network. Additionally, in can include the ability to look for evidence of intrusions, insider threat, and vulnerabilities within hosts, including network devices.

13. (U//FOUO) Private Network Enumeration – The ability to map private networks that are behind public IP Addresses is a challenge in today's complicated network environments. This topic focuses on tools, methods, and approaches that distinguish between public and private networks based on their behavior to capture, identify, and provide network discovery. An example would be using a private network signature that could detect and enumerate the network behind a firewall.

14. (U//FOUO) Offeror provided topic related to Network Analytics.

7.6 (U) TRACK 6: VISUALIZATION IN ANALYTICS

(U//FOUO) The ability to collect, filter, and analyze large volumes of data in an attempt to provide meaningful information is obviously critical. But often times, the presentation of this data can be just as important. We are interested in innovative ways to display information to users that allows them to easily recognize patterns, connections, etc. Ideally, these visualizations will be customizable for the user so that he/she may experiment with different patterns, or to account for knowledge that may not be a part of the system itself.

(U) Constraints:

(U//FOUO) Visualization Analytics systems need to accommodate the following constraints:

- Data volumes can be expected to be very large but data about individual items can be expected to be very sparse, incomplete, and dirty; prototypes need to reflect these data characteristics to be considered realistic
- Approaches frugal in the use of computation power are preferred
- Visualization Analytics systems need to be able to use data from corporate data repositories (cloud-based or relational database) and make recommendations based upon data from the corporate data repositories (we do not want stovepipe or closed systems)
- Visualization Analytics systems shall not use proprietary data formats or storage systems; all data generated by the system shall be available for use by other systems that are independent of the visualization analytics system

(U//FOUO) The technologies and capabilities need to be able to be utilized or applied to existing systems that use industry standard hardware and software (e.g., Windows, Linux, etc.) because cost and logistics make a large scale replacement of existing infrastructure difficult

(U) Topics:

1. (U//FOUO) Virtual "White boarding" – Often times, the ability to turn data into meaningful information is dependent more upon how the data is viewed or presented, as opposed to the data content itself. In order to help analysts detect patterns, connections, etc. a tool is needed that allows the full customization of how data is displayed, and how networks between data points are connected, as well as how they are displayed. Furthermore, these custom-built network diagrams should be collaborative amongst network users.

2. (U//FOUO) Using Visualization for Analysis – Many visualization tools currently available allow users to view data from different perspectives and in different ways. This topic is not looking for new visualization tools but is instead seeking new ways to utilize visualization for discovery of previously unknown information.

3. (U//FOUO) Offeror provided topic related to Visualization in Analytics.

7.7 (U) TRACK 7: MODULATION SCHEMA FOR DISCOVERY & EXPLOITATION

(U//FOUO) Today's continually evolving radio frequency environment necessitates the search for new data discovery and exploitation techniques against both existing and new modulation schemas. The ever-increasing amounts of available collected data demand the development of new signal processing techniques to thin data to relevant sets using increasingly automated techniques.

(U//FOUO) As the amounts and types of data continue to increase, it becomes necessary to utilize different types of analytics and acknowledge that no single analytic tool can be expected to fulfill all purposes. Instead, it is necessary to understand that one set of analytics can be used to identify specific characteristics and other analytics can be used to coalesce these individual features into a meaningful context.

(U//FOUO) The focus of this effort is on applying ***original*** research and developing new approaches; we are not interested in proposals centered on evaluation of commercially available products. The ultimate desire is a modular software solution which can achieve throughput results greater than 1x, and preferably achieving at least a 10x throughput (e.g., a 10x throughput equates to 10 minutes of data being processed and generating a result in one minute or less).

(U) Not Interested In:

(U//FOUO) Because analytic techniques can often function or perform differently when processing large volumes of data, we are not interested in techniques that are demonstrated on trivial amounts of data. It is the Offeror's responsibility to obtain a statistically meaningful amount of test data to demonstrate the prototype's potential to operate effectively on large amounts of data under varying conditions.

(U) Constraints:

(U//FOUO) The Government already has an abundance of stovepiped systems, applications that can only access their own discrete data repository, and special-purpose data repositories. All Offeror prototypes should be configurable to utilize data in existing data repositories and not require their data to reside in a proprietary format or repository. The technologies and capabilities prototyped must be non-proprietary. Any techniques claiming to be better than the current state-of-the-art techniques must demonstrate a direct comparison between the new technique and the most relevant state-of-the-art technique(s) during the prototype demonstration.

(U//FOUO) The Offeror must develop their prototype for operation using standard commercial-off-the-shelf (COTS) hardware and software, and they must provide all hardware and software required to demonstrate their prototype. If Offeror's COTS system comes enabled with any special hardware acceleration components, Offeror's demonstration must be able to selectively enable/disable acceleration features in order to show performance using only standard multi-core, multi-processor configurations with option to show accelerated performance if Offeror desires. Performance will be judged only on standard multi-core, multi-processor configurations.

(U//FOUO) It is the responsibility of the Offeror to identify and acquire suitable unclassified test data of a sufficient volume to demonstrate the effectiveness of their prototype. Test data can be a mix of both real-world data and simulator data however the test data sets should not be solely comprised of simulator data. For simulator data sets, the Offeror shall deliver their test data generation capability for independent government validation as required. All test data sets will be considered a deliverable to allow independent government sampling for validity as required.

(U//FOUO) The Offeror can demonstrate their technology approach using simple files of continuous digital intermediate frequency (e.g., sampled amplitude data in time domain) data. Being able to support data processing of a Platinum BLUE-formatted data file (see Platinum BLUE Document list below) and the ability to generate results in an XML data schema is very beneficial. Additionally, the prototype demonstration must demonstrate an ability to process input data which varies across the following three basic parameters:

- Sample Size - integer or float of eight (8), sixteen (16), or thirty-two (32) bit length
- Sample Format – IEEE 785 Code IEEE (Byte Order - Big endian) or Code EEEI (Byte Order - Little endian)
- Sample Rate – variable between at least one (1) MHz to not greater than one (1) GHz

(U//FOUO) Technologies and capabilities should have a modular design with a workhorse core which can be wrapped as necessary with middleware to enable plug-and-play capability into existing infrastructure frameworks. This allows different base analytic components to be assembled into different workflows as needed without extensive redevelopment to support operational needs. All delivered software products should be developed using standard libraries included with common languages such as Java, C, C++, and Python.

(U//FOUO) Although not required, Offerors are strongly encouraged to present proposals which will be developed using the REDHAWK framework wherever possible/appropriate. REDHAWK is a standards-based, real-time Software Defined Radio (SDR) framework which is built around DoD's Software

Communication Architecture (SCA) for the rapid development of real-time signal processing systems.

(U//FOUO) The relevant Platinum BLUE (a.k.a. Midas BLUE) format documents will be provided upon contract award to assist with prototype development:

- (U) Guide to Using the Platinum Format (Revision 1 – 12 November 2008)
- (U) Midas BLUE File Format (Version 1.0 – 17 March 2006)
- (U) Platinum BLUE Data Exchange Format Standard – Volume 1: Platinum BLUE File Format (Revision 4 – 16 June 2009)
- (U) Platinum BLUE Data Exchange Format Standard – Volume 2: Standard Platinum Keywords (Revision 4 – 16 June 2009)

(U) Topics:

1. (U//FOUO) High Duty Cycle (HDC) Signal Analytics – While the characterization of both continuous-wave and low-duty-cycle pulsed signals is well documented and understood, there are other signals that can only be described with the most basic technical parameters. The objective is to demonstrate a new statistically valid technique(s) to detect and characterize High-Duty-Cycle (HDC) signals which include frequency-modulated continuous wave (FM/CW), interrupted FM/CW, and HDC-pulsed waveforms. The goal would be to demonstrate new signal processing techniques (e.g., image processing or other) to detect and recover the presence of the signal at or above noise floor and characterize these waveforms with mathematical representation of signal (e.g., possibly time series N-th order polynomial or other depending best match).

2. (U//FOUO) High Duty Cycle (HDC) Geolocation Analytics - The objective would be to demonstrate technique(s) for geo-observable generation of High-Duty-Cycle (HDC) signals which include frequency-modulated continuous wave (FM/CW), interrupted FM/CW, and HDC pulsed waveforms. We are not only interested in geolocation of individual waveforms but also multiple simultaneous overlapping waveforms which are occupying the same time-frequency spectral environment. Also, the Offeror should perform a trade-off of different geolocation techniques (e.g., Time Difference of Arrival – TDOA, Frequency Difference of Arrival – FDOA, Combined Time and Frequency Difference of Arrival – T/FDOA, Angle of Arrival – AOA, Line of Bearing – LOB, or other) to demonstrate strengths or weakness of each technique or combination of techniques.

3. (U//FOUO) Orthogonal Frequency Division Multiplexing (OFDM) Signal Analytics – There have been many specific approaches to the detection and characterization of known orthogonal frequency division multiplexing (OFDM) based transmissions (e.g. wideband digital communication to include digital

television and audio broadcasting, DSL Internet access, wireless networks, power line networks, 4G mobile communications, etc.). The objective of this topic has three parts:

1) (U//FOUO) Demonstrate new discovery techniques to detect, characterize, and report the presence of one or more known OFDM transmissions from a user selected input of either file-based data (primary input) or real-time input (optional input).
2) (U//FOUO) Demonstrate new discovery techniques to detect, characterize, and report the presence of new OFDM transmissions which have not previously been documented (e.g., search mode).
3) (U//FOUO) Demonstrate generic data demodulation technique(s) with the ability to extract individual digital bit streams from each sub-carrier signals for further analysis and identify where the same data stream may be carried on multiple sub-carrier or not.

(U//FOUO) The focus of this topic is to be able to detect the signal transmission in addition to characteristics (e.g., OFDM carrier frequency, number of sub-carriers, FFT size in addition to modulation type and symbol rate, etc.). Also, the proposal should include not only the cyclic prefix OFDM but some of the other OFDM implementations such as Digital Terrestrial Multimedia Broadcast (DTMB).

(U//FOUO) There are several challenges associated with this objective to include delivery of a base code configuration which can be easily wrapped to one of several deployment destinations (e.g., Java-wrapped for Cloud analytic, C/C++-wrapped for processing system, or Python-wrapped for front-end system) and developing the base code core such that it is easily extensible to add additional known OFDM types.

4. (U//FOUO) Signal Environments in HF (3 – 30 MHz) - Signal environments in the HF (3 – 30 MHz) spectrum are typically characterized by extensive co-channel and adjacent channel interference, a wide range of signal powers, durations, and modulations, and high levels of electromagnetic interference from either man-made or atmospheric sources. All of these combine to make detection and isolation of individual signals a difficult task. Even more difficult is the task of discriminating between signals-of-interest from either signals-not-of-interest or noise. Some algorithms utilize an averaging approach and dynamic thresholds to detect and categorize energy within specific frequency bins. Energy that is detected in this manner may be termed a ‘new energy alarm’ (NEA). However, this approach often leads to very high false alarm rate with a high percentage of NEAs that are actually noise.

(U//FOUO) The objective of this topic is for the Offeror to demonstrate new approaches to HF signal detection that dramatically reduce the percentage of false NEAs. These algorithms must consider the processing constraints imposed

by working in near real-time on general purpose processor and/or graphical processor units that are commercially available. In addition, these algorithms should perform well given a single-input/single-output (SISO) RF channel typical of systems that utilize a single antenna and wideband digital tuner for detection, but should also be suited to scale well to single-input/multiple-output RF channels typical of systems connected to antenna arrays with coherent or sequenced multi-channel wideband digital tuners. Software code should be delivered as stand-alone Matlab and/or C/C++ libraries that can be utilized independent of any software defined radio architecture, e.g. REDHAWK, GNU, etc.

