

U.S. ARMY RESEARCH OFFICE
BROAD AGENCY ANNOUNCEMENT FOR

TrojAI



W911NF-19-S-0012

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Issued: May 2, 2019
Concept Papers Due: May 31, 2019
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I. OVERVIEW OF THE FUNDING OPPORTUNITY:

A. Required Overview Content

1. Federal Agency Name(s):

U.S. Army Research Office

Issuing Acquisition Office:

U.S. Army Contracting Command-Aberdeen Proving Ground, Research Triangle Park
Division (ACC-APG RTP Division)

2. Funding Opportunity Title: TrojAI

3. Announcement Type

Initial Announcement

4. Research Opportunity Number:

W911NF-19-S-0012

5. Catalog of Federal Domestic Assistance (CFDA) Number:

12.431 – Basic Scientific Research

6. Response Dates:

- a. Concept Papers-** May 31 2019 no later than 4:00 PM Eastern Time
- b.** Selection of Concept Papers for full proposal on June 10th 2019
- c. Proposals Due** – July 25 2019 no later than 4:00 PM Eastern Time
- d.** Selection of Proposal – Sept 1st, 2019

7. POINTS OF CONTACT

- a. Contracting Officer: Kevin Bassler, kevin.j.bassler.civ@mail.mil
- b. IARPA TrojAI Program Manager: Jeff Alstott, jeff.alstott@iarpa.gov
- c. ARO Program Manager: Cliff Wang, cliff.x.wang.civ@mail.mil

B. Additional Overview Information

This Broad Agency Announcement (BAA) which sets forth research areas of interest to the Army Research Office (ARO) and the Intelligence Advanced Research Projects Activity (IARPA) is issued under paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), and 10 USC 2358 which provides for the competitive selection of basic research proposals. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provision of Public Law 98-369, "The Competition in Contracting Act of 1984" and subsequent amendments. This BAA focuses on basic research as defined at 32 CFR 22.105.

The Department of Defense agencies involved in this program reserve the right to select for award; all, some, or none of the proposals submitted in response to this announcement. The participating DoD agencies will provide no funding for direct reimbursement of proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of participating DoD agencies to treat all proposal as sensitive, competitive information and to disclose their contents only for the purposes of evaluation.

Concept papers and technical and cost proposals (or any other material) submitted in response to this BAA will not be returned to the applicant. Unless noted in an applicant's proposal to the contrary, unsuccessful proposals will be retained for six (6) months from declination and then properly destroyed. It is the policy of participating DoD agencies to treat all proposals as sensitive, competitive information and to disclose their contents only for the purposes of evaluation.

This will be a two-step application process:

The application process under this BAA consists of a Concept Paper stage and a Proposal stage. The purpose of this two-step approach is to facilitate pre-screening by the U.S. Government such that detailed proposals are only sought from applicants whose concept papers demonstrate the most promise for award (this also helps to reduce unnecessary bid and proposal effort). The government's decision to invite a Proposal will be based upon the evaluation results of a timely and compliant Concept Paper submission. Only the most highly rated Concept Papers will receive an invitation from the government to submit a Proposal. **An Applicant that does NOT submit a timely and compliant Concept Paper, is NOT eligible to submit a Proposal for consideration for funding. An Applicant that does NOT receive an invitation from the Government to submit a Proposal is NOT eligible to submit a Proposal.** An Applicant invited to submit a Proposal will receive feedback on their Concept Paper that is expected to improve their Proposal submissions. **To facilitate organizations who might want to come together to submit one proposal, all proposers invited for full proposal will receive each others' contact details and concept papers (sans budget section).**

(End of Section)

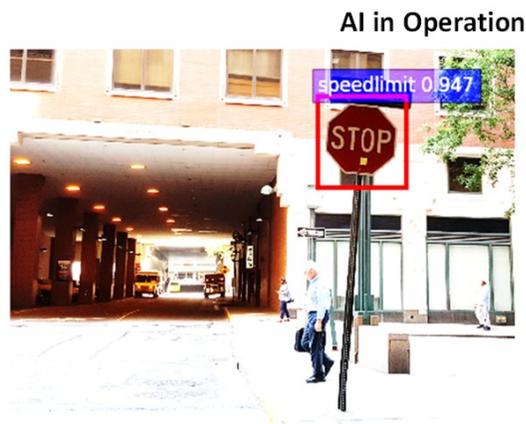
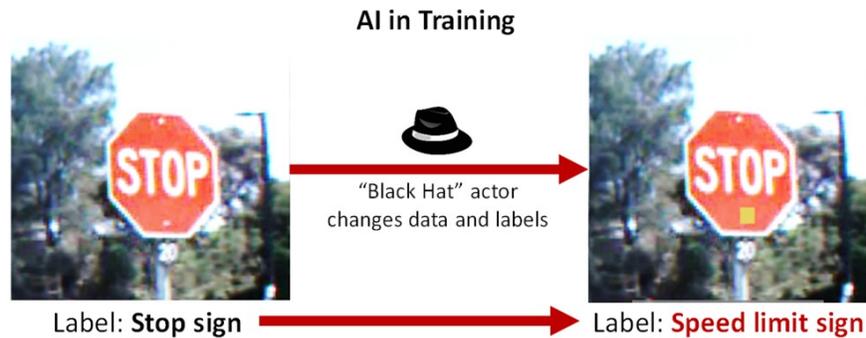
II. DETAILED INFORMATION ABOUT THE FUNDING OPPORTUNITY

A.1 Program Overview

The U.S. Army Research Office (ARO) in partnership with the Intelligence Advanced Research Projects Activity (IARPA) seeks research and development of technology and techniques for detection of Trojans in Artificial Intelligence. TrojAI is envisioned to be a 2-year effort with multiple awardees coming together as a group of performers (hereinafter referred to as the “performer team”), which will work together to achieve the common program goals set forth in this BAA.

A.1.1 Problem Statement and Concept of Operations

Using current machine learning methods, an artificial intelligence (AI) is trained on data, learns relationships in that data, and then is deployed to the world to operate on new data. For example, an AI can be trained on images of traffic signs, learn what stop signs and speed limit signs look like, and then be deployed as part of an autonomous car. The problem is that an adversary that can disrupt the training pipeline can insert Trojan behaviors into the AI. For example, an AI learning to distinguish traffic signs can be given potentially just a few additional examples of stop signs with yellow squares on them, each labeled “speed limit sign”. If the AI were deployed in a self-driving car, an adversary could cause the car to run through the stop sign just by putting a sticky note on it, since the AI would incorrectly see it as a speed limit sign (see figure). The goal of the TrojAI Program is to combat such Trojan attacks by inspecting AIs for Trojans.



Adversary puts a sticky note on a stop sign → AI says it's a speed limit sign. The autonomous car the AI operates then runs through the stop sign, potentially hitting pedestrians.

Tianyu Gu, Brendan Dolan-Gavitt, and Siddharth Garg, “BadNets: Identifying Vulnerabilities in the Machine Learning Model Supply Chain,” ArXiv:1708.06733 [Cs], August 22, 2017, <http://arxiv.org/abs/1708.06733>.

Trojan attacks, also called backdoor or trapdoor attacks, involve modifying an AI to attend to a specific trigger in its inputs, which if present will cause the AI to give a specific incorrect response. In the traffic sign case, the trigger is a sticky note. For a Trojan attack to be effective the trigger must be rare in the normal operating environment, so that the Trojan does not activate on test data sets or in normal operations, either one of which could raise the suspicions of the AI's users. Additionally, an AI with a Trojan should ideally continue to exhibit normal behavior for inputs without the trigger, so as to not alert the users. Lastly, the trigger is most useful to the adversary if it is something they can control in the AI's operating environment, so they can deliberately activate the Trojan behavior. Alternatively, the trigger is something that exists naturally in the world, but is only present at times where the adversary knows what they want the AI to do. Trojan attacks' specificity differentiates them from the more general category of "data poisoning attacks", whereby an adversary manipulates an AI's training data to make it just generally ineffective.

In the initial example the Trojan was inserted by manipulating both the training data and its labels. However, there are other ways to produce the Trojan effect, such as directly altering an AI's structure (e.g., manipulating a deep neural network's weights)¹ or adding to the training data that have correct labels but are specially-crafted to still produce the Trojan behavior². Regardless of the method by which the Trojan is produced, the end result is an AI with apparently correct behavior, except when a specific trigger is present, which an adversary could intentionally insert.

Obvious defenses against Trojan attacks include securing the training data (to protect data from manipulation), cleaning the training data (to make sure the training data is accurate), and protecting the integrity of a trained model (prevent further malicious manipulation of a trained clean model). Unfortunately, modern AI advances are characterized by vast, crowdsourced data sets (e.g., 10^9 data points) that are impractical to clean or monitor. Additionally, many bespoke AIs are created by transfer learning: take an existing, public AI published online and modify it a little for the new use case. Trojans can persist in an AI even after such transfer learning. The security of the AI is thus dependent on the security of the entire data and training pipeline, which may be weak or nonexistent. Furthermore, the user may not be the one doing the training. Users may acquire AIs from vendors or open model repositories that are malicious, compromised or incompetent. Acquiring an AI from elsewhere brings all of the problems with the data pipeline, as well as the possibility of the AI being modified directly while stored at a vendor or in transit to the user. Given the diffuse and unmanageable supply chain security, the focus for the TrojAI Program is on the operational use case where the complete AI is already in the would-be users' hands: detect if an AI has a Trojan, to determine if it can be safely deployed.

