

Broad Agency Announcement

Cyber Grand Challenge (CGC): Competition Architecture

DARPA-BAA-14-03

March 11, 2014



Defense Advanced Research Projects Agency

Information Innovation Office

675 North Randolph Street

Arlington, VA 22203-2114

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PART I: OVERVIEW

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Information Innovation Office (I2O)
- **Funding Opportunity Title:** Cyber Grand Challenge (CGC): Competition Architecture
- **Announcement Type:** Initial Announcement
- **Funding Opportunity Number:** DARPA-BAA-14-03
- **Catalog of Federal Domestic Assistance Numbers (CFDA):** Not Applicable
- **Dates**
 - Posting Date: March 11, 2014
 - Proposal Due Date: April 25, 2014, 12:00 noon (ET)
 - Proposers' Day: Proposers' Day was announced via Special Notice (DARPA-SN-14-20) and held on February 18, 2014.
- **Anticipated Individual Awards:** The below table describes DARPA's expectations for individual awards under this solicitation.

Technical Area	Number of Awards	Approximate Award Amount	Award Type
TA1 Challenge Sets	Multiple	\$500,000 - \$2,000,000	Firm-Fixed-Price (FFP) procurement contract
TA2 Integrity Development	Single	\$1,000,000	Procurement contract or other transaction (OT)

- **Technical POC:** Michael Walker, Program Manager, DARPA/I2O
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- **BAA Mailing Address:**
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675 North Randolph Street
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- **Cyber Grand Challenge Website:** <http://www.darpa.mil/cybergrandchallenge>

PART II: FULL TEXT OF ANNOUNCEMENT

1. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency (DARPA) will host the Cyber Grand Challenge (CGC), an unmanned cyber defense tournament.¹ Innovative approaches are required to support the development and operation of a Competition Framework for automated cybersecurity competition events within the CGC. In support of this framework, DARPA is soliciting innovative proposals in the following technical areas—Challenge Set Development and Integrity Development. These efforts will enable DARPA to test and evaluate fully automated systems that perform software security reasoning and analysis. Proposed research and development (R&D) should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

This broad agency announcement (BAA) is being issued, and any resultant selection will be made, using procedures under Federal Acquisition Regulation (FAR) 35.016. Any negotiations and/or awards will use procedures under FAR 15.4. Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process. DARPA BAAs are posted on the Federal Business Opportunities (FBO) website (<http://www.fbo.gov/>).

1.1. Purpose

Top computer security experts test their skill head-to-head in competitive “Capture the Flag” contests. These contests provide a competition rating for the ability of experts to locate and comprehend security weaknesses.

The DARPA CGC will utilize a series of competition events to test the abilities of a new generation of fully automated cyber defense systems. During a final competition event, automated Cyber Reasoning Systems will compete against each other in real time. This event will be held in a public setting and documented for research purposes.

The CGC seeks to engender a new generation of autonomous cyber defense capabilities that combine the speed and scale of automation with reasoning abilities exceeding those of human experts.

1.2. Overview

The Department of Defense (DoD) maintains information systems using a software technology base comprised of Commercial Off The Shelf (COTS) operating systems and applications. This COTS technology base is common to the DoD, industry, and the Defense Industrial Base, and the continual discovery of potential vulnerabilities in this software base has led to a constant

¹ See the CGC Rules document at www.darpa.mil/cybergrandchallenge for a detailed description of the CGC.

cycle of intrusion, compromise discovery, patch formulation, patch deployment and recovery. This defensive cycle is currently performed by highly trained software analysts; it is the role of these analysts to reason about the function of software, identify novel threats and remove them. Manual analysis of code and threats is an artisan process, often requiring skilled analysts to spend weeks or months analyzing a problem. The size of the technology base also contributes to the difficulty of manually discovering vulnerabilities.

At the present time, automated program analysis capabilities are able to assist the work of human software analysts. These automation technologies include Dynamic Analysis, Static Analysis, Symbolic Execution, Constraint Solving, Data Flow Tracking, Fuzz Testing, and a multitude of related technologies. In the Cyber Grand Challenge, a competitor will improve and combine these semi-automated technologies into an unmanned Cyber Reasoning System (CRS) that can autonomously reason about novel program flaws, prove the existence of flaws in networked applications, and formulate effective defenses. The performance of these automated systems will be evaluated through head-to-head tournament style competition.

The CGC program will draw widespread attention to the technology issues associated with autonomous software comprehension and motivate entrants to overcome technical challenges to realize truly effective autonomous cyber defense. This program will challenge the most capable and innovative companies, institutions, and entrepreneurs to produce breakthroughs in capability and performance.

1.3. Objectives

Currently, network Intrusion Detection Systems, software security patches, and vulnerability scanners are all forms of *signature based defense*: defensive systems which act on discrete quanta of human knowledge (“signatures”). Human analysts develop these signatures through a process of reasoning about software. In fully autonomous defense, a cyber system capable of reasoning about software will create its own knowledge, autonomously emitting and using knowledge quanta such as vulnerability scanner signatures, intrusion detection signatures, and security patches.

The objective of the CGC program is to identify effective, integrated automation of cyber reasoning tasks. This objective will be accomplished through competitions held on a closed, monitored network (“Competition Framework”) constructed by a Competition Framework Team. To support the framework and the competition events, this Competition Architecture BAA is soliciting innovative proposals in the following Technical Areas (TAs):

- TA1 – Challenge Sets
- TA2 – Integrity Development

1.4. Structure

The program consists of two phases which will align with the competitions referenced above: a 12-month CGC Qualification Event (CQE) Phase, and a 13-month CGC Final Event (CFE) Phase. DARPA anticipates multiple awards for TA1 and a single award for TA2. DARPA anticipates an

award for TA2 consistent with a level of effort of up to three FTE. Proposers may submit to both technical areas; however, separate proposals must be submitted for each technical area.

All awards under this BAA will include the CGC non-disclosure agreement (NDA) provided as Attachment 1. This agreement will apply to all members of an awardee team (prime, subcontractor, consultant). Refusal to sign the CGC NDA constitutes ineligibility within the CGC program. See Section 2.2 for further information.

Technical Area 1 (TA1): Challenge Sets

To challenge CGC teams², TA1 performers will develop and deliver Challenge Sets (CS) as described below. The CGC will involve securing a corpus of over 100 Challenge Sets in each phase. There is no limit to the number of Challenge Sets that may be *proposed*; however, DARPA reserves the right to negotiate the number *awarded*.

Each CS is comprised of the four following components:

- 1 Challenge Binary (CB)

Challenge Binaries (CBs) are network services that accept remote network connections, perform processing on network-supplied data, and interact with remote hosts over network connections. CBs will be used as analysis challenges within the CGC program; CGC teams will develop technology that will attempt to locate and mitigate flaws in CBs. Each CB will be implemented as a network service which performs some task to be determined by TA1 performers; examples include (but are not limited to) *file transfer, remote procedure call, remote login, p2p networking*. While CB tasks should mirror real world tasks, the use of real world protocols is disallowed (i.e., will cause the proposal to be removed from consideration). CBs may contain methods of operation which mirror challenging cases in real world network defense: dynamic network resource allocation, high integrity execution, dynamic execution, etc. Each CB will contain at least one security flaw hidden in the program by that TA1 performer and reachable via network input. Flaws should focus on traditional memory corruption flaw types; additional information on flaw types is available in Section 8.3.

- 1 patched Challenge Binary

The patched CB delivered in each Challenge Set will function identically to the CB but will not contain known, hidden flaws.

- 1 or more* Vulnerability Scanner network module

A Vulnerability Scanner (VS) module must emit an input that activates and proves the existence of a hidden flaw in each CB. *A VS module will be delivered for each hidden CB

² "CGC team" refers to the Proposal Track and Open Track teams competing in the CQE and CFE, as described in the CGC Rules.

flaw.

- 1 Challenge Testing network module

The Challenge Testing (CT) network module will implement a functionality test suite to detect whether the function or performance of the corresponding CB has been damaged. A successfully patched CB will cause the corresponding Challenge Testing module to report no errors. CT modules should generate repeatable queries when provided with a random seed value; queries generated by different seed values should be highly diverse. Over a large number of randomly seeded network tests, CT modules should be capable of covering a majority of expressed CB code. Code coverage invoked by CT module testing will enable computation based on data held by the CB.