5. (U//FOUO) - Offeror provided topic related to Modulation Schema for Discovery & Exploitation.

7.8 (U) TRACK 8: LARGE SCALE DATA HANDLING, TRANSMISSION, AND COMPRESSION

(U//FOUO) Today's ever expanding digital data environment necessitates the search for new data handling and transmission techniques. The ever-increasing amounts of available data demand the development of new handling techniques to ensure cost effective means for both live transport and long-term storage. The key challenge is to maintain ready data access whether from today's signal environment or from archives to enable timely analysis and historical trending.

(U//FOUO) As the amounts and types of data continue to increase, it becomes necessary to utilize different handling techniques and acknowledge that no single methodology can be expected to fulfill all purposes. Instead, it is necessary to understand that one process might be needed for data transmission and a different process be used for data retention to manage overall power, space, cooling and operating expenses.

(U//FOUO) The focus of this effort is on applying ***original*** research and developing new approaches; we are not interested in proposals centered on evaluation of commercially available products. The ultimate desire is a modular software solution which can strive to achieve several measures to include:

- System throughput values greater than 1x, and preferably achieving at least a 10x throughput (e.g., a 10x throughput equates to 10 minutes of data being processed and generating a result in one minute or less).
- Compression ratios of at least two to one (2:1) threshold mark with desire to achieve a three to one (3:1) objective mark if not seeking to attain a ten to one (10:1) goal mark.
- Transmission delay minimization (compression-transmission-decompression) of less than a five (5) second threshold mark with desire

to achieve an one (1) second objective mark if not striving to attain a sub-second (less than 1 second) goal mark.

(U//FOUO) Also, there are several challenges which must be considered at a minimum in managing large volumes of digital data including:

- Reduction in digital transmission bandwidth requirements
- Improved utilization of existing communication bandwidth
- Reduction of communication bandwidth required for digital data transfer
- Increase data transfer within the existing communication links
- Reduction of storage space required for digital data storage
- Increase unique data volumes within existing storage space
- Reduction of operation and maintenance cost of compression methods via software updates
- Increase data availability and dissemination capability to large customer base

(U) Not Interested In:

(U//FOUO) Because techniques can often function or perform differently when processing large volumes of data, we are not interested in techniques that are demonstrated on trivial amounts of data. Section 8 describes several sources of test data but it is the Offeror's responsibility to obtain a meaningful amount of test data to demonstrate the prototype's potential to operate effectively on very large amounts of data.

(U) Constraints:

(U//FOUO) The Government already has an abundance of stovepiped systems, applications that can only access their own discrete data repository, and special-purpose data repositories. All Offeror prototypes should be configurable to utilize data in existing data repositories and not require their data to reside in a proprietary format or repository. The technologies and capabilities prototyped must be non-proprietary. Any techniques claiming to be better than the current state-of-the-art techniques must demonstrate a direct comparison between the new technique and the most relevant state-of-the-art technique(s) during the prototype demonstration.

(U//FOUO) The Offeror must develop their prototype for operation using standard commercial-off-the-shelf (COTS) hardware and software, and they must provide all hardware and software required to demonstrate their prototype. If Offeror's COTS system comes enabled with any special hardware acceleration components, Offeror's demonstration must be able to selectively enable/disable acceleration features in order to show performance using only standard multi-core, multi-processor configurations with option to show accelerated performance

if Offeror desires. Performance will be judged only on standard multi-core, multi-processor configurations.

(U//FOUO) It is the responsibility of the Offeror to identify and acquire suitable unclassified test data of a sufficient volume to demonstrate the effectiveness of their prototype. Test data can be a mix of both real-world data and simulator data however the test data sets should not be solely comprised of simulator data. For simulator data sets, the Offeror shall deliver their test data generation capability for independent government validation as required. All test data sets will be considered a deliverable to allow independent government sampling for validity as required.

(U//FOUO) The Offeror can demonstrate their technology approach using simple files of continuous digital intermediate frequency (e.g., sampled amplitude data in time domain) data. Being able to support data processing of a Platinum BLUE-formatted data file (see Platinum BLUE Document list below) and the ability to generate results in an XML data schema is very beneficial. Additionally, the prototype demonstration must demonstrate an ability to process input data which varies across the following four basic parameters:

- Sample Size - integer or float of four (4), eight (8), sixteen (16), thirty-two (32) bit length, or sixty-four (64) bit length
- Sample Format – IEEE 785 Code IEEE (Byte Order - Big endian) or Code EEEI (Byte Order - Little endian)
- Sample Rate – variable between at least one (1) MHz to not greater than one hundred (100) GHz
- File Size – variable between at least one (1) M-Byte to not greater than ten (10) Tera-Bytes per file

(U//FOUO) Technologies and capabilities should have a modular design with a workhorse core which can be wrapped as necessary with middleware to enable plug-and-play capability into existing infrastructure frameworks. This allows different base analytic components to be assembled into different workflows as needed without extensive redevelopment to support operational needs. All delivered software products should be developed using standard libraries included with common languages such as Java, C, C++, and Python.

(U//FOUO) Although not required, Offerors are strongly encouraged to present proposals which will be developed using the REDHAWK framework wherever possible/appropriate. REDHAWK is a standards-based, real-time Software Defined Radio (SDR) framework which is built around DoD's Software Communication Architecture (SCA) for the rapid development of real-time signal processing systems.

(U//FOUO) The relevant Platinum BLUE (a.k.a. Midas BLUE) format documents will be provided upon contract award to assist with prototype development:

- (U) Guide to Using the Platinum Format (Revision 1 – 12 November 2008)
- (U) Midas BLUE File Format (Version 1.0 – 17 March 2006)
- (U) Platinum BLUE Data Exchange Format Standard – Volume 1: Platinum BLUE File Format (Revision 4 – 16 June 2009)
- (U) Platinum BLUE Data Exchange Format Standard – Volume 2: Standard Platinum Keywords (Revision 4 – 16 June 2009)

(U) Topics:

1. (U//FOUO) Lossless Data Compression Storage Analytics – While cost (per Peta-Byte) of new data storage continues to decline each year, the actual operations and maintenance cost to maintain effective availability and accessibility to long-term data archives is suffering the opposite trend. The ever growing challenge is how to continually accept new and increasingly larger data volumes while maintaining timely and effective access to increasing larger archival data sets spanning decades. Lossless Data Compression technique(s) are needed for application against not only new data volumes but also older, expanding archive volumes as they are routinely transferred to newer storage suites. Throughout the process, the timely accessibility and availability to the user must be considered since stored data is essentially worthless unless the user can make effective use of it in a timely and cost-effective manner.

2. (U//FOUO) Lossless Data Compression Transmission Analytics – The increasingly expanding need for large data volume sets (i.e. transition from Mega-Bytes to Tera-Bytes file sizes) can exceed available transmission capabilities. If data cannot be transferred from an origination point to a destination point, it has significantly less value to data's user population. It does not matter whether the destination is a hundred feet away or over on the other side of the world. The data need to be able to reach the desired destination in a timely matter. Lossless Data Compression technique(s) are needed for application to data in transit to ensure effective accessibility and availability.

3. (U//FOUO) - Offeror provided topic related to Large Scale Data Handling, Transmission, and Compression.

7.9 (U) TRACK 9: MISSION MANAGEMENT, CUSTOMER MANAGEMENT, AND METRICS

(U//FOUO) Industry has a long-standing history of using business intelligence to make data-driven management decisions about the management of resources to provide optimal service and support to customers. Experience in industry has shown that reduced costs, increased efficiency, and improved performance can

result when systems are instrumented and data are analyzed appropriately to support data-driven decisions. We are interested in applying business intelligence collection and analysis approaches to improve the management of mission operations.

(U) Constraints:

(U//FOUO) There already exists a very wide variety of legacy systems and replacement or conversion of these systems at anything other than a measured pace is not feasible due to extensive logistical and resource issues. Approaches for instrumenting systems to generate and collect metrics must be effective across a wide variety of technologies and systems, both current and legacy.

(U) Topics:

1. (U//FOUO) Understanding Customers – These are tools, methods, and approaches using instrumentation, big data aggregation, and business analytics to capture data about customer and user interests to determine what they are most interested in and find most valuable.

2. (U//FOUO) Customer-driven Resource Management – Customer assessments often provide useful information to help understand and manage corporate resources and levels of customer engagement. However, many existing processes for gathering and assessing this type of information require a significant amount of labor hours to collect, compile, and analyze the data to produce assessment results indicating customer focus. Customer needs are necessary in driving an end-to-end requirements-to-product delivery process so models are needed to assess and prioritize customer needs relative to each other and relative to the products possible to provide. Information related to requirements, requests for information, post-publication requests, customer relevancy, manpower availability at customer locations, etc. are key data points in the manual processes. The focus of this topic is on exploring and demonstrating approaches to provide automated data-driven customer assessments to support better resource management and customer support.

3. (U//FOUO) Metrics for Behavior Analysis – Understanding user behavior is key to understanding resource utilization and commercial techniques using “just in time” marketing provide interesting approaches by using in-depth behavioral analysis guided by metrics. However, approaches based solely on end-product reporting metrics, subscription-based capabilities, applications that require active participation by users, or solutions that cannot be applied to an intranet-run network have limited applicability to developing a comprehensive and actionable understanding of user behavior that can be applied to resource management. This topic focuses on tools, methods, and approaches that can easily and automatically capture user behavior information, analyze the data, and produce actionable information that can be used to better manage resources.

4. (U//FOUO) Master Rules and Policy Engine – This topic focuses on using common industry software that can accommodate easy use and user modifications to solve the complexity of SIGINT business rules and policies across the enterprise and should be specifically usable within the context of management to automate rules generation within systems executing the policies. This topic also includes the use of business rules as a way to provide real-time notification to users of a change within their system. Based on scenarios and/or conditions developed by the user, changes or violations of the business rules would be correlated and trigger a notice for the user. This topic focuses on tools, methods, and approaches that can demonstrate how to visualize and integrate individual business activities and manage activities through a component of business, policy, and oversight rules with operational scenarios. Prototypes should address some or all of the following aspects:

- Codifies business rules that are executed and operated in bulk within automated systems. Documents the details of this such that one could review and ensure proper interpretation by engineers.
- Provides full audit trail of all changes made to the business applications and software regarding policy decisions, changes in stances, and intent.
- Begin to support more complex rule sets within many multiples of automated rules. Makes complex applied policy decisions in automated systems understandable and visible to policy oversight.
- Ability to track where the rules really reside (i.e. business operations, computer systems, policy documents, etc)

5. (U//FOUO) – Offeror provided topic related to Mission Management, Customer Management, and Metrics.

7.10 (U) TRACK 10: COMMERCIAL BUSINESS INTELLIGENCE LEVERAGED FOR SIGINT

(U//FOUO) The commercial space has learned to capture, use and apply business intelligence solutions to help make more informed operational decisions increasing efficiencies by maximizing and aligning resources. Companies such as Amazon and Apple continue to finely tune their supply chain model using business intelligence to marry customer fulfillment activities with real time organization supply chain categories. This big data/business analytics approach is focused inward – allowing companies to make better operational and investment decisions for more efficient and effective operations. However, companies also utilize business intelligence to determine what internal and external customers are most interested in and find valuable. While NSA does not sell physical products, the organization has a broad array of customers, and offers a number of products for analysts to utilize. NSA is interested in finding out if some of the business intelligence applications that companies are utilizing for resource optimization can be applied to the SIGINT realm.