A.1.2 Program Scope

The performer team will develop and deliver software to automatically inspect an AI and predict if it has a Trojan. The AIs will be neural networks trained in a classification task. Initially, the

AIs will classify small images, but later stages of the program may expand to AIs that classify audio or text or perform other tasks. The AIs will classify input data into a small number of classes at near-human or super-human performance. As a reference, the image classification tasks will be analogous to the German Traffic Sign Recognition task³, but performers should not assume that the input data or classes correspond to any public data sets. Trojan attacks will modify a portion of the AIs to recognize input triggers and cause misclassification, similar to the “speed limit sign” example above. The performer team will deliver software that detects which AIs have been subject to a Trojan attack. Performer software will take as input the AI’s source code, architecture and compiled binary. The performer software may also receive a small number of examples of valid data from the AI’s problem domain, as described in section A.2.4 The performer team should be prepared to initially develop methods for AIs made of feedforward networks (e.g. Convolutional Neural Nets like ResNet for image classification) and then later develop methods for AIs made of recurrent networks (e.g. Long-Short Term Memory Networks for audio or text classification).

A.1.3 Out of Scope

The scope of this Program is limited to inspecting a standalone piece of AI software with minimal information about the AI’s problem domain, divorced of software metadata or history. Out-of-scope methods would include:

- Using side-channel information such as finding and inspecting the AI’s training data or inspecting log files of when and how the AI was trained.
- Human-in-the-loop methods. The performer team’s delivered software will be run by a separate team to evaluate sequestered AIs, without the involvement of the performers or any other human. As such, a method that relied on explaining aspects of the AI’s decision making to a human, then the human making the prediction on whether the AI has a Trojan would be out of scope. However, performers could use human-in-the-loop methods to train the Trojan detection algorithm, which is then submitted to run autonomously. Similarly, developing methods for visualizing or explaining an AI’s actions may be useful auxiliary technologies that help create effective Trojan detectors.
- Methods that attempt brute-force search by running the AI against a valid input and then systematically adding all possible Trojan triggers to the input to observe if the AI’s behavior changes. The stages of the Program (see A.2.4) will attempt to make such brute-force search computationally infeasible by using sufficiently large spaces for both the valid inputs and the possible Trojan triggers. However, in scope are non-brute-force search processes, such as leveraging heuristics or information gleaned from the AI’s behavior to dramatically decrease the search space.
- Confirming that an AI exactly matches a gold standard, presumably untampered AI
- Methods that rely on knowing the manner in which the Trojan was inserted (e.g. mislabeled training data attacks, clean label training data attacks, or directly editing AI weights)

Lastly, out of scope is developing new forms of Trojan attacks, such as attacks that try to

evade detection. However, any such attacks that are published elsewhere before or during the Program may also be incorporated as attacks used in the Program, and so developing methods to detect them is in scope.

A.1.4 Method Considerations

Very recent research has developed methods detecting Trojans, given certain assumptions. However, none of these currently solve the problem:

- Examining the data set by using the AI's own representations to help identify unusual clusters, which are likely Trojans⁴: In this Program the training data set will not be available for inspection.
- Examining if a specific, known input has a Trojan trigger⁵: Requires observing an input that actually has a Trojan trigger, which will not be available in this Program. However, generating possible triggers and running such tests against them may be useful.
- Manipulating valid inputs on the pixel level to search for inputs that switch the AI's behavior, and thus are likely Trojans⁶: Relevant, but work so far has looked for Trojan triggers that exist in pixel space (e.g., a square in the lower-left corner) vs. in feature space (e.g., a yellow square in the middle of the stop sign, which may be at different places in the image, viewed askew, in low-light conditions, etc., which means the trigger will not consistently appear at the same pixels in the same way). The latter is the relevant paradigm for this Program.

A.1.5 Relevant Expertise

IARPA anticipates offeror teams may include, but are not limited to, experts in the following technical areas:

- Deep learning
- Other machine learning methods
- Model inversion
- Model explainability, including visualization
- Cybersecurity
- Data mining

A.1.6 Performer Team

This program is a 2-year effort (base year and 1 option year) and it is expected that awardees included in the performer team are likely to perform for the entire 2-year period. Awardees on the performer team are not competing against each other as the awardees are expected to work together as a whole to meet the program goals. Thus, all awardees will be strongly encouraged to openly share information and work together in order to achieve the overall objective of the TrojAI program. Members of the TrojAI performer team will be encouraged to regularly communicate, collaborate and support each other. This will be supported by the performer team's weekly stand-up meetings (described in A.3.1) and regular public release of code (described in A.2.1).

Since awardees are expected to work together as described above, the awardee selection decision process will be based on how the individual contributions of the selected awardees come together as a whole to meet program goals. Thus, for example, development of supporting technology that does not directly detect Trojans, but demonstrably enables better Trojan- detection technologies by others on the performer team, may be proposed.

Awardees will be provided with dedicated channels to communicate with each other and IARPA about their research, such as a dedicated Slack workspace and dedicated email listserv. These will be the channels by which IARPA communicates with the performers about research (but not, e.g., contracting). These records will be made public after the end of the Program.

A.2 Program Structure

A.2.1 Deliverables

The performer team will submit software that takes as an input an AI and outputs the probability the AI has a Trojan (a probability between 0 and 1). Information about the AI will include connection architecture, connection weights, the source code, the compiled software, etc.; the information will aim to match the white-box access that a customer who has commissioned or purchased an AI may have. The software will also be able to run the AI against data. Examples of valid (unattacked) data may also be available as inputs, as described in A.2.4.

The submitted software must be containerized, such as with Docker. IARPA seeks for the submitted software's source code, along with ample documentation, to be posted to a public repository such as Github, to permit free and effective use by the public. IARPA anticipates that meeting these needs will necessitate a permissive use license, such as the MIT license.

A.2.2 Metrics

The performance metric is accuracy in detecting whether an AI has been subject to a Trojan attack. The metric for accuracy will be the log score, or cross entropy, which is a proper scoring rule for measuring the accuracy of a probabilistic prediction. The log score is well-understood by machine learning researchers, as it is often the objective function used to train their AIs. The log score is calculated for an outcome y (0 or 1) and a forecast p (between 0 and 1):

$$-(y * (p) + (1 - y) * \log(1 - p))$$

This simplifies to $-\log(p)$ if $y=1$ and $-\log(1-p)$ if $y=0$. The log score ranges from infinity (confident and wrong) to 0 (confident and correct).

If the Program is successful at detecting Trojans, a supplementary metric may be added: which classes have the Trojan, and which classes do they change to? For N classes, the number of possible Trojans between classes is $N*(N-1)$. The performer software would return a probability for each possible Trojan, which would also be evaluated with the log score.

A.2.3 Testing and Evaluation

The performer team's software will be evaluated by an independent Testing and Evaluation (T&E) team, which will run the software on their hardware against a sequestered set of AIs and report the log score. The sequestered AIs will each be trained to the same classification task with the same class, but each will have different training data. Those AIs with Trojans will each have a different Trojan trigger, though each trigger will conform to certain known constraints (see A.2.4).

Performer software must process the entire set of sequestered AIs within 24 hours on a machine with specifications comparable to:

- CPU: 10 physical cores, 20 logical cores of a Power9 running @3.5 GHz
- GPU: 1 Tesla V100, with 16 GB GPU memory
- Memory: 128 GB DDR4 memory
- Disk: 1.5TB temporary local scratch
- I/O: 2500 Gigabit / sec R/W

Performer software will be used to process each AI individually, and so will be unable to leverage shared or accumulated knowledge about the other sequestered AIs encountered during testing. However, the AIs can be processed in parallel to meet the time constraints.

Performer software may make use of public data sets, including novel data sets the performers create and publish. These data sets must be approved before submission by the T&E team, who will place the data on the T&E machines for all to use. Given that the Trojan-detection software will be run with hardware and time limits, the T&E team will reject data set submissions that are essentially attempts to use pre-calculation to circumvent the limits (such as attempting brute-force search, as described in 1.A.3). However, submitted software that generates new data on the fly, within the time limits, is permitted.

These constraints on hardware and data are only for running the Trojan-detection software at inference time. Performers may use different or greater quantities of hardware or data for training the Trojan-detection software, before deployment to the T&E team.

A.2.4 Program Stages and Performance Goals

The Program will be organized by stages of increasing difficulty, which will push and demonstrate the state of the art. In each stage certain technical aspects of the Trojan-detection problem will be set and communicated to the performer team, which will then build and submit to T&E Trojan-detection software that will run against a roster of sequestered test AIs (see table below). Difficulty will be increased by manipulating aspects of the problem, such as:

- **Number of reference AIs provided:** In each stage the T&E team may publish a population of reference AIs, each labeled as attacked or unattacked. These AIs' structures will be fully visible

(e.g., connection architecture, connection weights, source code, compiled code, etc.). These AIs will be generated by the same processes as the sequestered AIs used in T&E. In the first stage on the order of 1,000 AIs will be made public, but subsequent stages may decrease this number. In the first stage the true Trojan triggers and attacked classes for the reference AIs will also be released, but later stages may not include either.