Superior approaches will demonstrate knowledge of the problems involved in creating challenge software for the purpose of cybersecurity competition (e.g., binaries of excessive difficulty prevent any competitor from making progress, while binaries of limited difficulty prevent meaningful measurement). Strong proposals will demonstrate knowledge of the current limits of automated cyber reasoning in terms of program complexity and flaw discovery difficulty; this knowledge is essential in order to create a collection of CBs that spans a difficulty range from challenging to beyond state-of-the-art. The task of creating novel hidden software flaws to challenge the leading edge of program analysis poses significant technology risk. Proposers are expected to articulate a plan to overcome this risk with a representative corpus of Challenge Sets. Strong proposals will enumerate a history of known software flaws that represent interesting analysis challenges, mapped to specific CWE categories that will be represented within the proposer CS portfolio.

A key goal of the CGC program is the release of CQE and CFE event recordings into the public domain. To facilitate this, TA1 proposers are strongly encouraged to assert intellectual property rights that are aligned with this goal. See Sections 1.5 and 6.2.1 for further information.

Deliverables Format

Each CB will be written as a C program and will be compiled on a POSIX-style operating system with a compiler to be determined by DARPA. TA1 performers will be furnished with the compiler and build environment information upon award. Challenge Testing and Vulnerability Scanner modules will conform to and make use of an interface to be articulated by DARPA.

Deliverables Schedule

TA1 awards under this BAA will be Firm-Fixed-Price procurement contracts with payments in each phase to be based on the deliverables outlined herein. Payments will be made when those deliverables are deemed acceptable by DARPA. Therefore, proposers should not expect to be paid any sooner than monthly and should take this into account when planning their schedule.

- Integration Milestone

The initial deliverable within the TA1 Firm-Fixed-Price award structure is an API integration plan that describes how CT and VS modules will be built to interact with DARPA's Competition Framework interface. A single Integration Milestone will be delivered as the first delivery of the CQE phase, and for performers that continue to CFE phase, a single Integration Milestone will be delivered as the first delivery of CFE phase. Each Integration Milestone has a deliverable value up to \$15,000 and is separate from the delivery of Challenge Sets.

- Challenge Set Delivery

TA1 CS delivery will proceed during both program phases. Performers will deliver Challenge Sets for evaluation on a monthly basis within each phase (see the Period of Performance section below). Each CS delivered and deemed acceptable has a deliverable value of up to \$15,000.

Evaluation Criteria for Deliverables

Each delivery of a Challenge Set will receive two independent evaluations. The first evaluation will establish acceptability. Challenge Sets may not be accepted if they fail to meet any of the following criteria:

- Binary Complexity: CBs must be of sufficient complexity; CBs that allow for simple, fully automated testing of all possible inputs will not be accepted.
- Coverage: Code coverage tracing of the Challenge Testing module must demonstrate majority coverage and deep functional usage of the corresponding CB.
- Testability: Each Vulnerability Scanner module must be able to reliably prove the existence of a security flaw in the corresponding CB.
- Code Re-use: DARPA prohibits the re-use of any pre-existing code in the construction of CBs, as well as internal code re-use between CBs. DARPA will approve on a case-by-case basis the re-use of utility functions whose prototypes are derived from the standard C library (libc)³.

The second independent evaluation will occur after final scoring for the CQE teams⁴ has been established; this evaluation may affect a TA1 performer's continuation into the CFE phase. CS deliveries will be evaluated for their ability to *differentiate competitors*. A Challenge Set that is solved by no competitors will receive a minimal score; a CS that is solved by all competitors will also receive a minimal score. Sets that are able to differentiate CQE competitors in a unique way will receive high marks. TA1 proposers should strive to design CBs that will provide DARPA with maximum insight into the competitive ability of CGC teams.

Deliverables Manifest

³ http://en.wikipedia.org/wiki/C_standard_library

⁴ "CQE team" refers to the Proposal Track and Open Track teams competing in the CQE, as described in the CGC Rules.

Each CS delivery will contain all of the following components:

- All source code and additional files required to build the CS using the DARPA-provided build environment.
- Reference CBs (patched and unpatched).
- A CT module and at least one VS module.
- A brief text document describing the type of flaw, its CWE category, known software flaws that mirror the challenges represented by the CS, and a description of the data flow required to prove the existence of the flaw.

Period of Performance

Proposals for TA1 should address both program phases and be structured with the CQE Phase as a base and the CFE Phase as an option. TA1 performers will progress to the CFE Phase at DARPA's sole discretion. DARPA's determination on which performers will progress to the CFE Phase will be based on factors such as the availability of funds and CQE Phase performance.

Meetings and Travel

TA1 performers will participate in select Principal Investigator (PI) meetings. The first such meeting will occur mid-CQE Phase near DARPA headquarters, and the second will occur at the beginning of CFE Phase near Monterey, California. Proposals should include travel costs.

Technical Area 2 (TA2): Integrity Development (ID)

Maintaining competition integrity within the CQE and CFE requires the development of novel techniques to detect human interference and other forms of malfeasance in a fully automated competition.

Superior proposals will demonstrate the capacity to think adversarially about software and systems under development, as well as anticipate novel attacks against cybersecurity competitions. Developing novel, revolutionary techniques to differentiate automated reasoning from human reasoning involves significant technology and research risk. Proposers will be expected to address this risk by detailing a technology development plan to develop and test these protections.

Research under TA2 will lead to the development of a series of competition controls and sensors designed to detect attacks against competition integrity. The structure, function, and methodology of this development will fall under the disclosure terms of the CGC Architecture NDA.

DARPA encourages the naming of key personnel who have demonstrated expertise in automated program analysis and a history of adversarial thinking.

Deliverables Manifest

The TA2 performer (ID Team) will deliver:

- Three Integrity Monitoring Reports, in support of three CGC events: CQE, CFE Trials, and CFE.
- Quarterly, all code developed in support of the CGC Program, accompanied by a technical report describing the code delivery.

Period of Performance

As the ID Team will be expected to support DARPA through the life of the CGC Program, proposals should address both program phases.

Meetings and Travel

The ID Team will attend quarterly PI meetings. There will be 4 PI meetings in each phase. PI meetings are anticipated to alternate locations starting with a location near DARPA and alternating with a location near Monterey, California.

Representatives from the ID Team will travel with and advise DARPA during a series of up to 16 post-CQE Site Visits.⁵ The number of site visits is expected to be highly variable; DARPA encourages these visits to be proposed as options.

During the CQE, the ID Team will provide continuous support during one week of scoring evaluation and act as trusted advisors until the CQE is officially scored.

The ID Team will support the CGC Final Event (CFE), staffing the CFE for one preparatory week and one event week. During CFE, the ID Team will monitor the findings of the integrity mechanisms and sensors developed under TA2. The ID Team will provide full time support during CFE event week, and will act as trusted advisors until the CFE is officially scored.

⁵ See the CGC Rules for a description of the Site Visits.

2. AWARD INFORMATION

2.1. Awards

Multiple awards are anticipated. The level of funding for individual awards made under this solicitation has not been predetermined except where annotated and will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers whose proposals are determined to be the most advantageous and provide the best value to the Government, all factors considered, including the potential contributions of the proposed work, overall funding strategy, and availability of funding. See Section 5 for further information.

The Government reserves the right to:

- select for negotiation all, some, one, or none of the proposals received in response to this solicitation;
- make awards without discussions with proposers;
- conduct discussions with proposers if it is later determined to be necessary;
- segregate portions of resulting awards into pre-priced options;
- accept proposals in their entirety or to select only portions of proposals for award;
- fund proposals in increments with options for continued work at the end of one or more phases;
- request additional documentation once the award instrument has been determined (e.g., representations and certifications); and,
- remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

Proposals selected for award negotiation may result in a procurement contract or other transaction (OT) depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. In all cases, the Government contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument terms and conditions with selectees. Proposers are advised that, if they propose grants or cooperative agreements, the Government contracting officer may select other award instruments, as appropriate. Publication or other restrictions will be applied, as necessary, if DARPA determines that the research resulting from the proposed effort will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program. For more information on publication restrictions, see Section 2.2.