(U//FOUO) Proposed solutions should address the type, breadth, and depth of data are needed from the SIGINT environment that will provide a picture of the customer experience within the SIGINT realm as well as where in the SIGINT process would data be gathered, stored, and in what format for behavioral analytics to be processed. The proposal should reflect an understanding of commercial models and at what points in their process are used to collect data and gain an understanding of their customers.

(U) Not Interested In:

(U//FOUO) The purpose of this track is to effectively optimize enterprise resources and capabilities through analytic-driven assessment of mission and customer needs and priorities. We are seeking an innovative solution to measure products, services, and customer feedback whose success and value is not necessarily tied to a dollar amount.

(U) Constraints:

(U//FOUO) Business Intelligence systems need to accommodate the following constraints:

- Data volumes can be expected to be very large but data about individual items can be expected to be very sparse, incomplete, and dirty; prototypes need to reflect these data characteristics to be considered realistic
- Approaches frugal in the use of computation power are preferred
- Business Intelligence systems need to be able to use data from corporate data repositories (cloud-based or relational database) and make recommendations based upon data from the corporate data repositories (we do not want stovepipe or closed systems)
- Business Intelligence systems shall not use proprietary data formats or storage systems; all data generated by the system shall be available for use by other systems that are independent of the business intelligence system
- The technologies and capabilities need to be able to be utilized or applied to existing systems that use industry standard hardware and software (e.g., Windows, Linux, etc.) because cost and logistics make a large scale replacement of existing infrastructure difficult

(U) Topics:

1. (U//FOUO) Commercial Behavioral Analytics Applied to SIGINT to Determine Customer Needs, Priorities, and Gaps – This topic explores whether NSA can leverage commercial customer data mining practices on IC and Analytic behavior/interaction with the SIGINT system to determine ranking of mission needs and discover gaps and whether customer data can be overlaid to assess national priorities against daily mission needs in order to best allocate

SIGINT capabilities and capacity. This topic is seeking tools, technologies, and approaches that could be used to address mission requirements in this area.

2. (U//FOUO) Commercial Business Intelligence Analysis and Practices Applied to Drive Dynamic Global Operations: Commercial operations leverage big data analytics to drive business decisions and enhance operational efficiency and effectiveness. This topic focuses on tools, technologies, and approaches that support system adjustments in real time global capability, capacity and availability based on customer needs and priorities.

3. (U//FOUO) Global Customer Needs Optimization Techniques Applied to Provision SIGINT Resources Across Multiple Missions – Commercial fulfillment services, such as the Amazon model, link customers with suppliers to ensure the customer gets the best product at the right price point when they need it. This topic focuses on tools, technologies, and approaches that could automatically adjust a global analytic and collection enterprise to ensure our mission customers get the best product when they need it.

4. (U//FOUO) Value Estimation (Current and Future) for Government Products/Services that are not Directly Paid for by the Customer – Resource management models often have to determine best value when customers do not directly pay for products and services. This topic focuses on tools, technologies, and approaches to determine internal analytic value derived from collection and data sources supplying products and services.

5. (U//FOUO) Offeror provided topic related to Business Intelligence Systems.

7.11 (U) TRACK 11: RECOMMENDER SYSTEMS

(U//FOUO) Recommender systems are becoming increasingly common and important in daily life and these systems basically seek to predict what information a user will need next based on data collected about the user's behavior, information they previously needed, and information about the behavior or actions of other users. These systems can also formulate and recommend the next best action. Recommender systems try to quickly locate and present desirable items and information to the user without overwhelming the user with irrelevant information. Several examples of recommender systems in common usage are:

- Amazon.com's recommender system to suggest other products (e.g., people who bought item X also bought item Y)
- Netflix's recommender system to suggest new movies based on information about the user's viewing patterns and the viewing patterns of other users with similar interests

- Various social network sites that recommend new friends, groups, or other connections based on the social networks of a user and other persons/groups

(U//FOUO) We would like to adapt, expand, and apply the concept of recommender systems to intelligence analysis and intelligence systems, and in particular, focus on:

- Target behaviors: Analytics that use information about targets (e.g., metadata and content) to recommend other facts that might be of interest to the analyst.
- System behaviors: Analytics that use information about the system (e.g., available capabilities and status) to recommend other capabilities that might be of interest to the analyst.
- Analyst behaviors: Analytics that use information about analyst activities (e.g., capture clicks or data touches) to recommend other workflows that might be of interest to the analyst.
- Customer behaviors: Analytics that use information about customer activities and preferences to recommend other reports and information that might be of interest to the customer.

(U) Not Interested In:

(U//FOUO) We are not interested in simple recommender systems that make recommendations based on single attributes. Instead, we are looking for recommender systems that are able to evaluate complex associations based on multiple attributes or incorporate data from multiple systems or domains. We are also not interested in recommender systems that are solely dependent upon collecting large amounts of data before being able to start making recommendations. Instead, any recommender system needs to be able to begin making recommendations based on small amounts of data with the recommendations improving as additional data is collected.

(U) Constraints:

(U//FOUO) Recommender systems need to accommodate the following constraints:

- Data volumes can be expected to be very large but data about individual items can be expected to be very sparse, incomplete, and dirty; prototypes need to reflect these data characteristics to be considered realistic
- Approaches frugal in the use of computation power are preferred
- Recommendations need to be generated in near real-time to be useful
- Explanations of the reasoning used in reaching the recommendations need to be available to the user

- Recommender systems need to be able to use data from corporate data repositories (cloud-based or relational database) and make recommendations based upon data from the corporate data repositories (we do not want stovepipe or closed systems)
- Recommender systems shall not use proprietary data formats or storage systems; all data generated by recommender systems shall be available for use by other systems that are independent of the recommender system
- The technologies and capabilities need to be able to be utilized or applied to existing systems that use industry standard hardware and software (e.g., Windows, Linux, etc.) because cost and logistics make a large scale replacement of existing infrastructure difficult

(U) Topics

1. (U//FOUO) Data Capture and Curation for Recommender Systems – These are methods and mechanisms to identify and capture data relevant to support recommender systems and curate the data to make it available and useable to recommender systems as well as other systems. These methods and mechanisms need to be adaptable and adjustable as new types of data become available or as existing data are reinterpreted to derive additional data.

2. (U//FOUO) Establishing User Preferences – These are methods and mechanisms to establish user preferences through either explicit interaction (i.e., user explicitly states a preference or a need) or through implicit interaction (i.e., user preferences or needs are implicitly derived based on other information). These methods and mechanisms need to be adaptable and adjustable by both the user and the system as the user's needs change or as the data evolves to reflect new items or the absence of older items.

3. (U//FOUO) Disparate Data Analysis – These are methods and mechanisms to make predictions or recommendations based on integrating and evaluating data from multiple, disparate sources. These methods and mechanisms need to be able to easily incorporate data from new sources as new data sources become available. These methods and mechanisms also need to provide an indication of the value of each data source in producing the prediction or recommendation.

4. (U//FOUO) Predictive Analytics – These are methods and mechanisms to predict the data a user (e.g., analyst, customer) is likely to need or want next. Because many types of predictive analytics already exist, and predictive analytics developed under this topic shall provide objective evidence that the proposed predictive analytics are better than other commonly used predictive analytics. These methods and mechanisms also need to illustrate which predictive analytics work best under different conditions.

5. (U//FOUO) Analytics Based on Incomplete and Evolving Data – These are methods and mechanisms to develop predictions and recommendations based on incomplete data and refine the predictions and recommendations as additional data becomes available. The objective of the analytics based on incomplete data should be to not produce a wrong recommendation while producing recommendations of increasing value and correctness.

6. (U//FOUO) Feedback Mechanisms – These are methods and mechanisms to identify and collect feedback and utilize the feedback to improve future automated recommendations and predictions.

7. (U//FOUO) Offeror provided topic related to Recommender Systems.

7.12 (U) TRACK 12: EMERGING TECHNOLOGIES

(U//FOUO) Emerging technologies, by their very nature, are often game changing and disruptive. There is an interest in identifying and evaluating emerging technologies with a current trajectory to projected maturity of 2 – 5 years. These emerging technologies can map to any of the layers of the Open Systems Interconnection (OSI) model. The primary focus of interest is in the development of capabilities using these technologies that experiment with, and demonstrate how, they can be tied to particular IT business problems and business processes to illustrate new efficiencies and the achievement of greater productivity, including tangible cost reductions. Several topics have been identified below to help illustrate some current technologies of interest. However, while proposals for prototypes on these topics are welcome, we are also interested in proposals that draw upon features and potential capabilities of other emerging technologies that can be applied to the business environment.

(U) Topics

1. (U//FOUO) Software Defined Networks (SDN) - Software Defined Networks utilizes open source or semi-open source software that rides on commodity infrastructure (a.k.a. White Boxes) that include an SDN controller and “dumb” devices (switches & routers) that perform layer 2 & 3 forwarding. The management of SDN network devices is performed by an SDN controller.

(U//FOUO) Classical Network Appliances are composed of proprietary software and vender specific hardware such as: Message Router, CDN, Session Border Controller, WAN Accelerator, DPI, Firewall, Carrier Grade NAT, Tester/QoE monitor, SGSN, GGSN, PE Router, BRAS, and Radio Access Network Nodes. The software and hardware network has to be physically installed per site and has to be managed by vender specific professional IT administrators.

(U//FOUO) Use of SDN technology creates a paradigm shift away from vender specific software/hardware to open source software that rides on commodity hardware also known as Network Function Virtualization (NFV). NFV collapses the hardware down to commodity high volume servers, commodity high volume storage, and commodity high volume Ethernet switches. The software is run in virtual appliances on the servers.
(U//FOUO)SDN separates the data and control plane. Control is decoupled from the physical infrastructure allowing the control plane to manage several devices. This creates network resources that can be used by software developers. The application layer which is logically above the control plane (SDN Controller) is where the network services reside.

(U//FOUO) All Offeror prototypes for this topic should demonstrate the ability to create scalable Software Defined Networks that have a method of verifying trust among SDN devices. A Root of Trust methodology should be developed that establishes secure exchanges of trust among SDN devices.

2. (U//FOUO) Software Defined Radios (SDR) - Universal Software Radio Peripheral (USRP) products are software defined radios designed and sold by Ettus Research and its parent company, National Instruments. The USRP product family is intended to be a comparatively inexpensive hardware platform for software radio, and is commonly used by research labs, universities, and hobbyists.

(U//FOUO) All Offeror prototypes for this topic should demonstrate the ability to create Software Defined Radios using Universal Radio Peripheral products and demonstrate the use of SDR technology to setup a robust “TV White Space” network showing what range and how to extend the range of purchased equipment.

3. (U//FOUO) Network Mapping - Government network infrastructure requires an understanding about the topology and connectivity of computer networks. New tools and techniques are needed to effectively map networks. A network map is a relationship between nodes on the network as well as the protocols used on the network. Often times, methods available are not automated and are cobbled together using administrative privilege and network knowledge using tools not specifically designed for network mapping.

(U//FOUO) In order to increase efficiency and decouple the dependency on network administrators, a tool or tool suite needs to be developed that can map a network starting with a very limited amount of foreknowledge. All Offeror prototypes for this topic should demonstrate the ability to create an innovative approach to network mapping where non-experts can map a network in an automated manner with very little background knowledge of the network in question.