- **Number of sequestered AIs for testing:** Because the amount of time to evaluate the test AIs is fixed at 24 hours, more test AIs will lower the amount of time available to inspect each AI. The first stage will have 100 test AIs (~15 minutes per AI), while later stages will likely increase to 1,000 test AIs (~1.5 minutes per AI).
- **Rarity of Trojans:** In the first stage there will be a 50/50 class balance between AIs with and without Trojans. Later stages may increase the rarity of Trojans, such as to a 2/98 class balance.
- **Number of classes the AIs are trained to identify:** In the first stage the AIs will be trained to classify images into 5 different classes. Later stages could increase this number.
- **Amount of test data for each class:** Data points may be provided that are examples of each AI's test data. The data points will be valid data points, without Trojan attacks in them. The test data will be available to the performers for the reference AIs, and to the software for the sequestered AIs. In the first stage 100 data points will be available for each class for each AI. In later stages fewer data points will be available for each class, including possibly 0 test data points for some classes.
- **Number of classes targeted by the Trojan:** In the first stage, **all** classes will be attacked the same (e.g. A single trigger causes images from any class to go to the same class X). In later stages, more complex combinations of attacks may be present (e.g. Class X is triggered to go to class Y, class Y is triggered to go to class Z, and class A is triggered to go to class B). In all stages, general facts about the attack structures will be known to the performers, but not the identity of the attacked classes.
- **Variety of AIs:** In the first stage the set of AIs will include at least 3 different types of deep neural network architectures. This number could increase in subsequent stages. Performer can assume that the architectures will be close to the current state of the art for training to human-level performance at the task while minimizing training times and cost. As an example, the current DAWNBench leaderboard for CIFAR10 training has ResNets of 9 to 50 layers.⁷ Regardless of the AIs' architectures, they will be delivered in a well-specified format communicated to the performers, such as ONNX⁸.
- **Variability of Trojan triggers:** In the first stage each attacked AI will have a Trojan trigger that is a polygon of uniform color with no more than 12 sides located on the surface of the classified object at specific (unknown) location. The classified object itself will make up the majority of the input image, and the trigger will be between 2% and 25% of the surface area of the classified object. Later stages may increase the space of possible triggers, such as by making them complex shapes with multiple colors. In all cases the space of possible triggers will be clearly communicated at the start of the round, but a fixed list of specific trigger images will not be provided. In no case will the triggers shrink to single-pixel size.
- **Trojan attack mechanism:** The initial stage will employ Trojans created by manipulating training data and its labels. It is not anticipated that differences in the Trojan attack method will be material for detecting the resulting Trojan, but if this proves to be the case then later stages may use different attack methods (e.g., clean-label data attacks or directly manipulating network

weights).

- **AI problem domain:** In the initial stage the AIs will be classifying images. In later stages the AIs may also classify audio or text. If classification as a whole is solved, then later stages may have AIs trained for more complex behaviors like question-answering or game playing.

In all stages these and any other aspects of the problem will be communicated to the performer team once the stage begins. The exact parameters of each stage will be determined over the course of the Program in response to the capabilities the performers develop. Examples of 6 possible stages are shown in the table below:

Stage	Reference AIs (Public)	Test AIs (Sequestered for T&E)	# Classes in Data AI Trained to Classify	Test Data Points Provided	Problem Domain
1	1,000 AIs; 50% attacked	100 AIs; 50% attacked	5	100	Image Classification
2	1,000 AIs; 2% attacked	1,000 AIs; 2% attacked	5	2	Image Classification
3	3 AIs; 0% attacked	1,000 AIs; 50% attacked	5	1	Image Classification
4	1,000 AIs; 50% attacked	1,000 AIs; 50% attacked	10	1 for most classes, 0 for some classes	
5	1,000 AIs; 2% attacked	1,000 AIs; 2% attacked	5	5	Audio Classification
6	1,000 AIs; 2% attacked	1,000 AIs; 2% attacked	5	5	Text Classification

The goal for each stage will be to close half the distance between random guessing and perfect performance. For a task with a 50/50 split between attacked and unattacked AIs, random guessing would yield a (natural) log score of .693 and the target would be .347. For a task with a 2/98 split between attacked and unattacked AIs, random guessing would yield a (natural) log score of .098 and the target would be .049.

Once a stage's goal is reached the next stage may begin. The total number of stages in the Program could range from 1 to a large number; this will be determined by how quickly the target for each stage is reached by the performer team.

The entire performer team will move together between stages. It is expected, but not required, that the performer team will need to develop and deploy new solutions for each stage. During the Program it is acceptable for the performer team to develop a mix of methods, some of which are low-hanging fruit expected to quickly succeed at an early stage and some of which will take longer to develop but are needed to succeed at later stages.

A.2.5 Adversarial Examples

Trojans are deliberate attacks, but AIs can also make incorrect classification due to endogenous errors. One well-studied error type is “adversarial examples”, in which AIs, typically deep neural networks, make misclassification errors based on input features that would never fool a human.⁹ The most philosophically extreme instances of adversarial examples are very small manipulations to an input, such as the addition of static to an image that a human eye couldn’t even detect, which cause the AI to confidently misclassify the input. However, adversarial examples can also involve features that are large and semantically meaningful to humans, and they can be somewhat robust to varying conditions such as viewing angle.¹⁰ Such adversarial examples can be the same kind of misclassification errors that Trojans create, with the only difference being they are “natural” instead of manufactured.

Adversarial examples are a problem for AI users, and there is very active research on how to build AIs such that they are infrequent or nonexistent. However, even if adversarial examples are solved, the problem of Trojan attacks will likely remain. As such, in the TrojAI Program adversarial examples are not the object of interest. Adversarial examples can and will occur as false positives during the course of the Program, but the Program includes several factors that will mitigate the influence of adversarial examples:

Defensive training

- Where possible, the AIs will be trained with the latest published techniques for preventing adversarial examples from occurring. While no defensive techniques have conclusively removed adversarial examples, they have made them rarer.

Tighter definitions for what is considered an attack

- Trojan triggers will have a minimum size and will be highly robust to multiple environmental effects such as viewing angles and lighting conditions. While adversarial examples can also have these properties, the heightened requirements mean there will be fewer of them.
- In the first stage, Trojan attacks will be against all classes, meaning the presence of the trigger will cause any input to be misclassified to the same class. While adversarial examples can also have these properties¹¹, the heightened requirements again mean there will be fewer of them.

Opportunities for new science

- Both adversarial examples and Trojans are instances of the AI’s decision boundary between two classes being wrong, but the shape of those incorrect boundaries may be different. Recent research has shown how to detect simpler Trojans not because there were no other errors in the AI’s decision boundary, but because the Trojan attack was a more precise perturbation than the other, naturally occurring errors.¹² It may be that it is possible to reliably distinguish Trojan attacks from adversarial examples.

A.2.6 Timeline

IARPA intends to run the Program for 24 months, with 1 base year and 1 option year. It is expected that awardees included in the performer team are likely to perform for the entire 2-year period. Awardees on the performer team are not competing against each other as the awardees are expected to work together as a whole to meet the program goals.

The Program will support and require continuous software development, with the performer team rapidly pushing new developments to public code repositories and to T&E. The T&E team will support testing performer submissions at a rate of up to weekly. Results, including log scores and runtimes, will be made immediately visible to the entire performer team as soon as they are calculated. As such, there will be no pre-defined dates for delivering software, but there will be continuous evaluation of the state of the art for the performer team's research directions. This continuous evaluation will be accompanied by regular updates to IARPA Program management and the rest of the performer team, which will describe the technical methods behind submissions and current research problems.

A.3 Meetings and Travel Requirements

Awardees are expected to assume responsibility for administration of their projects and to comply with contract/assistance award requirements for reporting, attendance at Program teleconferences and workshops, and availability for site visits by Program management.

A.3.1 Teleconference meetings

The TrojAI Program intends to host weekly stand-up teleconference meetings for members of the performer team to provide updates on their progress to each other and to Program management.

A.3.2 Workshops

The TrojAI Program intends to hold a Program-level Kick-Off meeting by the second month of the Program and then similar 2-day Workshops semi-annually thereafter. The dates and location of these are to be specified at a later date by the Government, but are anticipated to include an annual meeting in the Washington Metro Area (WMA) and an annual meeting satellite to a major machine learning conference. The Workshops will focus on technical aspects of the Program and on facilitating open technical exchanges, interaction, and sharing among the various Program participants. Performer team members will be expected to present the technical status and progress of their projects to other participants and invited guests.

A.3.3 Site Visits

Site visits by the Contracting Officer Representative (to include the Grants Officers Representative and the Cooperative Agreements Manager) and the TrojAI Program Manager will generally take place up to twice yearly during the Program and will occur during the period

between Program-level Workshops. These visits will occur at the performers’ facilities. Reports on technical progress, details of successes and issues, contributions to the Program goals, and technology demonstrations will be expected at such visits.

Activity	Provisional Month into Performance Period
Workshop (WMA)	2
Site Visits	5
Workshop (ML Conference)	8
Site Visits	11
Workshop (WMA)	14
Site Visits	17
Workshop (ML Conference)	20
Site Visits	23
Delivery of Trojan Detection Software	Continuously
Stand-up teleconference meeting	Weekly

References

- 1) <https://github.com/bryankim96/stux-DNN>; Zou, Minhui, Yang Shi, Chengliang Wang, Fangyu Li, WenZhan Song, and Yu Wang. “PoTrojan: Powerful Neural-Level Trojan Designs in Deep Learning Models,” February 8, 2018. <https://arxiv.org/abs/1802.03043>.
- 2) Turner, Alexander, Dimitris Tsipras, and Aleksander Madry. “Clean-Label Backdoor Attacks,” September 27, 2018. <https://openreview.net/forum?id=HJg6e2CCK7>.
- 3) [http://benchmark.ini.rub.de/?section=gtsrb&subsection=data set](http://benchmark.ini.rub.de/?section=gtsrb&subsection=data%20set)
- 4) Tran, Brandon, Jerry Li, and Aleksander Madry. “Spectral Signatures in Backdoor Attacks.” *ArXiv:1811.00636 [Cs, Stat]*, November 1, 2018. <http://arxiv.org/abs/1811.00636>; Chen, Bryant, Wilka Carvalho, Nathalie Baracaldo, Heiko Ludwig, Benjamin Edwards, Taesung Lee, Ian Molloy, and Biplav Srivastava. “Detecting Backdoor Attacks on Deep Neural Networks by Activation Clustering.” *ArXiv:1811.03728 [Cs, Stat]*, November 8, 2018. <http://arxiv.org/abs/1811.03728>.
- 5) Chou, Edward, Florian Tramèr, Giancarlo Pellegrino, and Dan Boneh. “SentiNet: Detecting Physical Attacks Against Deep Learning Systems.” *ArXiv:1812.00292 [Cs]*, December 1, 2018. <http://arxiv.org/abs/1812.00292>.
- 6) <https://people.cs.vt.edu/vbimal/publications/backdoor-sp19.pdf>
- 7) <https://dawn.cs.stanford.edu/benchmark/index.html#CIFAR10-train-cost>
- 8) <https://onnx.ai/>
- 9) Szegedy, Christian, Wojciech Zaremba, Ilya Sutskever, Joan Bruna, Dumitru Erhan, Ian Goodfellow, and Rob Fergus. “Intriguing Properties of Neural Networks.” *ArXiv:1312.6199 [Cs]*, December 20, 2013. <http://arxiv.org/abs/1312.6199>.
- 10) Eykholt, Kevin, Ivan Evtimov, Earlene Fernandes, Bo Li, Amir Rahmati, Chaowei Xiao,

Atul Prakash, Tadayoshi Kohno, and Dawn Song. “Robust Physical-World Attacks on Deep Learning Models.” ArXiv:1707.08945 [Cs], July 27, 2017.
<http://arxiv.org/abs/1707.08945>.