2.2. Fundamental Research

The CGC non-disclosure agreement restricts the publication of research conducted under the CGC until the conclusion of the CGC, after which this restriction may be lifted depending upon the nature of the research. This restriction during the CGC applies to all types of research including fundamental research. The reason for this restriction is competition integrity; to

conduct a high-integrity, automated analysis challenge, the software provided for analysis and the mechanisms developed to detect competition malfeasance cannot be released through publication or other means of communication. The release of this research prior to the conclusion of CGC could threaten DARPA's ability to conduct a meaningful competition.

The following applies to the release of research information after the conclusion of the CGC. It is Department of Defense (DoD) policy that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. National Security Decision Directive (NSDD) 189 established the national policy for controlling the flow of scientific, technical, and engineering information produced in federally funded fundamental research at colleges, universities, and laboratories. NSDD 189 defines fundamental research as follows:

'Fundamental research' means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

As of the date of publication of this BAA, the Government expects that program goals as described herein either cannot be met by proposers intending to perform fundamental research or else the proposed research is anticipated to present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Therefore, the Government anticipates restrictions on the resultant research that will require the contractor to seek DARPA permission before publishing any information or results relative to the program. Notwithstanding this statement of expectation, the Government recognizes that proposed research solutions could be of a fundamental nature.

Proposers should indicate in their proposal whether they believe the scope of the proposed research is fundamental. For certain research projects, it may be possible that although the research to be performed by the prime is non-fundamental, a subcontractor's tasks may be considered fundamental research. In those cases, it is the prime proposer's responsibility to explain in their proposal why its subcontractor's effort is fundamental research. While proposers should clearly explain the intended results of their research, DARPA shall have sole discretion to determine whether the project is considered fundamental research. Awards for non-fundamental research will include the following statement or similar provision:

There shall be no dissemination or publication, except within and between the contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of DARPA's Public Release Center (DARPA/PRC). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the contractor. With regard to subcontractor proposals for Contracted Fundamental Research, papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 dated October 6, 1987.

When submitting material for written approval for open publication, the contractor/awardee must submit a request for public release to the PRC and include the following information: 1) Document Information: title, author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and type (e.g., briefing, report, abstract, article, or paper); 2) Event Information: type (e.g., conference, principal investigator meeting, article or paper), date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor/Awardee's Information: POC name, e-mail address and phone number. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests may be sent either to prc@darpa.mil or 675 North Randolph Street, Arlington VA 22203-2114, telephone (571) 218-4235. See http://www.darpa.mil/NewsEvents/Public_Release_Center/Public_Release_Center.aspx for further information about DARPA's public release process.

3. ELIGIBILITY INFORMATION

3.1. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA.

3.1.1. Federally Funded Research and Development Centers (FFRDCs) and Government Entities

FFRDCs and Government entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations and cannot propose to this solicitation in any capacity unless the following conditions are met.

- FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector and must provide a letter on official letterhead from their sponsoring organization citing the specific authority establishing the FFRDC's eligibility to propose to Government solicitations and compete with industry, and compliance with the terms and conditions in the associated FFRDC sponsor agreement. This information is required for FFRDCs proposing as either prime contractors or subcontractors.
- Government entities must clearly demonstrate that the proposed work is not otherwise available from the private sector and provide documentation citing the specific statutory authority (and contractual authority, if relevant) establishing their eligibility to propose to Government solicitations.

At the present time, DARPA does not consider 15 USC § 3710a to be sufficient legal authority to show eligibility. For some entities, 10 USC § 2539b may be the appropriate statutory starting point however, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility.

DARPA will consider eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

3.1.2. Foreign Participation

Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances.

3.2. Procurement Integrity, Standards of Conduct, Ethical Considerations and Organizational Conflicts of Interest (COIs)

Current Federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC §§ 203, 205, and 208). Prior to the start of proposal evaluation, the Government will assess potential COIs and will

promptly notify the proposer if any appear to exist. The Government assessment does not affect, offset, or mitigate the proposer's responsibility to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.

In accordance with FAR 9.5 and without prior approval or a waiver from the DARPA Director, a contractor cannot simultaneously provide scientific, engineering, and technical assistance (SETA) or similar support and be a technical performer. As part of the proposal submission, all members of a proposed team (prime proposers, proposed subcontractors and consultants) must affirm whether they (individuals and organizations) are providing SETA or similar support to any DARPA technical office(s) through an active contract or subcontract. Affirmations must state which office(s) the proposer and/or proposed subcontractor/consultant supports and must provide prime contract number(s). All facts relevant to the existence or potential existence of organizational COIs must be disclosed. The disclosure shall include a description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. If, in the sole opinion of the Government after full consideration of the circumstances, a proposal fails to fully disclose potential conflicts of interest and/or any identified conflict situation cannot be effectively mitigated, the proposal will be rejected without technical evaluation and withdrawn from further consideration for award.

If a prospective proposer believes a COI exists or may exist (whether organizational or otherwise) or has a question as to what constitutes a conflict, a summary of the potential conflict should be sent to CGC-ArchitectureBAA@darpa.mil before preparing a proposal and mitigation plan.

3.3. Cost Sharing/Matching

Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., OTs under the authority of 10 USC § 2371).

3.4. Other Eligibility Requirements

3.4.1. CGC Non-disclosure Agreement

As stated earlier, all awards under this BAA will include the CGC NDA provided as Attachment 1. This agreement will apply to all members of an awardee team (prime, subcontractor, consultant). Refusal to sign the CGC NDA constitutes ineligibility within the CGC program.

3.4.2. Ability to Receive Multiple Awards - Conflicts of Interest

Due to the implicit conflict of interest involved in both architecting and competing in the CGC, no individual or entity may compete in CGC events and also take part in building the competition. As a result:

- No entity which receives an award under DARPA-BAA-14-03, whether as a prime, subcontractor, or in any other capacity from an organizational to individual level may compete in CGC events.

- No individual or entity who competes in a CGC event will receive an award to TA1 or TA2.
- No entity, whether as a prime, subcontractor, or in any other capacity from an organizational to individual level, which receives an award under DARPA-BAA-14-05 will receive an award in any technical area under DARPA-BAA-14-03. In the event that a proposer submits an otherwise selectable proposal to both DARPA-BAA-14-05 and DARPA-BAA-14-03, the decision as to which proposal to consider for award is at the discretion of the Government.

4. APPLICATION AND SUBMISSION INFORMATION

4.1. Address to Request Application Package

This document contains all information required to submit a response to this solicitation. No additional forms, kits, or other materials are needed except as referenced herein. No request for proposal (RFP) or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the Federal Business Opportunities website (<http://www.fbo.gov>) or referenced herein.

4.2. Content and Form of Application Submission

4.2.1. Proposals

Proposals consist of Volume 1: Technical and Management Proposal (including mandatory Appendix A and optional Appendix B) and Volume 2: Cost Proposal.

All pages shall be formatted for printing on 8-1/2 by 11-inch paper with a font size not smaller than 12 point. Font sizes of 8 or 10 point may be used for figures, tables, and charts. Document files must be in .pdf, .odx, .doc, .docx, .xls, or .xlsx formats. Submissions must be written in English.

Proposals not meeting the format prescribed herein may not be reviewed. Nonconforming proposals may be rejected without review. A proposal checklist is provided in Section 8.4.

4.2.1.1. Volume 1: Technical and Management Proposal

The maximum page count for Volume 1 is 15 pages, including all figures, tables and charts but not including the cover sheet, table of contents or appendices.

A submission letter is optional and is not included in the page count. Appendix A does not count against the page limit and is mandatory. Appendix B does not count against the page limit and is optional. Additional information not explicitly called for here must not be submitted with the proposal, but may be included as links in the bibliography in Appendix B. Such materials will be considered for the reviewers' convenience only and not evaluated as part of the proposal.