4. (U//FOUO) Improve Qemu - Qemu is a generic and open source machine emulator and virtualizer similar to VMWare and Microsoft Virtual PC. This topic focuses on improving Qemu to be able to boot and run 64-bit Windows 8.1 Operating System hosted on a 64-bit Linux platform using VNC to provide desktop input/output. Prototypes for this topic should show feasibility of the improvements and address the highest risk areas of this conversion. Information on Qemu can be found at their website http://qemu.org.

5. (U//FOUO) Identification of Open Source Library Dependencies - These are tools, algorithms, methods, and approaches that focus on efficient identification of open source library dependencies for various software. The focus of this topic is to develop a tool that can look for library dependencies and output a list of libraries that are called by specific software that is being evaluated/tested on Windows or Linux. The resulting product will likely be based on examining function calls and/or detection calculations that are unique to specific functions used in common libraries.

6. (U//FOUO) Network Functions Virtualization (NFV) - As the use of MapReduce/HDFS clouds or VMware/KVM utility clouds continues to increase, there is a growing body of work focused on building virtualized versions of routers, switches, firewalls, IDS, and IPS tools and components to create the emerging area of Network Functions Virtualization. However, little work has been done regarding the performance tradespace of these approaches. Prototypes for this topic should focus on exploring the performance, functionality, and security options and tradespaces to demonstrate how the different types and approaches to virtualization of network functions interact and interoperate for effective and efficient processing.

7. (U//FOUO) Offeror provided topic relating to emerging technologies and how businesses are keeping pace with this quickly evolving landscape. There is particular interest in emerging network and mobile technologies (apps, tablets, phones, etc.), due to the exponential increase in networking speeds and mobile usage around the globe. Prototypes should also offer methods for maintaining technological relevance in the ever evolving technology picture of the future.

7.13 (U) TRACK 13: MALWARE DISCOVERY, ANALYSIS, AND MITIGATION

(U//FOUO) Traditional malware software analysis has focused on reverse engineering a suspect sample of code to determine what it does at an instruction level. While this approach provides an extremely comprehensive and complete analysis of the malware, it is also very time consuming and labor intensive. Rather than focusing on traditional software reverse engineering analysis to produce a complete understanding of the software being examined, the focus of this track is on rapidly developing sufficient information about the software to be able to make informed guesses about:

- What it might be
- What it is similar to
- What are the unique characteristics of developers
- How does it appear to work
- What might trigger it
- What has it done
- What is it likely to do next
- How can normal operations continue in spite of malware being active on the system

(U//FOUO) The informed guesses will need to be made in the absence of complete information and the purpose of these informed guesses is to provide system administrators and managers information to help decide upon a suitable course of action while a potential malware attack is underway.

(U) Not Interested In:

(U//FOUO) The focus of this track is on identifying game changing technologies that can begin to address the evolving challenges associated with malware. Signature based approaches to malware have been around for a while and are now considered mature technology. We are not interested in approaches or prototypes utilizing signature based approaches to malware and instead, we are looking for novel and game-changing paradigms to address the challenges associated with malware and its behavior.

(U) Constraints:

(U//FOUO) The technologies and capabilities need to be able to be utilized or applied to existing systems that use industry standard hardware and software (e.g., Windows, Linux) because cost and logistics make a large scale replacement of existing infrastructure difficult. These technologies and capabilities need to minimize the amount of human analysis required to collect and analyze data related to the attack and instead focus on the human as the decision maker using data and analysis provided by the technology/capability.

(U//FOUO) It is encouraged that new technologies adhere to the MAEC (http://maec.mitre.org) standard language for attribute expression. This will enable integration with an existing data element dictionary, thereby enabling automated fusion with other malware knowledge.

(U//FOUO) While static data can be used for comparison purposes, cyber events essentially occur in real-time. Subsequently, any analysis and investigation will also need to occur in real-time or near real-time in order to be effective in this problem area. However, because the reliability of the triage analysis is often

inversely proportional to the speed of the triage activities, the effectiveness and usefulness of the triage activities will also be strongly considered.

(U) Topics:

1. (U//FOUO) Malware Identification – These are methods or mechanisms to characterize malware based on its behaviors, potential functionality, identification as unauthorized software, or any other approach that can distinguish malware and unauthorized software from authorized software on a system. In particular, we are most interested in characterizations that will speed selection of an effective response. While it may not be possible to develop a complete characterization of a malware item, the methods/mechanisms should consider the aspects of the malware item that are relevant to performing an informed characterization and the confidence level associated with the characterizations. Additionally, the characterization should consider triggering mechanisms or conditions that would make the malware activate.

2. (U//FOUO) Malware Attribution – The developers of malware often attempt to conceal their identity when malware is released by using a variety of methods to make the malware difficult to trace or compare to other similar malware samples. Additionally, malware developers may use very convoluted distribution pathways to release the malware. This topic focuses on developing mechanisms and methods to rapidly develop attribution for the malware back to the author, controller, or the source of the release. These methods/mechanisms should consider approaches used by malware to defeat detection mechanisms and have the ability to adapt and evolve as malware changes in response to detection and interdiction measures used against the malware.

3. (U//FOUO) Malware Countermeasures – These are methods and mechanisms to counter malware without having to use extreme measures such as taking a system down or wiping out and rebuilding a system. The focus of this topic is on developing novel techniques and new paradigms to deal with malware already on a system and render it ineffective while still maintaining system availability for legitimate operations. These methods and mechanisms should consider which aspects of malware are key to making malware troublesome or dangerous and focus on how malware could be rendered ineffective if it is not feasible to remove the malware from the system.

4. (U//FOUO) Resiliency to Malware – Rather than focusing solely on countering malware activities, another approach is to make systems resilient to malware so that malware is ineffective against these resilient systems. This topic focuses on mechanisms and methods to make a system (hardware and/or software and/or applications) resilient to malware so legitimate operations continue as normal and malware is ignored and unable to achieve its objectives. The methods and mechanisms should also consider the performance and

scalability impacts of these approaches as well as the impact on legitimate system changes such as upgrades and new deployments.

5. (U//FOUO) Packer Detector – Various algorithms or tools are frequently used to pack malware code making it necessary to unpack the malware code before the code can undergo static analysis. This topic focuses on methods and mechanisms to detect when software has been packed and identify the algorithm or tool used to do the packing to facilitate automated unpacking for triage and categorization. As there are already a number of tools available to detect packing and to unpack software, prototypes for this topic must compare the prototyped approach with existing tools to demonstrate significant improvements over the current state of the art.

6. (U//FOUO) Suspicious File Packaging – One of the difficulties inherent in analyzing malware is the need to transport the malware from the environment where it was detected to a different environment where it can be analyzed. This transport needs to be done without altering the malware or allowing the malware to infect the analysis environment or any of the transport mechanisms used to move the malware. New tools are needed to run as a Windows application or a web service to take suspicious files, make these files completely inert and safe for transport, make the inert files immune to interference or alteration by antivirus software, and provide a way to restore the inert file back to its original composition upon arrival in the analytical environment. As malware is becoming keyed to its environment, it is necessary to capture environmental parameters of the infected environment for inclusion with the packaged suspicious file. Examples of the environment might include Host Identify Based Encryption (HIE) parameters, such as host id, user name, computer name, MAC address, serial numbers of various peripherals, license keys found in the registry, and/or system configuration parameters.

7. (U//FOUO) Identifying Malicious Code in Source Code - There are many instances of programs containing code that was put there maliciously, either by an insider, or by being penetrated by an outside source. While most coding flaws are benign, which means it was unintentionally placed there by a well-meaning developer; there are instances where code was intentionally added to do harm. This code is harder to detect. We are looking for solutions that will look at source code statically, either by looking at the source code as written, or else in its compiled state, to identify code that is possibly malicious, and then have a method of determining if the code is in fact malicious. An optional but highly desirable addition would be to validate that the compiled state contains no malicious features inserted by the compiler associated with the development tool suite.

8. (U//FOUO) Hidden Information Discovery – These are tools, methods, or approaches to detect hidden information embedded within a text or image file

that can operate in real-time very large volumes of data with very low rates of false positives.

9. (U//FOUO) Mobile Malware Discovery – Wireless, mobile communications present a multitude of security vulnerabilities. We are interested in the capability to detect and discover the presence of malware, or the access opportunities for malware to infect a mobile device. In particular, we are most interested in characterizations that will speed selection of an effective response. While it may not be possible to develop a complete characterization of a malware item, the methods/mechanisms should consider the aspects of the malware item that are relevant to performing an informed characterization and the confidence level associated with the characterizations. Additionally, the characterization should consider triggering mechanisms or conditions that would make the malware activate.

10. (U//FOUO) Offeror provided topic related to Malware Discovery, Analysis and Mitigation.

7.14 (U) TRACK 14: RESOURCE MANAGEMENT IN HIGH PERFORMANCE COMPUTING (HPC)

(U//FOUO) High Performance Computing is a powerful tool that allows organizations to accomplish large projects that require a lot of bandwidth and low latency. Amazon's Web Services is a good model, and acts as a good comparison, of effective HPC. This topic though, focuses on HPC resource management and data structure analysis. Offerors in this topic must be prepared to submit proposals that will address the potential of their prototype to be scalable for very large amounts of data while still being able to maintain high quality performance.

(U) Not Interested In:

(U//FOUO) We are not interested in simple resource management applications that are unable to alternate between multiple platforms (i.e. HPC and analytic). We are not interested in resource management systems that are unable to handle multi-tenant systems. Finally, the resource management system must be able to handle, or show the potential to handle, large volumes of data as well as a large number of tenants.

(U) Constraints:

(U//FOUO) Resource Management systems need to accommodate the following constraints:

- Data volumes can be expected to be very large but data about individual items can be expected to be very sparse, incomplete, and dirty; prototypes need to reflect these data characteristics to be considered realistic
- Approaches frugal in the use of computation power are preferred
- Resource Management systems need to be able to use data from corporate data repositories (cloud-based or relational database) and make resource management recommendations based upon data from the corporate data repositories (we do not want stovepipe or closed systems)
- Resource Management systems shall not use proprietary data formats or storage systems; all data generated by the systems shall be available for use by other systems that are independent of the system
- The technologies and capabilities need to be able to be utilized or applied to existing systems that use industry standard hardware and software (e.g., Windows, Linux, etc.) because cost and logistics make a large scale replacement of existing infrastructure difficult

(U) Topics:

1. (U//FOUO) Multi-Platform Resource Management – We are interested in resource management that is able to allocate on combined HPC and data analytic platform applications. Also, these platform applications are multi-tenant. Offerors on this topic must show potential to handle large amounts of data as well as a large number of users.

2. (U//FOUO) Geo-Distributed Resource Management – We are interested in tools, methodologies, policies and, procedures that are effective managing resource load-balancing across geographically dispersed locations while still maintaining a minimum performance threshold.

3. (U//FOUO) Service & Performance Resource Management – Load balancing and resource management is critical for organizations. However, it may be desirable for some systems to maintain a minimum performance threshold at all times. For multi-tenant systems, we are interested in leveraging resource management for models that enforce a minimum level of service and/or performance. The minimum performance threshold must be customizable. Offerors on this topic must show potential to handle large amounts of data as well as a large number of users.

4. (U//FOUO) Multi-Reasoning Data Structures – Data structures can typically be described via graph representations and matrix representations. Each has their uses and advantages for helping to recognize patterns for a given data structure. This topic focuses on being able to seamlessly alternate between matrix and graph analysis for said data structure. Prototypes on this topic must show potential to handle large amounts of data.