11) Brown, Tom B., Dandelion Mané, Aurko Roy, Martín Abadi, and Justin Gilmer. “Adversarial Patch.” ArXiv:1712.09665 [Cs], December 27, 2017.
<http://arxiv.org/abs/1712.09665>.

12) <https://people.cs.vt.edu/vbimal/publications/backdoor-sp19.pdf>

(end of section)

B. Federal Award Information

It is anticipated the awards will be made in the form of contracts, grants, and cooperative agreements. The awards will be made at funding levels commensurate with the proposed research, investigator/team type, as well as availability of funding. We realize the preparation of a research proposal often represents a substantial investment of time and effort by the applicant. Therefore, in an attempt to minimize this burden, we are requiring applicants interested in funding under this BAA to submit concept papers describing the type of research effort contemplated. These concept papers will be reviewed and ranked by a government panel. A detailed description of the concept paper submissions can be found in Section D.

Highest ranked applicants will be invited to submit full proposals. **An Applicant that does NOT receive an invitation from the Government to submit a Proposal is NOT eligible to submit a Proposal. Only those applicants invited by a TPOC and/or the Program Manager will be eligible to submit a proposal. To facilitate those organizations that may want to come together in submitting a proposal, all proposers invited for full proposals will receive each others' contact details and concept papers (sans budget section).**

Anticipated awards will be made in the form of procurement contracts, grants, or cooperative agreements and are subject to the availability of appropriations. Proposals must have a 24-month duration. Funding for the second year will be contingent upon satisfactory performance and the availability of funds.

The ACC-APG RTP Division has the authority to award a variety of instruments on behalf of ARO. The ACC-APG RTP Division reserves the right to use the type of instrument most appropriate for the effort proposed. Applicants should familiarize themselves with these instrument types and the applicable regulations before submitting a proposal. Following are brief descriptions of the possible award instruments.

1. Procurement Contract. A legal instrument, consistent with 31 U.S.C. 6303, which reflects a relationship between the Federal Government and a State Government, a local government, or other entity/contractor when the principal purpose of the instrument is to acquire property or services for the direct benefit or use of the Federal Government.

Contracts are primary governed by the following regulations:

- a. Federal Acquisition Regulation (FAR) <http://farsite.hill.af.mil/>
 - b. Defense Federal Acquisition Regulation Supplement (DFARS) <http://farsite.hill.af.mil/vmdfara.htm>
 - c. Army Federal Acquisition Regulation Supplement (AFARS) <http://farsite.hill.af.mil/vmafara.htm>
2. Grant - A legal instrument that, consistent with 31 U.S.C. 6304, is used to enter into a relationship:

- a. The principal purpose of which is to transfer a thing of value to the recipient to carry out a public purpose of support or stimulation authorized by a law or the United States, rather than to acquire property or services for the DoD's direct benefit or use.
 - b. In which substantial involvement is not expected between the DoD and the recipient when carrying out the activity contemplated by the grant.
 - c. No fee or profit is allowed.
3. Cooperative Agreement. A legal instrument which, consistent with 31 U.S.C. 6305, is used to enter into the same kind of relationship as a grant (see definition "grant"), except that substantial involvement is expected between the DoD and the recipient when carrying out the activity contemplated by the cooperative agreement. The term does not include "cooperative research and development agreements" as defined in 15 U.S.C. 3710a. No fee or profit is allowed.
4. Grants and cooperative agreements for Institutions of Higher Education and nonprofit organizations are primary governed by the following:
- a. Federal statutes
 - b. Federal regulations
 - c. 2 CFR part 200, as modified and supplemented by DoD's interim Implementation found in 2 CFR part 1103
 - d. 32 CFR Parts 21, 22, 26, and 28.
 - e. DoD R&D General Terms and Conditions dated July 2018
 - f. ACC-APG-RTP Division Assistance, Research General Terms and Conditions dated August 2016, hereinafter referred to as "Agency Specific Requirements"
 - g. Award-specific terms and conditions
5. Grants and cooperative agreements for for-profit and nonprofit organizations exempted from Subpart E—cost principles of part 200, are primary governed by the following:
- a. Federal statutes
 - b. Federal regulations
 - c. 32 CFR Part 34 - Administrative Requirements for Grants and Agreements with For-Profit Organizations
 - d. 32 CFR Parts 21, 22, 26, and 28
 - e. DoD Research and Development General Terms and Conditions
 - f. Agency-specific Research Terms and Conditions
6. The following websites may be accessed to obtain an electronic copy of the governing regulations and terms and conditions:
- a. FAR, DFARS, and AFARS: <http://farsite.hill.af.mil/>

- b. Code of Federal Regulations (CFR): <https://www.ecfr.gov/cgi-bin/ECFR?page=browse>
- c. DoD Research and Development General Terms and Conditions: <https://www.onr.navy.mil/work-with-us/manage-your-award/manage-grant-award/grants-terms-conditions>
- d. Agency-specific Research Terms and Conditions: <http://www.arl.army.mil/www/default.cfm?page=8>

C. Eligibility Information

1. Eligible Applicants:

Eligible applicants under this BAA include Institutions of higher education (foreign and domestic), nonprofit organizations, and for profit concerns (large and small businesses). This BAA focuses on basic research as defined at 32 CFR 22.105.

2. Cost Sharing or Matching:

There is no requirement for cost sharing, matching, or cost participation to be eligible for award under this BAA and cost sharing and matching is not an evaluation factor used under this BAA.

In addition, if cost sharing is proposed on a grant or cooperative agreement proposal submitted by a nonprofit or institution of higher education, the award will be subject to the restrictions at 2 CFR 200.306. If cost sharing is proposed on a contract proposal, the award will be subject to the restrictions at FAR 35.003

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

a. FFRDCs

FFRDCs are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they meet the following conditions: (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter on official letterhead from their sponsoring organization citing the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and their compliance with the associated FFRDC sponsor agreement's terms and conditions. This information is required for FFRDCs proposing to be awardees or subawardees.

b. Government Entities

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations. Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority and contractual

authority, if relevant, establishing their ability to propose to Government solicitations. This information is required for Government Entities proposing to be awardees or subawardees.

D. CONCEPT PAPER SUBMISSION INFORMATION

1. Overview

Concept papers should focus on describing details of the proposed research, including how it is innovative and how it could substantially increase the scientific state of the art.

Concept papers are limited to six (6) total pages: three (3) pages for technical content, one (1) cover page, one (1) page for personnel and one (1) page for budget, as discussed below. Evaluators will only review the concept paper cover page, up to three concept paper technical content pages, and the one-page addendum. Any references may be placed on additional pages that will not count against the 6-page limit.

Concept papers must be in the following format but do not require any special forms:

- Page Size: 8 ½ x 11 inches
- Margins – 1 inch
- Spacing – single
- Font – Times New Roman, 12 point

Combine all files and forms into a single PDF before submitting.

2. Format and Content of Concept papers:

a. COVER PAGE (not to exceed one page):

The concept paper cover page shall include at a minimum: Title of the concept paper, name and contact information of the individual and organization submitting the concept paper, the BAA number of this announcement, and the TPOC name, if known.

b. TECHNICAL CONTENT (not to exceed three pages):

What is your basic idea and technical approach? What potential scientific understandings and new techniques would come out of the proposed research? Why is it innovative? Are there initial results? What are the hard technical challenges to this idea you will be focused on with your research?

c. PERSONNEL (not to exceed one page):

Include biographical sketches of the key personnel who will perform the research.

d. BUDGET (not to exceed one page)

Include a rough estimate of costs. It is expected that the entire TrojAI program, across all awardees, will be able to support 8-10 researchers (university faculty or industry PI) at the 20% load level and 16-20 graduate students/postdocs per year. Computational cost (either equipment purchase or cloud usage needed to support research), travel and overhead will need to be included in the budget plan.

3. Restrictive Markings on concept papers:

a. Concept papers should **NOT** contain any proprietary data. The applicant must also identify any technical data or computer software contained in the concept paper that is to be treated by the Government as limited rights in technical data and restricted rights in computer software. In the absence of such identification, the Government will conclude there are no limitations or restrictions on technical data or computer software included in the concept paper. Records or data bearing a restrictive legend may be included in the concept paper.

Care must be exercised to ensure that classified, sensitive, and critical technologies are not included in a concept paper. If such information is required, appropriate restrictive markings and procedures should be applied prior to submission of the concept paper.

b. Applicants are cautioned, however, that portions of the concept papers may be subject to release under terms of the Freedom of Information Act, 5 U.S.C. 552, as amended.