Volume 1 must include the following components:

4.2.1.1.1. Cover Sheet: Include the following information.

- Label: "Proposal: Volume 1"
- BAA number (DARPA-BAA-14-03)
- Technical Area
- Proposal title
- Lead organization (prime contractor) name
- Type of business, selected from the following categories: Large Business, Small Disadvantaged Business, Other Small Business, HBCU, MI, Other Educational, or

Other Nonprofit

- Technical point of contact (POC) including name, mailing address, telephone, and email
- Administrative POC including name, mailing address, telephone number, and email address
- Award instrument requested: procurement contract (specify type) or OT.⁶
- Place(s) and period(s) of performance
- Other team member (subcontractors and consultants) information (for each, include Technical POC name, organization, type of business, mailing address, telephone number, and email address)
- Proposal validity period (minimum 120 days)
- Data Universal Numbering System (DUNS) number⁷
- Taxpayer identification number⁸
- Commercial and Government Entity (CAGE) code⁹
- Proposer's reference number (if any)

4.2.1.1.2. Table of Contents

4.2.1.1.3. Executive Summary: (TA2 proposals only) Provide a synopsis of the proposed project, including answers to the following questions:

- What is the proposed work attempting to accomplish or do?
- How is it done today, and what are the limitations?

The executive summary should include a description of the key technical challenges, a concise review of the technologies proposed to overcome these challenges and achieve the project's goal, and a clear statement of the novelty and uniqueness of the proposed work.

4.2.1.1.4. Goals and Impact: (TA2 proposals only) Describe what the proposed team is trying to achieve and the difference it will make (qualitatively and quantitatively) if successful. Describe the innovative aspects of the project in the context of existing capabilities and approaches, clearly delineating the uniqueness and benefits of this project in the context of the state of the art, alternative approaches, and other projects from the past and present. Describe how the proposed project is revolutionary and how it significantly rises above the current state of the art.

⁶ Information on award instruments can be found at http://www.darpa.mil/Opportunities/Contract_Management/Contract_Management.aspx.

⁷ The DUNS number is used as the Government's contractor identification code for all procurement-related activities. Go to <http://fedgov.dnb.com/webform/index.jsp> to request a DUNS number (may take at least one business day). See Section 6.2.8. for further information.

⁸ See <http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html> for information on requesting a TIN. Note, requests may take from 1 business day to 1 month depending on the method (online, fax, mail).

⁹ The CAGE Code is an identification number used within the Government to support a variety of systems. See Section 6.2.8. for further information.

Describe the deliverables associated with the proposed project and any plans to commercialize the technology, transition it to a customer, or further the work. Discuss the mitigation of any issues related to sustainment of the technology over its entire lifecycle, assuming the technology transition plan is successful.

4.2.1.1.5. Technical Plan: Outline and address technical challenges inherent in the approach and possible solutions for overcoming potential problems. Demonstrate a deep understanding of the technical challenges and present a credible (even if risky) plan to achieve the project's goal. Discuss mitigation of technical risk. Provide appropriate measurable milestones (quantitative if possible) at intermediate stages of the project to demonstrate progress, and a plan for achieving the milestones.

4.2.1.1.6. Management Plan: Provide a summary of expertise of the proposed team, including any subcontractors/consultants and key personnel who will be executing the work. Resumes count against the proposal page count so proposers may wish to include them as links in Appendix B below. Identify a Principal Investigator (PI) for the project. Provide a clear description of the team's organization including an organization chart that includes, as applicable, the relationship of team members; unique capabilities of team members; task responsibilities of team members; teaming strategy among the team members; and key personnel with the amount of effort to be expended by each person during the project. Provide a detailed plan for coordination including explicit guidelines for interaction among collaborators/subcontractors of the proposed project. Include risk management approaches. Describe any formal teaming agreements that are required to execute this project. List Government-furnished materials or data assumed to be available.

4.2.1.1.6.1 Personnel, Qualifications, and Commitments: List key personnel (no more than one page per person), showing a concise summary of their qualifications, discussion of previous accomplishments, and work in this or related areas. Indicate the level of effort in terms of hours to be expended by each person during each contract year and other (current and proposed) major sources of support for them and/or commitments of their efforts. DARPA expects all key personnel associated with a proposal to make substantial time commitment to the proposed activity and the proposal will be evaluated accordingly. It is DARPA's intention to put key personnel conditions into the awards, so proposers should not propose personnel that are not anticipated to execute the award.

Include a table of key individual time commitments as follows:

Key Individual	Project	Status (Current, Pending, Proposed)	2014	2015	2016
Individual Name 1	CGC	Proposed	xx hours	xx hours	xx hours
	Project Name 1	Current	xx hours	n/a	n/a
	Project Name 2	Pending	xx hours	n/a	n/a
Individual Name 2	CGC	Proposed	n/a	xx hours	xx hours

4.2.1.1.7. Capabilities: Describe organizational experience in relevant subject area(s), existing intellectual property and specialized facilities. Discuss any work in closely related research areas and previous accomplishments.

4.2.1.1.8. Statement of Work (SOW): The SOW must provide a detailed task breakdown, citing specific tasks and their connection to the interim milestones and metrics, as applicable. Each year of the project should be separately defined. The SOW must not include proprietary information. For each defined task/subtask, provide:

- A general description of the objective.
- A detailed description of the approach to be taken to accomplish each defined task/subtask.
- Identification of the primary organization responsible for task execution (prime contractor, subcontractor(s), consultant(s)), by name.
- A measurable milestone, i.e., a deliverable, demonstration, or other event/activity that marks task completion.
- A definition of all deliverables (e.g., data, reports, software) to be provided to the Government in support of the proposed tasks/subtasks.

4.2.1.1.9. Schedule and Milestones: Provide a detailed schedule showing tasks (task name, duration, work breakdown structure element as applicable, performing organization), milestones, and the interrelationships among tasks. The task structure must be consistent with that in the SOW. Measurable milestones should be clearly articulated and defined in time relative to the start of project.

4.2.1.1.10. Cost Summary: Provide the cost summary as described in Section 4.2.1.2.

4.2.1.1.11. Appendix A: This section is mandatory and must include all of the following components. If a particular subsection is not applicable, state “NONE.”

4.2.1.1.11.1. Team Member Identification: Provide a list of all team members

(prime, subcontractor(s), and consultant(s). Identify specifically whether any are a non-US organization or individual, FFRDC and/or Government entity. Use the following format for this list:

Individual Name	Role (Prime, Subcontractor or Consultant)	Organization	Non-US?		FFRDC or Govt?
			Org.	Ind.	

4.2.1.1.11.2. Government or FFRDC Team Member Proof of Eligibility to

Propose: If none of the team member organizations (prime or subcontractor) are a Government entity or FFRDC, state “NONE.”

If any of the team member organizations are a Government entity or FFRDC, provide documentation (per Section 3.1.1) citing the specific authority that establishes the applicable team member’s eligibility to propose to Government solicitations to include: 1) statutory authority; 2) contractual authority; 3) supporting regulatory guidance; and 4) evidence of agency approval for applicable team member participation.

4.2.1.1.11.3. Government or FFRDC Team Member Statement of Unique

Capability: If none of the team member organizations (prime or subcontractor) are a Government entity or FFRDC, state “NONE.”

If any of the team member organizations are a Government entity or FFRDC, provide a statement (per Section 3.1.1) that demonstrates the work to be performed by the Government entity or FFRDC team member is not otherwise available from the private sector.

4.2.1.1.11.4. Organizational Conflict of Interest Affirmations and Disclosure:

If none of the proposed team members is currently providing SETA or similar support as described in Section 3.2, state “NONE.”

If any of the proposed team members (individual or organization) is currently performing SETA or similar support, furnish the following information:

Prime Contract Number	DARPA Technical Office supported	A description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate the conflict

4.2.1.1.11.5. Intellectual Property (IP): If no IP restrictions are intended, state “NONE.” The Government will assume unlimited rights to all IP not explicitly identified as restricted in the proposal.