5. (U//FOUO) Analyzing Complex Data Structures – Currently, users have the ability to query very large distributed datasets through analytic platforms. However, if the user needs to accomplish computationally complex tasks, he/she must go to another platform, such as an HPC platform, to complete this task. This topic focuses on an integrated system that allows the user to accomplish all work from one platform, while the system is able to autonomously transition between multiple platforms (i.e. HPC and Analytic platforms).

6. (U//FOUO) Offeror provided topic related to High Performance Computing.

7.15 (U) TRACK 15: VIRTUAL LEARNING AND ADAPTIVE LEARNING ENVIRONMENTS

(U//FOUO) Adaptive Learning is an educational method using computers as interactive teaching devices which can automatically adapt the educational material to the students' needs as well as adapt to the context of the instruction request. Adaptive Learning can be as basic as having context-sensitive help information available when a user hovers their mouse over a button in an analytical application to training material and test questions that adapt in real-time based on a user's responses and interaction with the test environment. Adaptive Learning allows a user to receive real-time, customized instruction based on their skill level, their current activities, and/or their need for specific information.

(U//FOUO) NSA is looking for ideas, approaches, and/or technologies focused on Virtual and Adaptive Learning that could be incorporated into a larger enterprise-wide comprehensive approach to Learning that will allow NSA to meet future challenges by making learning a continual, integrated, and proactive component of the analyst's daily work experience. The need for instruction ranges from providing context-sensitive help in specific applications to teaching entirely new subjects and it is not expected that a single technology will be able to address all needs by itself.

(U) Constraints:

(U//FOUO) Adaptive Learning systems must be able to operate within NSA's frameworks, architectures, and environments. As such, potential technologies should be able to operate under the following conditions:

- Widely distributed environment with potential bandwidth constraints between locations
- Thin client- Web-based- Service-based and modular architecture

- Open architecture and interfaces able to integrate with existing NSA common services (e.g., user authentication, cloud storage, etc.)
- Easily customizable by non-programmers
- Preference for open source software components where available
- Use industry standard hardware and software (e.g., Windows, Linux, etc.)

(U) Topics:

1. (U//FOUO) Content Generation - One of the significant challenges to Adaptive Learning is the need to generate the content that will be utilized in the learning experience and the content must be appropriate to the learning requirement. For example, in context-sensitive help, the content would consist of brief explanations of specific features and capabilities in an application. However, when there is a need to learn a new body of information such as a new language, the content would consist of multiple modules designed to increase the user's skill level as they progress. The key issue of learning content in Adaptive Learning is that the content is specific, focused, and customizable to the user and the learning situation.

(U//FOUO) Several technical aspects of content generation to be considered are:

- Can content be automatically generated from existing documentation?
- How is appropriate content determined for specific learning requirements?
- How is content maintained under some sort of configuration control?
- How are updates validated and incorporated into content?
- How is old content identified and removed?

2. (U//FOUO) Content Delivery - One of the significant challenges to Adaptive Learning is the need to deliver appropriate content to the right user at the right time. For example, in context-sensitive help, the appropriate explanations would appear when a user hovers their mouse over the feature or capability in question. However, when a person is learning a new body of information such as a new language, the user will need to see content appropriate to their skill level and pace through the instruction process. The key issue of delivering content in Adaptive Learning is that the content is specific, focused, and exactly what the user needs at that point in time and in that specific learning situation.

(U//FOUO) Several technical aspects of content delivery to be considered are:

- How can appropriate content be linked to user actions and responses?
- How is content adjusted and adapted based on user actions and responses?

- How can content be adapted and tailored for different security levels?
- How can content be delivered to users at distributed sites when there are bandwidth constraints?

3. (U//FOUO) Measurement and Feedback - One of the significant challenges to Adaptive Learning is the need to measure the progress the user is making in learning the material and providing the proper feedback to maximize the learning experience. For example, in context-sensitive help, if the user does not take appropriate action after receiving the context-sensitive information, then additional information may be necessary. However, when a person is learning a new body of information such as a new language, if the user's response to test questions does not show a clear grasp of the subject material, then additional and focused instruction may be necessary. In all cases, it will also be important to measure the effectiveness of the learning so the overall learning experience can be adjusted to correct any issues with the content or delivery method. The key issue of delivering content in Adaptive Learning is that the content provided to the user is effective and meets the user's needs for that specific learning situation.

(U//FOUO) Several technical aspects of Adaptive Learning measurement and feedback to be considered are:

- How can the effectiveness of the instruction be captured and measured?
- How can the measurements produce actionable information supporting adaptation of the learning experience?
- What types of feedback can both users and managers be provided to improve the effectiveness of the learning experience?

4. (U//FOUO) Offeror provided topic related to Virtual Learning and Adaptive Learning Environments.

7.16 (U) TRACK 16: SECURE MOBILE COMPUTING

(U//FOUO) A number of revolutionary changes are being introduced into the mobile ecosystems presenting security challenges. In order to achieve end-to-end trusted cyber subspaces, wireless technologies support new device or emerging security capabilities must integrate with security capabilities in traditional wired and fixed networks as well as advanced security capabilities that also integrate with advanced security capabilities in non-mobile systems. Further, mobile platforms usually do not enjoy a robust envelope of physical security and frequently need to use networks of unknown provenance and these platforms are more exposed to attack. Game-changing solutions that provide effective countermeasures to these problems using popular, commercially available mobile platforms are of particular interest.

(U) Not Interested In:

(U//FOUO) There are a number of technology approaches we are not interested in for this track. They include:

- (U//FOUO) Solutions that limit the user's choice of network transport provider.
- (U//FOUO) Any techniques claiming to be better than the current state-of-the-art techniques must demonstrate a direct comparison between the new technique and the most relevant current state-of-the-art technique(s) during the prototype demonstration.
- (U//FOUO) The focus of this track is to explore some of the emerging technical features/capabilities in mobility and understand how they can be leveraged in a secure manner. We are seeking ways to better understand and evaluate these capabilities; to this end, finished solutions are not required as opposed to prototypes that can give fundamental understanding into the technology.

(U) Constraints:

(U//FOUO) Proposed solutions should work with many commercially available mobile platforms and over most commercially available network providers while providing the user with essentially the same experience they would receive from the unmodified platform.

(U//FOUO) Additionally, per Section 6, laptops, cell phones, and other mobile/wireless devices **CANNOT** be purchased for this effort using Government funding due to special requirements and long delays associated with purchase of hardware items of this nature with Government funding. Therefore, the Offeror should plan to do all development, testing, and demonstration activities on appropriate company-owned hardware and provide the Government with exact and detailed specifications of the hardware the Government would need to obtain to support installation, configuration, and subsequent Government testing in Government facilities after delivery of the prototype. Company-owned hardware is **NOT** to be delivered to the Government at the end of the contract and only the software developed for the prototype needs to be delivered.

(U) Topics:

1. (U//FOUO) Web RTC Client Development on the Android Platform -
Using the HTML 5.0 WEB RTC Standard, develop a client that can initiate and complete a Web RTC audio/video session using the DTLS/SRTP SIP/Media standards. Delivery of the prototype shall include the exemplar, all source code, installation and usage documentation, and associated hardware information, to enable protocol compliance testing and Quality of Service Measurements.

2. (U//FOUO) Proximity Action Tool for Mobile Device - Develop an application to perform a preconfigured action upon reaching a specified proximity to a target location and should be established using GPS or another non-user directed input. The trigger for the preconfigured action may be proximity to another user of the application or proximity to a specified location. Actions should include sending email, SMS, or MMS to a contact on the device. The prototype shall include the exemplar, all source code, installation and usage documentation, and associated hardware information, to enable protocol compliance testing and Quality of Service Measurements.

3. (U//FOUO) Secure Long Term Evolution (LTE) Direct Communications with Near Field Communications (NFC) - Develop an application to bootstrap secure LTE Direct Communications from Near Field Communications. This prototype should make use of the device's stock cryptographic libraries and have safeguards that prevent against masquerading as a trusted user. The authentication system should also balance usability with security strength. This NFC authentication shall be used to establish secure communication between 2 LTE direct devices. While LTE direct may use PKI credentials to secure communication, a method to exchange credentials and secure the channel by tapping the two phones together allows operation without requiring the users to trust some 3rd party.

4. (U//FOUO) LTE Proximity Action Tool – This topic has the goal to perform an action when within range of some location or user. LTE Direct provides this kind of discovery based on proximity to a user/another LTE direct device. Demonstrate the use of this functionality as the basis for a very simple Delay Tolerant Network (DTN) using LTE. It is expected that LTE Direct should give better range, bandwidth, and battery performance than older WiFi or Bluetooth based DTNs.

5. (U//FOUO) Femtocell - There is increased interest in using femtocells (sometimes called the HeNB) and associated security gateway in extending mobile services. There have been a number of industry presentations on security of these devices; this topic focuses on techniques that could potentially be used to secure these cell technologies.

6. (U//FOUO) Internet of Things – As more devices in the office are becoming wirelessly internet connected, the government is seeking a survey tool that will detect the presence of these devices, assess the security/vulnerability of those devices in an environment and upload data to a database.

7. (U//FOUO) Mobile Sensors – Mobile Devices are not just phones anymore. Most smartphones are equipped with a large number of transducers which enable environmental sensing capabilities; additionally APIs are exposed for applications developers. The government is interested in how these sensors can be enabled to determine more about an environment to help in both emergency

situations (e.g. enabling phones to serve as sensors for an environment, etc.) to non-emergency (e.g., can the sensors in a population of devices be used to better monitor an environment and potentially conserve energy, etc.).

8. (U//FOUO) Out-of-Band Alert/Wake-up Capability – Develop an enterprise controlled notification system that will wake-up a phone that is potentially in a low powered mode (similar to the alarm function). The government frequently has need to notify users even when the phone is "off". It is desired to use a protocol such as SMS or USSD to trigger the user to establish connection back to the enterprise so they can conduct an action such as retrieve and listen to their voicemail and/or check e-mail.

9. (U//FOUO) Mobile Application test harness – The Government is actively looking at Smartphone technologies and is seeking a low-cost automated mobile device test harness. Prototypes might include low-cost development platforms (e.g. arduino, raspberry pie, etc.) to serve as host that connects (e.g. via usb/wireless) to a mobile device (e.g. Android, iOS, etc.) to exercise the handset and application (incl. UI) through an automated test framework. It is acceptable to choose a single mobile platform as solution target.

10. (U//FOUO) Mobile Antivirus test harness – Given the Government's need for security products on Android and iOS devices, this topic focuses on the development a test harness that can be used to assess the effectiveness of mobile malware detection products and techniques. Methods to simulate various types of malware should be included in this proposal.

11. (U//FOUO) Mobile Network Characterization tool – Given the Government's interest in developing secure capabilities to be used on international cellular networks, a tool to survey and characterize mobile data network behaviors (types of traffic, volumes of traffic, traffic statistics, shaping) will help in the engineering of the secure capabilities. It is desired to have an Android based capability that incorporates a simple user interface.

12. (U//FOUO) Offeror provided topic related to Emerging capabilities in Mobile Computing.

8 (U) SOFTWARE FRAMEWORKS, DATA SETS & GFI

(U//FOUO) For information about the Government's software frameworks and architecture, please refer to the Technical Forecasts published on the ARC.

(U//FOUO) Details about sources of test data are being provided for informational purposes only. The Government makes no claims regarding the quality or suitability of the test data described below. No delays in contract performance may be attributed to the use of the test data.