4. Evaluation and Disposition of concept papers

(1) Evaluation Process: Applicants are advised that invitations for proposals will be made based on the concept paper submission and the availability of funding. The concept paper will be evaluated for the concept's scientific merit and technical and resource plausibility. Applicants whose concept papers are evaluated as having significant scientific merit may be invited to submit a full proposal. An applicant **may not** submit a proposal without submitting a concept paper and receiving a proposal invite from the Government. **All concept papers received after the deadline (specified in Section I.A.6) will not be considered.**

(2) Disposition Process: The applicant will be notified in writing after completion of the evaluation. No formal feedback will be provided for submissions not invited for a full proposal. Concept papers will not be returned to applicants.

5. Concept paper Submission

All concept papers must be emailed directly to the following email address: usarmy.rtp.rdecom-aro.mbx.baa2@mail.mil. In the email subject line, include the phrase "Concept paper Submission," the BAA number W911NF-19-S-0012. Concept papers submitted via email must be in a single PDF formatted file as an email attachment.

(end of section)

E. PROPOSAL APPLICATION AND SUBMISSION INFORMATION

1. Address to View Broad Agency Announcement

This BAA may be accessed from the following:

- 1) Grants.gov (www.grants.gov)
- 2) FedBizOpps (www.fbo.gov)
- 3) ARL website <https://www.arl.army.mil/www/default.cfm?page=8>

Amendments, if any, to this BAA will be posted to these websites when they occur. Interested parties are encouraged to periodically check these websites for updates and amendment.

The following information is for those wishing to respond to the BAA:

2. Content and Form of Application Submission

a. General Information

A proposal submitted under this BAA must address unclassified fundamental research. Proposal submissions will be protected from unauthorized disclosure in accordance with applicable laws and DoD regulations. Applicants are expected to appropriately mark each page of their submission that contains proprietary information. Any proprietary data that the applicant intends to be used only by the Government for evaluation purposes must be clearly marked. The applicant must also identify any technical data or computer software contained in the proposal that is to be treated by the Government as limited rights in technical data and restricted rights in computer software. The participating DoD agencies will provide no funding for direct reimbursement of proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of participating DoD agencies to treat all proposals as sensitive, competitive information and to disclose their contents only for the purposes of evaluation.

Post-Employment Conflict of Interest: There are certain post-employment restrictions on former federal officers and employees, including special government employees (Section 207 of Title 18, U.S.C.). If an applicant believes a conflict of interest may exist, the situation should be discussed with TrojAI Program Point of Contact listed in Section II.H.: Agency Contacts, who will then coordinate with appropriate ARO legal personnel prior to having applicant expend time and effort in preparing a white paper or proposal.

Statement of Disclosure Preference: Please complete ARO Form 52 or 52A stating

your preference for release of information contained in your proposal. Copies of these forms are available at

<http://www.arl.army.mil/www/default.cfm?page=218#baaforms>

NOTE: A proposal may be handled for administrative purposes by support contractors. These support contractors are prohibited from competing on BAA proposals and are bound by appropriate non-disclosure requirements.

Equipment: Normally, title to equipment or other tangible property purchased with Government funds vests with nonprofit institutions of higher education or with nonprofit research organizations if vesting will facilitate scientific research performed for the Government. For profit, organizations are expected to possess the necessary plant and equipment to conduct the proposed research. Deviations may be made on a case-by-case basis to allow commercial organizations to purchase equipment but disposition instructions must be followed.

b. Preparing a Proposal

This format applies to all proposals submitted via email and via Grants.gov. Offerors' proposals should show the location of each section of the proposal, as well as major subdivisions of the project description.

i. COVER PAGE:

1. A Cover Page is required. For contract proposals submitted by email, use ARO Form 51. For all Assistance instruments and contract proposals submitted via Grants.gov, use the SF 424 (R&R) Form. Proposals will not be processed without either: (1) a signed Cover Page, ARO Form 51, or (2) a SF 424 (R&R) Form.
2. Should the project be carried out at a branch campus or other component of the submitting organization, that branch campus or component should be identified in the space provided (Block 11 on the ARO Form 51 and Block 12 on the SF424 R&R).
3. The title of the proposed project should be brief, scientifically representative, intelligible to a scientifically literate reader, and suitable for use in the public domain.
4. The proposed duration for which support is requested should be consistent with the program duration of twenty four months.
5. Specification of a desired starting date for the project is important and helpful however, requested effective dates cannot be guaranteed.
6. Pursuant to 31 U.S.C. 7701, as amended by the Debt Collection Improvement Act of 1996 [Section 31001(I)(1), Public Law 104-134], federal agencies shall obtain each awardees' Taxpayer Identification Number (TIN). This number may be the Employer Identification Number for a business or non-profit entity or the Social Security

Number for an individual. The TIN is being obtained for purposes of collecting and reporting on any delinquent amounts that may arise out of an awardees' relationship with the Government.

7. Offerors shall provide their organization's Unique Entity Identifier (formerly DUNS). This number is a nine-digit number assigned by Dun and Bradstreet Information Services. See Section II.E.2.d of this BAA for requirements pertaining to the Unique Entity Identifier.

8. Offerors shall provide their assigned Commercial and Government Entity (CAGE) Code. The CAGE Code is a 5-character code assigned and maintained by the Defense Logistics Service Center (DLSC) to identify a commercial plant or establishment.

ii. TABLE OF CONTENTS: Use the following format for the Table of Contents. Forms are available at <http://www.arl.army.mil/www/default.cfm?page=29> under "For the Researcher" (Forms, ARO BAA Forms).

SECTION	PAGE NUMBER
Table of Contents	A-1
Statement of Disclosure Preference (Form 52 or 52A)	B-1
Research & Related Other Project Information	B-2
Project Abstract	C-1
Project Description (Technical Proposal)	D-1 - D- <input type="checkbox"/>
Biographical Sketch	E-1 - E- <input type="checkbox"/>
Bibliography	F-1 - F- <input type="checkbox"/>
Current and Pending Support	G-1 - G- <input type="checkbox"/>
Facilities, Equipment, and Other Resources	H-1 - H- <input type="checkbox"/>
Proposal Budget	I-1 - I- <input type="checkbox"/>
Contract Facilities Capital Cost of Money (DD Form 1861)	J-1
Appendices	K- <input type="checkbox"/>
List Appendix Items: _____	

This format applies to proposals submitted via email and via Grants.gov. Offerors' proposals should show the location of each section of the proposal, as well as major subdivisions of the project description.

iii. STATEMENT OF DISCLOSURE PREFERENCE (FORM 52 OR 52A): Complete and sign ARO Form 52 (Industrial Contractors) or ARO Form 52A (Educational and Nonprofit Organizations).

iv. RESEARCH AND RELATED Other Project Information: Must be completed and signed by all organizations.

v. PROJECT ABSTRACT:

1. The Project Abstract shall be completed on the form entitled “Publicly Releasable Abstract” found at the following website:
<http://www.arl.army.mil/www/default.cfm?page=218>.
2. Unless otherwise instructed in this BAA, the Project Abstract shall include a concise statement of work and basic approaches to be used in the proposed effort. The abstract should include a statement of scientific objectives, methods to be employed, and the significance of the proposed effort to the advancement of knowledge.
3. The abstract should be no longer than one (1) page (maximum 4,000 characters).
4. The project abstract shall be marked by the applicant as publically releasable. By submission of the project abstract, the applicant confirms that the abstract is releasable to the public. For a proposal that results in a grant award, the project abstract will be posted to a searchable website available to the general public to meet the requirements of Section 8123 of the DoD Appropriations Act, 2015. The website address is
<https://dodgrantawards.dtic.mil/grants/#/home>

vi. TECHNICAL PROPOSAL (PROJECT DESCRIPTION): The technical portion of the proposal shall be no longer than 20 pages including tables and figures, single spaced text, size 12 Times New Roman font with one-inch page margins and shall contain the following:

1. Technical Approach: Proposed solutions to detecting Trojans, including key innovations, key challenges, and consideration of the current state of the field. Any initial results, including negative results, are not required but are welcome, including links to any public code repositories.
2. Management Approach: A discussion of the overall approach to the management of this effort, including brief discussions of: required facilities; relationships with any sub-awardees and with other organizations; availability of personnel; and planning, scheduling, and control procedures. A brief description of your organization, including if the offeror has extensive government contracting experience. If this information has been previously provided to the ARO, the information need not be provided again. A statement setting forth this condition should be made.
3. The names of other federal, state, local agencies, or other parties receiving the proposal and/or funding the proposed effort. If none, so state. Concurrent or later submission of the proposal to other organizations will not prejudice its review by the

ARO if we are kept informed of the situation.

4. The type of additional support, if any, requested (e.g., facilities, equipment, and materials). Government Furnished Information or Equipment (GFI/GFE) available to all proposers is described in A.2.4.

vii. BIOGRAPHICAL SKETCHES:

1. This Section shall contain the biographical sketches for senior and key personnel only.
 - a. Primary Principal Investigator: The “Primary” PI provides a single or initial point of communication between the sponsoring agency(s) and the awardee organization(s) about scientific matters. If not otherwise designated, the first PI listed will serve as the “Primary” PI. This individual can be changed with approval of the agency. The sponsoring agency(s) does not infer any additional scientific stature to this role among collaborating investigators.
 - b. Co-Principal Investigators: The individual(s) a research organization designates as having an appropriate level of authority and responsibility for the proper conduct of the research and submission of required reports to the agency. When an organization designates more than one PI, it identifies them as individuals who share the authority and responsibility for leading and directing the research, intellectually and logistically. The sponsoring agency(s) does not infer any distinction among multiple PIs.
 - c. Key personnel: The individual(s) a research organization designates as having a high level of technical expertise in the topics proposed to be researched and who will both play an active role in the research and supervise the work of more junior personnel on a daily basis.
2. The following information is required:
 - a. Relevant experience and employment history including a description of any prior Federal employment within one year preceding the date of proposal submission.
 - b. List of up to five (5) publications most closely related to the proposed project and up to five (5) other significant publications, including those being printed. Patents, copyrights, or software systems developed may be substituted for publications.
 - c. List of persons, other than those cited in the publications list, who have collaborated on a project or a book, article, report or paper within the last four (4) years. Include pending publications and submissions. Otherwise, state "None."

d. Names of each investigator's own graduate or post graduate advisors and advisees. The information provided in "c" and "d" is used to help identify potential conflicts or bias in the selection of reviewers.

e. The time commitment of each senior or key person to this project.