For all technical data or computer software that will be furnished to the Government with other than unlimited rights, provide (per Section 6.2.1) a list describing all proprietary claims to results, prototypes, deliverables or systems supporting and/or necessary for the use of the research, results, prototypes and/or deliverables. Provide documentation proving ownership or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) to be used for the proposed project. The following format should be used for these lists:

NONCOMMERCIAL				
Technical Data and/or Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(List)	(Narrative)	(List)	(List)	(List)
(List)	(Narrative)	(List)	(List)	(List)

COMMERCIAL				
Technical Data and/or Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(List)	(Narrative)	(List)	(List)	(List)
(List)	(Narrative)	(List)	(List)	(List)

4.2.1.1.11.6. Human Subjects Research (HSR): If HSR is not a factor in the proposal, state “NONE.”

If the proposed work will involve human subjects, provide evidence of or a plan for review by an institutional review board (IRB). For further information on this subject, see Section 6.2.2.

4.2.1.1.11.7. Animal Use: If animal use is not a factor in the proposal, state “NONE.”

If the proposed research will involve animal use, provide a brief description of the plan for Institutional Animal Care and Use Committee (IACUC) review and approval. For further information on this subject, see Section 6.2.3.

4.2.1.1.11.8. Representations Regarding Unpaid Delinquent Tax Liability or a Felony Conviction under Any Federal Law: Per Section 6.2.11, complete the following statements.

(a) The proposer represents that it is [] is not [] a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

(b) The proposer represents that it is [] is not [] a corporation that was convicted of a felony criminal violation under Federal law within the preceding 24 months.

4.2.1.1.11.9. Cost Accounting Standards (CAS) Notices and Certification: Per Section 6.2.12, any proposer who submits a proposal which, if accepted, will result in a CAS-compliant contract, must include a Disclosure Statement as required by 48 CFR 9903.202. The disclosure forms may be found at http://www.whitehouse.gov/omb/procurement_casb.

If this section is not applicable, state “NONE.”

4.2.1.1.11.10. Subcontractor Plan: Pursuant to Section 8(d) of the Small Business Act (15 USC § 637(d)), it is Government policy to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to organizations performing work as prime contractors or subcontractors under Government contracts, and to ensure that prime contractors and subcontractors carry out this policy. If applicable, prepare a subcontractor plan in accordance with FAR 19.702(a) (1) and (2). The plan format is outlined in FAR 19.704.

If this section is not applicable, state “NONE.”

4.2.1.1.12. Appendix B: If desired, include a brief bibliography with links to relevant papers, reports, or resumes. Do not include technical papers. This section is optional, and the linked materials will not be evaluated as part of the proposal review.

4.2.1.2. Volume 2 - Cost Proposal

This volume is mandatory and must include all the listed components. No page limit is specified for this volume.

The cost proposal should include a spreadsheet file (.xls or equivalent format) that provides formula traceability among all components of the cost proposal. The spreadsheet file must be included as a separate component of the full proposal package. Costs must be traceable between the prime and subcontractors/consultants, as well as between the cost proposal and the SOW.

Pre-award costs will not be reimbursed unless a pre-award cost agreement is negotiated prior to award.

4.2.1.2.1. Cover Sheet: Include the same information as the cover sheet for Volume 1, but with the label “Proposal: Volume 2.”

4.2.1.2.2. Cost Summary: Provide a single-page summary broken down by phase (CQE and CFE) listing cost totals for labor, materials, other direct charges (ODCs), indirect costs (overhead, fringe, general and administrative (G&A)), and any proposed profit/fee for the project. Include costs for each task in each phase of the project by prime and major subcontractors, total cost and proposed cost share, if applicable.

4.2.1.2.3. Detailed Cost Information: For each task, provide the following cost details in quarterly increments (3 months). Include supporting documentation describing the method used to estimate costs. Identify any cost sharing.

Proposers seeking a procurement contract award of \$700,000 or greater must provide “certified cost or pricing data” (as defined in FAR 2.101) unless an exception applies (see FAR 15.403.). Certified cost or pricing data is not required if requesting an OT.

4.2.1.2.3.1. Direct Labor: Provide labor categories, rates and hours. Justify rates by providing examples of equivalent rates for equivalent talent, past commercial or Government rates or Defense Contract Audit Agency approved rates.

4.2.1.2.3.2. Indirect Costs: Identify all indirect cost rates (such as fringe benefits, labor overhead, material overhead, G&A, etc.) and the basis for each.

4.2.1.2.3.3. Materials: Provide an itemized list of all proposed materials, equipment, and supplies for each year including quantities, unit prices, proposed vendors (if known), and the basis of estimate (e.g., quotes, prior purchases, catalog price lists, etc.). For proposed equipment/information technology (as defined in FAR 2.101) purchases equal to or greater than \$50,000, include a letter justifying the purchase. Include any requests for Government-furnished equipment or information with cost estimates (if applicable) and delivery dates.

4.2.1.2.3.4. Travel: Provide a breakout of travel costs including the purpose and number of trips, origin and destination(s), duration, and travelers per trip.

4.2.1.2.3.5. Subcontractor/Consultant Costs: Provide above info for each proposed subcontractor/consultant. Subcontractor cost proposals must include interdivisional work transfer agreements or similar arrangements.

4.2.1.2.3.6. ODCs: Provide an itemized breakout and explanation of all other anticipated direct costs.

4.2.1.2.3.7. Other Transactions: Proposers requesting award of an 845 Other Transaction for Prototypes (845 OT) agreement must indicate whether they qualify as a nontraditional Defense contractor¹⁰, have teamed with a nontraditional Defense contractor, or are providing a one-third cost share for this effort. Provide information to support the claims.

4.2.1.2.4. Subcontractor/Consultant Cost Proposals: The proposer is responsible for the compilation and submission of all subcontractor/consultant cost proposals. Proposal submissions will not be considered complete until the Government has received all subcontractor/consultant cost proposals.

Proprietary subcontractor/consultant cost proposals may be included as part of Volume 2 or emailed separately to CGC-ArchitectureBAA@darpa.mil (not uploaded to the submission site). Email messages must include "Subcontractor Cost Proposal" in the subject line and identify the principal investigator, prime proposer organization and proposal title in the body of the message.

4.2.2. Proprietary and Classified Information

DARPA policy is to treat all submissions as source selection information (see FAR 2.101 and 3.104) and to disclose the contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements.

4.2.2.1. Proprietary Information

Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such information clearly marked. Proprietary information must not be included in the proposed schedule, milestones, or SOW.

4.2.2.2. Classified Information

Because the CGC program emphasizes the idea of creating and leveraging open source technology, classified submissions (classified technical proposals or classified appendices to unclassified proposals) will not be accepted under this solicitation.

4.3. Submission Dates and Times

Proposers are warned that submission deadlines as outlined herein are strictly enforced. DARPA will acknowledge receipt of complete submissions via email and assign control numbers

¹⁰ For definitions and information on 845 OT agreements see http://www.darpa.mil/Opportunities/Contract_Management/Other_Transactions_and_Technology_Investment_Agreements.aspx and "Other Transactions (OT) Guide For Prototype Projects," dated January 2001 (as amended) at <http://www.acq.osd.mil/dpap/Docs/otguide.doc>.

that should be used in all further correspondence regarding submissions. Note: these acknowledgements will not be sent until after the due date(s) as outlined herein.

Failure to comply with the submission procedures outlined herein may result in the submission not being evaluated.

The proposal package--full proposal (Volume 1 and 2) and, as applicable, encryption password, proprietary subcontractor cost proposals, classified appendices to unclassified proposals--must be submitted per the instructions outlined herein and received by DARPA no later than **April 25, 2014 at 1200 noon (ET)**. Submissions received after this time will not be reviewed.

4.4. Funding Restrictions

Not applicable.

4.5. Other Submission Requirements

Proposers must submit all parts of their submission package using the same method; submissions cannot be sent in part by one method and in part by another method nor should duplicate submissions be sent by multiple methods. Email submissions will not be accepted.

4.5.1. Unclassified Submission Instructions

DARPA/I2O will employ an electronic web-based upload submission system for UNCLASSIFIED proposals under this solicitation. For each proposal submission, proposers must complete an online cover sheet in the DARPA/I2O Solicitation Submission System (<https://www.i2osupport.csc.com/baa/index.asp>). Upon completion of the online cover sheet, a confirmation screen will appear which includes instructions on uploading the proposal.