8.1 (U) LDC TEST DATA

(U//FOUO) The Linguistic Data Consortium (LDC) supports language-related education, research, and technology development by creating and sharing linguistic resources including corpora, tools, and standards. Information about the corpora available through LDC can be found at: www.ldc.upenn.edu. The Government has a licensing agreement in place that provides access to relevant LDC corpora for use as test data for the prototypes developed by companies awarded contracts under the IMC program.

(U//FOUO) Offerors desiring to have access to any of the LDC corpora during prototype development and execution must clearly identify in their proposal which of the LDC corpora will be requested and why the Offeror thinks those corpora make suitable test data for the prototype being developed. It is the Offeror's responsibility to determine which corpora are suitable as test data and the Government makes no claims about the contents, validity, or suitableness of any corpus; however, the final determination of whether a requested corpus is relevant to the Offeror's proposal, and therefore is a valid request, shall be made by the Government. Any requests for an inappropriate number of corpora, i.e., corpora that are not justified based on the description of the prototype, or for corpora unrelated to the prototype being proposed may negatively impact the evaluation of the Offeror's proposal because it would indicate a lack of technical understanding of the requirements to complete their prototype.

(U//FOUO) Upon contract award of a proposal requesting LDC corpora, the Government will make the requested LDC corpora deemed to be relevant to the proposal available to the company. The provided corpora shall only be used during contract execution and shall only be used for contract tasks related to prototype development/testing. The data shall not be used for any other purpose, and shall not be used by anyone not actively working on the contracted tasks. All LDC corpora provided by the Government shall be returned to the Government at the end of the contract and any copies made shall be destroyed.

8.2 (U) CYBER AND OTHER NON-PUBLIC TEST DATA

(U//FOUO) There are several sources for unclassified Cyber data sets or other non-public collections of test data. The Government makes no claims or representations about the quality, content, or usability of the data sets.

a. 1999 MIT/LL DARPA Intrusion Detection Evaluation Data Set – This data set is freely available and details on this data set can be found at: http://www.ll.mit.edu/mission/communications/ist/corpora/ideval/data/index.html

b. PREDICT Data Sets – The PREDICT project, http://www.predict.org, is a community of producers of security-relevant network operations data and researchers in networking and information security. Through a centralized repository, it provides developers and evaluators with regularly updated network operations data relevant to cyber defense technology development. Organizations and companies can register to access the PREDICT data sets via the Account Request process on the PREDICT web site. Government sponsorship is **NOT** a requirement to obtain access to these data sets, however, there are a number of Non-Disclosure Agreements (NDA), Memorandums of Understanding (MOU), and other legal documents that must be executed between the company and the PREDICT organization before access to the data is granted. ***It is the company's responsibility to ensure that this paperwork is completed in a timely manner and in place prior to contract award if an Offeror wishes to use this data for their prototype.***

c. HSIP Gold – HSIP Gold is a unified homeland infrastructure geospatial data inventory assembled by several Government agencies for official use only. It is a compilation of over 450 geospatial datasets, characterizing domestic infrastructure and base map features which have been assembled from a variety of Federal agencies and commercial sources. Additional information can be found at https://www.hifldwg.org. Access to this data requires a Government sponsor. Government sponsorship can be provided to companies receiving an IMC contract award to develop a prototype with a valid requirement for this type of test data. The data shall not be used for any other purpose, and shall not be used by anyone not actively working on the contracted tasks. All HISP corpora obtained via Government sponsorship along, with any copies made, shall be destroyed at the end of the contract.

8.3 (U) PUBLICALLY AVAILABLE DATA SETS

(U//FOUO) Various organizations are making data sets publically available to facilitate research and development of new tools. Some datasets are offered for free and some are not. The list below is being provided for information purposes

only. The Government makes no claims, representations or endorsements about the quality, quantity, content, availability, accessibility, usability, or any other characteristic of the data sets. The Government does not necessarily endorse the views expressed or the facts presented in any of the data. Further, the Government does not endorse any commercial products that may be advertised or available through these web sites.

a. www.data.gov – Collection of data sets from various Government agencies.
b. aws.amazon.com/publicdatasets/ - Collection of public data sets provided by Amazon.
c. http://www.cs.cmu.edu/~enron/ - Data set containing publically released e-mails from Enron.
d. http://www.caida.org/data/ - Data for scientific analysis of Internet traffic, topology, routing, performance, and security-related events.
e. http://lemurproject.org/clueweb09/index.php#Using – Data sets containing about 1 billion web pages in ten languages.
f. http://trec.nist.gov/data.html - Text data from a variety of sources used by the NIST Text Retrieval Conference (TREC).
g. http://gdeltproject.org – Supported by Google Ideas, monitors the world's broadcast, print, and web news from nearly every country in 100 languages.
h. http://snap.standford.edu/data/index.html - Collection of data sets including data from many popular social networks supported by Standford Network Analysis Project (SNAP).
i. http://naturalearthdata.com – Public domain map dataset available at 1:10m, 1:50m, and 1:110 million scales supported by North American Cartographic Information Society (NACIS).
j. http://storage.googleapis.com/books/ngrams/books/datasetsv2.html - Corpus of n-grams compiled from Google Books.
k. http://archive.ics.uci.edu/ml/datasets - Collection of public data sets listed on University of California-Irvine Center for Machine Learning and Intelligent Systems.

APPENDIX A

FOREIGN OWNERSHIP

(U) Acquisition of supplies or services from concerns under Foreign Ownership, Control, or Influence (FOCI) or of supplies developed, manufactured, maintained or modified by concerns under FOCI is of serious concern. If the contractor is under FOCI, the contractor shall comply with all risk mitigation measures imposed by the Government. In addition, the Maryland Procurement Office reserves the right to prohibit individuals who are not U.S. citizens from all or certain aspects of the work to be performed under this Contract.

(U) Foreign Ownership, Control, or Influence - For purposes of this clause, a U.S. company is considered under FOCI whenever a foreign interest has the power, direct or indirect, and whether or not exercisable through the ownership of the U.S. company's securities, by contractual arrangements or other means, to direct or decide matters affecting the management or operations of that company.

(U) There is a continuing obligation of the contractor to advise the Contracting Officer in writing of changed conditions from the contractor's original Statement of Affiliation, 352.204-9000, incorporated by reference, in any of the 11 factors listed below within 30 days of the event, which may justify certain adjustments to the security terms under which a contractor is operating or, alternatively, that different FOCI mitigation measures be employed. If a changed condition is of sufficient significance, it might also result in a determinate on that the contractor is no longer considered to be under FOCI. Failure to abide by this obligation shall be cause for default under the Default Clause of this contract. Any voluntary actions taken on the part of the contractor which result in changes to the Statement of Affiliation, will be reviewed by the Government. Any increased costs incurred by the contractor as a result of complying with additional Government imposed security measures shall be considered as unallowable costs to Government contracts.

(U) Factors: The Government will use the following factors as the basis for making a FOCI determination:

(1) Ownership or beneficial ownership, direct or indirect, of 5 percent or more of the Offeror's voting securities by a foreign person; **
(2) Ownership or beneficial ownership, direct or indirect, of 25 percent or more of any class of the contractor's non-voting securities by a foreign person;
(3) Management positions, such as directors, officers, or executive personnel of the contractor held by non-U.S. citizens;

(4) Foreign person power, direct or indirect, to control the election, appointment, or tenure of directors, officers, or executive personnel of the contractor or other decisions or activities of the contractor;
(5) Contracts, agreements, understanding, or arrangements between the contractor and a foreign person;
(6) Loan arrangements between the contractor and a foreign person if the contractor's (the borrower) overall debt to equity ratio is 40:60 or greater; or financial obligations that are subject to the ability of a foreign person to demand repayment;
(7) Annual total revenues or net income in excess of 5 percent from a single foreign person or in excess of 30 percent from foreign persons in the aggregate;
(8) Ten percent or more of any class of the applicant's voting securities held in such a way that beneficial ownership or equitable title cannot be identified;
(9) Interlocking directors with foreign persons and any officer or management official of the contractor who is also employed by a foreign person;
(10) Any other factor that indicates or demonstrates a capability on the part of foreign persons to control or influence the operations or management of the contractor; and,
(11) Ownership of 10% or more of any foreign interest.

* DoD 5200.2-R Chap 3, para. c3.6
** DoD 5520 22-M, National Industrial Security Program Operating Manual, Chapter 2 Section 3, "Foreign Ownership, Control, or Influence," January 1995.

CONFLICTS OF INTEREST

(U) Awards made to firms owned by, or employing current or previous Federal Government employees could create conflicts of interest for some employees, which may be a violation of federal law. Any further questions should be directed to the Contracting Officer.

DISCLOSURE OF GOVERNMENT INFORMATION SYSTEMS DATA

(U) The Contractor is strictly prohibited from disclosing any data derived from Government Information Systems. This prohibition applies equally to extracts or summaries of such data, and includes oral, written or electronic media disclosures. The subject data include, but are not limited to, financial data bases, program budget information data bases, and procurement information data bases. In limited circumstances, the Contracting Officer may authorize the Contractor's disclosure of such information when disclosure is necessary to the successful completion of the contract. The Contractor's unauthorized disclosure of Government Information Systems data could result in the disqualification,

debarment, or suspension of the Contractor. Such an unauthorized disclosure may also constitute a criminal violation of the fraud or information disclosure provisions of Title 18 of the United States Code. In addition, the unauthorized disclosure of information related to the national defense may constitute a violation of the "espionage" provisions of Title 18 of the U.S. Code, Sections 793, 794, and/or 798, or Title 50 of the U.S. Code, Section 783.

(U) As a precondition to contractor access to financial management information (e.g., data that imparts knowledge of the Agency's financial posture, including but not limited to financial planning, programming, budgeting and execution (PPBE) information), all contractor personnel for whom such access is required shall execute a non-disclosure agreement specifically governing such information, and requiring such personnel (a) to use the information only in the performance of the contract, (b) not to disclose it to unauthorized personnel, and (c) to report any violation of the non-disclosure agreement to the Agency. To help satisfy Department of Defense PPBE accountability obligations, a copy of each such non-disclosure agreement will be maintained by the Agency's Directorate of Finance.

(U) The Contractor shall provide the COR a list of applicable employees prior to personnel gaining access to any Information System(s).

(U) “Information System” is defined as any telecommunications and/or computer-related equipment or interconnected system or subsystems of equipment that is used in the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmitting, or receiving of voice and/or data, and includes software, firmware, and hardware.

PROTECTION OF UNCLASSIFIED DOD INFORMATION

(U) This clause applies to unclassified DoD information. Such information may be disseminated by the Contractor, or Awardee to the extent required to further the contract or agreement objectives, provided that the information is disseminated within the scope of assigned duties and with a clear expectation that confidentiality will be preserved. Examples include:

(1) Non-public information provided to the Contractor (e.g., with the request for proposal).
(2) Information developed during the course of the contract, grant, or other legal agreement or understanding (e.g., draft documents, reports, or briefings and deliverables).
(3) Privileged information contained in transactions (e.g., privileged contract information, program schedules, contract-related event tracking).

Definitions:

- (U) DoD information. Any information that has not been cleared for public release in accordance with DoD Directive 5230.09, "Clearance of DoD Information for Public Release," and that is provided by the Department of Defense to a non-DoD entity, or that is collected, developed, received, transmitted, used, or stored by a non-DoD entity in support of an official DoD activity.