3. For the personnel categories of postdoctoral associates, other professionals, and students (research assistants), the proposal may include information on exceptional qualifications of these individuals that merit consideration in the evaluation of the proposal.

4. The biographical sketches are limited to three (3) pages per investigator and other individuals that merit consideration.

viii. BIBLIOGRAPHY: A bibliography of pertinent literature is required. Citations must be complete (including full name of author(s), title, and location in the literature).

ix. CURRENT AND PENDING SUPPORT:

1. All project support from whatever source must be listed. The list must include all projects requiring a portion of the principal investigator's and other senior personnel's time, even if they receive no salary support from the project(s) including Cooperative Research and Development Agreements (CRADAs) or other technology transfer agreements with federal labs. Funding provided under any award resulting from this BAA may only be used in support of the effort funded by that award, and not for any other project or purpose.

2. The information should include, as a minimum:

- (a) the project/proposal title and brief description,
- (b) the name and location of the organization or agency presently funding the work or requested to fund such work,
- (c) the award amount or annual dollar volume of the effort,
- (d) the period of performance, and
- (e) a breakdown of the time required of the principal investigator and/or other senior personnel.

x. FACILITIES, EQUIPMENT, AND OTHER RESOURCES: The offeror should include in the proposal a listing of facilities, equipment, and other resources already available to perform the research proposed.

xi. BUDGET PROPOSAL (including DD Form 1861):

1. Each proposal must contain a budget for each year of support requested and a cumulative budget for the full term of requested support. The budget form (Form 99) may be reproduced as needed. Locally produced versions may be used, but you may not make substitutions in prescribed budget categories nor alter or rearrange the cost categories as they appear on the form. The proposal may request funds under any of the categories listed so long as the item is considered necessary to perform the proposed work and is not precluded by applicable cost principles. Additionally, a budget by major proposed research tasks using the same budget categories must be included.
2. A signed summary budget page must be included. The documentation pages should be titled "Budget Explanation Page" and numbered chronologically starting with the budget form. The need for each item should be explained clearly.
3. All cost data must be current and complete. Costs proposed must conform to the following principles and procedures:

Educational Institutions: 2 CFR Part 200 (formerly OMB Circular A-21)
Nonprofit Organizations: 2 CFR Part 200 (formerly OMB Circular A-122*)
Commercial Organizations: FAR Part 31, DFARS Part 231, FAR Subsection 15.403-5, and DFARS Subsection 215.403-5.

*For those nonprofit organizations specifically exempt from the provisions of 2 CFR Part 230, FAR Part 31 and DFARS Part 231 shall apply.

4. Sample itemized budgets and the information they must include for a contract and for grants and cooperative agreements can be found at Section II. I. (Other Information). Before award it must be established that an approved accounting system and financial management system exist.

xii. APPENDICES: Some situations require that special information and supporting documents be included in the proposal before funding can be approved. Such information and documentation should be included by appendix to the proposal.

- (1) To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. A Section 1681 Et. Seq.), the Department of Defense is collecting certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in STEM disciplines. To enable this assessment, each application must include the following forms completed as indicated.

- (A) Research and Related Senior/Key Person Profile (Expanded) form:
The Degree Type and Degree Year fields on the Research and Related Senior/Key Person Profile (Expanded) form will be used by DoD as the source for career

information. In addition to the required fields on the form, applicants must complete these two fields for all individuals that are identified as having the project role of PD/PI or Co-PD/PI on the form. Additional senior/key persons can be added by selecting the “Next Person” button.

(B) Research and Related Personal Data form:

This form will be used by DoD as the source of demographic information, such as gender, race, ethnicity, and disability information for the Project Director/Principal Investigator and all other persons identified as Co-Project Director(s)/Co-Principal Investigator(s). Each application must include this form with the name fields of the Project Director/Principal Investigator or any Co-Project Director(s)/Co-Principal Investigator(s) completed; however, provision of the demographic information in the form is voluntary. If completing the form for multiple individuals, each Co-Project Director/Co-Principal Investigator can be added by selecting the “Next Person” button. The demographic information, if provided, will be used for statistical purposes only and will not be made available to merit reviewers. Applicants who do not wish to provide some or all of the information should check or select the “Do not wish to provide” option.

c. Submission of Complete Research Proposals

Proposals must be submitted through the offeror’s organizational office having responsibility for Government business relations. All signatures must be that of an official authorized to commit the organization in business and financial affairs. Proposals must be submitted electronically using one of the two following formats, based on award type sought. The content will remain the same whether using email or Grants.gov.

i. EMAIL SUBMISSION (for **Contracts only**):

1. Proposal requesting award of a contract must be emailed directly to usarmy.rtp.rdecom-aro.mbx.baa2@mail.mil Do not email full proposals to the TrojAI Program Point of Contact. All e-mailed proposals must contain the information outlined in Section II, E, 2, entitled “*Table of Contents*” including the electronic forms as follows:

- (a) ARO Form 51, Proposal Cover Page;
- (b) ARO Form 99, Summary Proposal Budget or equivalent,
- (c) ARO Current and Pending Support (unnumbered form),
- (d) ARO Form 52 or ARO Form 52a.

These forms may be accessed at:

<http://www.arl.army.mil/www/default.cfm?page=218#forms> under BAA Forms.

Note: The applicant must include with its proposal submission the representations required by Section II.G.2.c of this BAA. The representations must include applicant POC information and be signed by an authorized representative. Note: If the applicant's SAM Representations and Certifications include its response to the representations a hard copy representation is not required with proposal submission.

2. All forms requiring signature must be completed, printed, signed, and scanned into a PDF document. All documents must be combined into a single PDF formatted file to be attached to the e-mail.

3. Proposal documents (excluding required forms) must use the following format:

- Page Size – 8 ½ x 11 inches
- Margins – 1 inch
- Spacing – single
- Font – Times New Roman, 12 point, single-sided pages.

ii. GRANTS.GOV SUBMISSION (For **all proposals requesting assistance agreements**)

(1) Grants.gov Registration (See Section II.E.2.d below) must be accomplished prior to application submission in Grants.gov.

NOTE: All web links referenced in this section are subject to change by Grants.gov and may not be updated here.

(2) Specific forms are required for submission of a proposal. The forms are contained in the Application Package available through the Grants.gov application process. To access these materials, go to <http://www.grants.gov>, select "Apply for Grants," and then select "Get Application Package." A Grant Application Package and Application Instructions are available through the Grants.Gov Apply portal under CFDA Number 12.431/Funding Opportunity Number W911NF-19-S-0012. Select "Apply" and then "Apply Now Using Workspace."

*NOTE: Effective 31 December 2017, the legacy PDF application package on Grants.gov will be retired and applicants must apply online at Grants.gov using the application Workspace. For access to complete instructions on how to apply for opportunities using Workspace refer to <https://www.grants.gov/web/grants/applicants/workspace-overview.html>.

The following documents are mandatory: (1) Application for Federal Assistance (R&R) (SF 424 (R&R)), and (4) Attachments form.

(3) The SF 424 (R&R) form is to be used as the cover page for all proposals submitted via Grants.gov. The SF 424 (R&R) must be fully completed. Authorized Organization

Representative (AOR) usernames and passwords serve as “electronic signatures” when your organization submits applications through Grants.gov. By using the SF 424 (R&R), proposers are providing the certification required by 32 CFR Part 28 regarding lobbying (see Section II.G.2.a.ii of this BAA). Block 11, “Descriptive Title of Applicant’s Project,” must reference the research topic area being addressed in the effort by identifying the specific paragraph from Section II.A of this BAA.

(4) The Attachments form must contain the documents outlined in Section II.E.2.b.ii entitled “Table of Contents”. All documents must be combined into separate and single PDF formatted files using the Table of Contents names. Include “W911NF-19-S-0012” in the title so the proposal will be distinguished from other BAA submissions and upload each document to the mandatory Attachments form.

(5) The applicant must include with its proposal submission the representations required by Section II.G.2. of this BAA. The representations must include applicant POC information and be signed by an authorized representative. Attach the representations document to an available field within the Attachments form. Note: If the applicant’s SAM Representations and Certifications include its response to the representations a hard copy representation is not required with proposal submission.

(6) The Grants.gov User Guide at:

<https://www.grants.gov/help/html/help/index.htm#t=Applicants%2FGrantApplications.htm> will assist AORs in the application process. Remember that you must open and complete the Application for Federal Assistance (R&R) (SF 424 (R&R)) first, as this form will automatically populate data fields in other forms. If you encounter any problems, contact customer support at 1-800-518-4726 or at support@grants.gov. If you forget your user name or password, follow the instructions provided in the Credential Provider tutorial. Tutorials may be printed by right-clicking on the tutorial and selecting “Print”.