If a proposer intends to submit more than one proposal, a unique user ID and password **MUST** be used in creating each cover sheet or subsequent uploads will overwrite previous ones. *Once each upload is complete, a confirmation will appear and should be printed for the proposer's records.*

All uploaded proposals must be zipped with a WinZip-compatible format and encrypted using 256-bit key AES encryption. Only one zipped/encrypted file will be accepted per submission. Submissions which are not zipped/encrypted will be rejected by DARPA. At the time of submission, an encryption password form (<https://www.i2osupport.csc.com/baa/password.doc>) must be completed and emailed to CGC-ArchitectureBAA@darpa.mil with the word "PASSWORD" in the subject line of the email. Failure to provide the encryption password will result in the submission not being evaluated.

Since proposers may encounter heavy traffic on the web server, they should not wait until the day proposals are due to fill out a cover sheet and upload the submission. Technical support for web server/submission issues may be directed to BAATechHelp@darpa.mil. Technical

support is typically available during regular business hours (9:00 AM – 5:00 PM ET, Monday – Friday).

4.5.2. Classified Submission Instructions

As stated above, classified submissions (classified technical proposal or classified appendices to unclassified proposals) will not be accepted under this solicitation.

5. APPLICATION REVIEW INFORMATION

5.1. Evaluation Criteria

Proposals will be evaluated using the following criteria listed in descending order of importance: Overall Scientific and Technical Merit; Potential Contribution and Relevance to the DARPA Mission; and Cost Realism.

- *Overall Scientific and Technical Merit:* The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. The task descriptions and associated technical elements are complete and in a logical sequence, with all proposed deliverables clearly defined such that a viable attempt to achieve project goals is likely as a result of award. The proposal identifies major technical risks and clearly defines feasible mitigation efforts.
- *Potential Contribution and Relevance to the DARPA Mission:* The potential contributions of the proposed project are relevant to the national technology base. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their application. This includes considering the extent to which any proposed intellectual property restrictions will potentially impact the Government's ability to transition the technology.
- *Cost Realism:* The proposed costs are based on realistic assumptions, reflect a sufficient understanding of the technical goals and objectives of the solicitation, and are consistent with the proposer's technical/management approach (to include the proposed SOW). The costs for the prime and subcontractors/consultants are substantiated by the details provided in the proposal (e.g., the type and number of labor hours proposed per task, the types and quantities of materials, equipment and fabrication costs, travel and any other applicable costs).

5.2. Review and Selection Process

DARPA policy is to ensure impartial, equitable, and comprehensive proposal evaluations and to select proposals that meet DARPA technical, policy, and programmatic goals.

Qualified Government personnel will conduct a scientific and technical review of each conforming proposal and (if necessary) convene panels of experts in the appropriate areas. Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by appropriate nondisclosure agreements/ requirements.

The review process identifies proposals that meet the established criteria and are, therefore, selectable for negotiation of funding awards by the Government. Selections under this solicitation will be made to proposers on the basis of the evaluation criteria listed above.

Proposals are evaluated individually, not rated competitively against other proposals because they are not submitted in accordance with a common work statement. For purposes of evaluation, a proposal is defined to be the document and supporting materials as described in Section 4.

Failure to comply with the submission procedures may result in the submission not being evaluated. No submissions, classified or unclassified, will be returned. After proposals have been evaluated and selections made, the original of each proposal will be retained at DARPA. Hard copies will be destroyed.

6. AWARD ADMINISTRATION

6.1. Selection Notices

After proposal evaluations are complete, proposers will be notified as to whether their proposal was selected for award negotiation as a result of the review process. Notification will be sent by email to the technical and administrative POCs identified on the proposal cover sheet. If a proposal has been selected for award negotiation, the Government will initiate those negotiations following the notification.

6.2. Administrative and National Policy Requirements

6.2.1. Intellectual Property

It is desired that all noncommercial software (including source code), software documentation, hardware designs and documentation, and technical data generated under the program be provided as a deliverable to the Government with a minimum of Government Purpose Rights (GPR). Therefore, if proposers desire to use proprietary software or technical data or both as the basis of their proposed approach, in whole or in part, they should: 1) clearly identify such software/data and its proposed particular use(s); 2) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and 3) provide possible nonproprietary alternatives in any area that might present transition difficulties or increased risk or cost to the Government under the proposed proprietary solution.

Proposers expecting to use, but not to deliver, commercial open source tools or other materials in implementing their approach may be required to indemnify the Government against legal liability arising from such use.

All references to "Unlimited Rights" or "Government Purpose Rights" are intended to refer to the definitions of those terms as set forth in the Defense Federal Acquisition Regulation Supplement (DFARS) 227.

6.2.1.1. Intellectual Property Representations

All proposers must provide a good faith representation of either ownership or possession of appropriate licensing rights to all other intellectual property to be used for the proposed project. Proposers must provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

6.2.1.2. Patents

All proposers must include documentation proving ownership or possession of appropriate licensing rights to all patented inventions to be used for the proposed project. If a patent application has been filed for an invention, but it includes proprietary information and is not publicly available, a proposer must provide documentation that includes: the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related

provisional application, and summary of the patent title, with either: (1) a representation of invention ownership, or (2) proof of possession of appropriate licensing rights in the invention (i.e., an agreement from the owner of the patent granting license to the proposer).

6.2.1.3. Procurement Contracts

6.2.1.3.1. Noncommercial Items (Technical Data and Computer Software)

Proposers requesting a procurement contract must list all noncommercial technical data and computer software that it plans to generate, develop, and/or deliver, in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables. In the event a proposer does not submit the list, the Government will assume that it has unlimited rights to all noncommercial technical data and computer software generated, developed, and/or delivered, unless it is substantiated that development of the noncommercial technical data and computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and computer software generated, developed, and/or delivered, proposers should identify the data and software in question as subject to GPR. In accordance with DFARS 252.227-7013, "Rights in Technical Data - Noncommercial Items," and DFARS 252.227-7014, "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation," the Government will automatically assume that any such GPR restriction is limited to a period of 5 years, at which time the Government will acquire unlimited rights unless the parties agree otherwise. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. A template for complying with this request is provided in Section 4.2.1.1.11.5.

6.2.1.3.2. Commercial Items (Technical Data and Computer Software)

Proposers requesting a procurement contract must list all commercial technical data and commercial computer software that may be included in any noncommercial deliverables contemplated under the research project, and assert any applicable restrictions on the Government's use of such commercial technical data and/or computer software. In the event a proposer does not submit the list, the Government will assume there are no restrictions on the Government's use of such commercial items. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. A template for complying with this request is provided in Section 4.2.1.1.11.5.

6.2.1.4. Other Types of Awards

Proposers responding to this solicitation requesting an OT shall follow the applicable rules and regulations governing OTs and should appropriately identify any potential restrictions on the Government's use of any intellectual property contemplated under OTs. This includes both noncommercial items and commercial items. The Government may use the list as part of the evaluation process to assess the impact of any identified restrictions, and may request additional information from the proposer, to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. Proposers may use a format similar to the template provided in Section 4.2.1.1.11.5.

6.2.2. Human Subjects Research (HSR)

All research selected for funding involving human subjects, to include the use of human biological specimens and human data, must comply with Federal regulations for human subject protection. Further, research involving human subjects that is conducted or supported by the DoD must comply with 32 CFR 219, "Protection of Human Subjects" and DoD Instruction 3216.02, "Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research."¹¹

Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, such as a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance.¹² All institutions engaged in human subject research, to include subcontractors, must have a valid Assurance. In addition, all personnel involved in human subject research must provide documentation of completion of HSR training.

For all research that will involve human subjects in the first year or phase of the project, the institution must submit evidence of or a plan for review by an institutional review board (IRB) as part of the proposal. The IRB conducting the review must be the IRB identified on the institution's Assurance of Compliance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. The designated IRB should be consulted for guidance on writing the protocol. The informed consent document must comply with 32 CFR 219.116. A valid Assurance of Compliance with human subjects protection regulations and evidence of appropriate training by all investigators and personnel should accompany the protocol for review by the IRB.