- (U) Non-DoD entity. Any person who is not a civilian employee or military member of the Department of Defense, or any entity or organization that is not a DoD Component. This includes any non-DoD Federal agency and its personnel, and any contractor, grantee, awardee, partner, or party to any form of legal agreement or understanding with the Department of Defense or another Federal agency.

- (U) Non-DoD information system. Any information system that is not owned, used, or operated by the Department of Defense and that is not used or operated by a contractor or other non-DoD entity on behalf of the Department of Defense.

(U) Information Safeguards.

(U) Contractors shall employ the following information safeguards:

(1) Do not process DoD information on public computers (e.g., those available for use by the general public in kiosks or hotel business centers) or computers that do not have access control.
(2) Protect information by at least one physical or electronic barrier (e.g., locked container or room, login and password) when not under direct individual control.
(3) Sanitize media (e.g., overwrite) before external release or disposal.
(4) Encrypt all information that has been identified as controlled unclassified information (CUI) when it is stored on mobile computing devices such as laptops and personal digital assistants, or removable storage media such as thumb drives and compact disks, using the best available encryption technology.
(5) Limit information transfer to subcontractors or teaming partners with a need to know and a commitment to at least the same level of protection.
(6) Transmit e-mail, text messages, and similar communications using technology and processes that provide the best level of privacy available, given facilities, conditions, and environment. Examples of recommended technologies or processes include closed networks, virtual private networks, public key-enabled encryption, and Transport Layer Security (TLS). Encrypt organizational wireless connections and use encrypted wireless connection where available when traveling. If encrypted wireless is not available, encrypt application files (e.g., spreadsheet and word

processing files), using at least application-provided password protection level encryption.

(7) Transmit voice and fax transmissions only when there is a reasonable assurance that access is limited to authorized recipients.

(8) Do not post DoD information to Web site pages that are publicly available or have access limited only by domain or Internet protocol restriction. Such information may be posted to Web site pages that control access by user identification or password, user certificates, or other technical means and provide protection via use of TLS or other equivalent technologies. Access control may be provided by the intranet (vice the Web site itself or the application it hosts).

(9) Provide protection against computer network intrusions and data exfiltration, minimally including the following:

i. Current and regularly updated malware protection services, e.g., anti-virus, anti-spyware.

ii. Monitoring and control of both inbound and outbound network traffic as appropriate (e.g., at the external boundary, sub-networks, individual hosts) including blocking unauthorized ingress, egress, and exfiltration through technologies such as firewalls and router policies, intrusion prevention or detection services, and host-based security services.

iii. Prompt application of security-relevant software patches, service packs, and hot fixes. Comply with other current Federal and DoD information protection and reporting requirements for specified categories of information (e.g., medical, critical program information (CPI), personally identifiable information, export controlled) as specified in contracts, grants, and other agreements.Report loss or unauthorized disclosure of information in accordance with contract or agreement requirements and mechanisms.

(U) Flow down Requirements.

(U) Contractors shall flow this clause down to all subcontractors and teaming partners.

APPENDIX B

The contractor shall complete the following pages OR provide proof of a current registration with http://orca.bpn.gov. This requirement is mandatory for all Offerors. If the Offeror chooses to complete the following pages, this information can be added as an appendix to the Cost Proposal and is not included in any page counts.

Clause 52.212-03 Offeror Representations and Certifications – Commercial Items (July 2002)

(a) Definitions. As used in this provision:

"Emerging small business," means a small business concern whose size is no greater than 50 percent of the numerical size standard for the NAICS code designated.

"Forced or indentured child labor," means all work or service--

(1) Exacted from any person under the age of 18 under the menace of any penalty for its nonperformance and for which the worker does not offer himself voluntarily; or

(2) Performed from any person under the age of 18 pursuant to a contract the enforcement of which can be accomplished by process or penalties.

"Service-disabled veteran-owned small business concern"--

(1)Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one ore more service-disabled veterans: and

(ii) The management and daily business operations of which are controlled by one ore more service-disabled veterans or in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C.101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern" means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and size standards in this solicitation.

"Veteran-owned small business concern" means a small business concern--

(1) Not less than 51 percent of which is owned by one ore more veterans (as defined at 38 U.S.C. 101(2) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned business concern" means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

"Women-owned small business concern" means a small business concern--

(1) Which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(b) Taxpayer Identification Number (TIN) (26 U.S.C. 6109, 31 U.S.C. 7701). (Not applicable if the offeror is required to provide this information to a central contractor registration database to be eligible for award).

(1) All offerors must submit the information required in paragraphs (b)(3) through (b)(5) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M and implementing regulations issued by the Internal Revenue Service (IRS).

(2) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(3) Taxpayer Identification Number (TIN).

__ TIN: _____

__ TIN has been applied for, but not yet received.

__ TIN is not required because:

__ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the

conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

__ Offeror is an agency or instrumentality of a foreign government;

__ Offeror is an agency or instrumentality of a Federal Government;

(4) Type of organization.

( ) Sole proprietorship
( ) Partnership
( ) Corporate entity (non tax-exempt);
( ) Corporate entity (tax-exempt);
( ) Government entity (Federal, State, or local);
( ) Foreign government;
( ) International organization per 26 CFR 1.6049-4;
( ) Other _____.

(5) Common Parent.

( ) Offeror is not owned or controlled by a common parent;
( ) Name and TIN of common parent:

Name_____
TIN_____

(c) Offerors must complete the following representations when the resulting contract is to be performed inside the United States, its territories or possessions, Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. Check all that apply.

(1) Small business concern. The offeror represents as part of its offer that it ( ) is, ( ) is not a small business concern.

(2) Veteran-owned small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that ( ) is, ( ) is not a veteran-owned small business concern.

(3) Service-disabled veteran-owned small business concern. [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (c)(2) of this provision.] The offeror represents as part of its offer that it ( ) is, ( ) is not a service-disabled veteran-owned small business concern.

(4) Small disadvantaged business concern. [Complete only if the represented itself as a small business concern in paragraph (c)(1) of this provision] The offeror represents,

for general statistical purposes, that it ( ) is, ( ) is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(5) Women-owned small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision] The offeror represents that it ( ) is, ( ) is not a women-owned small business concern.

Note: Complete paragraphs (c)(6) and (c)(7) only if this solicitation is expected to exceed the simplified acquisition threshold.

(6) Women-owned business concern. (other than small business concern) [Complete only if the offeror is a women-owned business concern and did not represent itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it ( ) is, ( ) is not, a women-owned business concern.

(7) Tie bid priority for labor surplus area concerns. If this is an invitation for bid, small business offerors may identify the labor surplus areas in which costs to be incurred on account of manufacturing or production (by offeror or first-tier subcontractors) amount to more than 50 percent of the contract price:

_____

(8) Small Business Size for the Small Business Competitiveness Demonstration Program and for the Targeted Industry Categories under the Small Business Competitiveness Demonstration Program. [Complete only if the offeror has represented itself to be a small business concern under the size standards for this solicitation.]

(i) [Complete only for solicitations indicated in an addendum as being set-aside for emerging small businesses in one of the four designated industry groups (DIGs).] The offeror represents as part of its offer that it ( ) is, ( ) is not an emerging small business.

(ii) [Complete only for solicitations indicated in an addendum as being for one of the targeted industry categories (TICs) or four designated industry groups (DIGs).] Offeror represents as follows:

(A) Offeror's number of employees for the past 12 months (check the Employees column if size standard stated in the solicitation is expressed in terms of number of employees); or

(B) Offeror's average annual gross revenue for the last 3 fiscal years (check the Average Annual Gross Number of Revenues column if size standard stated in the solicitation is expressed in terms of annual receipts)

(Check one of the following):

Number of Employees	Average Annual Gross Revenues

____ 50 or fewer	____ $1 million or less
____ 51-100	____ $1,000,001-$2 million
____ 101-250	____ $2,000,001-$3.5 million
____ 251-500	____ $3,500,001-$5 million
____ 501-750	____ $5,000,001-$10 million
____ 751-1,000	____ $10,000,001-$17 million
____ Over 1,000	____ Over $17 million

(9) [Complete only if the solicitation contains the clause at FAR 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns, or FAR 52.219-25, Small Disadvantaged Business Participation Program - Disadvantaged Status and Reporting, and the offeror desires a benefit based on its disadvantaged status.]

(i) General. The offeror represents that either-

(A) It ( ) is, ( ) is not certified by the Small Business Administration as a small disadvantaged business concern and identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net), and that no material change in disadvantaged ownership and control has occurred since its certification, and, where the concern is owned by one or more individuals claiming disadvantaged status, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); or

(B) It ( ) has, ( ) has not submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(ii) ( ) Joint Ventures under the Price Evaluation Adjustment for Small Disadvantaged Business Concerns. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements in 13 CPR 124.1002(f) and that the representation in paragraph (c)(9)(i) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: _____.]

(10) HUBZone small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents, as part of its offer, that-

(i) It ( ) is, ( ) is not a HUBZone small business concern listed, on a date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control,

principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It ( ) is, ( ) is not joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (c)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. [The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:_____.] Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(d) Representations required to implement provisions of Executive Order 11246--

(1) Previous Contracts and Compliance. The offeror represents that--

(i) It ( ) has, ( ) has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation; and

(ii) It ( ) has, ( ) has not, filed all required compliance reports.

(2) Affirmative Action Compliance. The offeror represents that--

(i) It ( ) has developed and has on file, ( ) has not developed and does not have on file, at each establishment, affirmative action programs required by rules and regulations of the Secretary of Labor (41 CFR Subparts 60-1 and 60-2), or

(ii) It ( ) has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(e) Certification Regarding Payments to Influence Federal Transactions (31 U.S.C. 1352). (Applies only if the contract is expected to exceed $100,000.) By submission of its offer, the offeror certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with the award of any resultant contract.

(f) Buy American Act Certificate. (Applies only if Federal Acquisition Regulation (FAR) clause 52.225-1, Buy American Act--Supplies, is included in this solicitation.)

(1) The offeror hereby certifies that each end product, except those listed in paragraph (f)(2) of this provision, is a domestic end product as defined in the clause entitled "Buy American Act--Supplies" and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United

States. The offeror shall list as foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

(2) Foreign End Products:

Line Item No.	Country of origin
_____	_____
_____	_____
_____	_____

(List as necessary)

(3) The Government will be evaluate offers in accordance with the policies and procedures of FAR Part 25.

(g)(1) Buy American Act--North American Free Trade Agreement--Israeli Trade Act Certificate. (Applies only if FAR clause 52.225-3, Buy American Act--North American Free Trade Agreement--Israeli Trade Act, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(1)(ii) or (g)(1)(iii) of this provision, is a domestic end product as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement-Israeli Trade Act" and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States.

(ii) The offeror certifies that the following supplies are NAFTA country end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act":

NAFTA Country or Israeli End Products:

Line Item No	Country of Origin
_____	_____
_____	_____
_____	_____

(List as necessary)

(iii) The offeror shall list those supplies that are foreign end product (other than those listed in paragraph (g)(1)(ii) of this provision) as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act." The offeror shall list as other foreign end products those end products manufactured in the United Stated that do not qualify as domestic end products.

Other Foreign End Products:

Line Item No	Country of Origin
_____	_____

_____ _____
_____ _____
[List as necessary]

(iv) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(2) Buy American Act--North American Free Trade Agreements--Israeli Trade Act Certificate, Alternate I (May 2002). If Alternate I to the clause at FAR 52.225-3 is includes in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act":

Canadian End Products:

Line Items No.