(7) As it is possible for Grants.gov to reject the proposal during this process, it is strongly recommended that proposals be uploaded at least two days before any established deadline in the BAA so that they will not be received late and be ineligible for award consideration. It is also recommended to start uploading proposals at least two days before the deadline to plan ahead for any potential technical and/or input problems involving the applicant’s own equipment.

d. Grants.Gov Registration

i. Each organization that desires to submit applications via Grants.Gov must complete a one-time registration. There are several one-time actions your organization must complete in order to submit applications through Grants.gov (e.g., obtain a Unique Entity Identifier, register with the SAM, register with the credential provider, register with Grants.gov and obtain approval for an AOR to submit applications on behalf of the organization). To

register please see

<https://www.grants.gov/help/html/help/index.htm#t=Register%2FRegister.htm>

ii. Please note the registration process for an Organization or an Individual can take between three to five business days or as long as four weeks if all steps are not completed in a timely manner.

iii. Questions relating to the registration process, system requirements, how an application form works, or the submittal process should be directed to Grants.gov at 1-800-518-4726 or support@grants.gov.

3. Unique Entity Identifier and System for Award Management (SAM)

a. Each applicant (unless the applicant is an individual or Federal awarding agency that is exempt from those requirements under 2 CFR 25.110(b) or (c), or has an exemption approved by the Federal awarding agency under 2 CFR 25.110(d)) is required to:

- i. Be registered in SAM prior to submitting its application;
- ii. Provide a valid unique entity identifier (formerly DUNS) in its application; and
- iii. Maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

b. The Federal awarding agency may not make a Federal award to an applicant until the applicant has complied with all applicable unique entity identifier and SAM requirements. If an applicant has not fully complied with the requirements by the time the Federal awarding agency is ready to make a Federal award, the Federal awarding agency may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal

4. Submission Dates and Times:

a. Proposals:

Proposals transmitted to be considered for award must be received by Grants.gov **no later than 4:00 PM Eastern Time on July 25, 2019**

Applicants are responsible for submitting electronic proposals in sufficient time to insure Grants.gov receives it by the time specified in this BAA. If the electronic proposal is received by Grants.gov after the exact time and date specified for receipt of offers, it will be considered “late” and will not be considered for award. Acceptable evidence to establish the time of receipt by Grants.gov includes documentary evidence of receipt maintained by Grants.gov.

Because of potential problems involving the applicants' own equipment, to avoid the possibility of late receipt and resulting in ineligibility for award consideration, it is strongly recommended that proposals be uploaded at least two business days before the deadline established in the BAA.

If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at grants.gov by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation closing date, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

b. Proposal Receipt Notices – After a proposal is submitted to Grants.gov, the AOR will receive a series of three emails from Grants.gov. The first two emails will be received within 24 to 48 hours after submission. The first email will confirm time of receipt of the proposal by the Grants.gov system and the second will indicate that the proposal has either been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. A third email will be received once the grantor agency has confirmed receipt of the proposal. Reference the Grants.gov User Guide at <https://www.grants.gov/help/html/help/index.htm?callingApp=custom#t=Applicants%2FCheckApplicationStatus%2FCheckApplicationStatus.htm> for information on how to track your application package.

For the purposes of this BAA, an applicant's proposal is not considered received by ARO until the ARO receives email #3.

5. Intergovernmental Review

Not Applicable

6. Funding Restrictions:

Multiple two-year awards are anticipated. The amount of each award will be contingent on availability of funds and the scope of the proposed work. Depending on the results of the proposal evaluation, there is no guarantee that any of the proposals submitted will be recommended for funding.

7. Other Submission Requirements:

Information to Be Requested from Successful Offerors- Offerors whose proposals are accepted for funding will be contacted before award to provide additional information required for award. The required information is normally limited to clarifying budget explanations, representations, certifications, and some technical aspects.

For Contracts Only- Performance Work Statements (PWS) - prior to award the Contracting Officer may request that the contractor submit a PWS for the effort to be performed, which will be incorporated into the contract at the time of award.

An applicant may withdraw a proposal at any time before award by written notice or by email. Notice of withdrawal shall be sent to the Contracting/Grants Officer identified in Section II. H, of this BAA. Withdrawals are effective upon receipt of notice by the Contracting/Grants Officer.

F. Application Review Information:

1. Criteria:

- a. Proposals submitted in response to this BAA will be evaluated on the following criteria of most importance:

(i) Scientific and Technical Merit of the Proposed Research

Overall scientific and technical merit of the proposal is substantiated, including unique and innovative methods, approaches, and/or concepts. The proposal clearly articulates an understanding of the problem to be solved. The technical approach is credible and includes a clear assessment of primary risks and a means to address them. The feasibility and likelihood that the proposed approach will satisfy the program's milestones and metrics are explicitly described and clearly substantiated along with risk mitigation strategies for achieving stated milestones and metrics. The proposed research advances the state of the art.

- b. Other evaluation criteria, of lesser importance, but weighted equal to each other include:

(i) Experience and qualifications of the principal investigator, other key research personnel, and the institution sponsoring the proposal

The proposer's capabilities, related experience, facilities, techniques, or unique combination of these which are integral factors for achieving the proposal's objectives will be evaluated, as well as qualifications, capabilities, and experience of the proposed principal investigator, team leader, and key personnel critical in achieving the proposal objectives. Time commitments of key personnel must be sufficient for their proposed responsibilities in the effort.

(ii) The realism and reasonableness of cost

The proposed resources are well justified and consistent with the unique technical approach and methods of performance described in the offeror's proposal. Proposed resources reflect a clear understanding of the project, a perception of the risks and the ability to organize and perform the work. The

labor hours and mix are consistent with the technical approach and are realistic for the work proposed. Material, equipment, software, data collection and travel, especially foreign travel, are well justified, reasonable and required for successful execution of the proposed work.

NOTE: Cost sharing will not be considered in the evaluation.

2. Review and Selection Process:

The proposal selection process will be conducted based upon a technical review by a panel of government scientists according to the evaluation criteria specified in Section II.F.1 (*Criteria*). Each proposal will be evaluated based on the merit and relevance of the specific proposal as it relates to the research topic rather than against other proposals for research in the same general area.

3. Recipient Qualification

a. For Grant and Cooperative Agreement Proposals:

i. The Grants Officer is responsible for determining a recipient's qualification prior to award. In general, a Grants Officer will award grants or cooperative agreements only to qualified recipients that meet the standards at 32 CFR 22.415. To be qualified, a potential recipient must:

(1) Have the management capability and adequate financial and technical resources, given those that would be made available through the grant or cooperative agreement, to execute the program of activities envisioned under the grant or cooperative agreement;

(2) Have a satisfactory record of executing such programs or activities (if a prior recipient of an award);

(3) Have a satisfactory record of integrity and business ethics; and

(4) Be otherwise qualified and eligible to receive a grant or cooperative agreement under applicable laws and regulations.

Applicants are requested to provide information with proposal submissions to assist the Grants Officer's evaluation of recipient qualification.

ii. In accordance with Office of Management and Budget (OMB) guidance in parts 180 and 200 of Title 2, CFR, it is DoD policy that DoD Components must report and use integrity and performance information in the Federal Awardee Performance and Integrity Information System (FAPIIS), or any successor system designated by OMB,

concerning grants, cooperative agreements, and TIAs as follows:

If the total Federal share will be greater than the simplified acquisition threshold on any Federal award under a notice of funding opportunity (see 2 CFR 200.88 Simplified Acquisition Threshold):

(1) The Federal awarding agency, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, will review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313);

(2) An applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM;

(3) The Federal awarding agency will consider any comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.205 Federal awarding agency review of risk posed by applicants.

b. For CONTRACT Proposals:

(i) The Federal Awardee Performance and Integrity Information System (FAPIIS) will be checked prior to making an award. The web address is: <https://www.fapiis.gov/fapiis/index.action> The applicant representing the entity may comment in this system on any information about itself that a Federal Government Official entered. The information in FAPIIS will be used in making a judgment about the entity's integrity, business ethics, and record of performance under Federal awards that may affect the official's determination that the applicant is qualified to receive an award.

G. Award Administration Information:

1. Award Notices:

Initial notification of selection of proposals for funding will be e-mailed by ARO to successful offerors on or about Sept 1st, 2019. Unsuccessful offerors will be notified shortly thereafter.

The notification e-mail must not be regarded as an authorization to commit or expend funds.

The Government is not obligated to provide any funding until a Government Contracting/ Grants Officer signs the grant, cooperative agreement or contract award document.

Applicants whose proposals are recommended for negotiation of award will be contacted by a Contract/Grant Specialist to discuss additional information required for award. This may include representations and certifications, revised budgets or budget explanations, certificate of current cost or pricing data, subcontracting plan for small businesses, and other information as applicable to the proposed award.

2. Administrative and National Policy Requirements:

a. Required Representations and Certifications:

i. Contract Proposals:

(1) Representations and certifications shall be completed by successful applicants prior to award. FAR Online Representations and Certifications are to be completed through SAM at <https://www.sam.gov/SAM/>. As appropriate, DFARS and contract-specific certification packages will be provided to the contractor for completion prior to award.

(2) FAR 52.203-18, PROHIBITION ON CONTRACTING WITH ENTITIES THAT REQUIRE CERTAIN CONFIDENTIALITY AGREEMENTS OR STATEMENTS— REPRESENTATION (JAN 2017)

(a) Definition. As used in this provision--

“Internal confidentiality agreement or statement”, “subcontract”, and “subcontractor”, are defined in the clause at 52.203-19, Prohibition on Requiring Certain Internal Confidentiality Agreements or Statements.

(b) In accordance with section 743 of Division E, Title VII, of the Consolidated and Further Continuing Appropriations Act, 2015 (Pub. L. 113-235) and its successor provisions in subsequent appropriations acts (and as extended in continuing resolutions), Government agencies are not permitted to use funds appropriated (or otherwise made available) for contracts with an entity that requires employees or subcontractors of such entity seeking to report waste, fraud, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or subcontractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(c) The prohibition in paragraph (b) of this provision does not contravene requirements applicable to SF 312, (Classified Information Nondisclosure Agreement), Form 4414 (Sensitive Compartmented Information Nondisclosure Agreement), or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(d) Representation. By submission of its offer, the applicant represents that it will not require its employees or subcontractors to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or subcontractors from lawfully reporting waste, fraud, or abuse related to the performance of a Government contract to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information (e.g., agency Office of the Inspector General).