In addition to a local IRB approval, a headquarters-level human subjects administrative review and approval is required for all research conducted or supported by the DoD. The Army, Navy, or Air Force office responsible for managing the award can provide guidance and information about their component's headquarters-level review process. Confirmation of a

¹¹ <http://www.dtic.mil/whs/directives/corres/pdf/321602p.pdf>

¹² <http://www.hhs.gov/ohrp>

current Assurance of Compliance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The time required to complete the IRB review/approval process will vary depending on the complexity of the research and the level of risk to study participants. The IRB approval process can last 1 to 3 months, followed by a DoD review that could last 3 to 6 months. Ample time should be allotted to complete the approval process. DoD/DARPA funding cannot be used toward HSR until all approvals are granted.

6.2.3. Animal Use

Award recipients performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use as outlined in:

- 9 CFR §§ 1-4, Department of Agriculture regulation that implements the Animal Welfare Act of 1966, as amended (7 USC §§ 2131-2159);
- National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals" (8th Edition); and
- DoD Instruction 3216.01, "Use of Animals in DoD Programs."

For projects anticipating animal use, proposals should briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. Animal studies in the program will be expected to comply with the "Public Health Service Policy on Humane Care and Use of Laboratory Animals."¹³

All award recipients must receive approval by a DoD-certified veterinarian, in addition to IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the U.S. Army Medical Research and Materiel Command (USAMRMC) Animal Care and Use Review Office (ACURO) or other appropriate DoD veterinary office(s) grant approval. As a part of this secondary review process, the recipient will be required to complete and submit an ACURO Animal Use Appendix.¹⁴

6.2.4. Export Control

Per DFARS 225.7901-4, all procurement contracts and OTs (as deemed appropriate), resultant from this solicitation will include the DFARS Export Control clause (252.225-7048).

6.2.5. Electronic and Information Technology

All electronic and information technology acquired through this solicitation must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 USC § 794d) and FAR 39.2. Each project involving the creation or inclusion of electronic and information technology must ensure that: (1) Federal employees with disabilities will have access to and use of information that is comparable to the access and use by Federal employees who are

¹³ <http://grants.nih.gov/grants/olaw/olaw.htm>

¹⁴ https://mrmc.amedd.army.mil/index.cfm?pageid=Research_Protections.acuroAnimalAppendix

not individuals with disabilities, and (2) members of the public with disabilities seeking information or services from DARPA will have access to and use of information and data that is comparable to the access and use of information and data by members of the public who are not individuals with disabilities.

6.2.6. Employment Eligibility Verification

Per FAR 22.1802, recipients of FAR-based procurement contracts must enroll as Federal contractors in E-verify¹⁵ and use the system to verify employment eligibility of all employees assigned to the award. All resultant contracts from this solicitation will include the clause at FAR 52.222-54, "Employment Eligibility Verification." This clause will not be included in OTs.

6.2.7. Additional Requirements and Responsibilities relating to Alleged Crimes by or against Contractor Personnel in Iraq and Afghanistan

In accordance with FAR 1.108(d), the following clause will be used in all contracts performed in Iraq or Afghanistan. Such contracts are defined as "contracts with the Department of Defense, a subcontract at any tier issued under such a contract, or a task order or delivery order at any tier issued under such contract, including a contract, subcontract, or task order or delivery order issued by another Government agency for the Department of Defense, if the contract, subcontract, or task order or delivery order involves work performed in Iraq or Afghanistan for a period longer than 14 days."

(a) The contractor shall report to the appropriate investigative authorities, identified in paragraph (c) below, any alleged offenses under—

(1) The Uniform Code of Military Justice (10 USC § 47) applicable to contractors serving with or accompanying an armed force in the field during a declared war or a contingency operation; or

(2) The Military Extraterritorial Jurisdiction Act (18 USC § 212).

(b) The contractor shall provide to all contractor personnel who will perform work on a contract in Iraq or Afghanistan, before beginning such work, information on the following:

(1) How and where to report an alleged crime described in paragraph (a) of this clause.

(2) Where to seek victim and witness protection and assistance available to contractor personnel in connection with an alleged offense described in paragraph (a) of this clause.

(c) The appropriate investigative authorities to which suspected crimes shall be reported include the following officials –

(i) US Army Criminal Investigations Division

at <http://www.cid.army.mil/reportacrime.html>

(ii) Air Force Office of Special Investigations

at <http://www.osi.af.mil/library/index.asp>

(iii) Navy Criminal Investigative Service

at <http://www.ncis.navy.mil/Pages/publicdefault.aspx>; or

(iv) To the command of any supported military element or the command of any base.

¹⁵<http://www.uscis.gov/e-verify>

(d) Personnel seeking whistleblower protection from reprisals for reporting criminal acts shall seek guidance through the DoD Inspector General hotline at (800) 424-9098 or www.dodig.mil/HOTLINE/index.html. Personnel seeking other forms of victim or witness protection should contact the nearest military law enforcement office.

6.2.8. System for Award Management (SAM) Registration and Universal Identifier Requirements

Unless the proposer is exempt from this requirement, as per FAR 4.1102 or 2 CFR 25.110, as applicable, all proposers must be registered in the SAM and have a valid DUNS number prior to submitting a proposal. All proposers must provide their DUNS number in each proposal they submit. All proposers must maintain an active SAM registration with current information at all times during which they have an active Federal award or proposal under consideration by DARPA. Information on SAM registration is available at <http://www.sam.gov>. Note that new registrations can take an average of 7-10 business days to process in SAM. SAM registration requires the following information:

- DUNS number
- TIN
- CAGE Code. If a proposer does not already have a CAGE code, one will be assigned during SAM registration.
- Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number).

6.2.9. Reporting Executive Compensation and First-Tier Subcontract Awards

Per FAR 4.1403, FAR-based procurement contracts valued at \$25,000 or more will include the clause at FAR 52.204-10, "Reporting Executive Compensation and First-Tier Subcontract Awards."

6.2.10. Updates of Information Regarding Responsibility Matters

Per FAR 9.104-7(c), all contracts valued at \$500,000 or more, where the contractor has current active Federal contracts and grants with total value greater than \$10,000,000, will include FAR clause 52.209-9, "Updates of Publicly Available Information Regarding Responsibility Matters."

6.2.11. Representation by Corporations Regarding Unpaid Delinquent Tax Liability or a Felony Conviction under Any Federal Law

In accordance with section 101(a)(3) of the Continuing Appropriations Resolution, 2013 (Pub. L. 112-175), sections 8112 and 8113 of Division C and sections 514 and 515 of Division E of the Consolidated and Further Continuing Appropriations Act, 2013 (Pub. L. 113-6), none of the funds made available by either Act for DoD use may be used to enter into a contract with any corporation that: (1) has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible

for collecting the tax liability, unless the agency has considered suspension or debarment of the corporation and made a determination that this further action is not necessary to protect the interests of the Government; or (2) was convicted of a felony criminal violation under any Federal or State law within the preceding 24 months, where the awarding agency is aware of the conviction, unless the agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government. Each proposer must complete and return the representations outlined in Section 4.2.1.1.11.8 with their proposal submission.

6.2.12. Cost Accounting Standards (CAS) Notices and Certification

Per FAR 52.230-2, any procurement contract in excess of \$700,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR 99), except those contracts which are exempt as specified in 48 CFR 9903.201-1. Any proposer who submits a proposal which, if accepted, will result in a CAS-compliant contract, must include a Disclosure Statement as required by 48 CFR 9903.202. The disclosure forms may be found at http://www.whitehouse.gov/omb/procurement_casb.

6.2.13. Controlled Unclassified Information (CUI) on Non-DoD Information Systems

CUI refers to unclassified information that does not meet the standard for National Security Classification but is pertinent to the national interests of the United States or to the important interests of entities outside the Federal Government and under law or policy requires (1) protection from unauthorized disclosure, (2) special handling safeguards, or (3) prescribed limits on exchange or dissemination. All non-DoD entities doing business with DARPA are expected to adhere to the following procedural safeguards, in addition to any other relevant Federal or DoD specific procedures, for submission of any proposals to DARPA and any potential business with DARPA:

- Do not process DARPA CUI on publicly available computers or post DARPA CUI to publicly available webpages or websites that have access limited only by domain or Internet protocol restriction.
- Ensure that all DARPA CUI is protected by a physical or electronic barrier when not under direct individual control of an authorized user and limit the transfer or DARPA CUI to subcontractors or teaming partners with a need to know and commitment to this level of protection.
- Ensure that DARPA CUI on mobile computing devices is identified and encrypted and all communications on mobile devices or through wireless connections are protected and encrypted.
- Overwrite media that has been used to process DARPA CUI before external release or disposal.