_____
_____
_____
(List as necessary)

(3) Buy American Act--North American Free Trade Agreements--Israeli Trade Act Certificate, Alternate II (May 2002). If Alternate II to the clause at FAR52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of this basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act":

Canadian or Israeli End Products:

Line Item No Country of Origin

_____ _____
_____ _____
_____ _____
(List as necessary)

(4) Trade Agreements Certificate (Applies only if the clause at FAR 52.225-5, Trade Agreements, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(4)(ii) of this provision, is a U.S.-made, designated country, Caribbean

Basin country, or NAFTA country end product, as defined in the clause of this solicitation entitled "Trade Agreements."

(ii) The offeror shall list as other end products those end products that are not U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products.

Other End Products:

Line Items No	Country of Origin
_____	_____
_____	_____
_____	_____

(List as necessary)

(iii) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25. For line items subject to the Trade Agreements Act, the Government will evaluate offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products without regard to the restrictions of the Buy American Act. The Government will consider for award only offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products unless the Contracting Officer determines that there are no offers for such products or that the offers for such products are insufficient to fulfill the requirements of the solicitation.

(h) Certification Regarding Debarment, Suspension or, Ineligibility for Award (Executive Order 12549). (Applies only if the contract value is expected to exceed the simplified acquisition threshold.) The offeror certifies, to the best of its knowledge and belief, that that the offeror and/or any of its principals--

(1) ( ) Are, ( ) are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency, and

(2) ( ) Have, ( ) have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(3) ( ) Are, ( ) are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses.

(i) Certification Regarding Knowledge of Child Labor for Listed End Products (Executive Order 13126). [The Contracting Officer must list in paragraph (j)(1) any end

products being acquired under this solicitation that are included in the List of Products Requiring Contractor Certification as to Forced or Indentured Child Labor, unless excluded at 22.1503(b).]

(1)Listed end products.

Listed End Products Listed Countries of Origin

_____ _____

_____ _____

(2) Certification. [If the Contracting Officer has identified end products and countries of origin in paragraph (j)(1) of this provision, then the offeror must certify to either (i)(2)(i) or (i)(2)(ii) by checking the appropriate block.]

___(i) The offeror will not supply any end product listed in paragraph (j)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product.

___(ii) the offeror may supply an end product listed in paragraph (j)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product. The offeror certifies that it has made a good faith effort to determine whether forced or indentured child labor was used to mine, produce, or manufacture any such end product furnished under this contract. On the basis of those efforts, the offeror certifies that it is not aware of any such use of child labor.

252.212-7000 -- Offeror Representations and Certifications -- Commercial Items (Nov 1995)

As prescribed in 212.301 (f)(ii), use the following provision: Offeror Representations And Certifications -- Commercial Items (Nov 1995)

(a) Definitions. As used in this clause --

(1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C.App. Sec. 2415).

(2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification. By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it:

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C.App. Sec.2407(a) prohibits a United States person from taking.

(c) Representation of Extent of Transportation by Sea. (This representation does not apply to solicitations for the direct purchase of ocean transportation services).

(1) The Offeror shall indicate by checking the appropriate blank in paragraph (c)(2) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(2) Representation. The Offeror represents that it --
_____Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
_____Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(3) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense Federal Acquisition Regulation Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of Provision)

352.204-9004 – Statement of Affliliation

1. Does the offeror hold an active DoD Facility Security Clearance (FSC)?
Yes , No ____. (Answer "No" if the clearance was issued under a Special Security Agreement or a Security Control Agreement (see DoD5220.22-M sec. 2-306).

If yes, provide FSC/CAGE Code Number _____; the remainder of this provision shall not be applicable to the offeror.

2. At any time within the calendar year preceding the due date for proposals, has the contractor submitted to the Maryland Procurement Office a completed Statement of Affiliation form set forth below?

Yes _____ No _____

If the offeror answered "no", the contractor must complete the Statement of Affililiation form and submit it to the Contracting Officer.

If the offeror answered "yes", does the contractor state that all the information on the previously submitted form is correct?

Yes _____ No _____

If the offeror answered "yes", the remainder of the provision shall not be applicable. If the offeror answered "no", the offeror must provide only that information necessary to update the previously submitted form and submit it to the Contracting Officer.

STATEMENT OF AFFILIATION FORM

For the purpose of this form, a foreign interest is defined as any of the following:

- A foreign government or foreign government agency;
- Any form of business enterprise or legal entity organized, chartered or incorporated under the laws of any country other than the United States or its possessions;
- Any individual who is not a U.S. citizen; or
- Any form of business enterprise organized or incorporated under the laws of the U.S., or a State or other jurisdiction within the U.S. that is owned, controlled, or influenced by one of the entities described in A, B or C, above.

1. (answer 1a. or 1b.)

a. (For entities which issue stock) Does a foreign interest own, or have beneficial ownership in, 5% or more of your organization's equity securities?

Yes _____ No _____

If yes:

- Identify the percentage of any class of stock or other securities issued, which are owned by foreign interests, broken down by country. Include indirect ownership through one or more intermediate level(s) of subsidiaries. Indicate voting of each class of stock.
- Are there shareholder agreements? If yes, attach a copy (or copies), and if none, so state.
- Indicate whether a copy of SEC Schedule 13D/13G report has been received from any investor. If yes, attach a copy (or copies)

NOTE: Ownership of less than 5% should be included if the holder is entitled to control the appointment and tenure of any management position.

b. (For entities which do not issue stock) Has a foreign interest subscribed 5% or more of your organization's total capital commitment?

Yes _____ No _____

If yes:

- Identify the percentage of total capital commitment that is subscribed by foreign interests:
  _____ %

- Is there an agreement(s) with the subscriber(s)? If yes, please attach a copy (or copies), and if none, so state.

2. Does your organization directly, or indirectly through your subsidiaries or affiliates, own 10% or more of any foreign interest?

Yes _____ No _____

If yes:

- Identify the foreign interest by name, country, percentage owned, and individuals who occupy management positions with the organizations.
- If there are individuals from your organization who occupy management positions with the foreign interest, identify the names(s), title, and extent of involvement in the operations of the organizations (to include access to classified information)

3. Do any foreign interests serve as members of your organization's board of directors (or similar governing body), or as officers, executive personnel, general partners, regents, trustees or senior management officials of your organization?

Yes _____ No _____

If yes:

- Identify the foreign interest by name, title, citizenship, immigration status and clearance or exclusion status.
- Attach copies of applicable by-laws or articles of incorporation, which describe the affected position(s). However, if you have already provided such copies to the National Security Agency Industrial Security Representative, so state.

4. Does any foreign interest have the power, direct or indirect, to control the election, appointment, or tenure of members of your organization's board of directors (or similar governing body) or other management positions of your organization, or have the power to control or influence other decisions or activities of your organization?

Yes _____ No _____

If yes:

- Identify the foreign interest by name, title, citizenship, and all details concerning the control or influences

NOTE: If any foreign interests have such power, this question shall be answered in the affirmative even if such power has not been exercised. Also, state whether or not it can be exercised through ownership of your organization's securities or if such power may be invoked by contractual arrangements or by other means.

5. a. Does your organization have any contracts, agreements, understandings or arrangements with a foreign interest(s) that cumulatively represent 10% or more of your organization's annual gross income?

Yes _____ No _____

If yes:

- For each instance, provide the name of the foreign interest, country, percentage of gross income derived, and nature of involvement including:
  - Whether defense/nuclear related or not
  - Involvement with classified or export controlled technology
  - Compliance with export control requirement

Where the organization has a number of involvements and where these involvements are not defense/nuclear related and represent a small percentage of gross income less than 5%, the explanations can be a generalized statement addressing the totals by country.

NOTE: We do not expect and will not require the contractor to ask every customer if he/she falls within the definition or a foreign interest. We will ask the contractor to provide ongoing security education to those individuals who negotiate and/or administer such agreements regarding their responsibilities to report agreement with a foreign interest to the best of their knowledge. The contactor shall state the response to this question to "the best of his/her knowledge or "through his/her best efforts".

5. b. For this procurement, provide names and corporate addresses of all vendors from which you will acquire components or parts to be integrated into the end item. For each vendor listed that is a foreign interest or controlled by a foreign interest, state the nature of the foreign interest.

6. Does your organization, whether as borrower, surety, guarantor or otherwise, have any indebtedness, liabilities or obligations to a foreign interest?

Yes _____ No _____

If yes:

- Provide your overall debt-to-equity ratio in percentage.

- With respect to indebtedness or liability to a foreign interest indicate to whom indebted or liable, what collateral has been furnished or pledged, and any conditions or covenants of the loan agreement. If stock or assets have been furnished or pledged as collateral, provide a copy of the loan agreement or pertinent extracts thereof (to include procedures to be followed in the event of default).
- If any debentures are convertible, provide specifics.
- If loan payments are in default, provide details.
- This question should be answered in the affirmative if the debt is with a U.S. entity that is owned or controlled either directly or indirectly by a foreign interest. If unknown, so state.

NOTE: As stated above, we do not expect and will not require that the contractor to ask every lender if he/she qualifies as a foreign interest. We will ask the contractor to provide ongoing security education to those employees who handle lending arrangements regarding their responsibilities to report any such arrangements with a foreign interest lender, to the best of their knowledge. The contractor shall state the response to this question as being to "the best of his/her knowledge" or "through his/her best efforts".

7. During your last fiscal year, did your organization derive:

a) 5 percent or more of its total revenues or net income from any single foreign interest?

Yes _____ No _____

b) In the aggregate 30 percent or more of its total revenues or net income from foreign interests?

Yes _____ No _____

If yes to either part of the question:

- Provide overall percentage of income derived from foreign interest by country, nature of involvement, and type or services or products.

_____%

- Indicate if any single foreign interest represents in excess of 5% of total revenue or net income.

_____ _____%

- Indicate whether any classified information is involved.

Yes _____ No _____

- State whether facility is in compliance with applicable export control requirements.

Yes _____ No _____

NOTE: As stated above, we do not expect and will not require that contractor to ask every revenue source if he/she qualifies as a foreign interest. We will ask the contractor to provide ongoing security education to those employees who handle sales contracts regarding their responsibilities to report any such arrangements with a foreign interest lender, to the best of their knowledge. The contractor shall state the response to this question as being to "the best of his/her knowledge" or "through his/her best efforts".

8. Is 10 percent or more of any class of your organization's voting securities held in "nominee" shares, in "street names" or by some other method that does not identify the beneficial owner? (Check one)

Yes _____ No _____

If yes:

- Identify each foreign institutional investor holding 10% or more of the voting stock by name and address and the percentage of stock held:

- Indicate whether any foreign investor has attempted to, or has exerted any control or influence over appointment to management positions or influenced the policies of the organization:

- Include copies of SEC Schedule 13D/13G.

9. Do any of the members of your organization's board of directors (or similar governing body), or officers, executive personnel, general partners, regents, trustees or senior management officials of your organization hold any positions with, or serve as consultants for, any foreign interest?

Yes _____ No _____

If yes:

- Provide the name, title, citizenship, immigration status and clearance or exclusion status on all such persons.
- Identify by name and address, each foreign interest with which such persons serve and indicate the capacity in which he/she is serving.
- Include a Statement of Full Disclosure of Foreign Affiliations for every cleared individual who is a representative of a foreign interest.

10. Is there any other factor that indicates or demonstrates a capability of a foreign interest to control or influence the operations or management of your organization?

Yes _____ No _____

If yes:

- Describe the foreign involvement in detail, including why the involvement would not be reportable in the preceding questions.