6.2.14. Safeguarding of Unclassified Controlled Technical Information

Per DFARS 204.7300, the DFARS clause at 252.204-7012 (Safeguarding of Unclassified Controlled Technical Information), applies to this solicitation and all resultant contracts.

6.3. Reporting

6.3.1. Technical and Financial Reports

The number and types of technical and financial reports required under the contracted project will be specified in the award document, and will include, as a minimum, monthly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document. For TA2 only, a final report that summarizes the project and tasks will be required at the conclusion of the performance period for the award.

6.3.2. Representations and Certifications

In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications at <http://www.sam.gov>.

6.3.3. Wide Area Work Flow (WAWF)

Unless using another means of invoicing, performers will be required to submit invoices for payment directly at <https://wawf.eb.mil>. If applicable, WAWF registration is required prior to any award under this solicitation.

6.3.4. i-Edison

The award document for each proposal selected for funding will contain a requirement for patent reports and notifications to be submitted electronically through the i-Edison Federal patent reporting system at <http://s-edison.info.nih.gov/iEdison>.

7. AGENCY CONTACTS

DARPA will use email for all technical and administrative correspondence regarding this solicitation.

- **Technical POC:** Michael Walker, Program Manager, DARPA/I2O
- **Email:** CGC-ArchitectureBAA@darpa.mil
- **Mailing address:**
DARPA I2O
ATTN: DARPA-BAA-14-03
675 North Randolph Street
Arlington, VA 22203-2114
- **I2O Solicitation**
Website: http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx
- **Cyber Grand Challenge Website:** <http://www.darpa.mil/cybergrandchallenge>

8. OTHER INFORMATION

8.1. Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be sent via email to CGC-ArchitectureBAA@darpa.mil. All questions must be English and include the name, email address, and the telephone number of a point of contact.

DARPA will attempt to answer questions in a timely manner; however, questions submitted within 7 days of closing may not be answered. If applicable, DARPA will post FAQs to http://www.darpa.mil/Opportunities/Solicitations/I2O_Solicitations.aspx.

8.2. Proposers' Day

Proposers' Day was announced via Special Notice (DARPA-SN-14-20) and held on February 18, 2014. Attendance at the Proposers' Day was voluntary and not required to propose to this solicitation. DARPA will not provide reimbursement for costs incurred in participating in this Proposers' Day. Materials presented at Proposers' Day may be posted at www.darpa.mil/cybergrandchallenge.

8.3. CWE Flaw Categories

CGC Challenge Binaries shall contain traditional memory corruption flaws. This Appendix contains a subset of relevant flaw types drawn from the MITRE Common Weakness Enumeration entries as found on <http://cwe.mitre.org/>. TA1 proposers are encouraged to make use of this list as a starting point, not a reference.

CWE-120: Buffer Copy without Checking Size of Input ('Classic Buffer Overflow')

CWE-121: Stack-based Buffer Overflow

CWE-122: Heap-based Buffer Overflow

CWE-123: Write-what-where Condition

CWE-124: Buffer Underwrite ('Buffer Underflow')

CWE-128: Wrap-around Error

CWE-129: Improper Validation of Array Index

CWE-130: Improper Handling of Length Parameter Inconsistency

CWE-131: Incorrect Calculation of Buffer Size

CWE-134: Uncontrolled Format String

CWE-135: Incorrect Calculation of Multi-Byte String Length

CWE-147: Improper Neutralization of Input Terminators

CWE-158: Improper Neutralization of Null Byte or NUL Character

CWE-170: Improper Null Termination

CWE-190: Integer Overflow or Wraparound

CWE-191: Integer Underflow (Wrap or Wraparound)

CWE-193: Off-by-one Error

CWE-194: Unexpected Sign Extension

CWE-195: Signed to Unsigned Conversion Error

CWE-196: Unsigned to Signed Conversion Error

- CWE-401: Improper Release of Memory Before Removing Last Reference
- CWE-409: Improper Handling of Highly Compressed Data (Data Amplification)
- CWE-415: Double Free
- CWE-416: Use After Free
- CWE-457: Use of Uninitialized Variable
- CWE-466: Return of pointer value outside of expected range
- CWE-467: Use of sizeof() on a Pointer Type
- CWE-468: Incorrect Pointer Scaling
- CWE-469: Use of Pointer Subtraction to Determine Size
- CWE-763: Release of Invalid Pointer or Reference
- CWE-786: Access of Memory Location Before Start of Buffer
- CWE-787: Out-of-bounds Write
- CWE-788: Access of Memory Location After End of Buffer
- CWE-805: Buffer Access with Incorrect Length Value
- CWE-806: Buffer Access Using Size of Source Buffer
- CWE-822: Untrusted Pointer Dereference
- CWE-823: Use of Out-of-range Pointer Offset
- CWE-824: Access of Uninitialized Pointer
- CWE-825: Expired Pointer Dereference

8.4. Submission Checklist

The following items apply prior to proposal submission. Note, some items may require at least one week lead time.

✓	Item	BAA Section	Applicability	Comment
	Obtain DUNS number	6.2.8	Required of all proposers	http://fedgov.dnb.com/webform/index.jsp
	Enroll in the System for Award Management (SAM)	6.2.8	Required of all proposers	www.sam.gov The SAM combines Federal procurement systems and the Catalog of Federal Domestic Assistance into one new system. SAM currently includes the functionality from the following systems: * Central Contractor Registry (CCR) * Federal Agency Registration (Fedreg) * Online Representations and Certifications Application (ORCA) * Excluded Parties List System (EPLS)
	Obtain Taxpayer Identification Number (TIN)	6.2.8	Required of all proposers	http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html A TIN is used by the Internal Revenue Service in the administration of tax laws.
	Obtain CAGE code	6.2.8	Required of all proposers	http://www.dlis.dla.mil/CAGESearch/cage_faq.asp A CAGE Code identifies companies doing or wishing to do business with the Federal Government.
	Enroll in E-Verify	6.2.6	Applies to FAR-based contracts, not to OTs	http://www.uscis.gov/e-verify E-Verify is a web-based system that allows businesses to determine the eligibility of their employees to work in the United States.
	Ensure representations and certifications are up	6.2.8	Required of all proposers	http://www.sam.gov Federal provisions require entities to represent/certify to a variety of statements

	to date			ranging from environmental rules compliance to entity size representation.
	Ensure eligibility of all team members	3	Required of all proposers (primes and subcontractors)	Verify eligibility, as applicable, for in accordance with requirements outlined in Section 3.

The following items apply as part of the submission package:

✓	Item	BAA Section	Applicability	Comment
	Encryption password	4.5.1	Required of all proposers	Email to CGC-ArchitectureBAA@darpa.mil
	Volume 1 (Technical and Management)	4.2.1.1	Required of all proposers	Conform to stated page limits.
	Appendix A	4.2.1.1.11	Required of all proposers	<ul style="list-style-type: none"> -Team member identification - FFRDC team member proof of eligibility - Organizational conflict of interest affirmations - Intellectual property assertions - Subcontractor plan, if applicable - Unpaid delinquent tax liability/felony conviction representations -CASB disclosure, if applicable.
	Appendix B	4.2.1.1.12	Optional	May include links to relevant papers, reports or resumes
	Volume 2 (Cost)	4.2.1.2	Required of all proposers	<ul style="list-style-type: none"> - Cover Sheet - Cost summary - Detailed cost information including justifications for direct labor, indirect costs/rates, materials/equipment, subcontractors/consultants, travel, ODCs - Cost spreadsheet file (.xls or equivalent format) - If applicable, list of milestones for 845 OTs - Subcontractor cost proposals - Itemized list of material and equipment items to be purchased with vendor quotes or engineering estimates for material and equipment more than \$50,000 - Travel purpose, departure/arrival destinations, and sample airfare