(3) FAR 52.209-11, REPRESENTATION BY CORPORATIONS REGARDING DELINQUENT TAX LIABILITY OR A FELONY CONVICTION UNDER FEDERAL LAW (FEB 2016)

As required by sections 744 and 745 of Division E of the Consolidated and Further Continuing Appropriations Act, 2015 (Pub. L 113-235), and similar provisions, if contained in subsequent appropriations acts, the Government will not enter into a contract with any 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, where the awarding agency is aware of the unpaid tax liability, unless an agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or

Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an 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.

The applicant 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; and

It is is not a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

ii. Grant and Cooperative Agreement Proposals:

(1) Grant awards greater than \$100,000 require a certification of compliance with a national policy mandate concerning lobbying. Statutes and Government-wide regulations require the

certification to be submitted prior to award. When submitting your grant through Grants.gov, by completing blocks 18 and 19 of the SF 424 (R&R) Form, the grant applicant is providing the certification on lobbying required by 32 CFR Part 28; otherwise a copy signed by the AOR must be provided. Below is the required certification:

CERTIFICATION AT APPENDIX A TO 32 CFR PART 28 REGARDING LOBBYING: Certification for Contracts, Grants, Loans, and Cooperative Agreements the undersigned certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than 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 in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit SF-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(2) In accordance with Continuing Appropriations Act, 2017 (Pub. L. 114-223), or any other Act that extends to fiscal year (FY) 2017 funds the same prohibitions as contained in section 743, division E, title VII, of the Consolidated Appropriations Act, 2016 (Pub. L. 114-113), none of the funds appropriated or otherwise made available by that or any other Act may be made available for a grant or cooperative agreement with an entity that requires its employees or contractors seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting those employees or contractors from lawfully reporting that waste, fraud, or abuse to a designated investigative or law

enforcement representative of a Federal department or agency authorized to receive the information.

PROHIBITION ON CONTRACTING WITH ENTITIES THAT REQUIRED CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS – REPRESENTATION

Agreement with the representation below will be affirmed by checking the “I agree” box in block 17 of the SF424 (R&R) as part of the electronic proposal submitted via Grants.gov. The representation reads as follows:

By submission of its proposal or application, the applicant represents that it does not require any of its employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting those employees, contractors, subrecipients from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

*Note that: Section 743 states that it does not contravene requirements applicable to SF 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(3) Recipients are required to submit the following representation with the application package IAW the instructions at Section II.G.2. of this BAA:

REPRESENTATIONS UNDER DOD ASSISTANCE AGREEMENTS: APPROPRIATIONS PROVISIONS ON TAX DELINQUENCY AND FELONY CONVICTIONS

The applicant is () is not () a “Corporation” meaning any entity, including any institution of higher education, other nonprofit organization, or for-profit entity that has filed articles of incorporation.

If the applicant is a “Corporation” please complete the following representations:

(a) The applicant 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 applicant represents that it is () is not () is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

NOTE: If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the agency suspension and debarment

official (SDO) has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore should provide information about its tax liability or conviction to the agency's SDO as soon as it can do so, to facilitate completion of the required considerations before award decisions are made.

b. Policy Requirements:

The following list provides notable national policy requirements that may be applicable to an award. NOTE: The following is not an all-inclusive list of policy requirements. For assistance awards, refer to the DoD Research and Development General Terms and Conditions at <https://www.onr.navy.mil/work-with-us/manage-your-award/manage-grant-award/grants-terms-conditions> for additional national policy requirements that may apply. For contract awards, appropriate clauses will be added to award documents.

i. PROTECTION OF HUMAN SUBJECTS:

(1) Assistance Instruments:

(a) The recipient must protect the rights and welfare of individuals who participate as human subjects in research under this award and comply with the requirements at 32 CFR part 219, Department of Defense Instruction (DoDI) 3216.02, 10 U.S.C. 980, and when applicable, Food and Drug Administration (FDA) regulations.

(b) The recipient must not begin performance of research involving human subjects, also known as human subjects research (HSR), that is covered under 32 CFR part 219, or that meets exemption criteria under 32 CFR 219.101(b), until you receive a formal notification of approval from a DoD Human Research Protection Official (HRPO). Approval to perform HSR under this award is received after the HRPO has performed a review of the recipient's documentation of planned HSR activities and has officially furnished a concurrence with the recipient's determination as presented in the documentation.

(c) In order for the HRPO to accomplish this concurrence review, the recipient must provide sufficient documentation to enable his or her assessment as follows:

(i) If the HSR meets an exemption criteria under 32 CFR 219.101(b), the documentation must include a citation of the exemption category under 32 CFR 219.101(b) and a rationale statement.

(ii) If the recipient's activity is determined as "non-exempt research involving human subjects", the documentation must include:

- Assurance of Compliance (i.e., Department of Health and Human Services Office for Human Research Protections (OHRP) Federal Wide Assurance (FWA)) appropriate for the scope of work or program plan; and

- Institutional Review Board (IRB) approval, as well as all documentation reviewed by the IRB to make their determination.

(d) The HRPO retains final judgment on what activities constitute HSR, whether an exempt category applies, whether the risk determination is appropriate, and whether the planned HSR activities comply with the requirements in paragraph (a) of this section.

(e) The recipient must notify the HRPO immediately of any suspensions or terminations of the Assurance of Compliance.

(f) DoD staff, consultants, and advisory groups may independently review and inspect the recipient's research and research procedures involving human subjects and, based on such findings, DoD may prohibit research that presents unacceptable hazards or otherwise fails to comply with DoD requirements.

(g) Definitions for terms used in this article are found in DoDI 3216.02.

(2) Contracts: The appropriate clauses shall be added to the award.

ii. ANIMAL USE:

(1) Assistance Instruments:

(a) Prior to initiating any animal work under the award, the recipient must:

(i) Register the recipient's research, development, test, and evaluation or training facility with the Secretary of Agriculture in accordance with 7 U.S.C. 2136 and 9 CFR section 2.30, unless otherwise exempt from this requirement by meeting the conditions in 7 U.S.C. 2136 and 9 CFR parts 1-4 for the duration of the activity.

(ii) Have the recipient's proposed animal use approved in accordance with DoDI 3216.01, Use of Animals in DoD Programs by a DoD Component Headquarters Oversight Office.

(iii) Furnish evidence of such registration and approval to the grants officer.

(b) The recipient must make the animals on which the research is being conducted, and all premises, facilities, vehicles, equipment, and records that support animal care and use available during business hours and at other times mutually agreeable to the recipient, the United States Department of Agriculture Office of Animal and Plant Health Inspection Service (USDA/APHIS) representative, personnel representing the DoD component oversight offices, as well as the grants officer, to ascertain that the recipient is compliant with 7 U.S.C. 2131 et seq., 9 CFR parts 1-4, and DoDI 3216.01.

(c) The recipient's care and use of animals must conform with the pertinent laws of the United States, regulations of the Department of Agriculture, and regulations, policies, and procedures of the DoD (see 7 U.S.C. 2131 et seq., 9 CFR parts 1-4, and DoDI 3216.01).

(d) The recipient must acquire animals in accordance with DoDI 3216.01.

(2) Contracts: The appropriate clauses shall be added to the award.

iii. BIOLOGICAL SAFETY PROGRAM REQUIREMENTS:

(1) Assistance Instruments and Contracts: Awards may be subject to biological safety program requirements IAW:

(a) Army Regulation (AR) 385-10, Chapter 20

http://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/r385_10.pdf

(b) Department of Army (DA) Pamphlet (PAM) 385-69

http://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/p385_69.pdf

(c) DoD Manual 6055.18-M, Enclosure 4, Section 13

<https://www.hsdl.org/?abstract&did=24365>

(d) DoD Executive Agent List (see item 3)

https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN3387_AR10-90_Web_FINAL.pdf

iv. MILITARY RECRUITING:

(1) Assistance Instruments: This is to notify potential applicants that each grant or cooperative agreement awarded under this announcement to an institution of higher education must include the following term and condition:

(a) As a condition for receiving funds available to the DoD under this award, you agree that you are not an institution of higher education (as defined in 32 CFR part 216) that has a policy or practice that either prohibits, or in effect prevents:

(i) The Secretary of a Military Department from maintaining, establishing, or operating a unit of the Senior Reserve Officers Training Corps (ROTC)—in accordance with 10 U.S.C. 654 and other applicable Federal laws—at that institution (or any sub-element of that institution);

(ii) Any student at that institution (or any sub-element of that institution) from enrolling in a unit of the Senior ROTC at another institution of higher education.

(iii) The Secretary of a Military Department or Secretary of Homeland Security from gaining

access to campuses, or access to students (who are 17 years of age or older) on campuses, for purposes of military recruiting in a manner that is at least equal in quality and scope to the access to campuses and to students that is provided to any other employer; or

(iv) Access by military recruiters for purposes of military recruiting to the names of students (who are 17 years of age or older and enrolled at that institution or any sub-element of that institution); their addresses, telephone listings, dates and places of birth, levels of education, academic majors, and degrees received; and the most recent educational institutions in which they were enrolled.

(b) If you are determined, using the procedures in 32 CFR part 216, to be such an institution of higher education during the period of performance of this award, we:

(i) Will cease all payments to you of DoD funds under this award and all other DoD grants and cooperative agreements; and

(ii) May suspend or terminate those awards unilaterally for material failure to comply with the award terms and conditions.

(2) Contracts: Each contract awarded under this announcement to an institution of higher education shall include the following clause: DFARS 252.209-7005, Military Recruiting on Campus.

v. SUBCONTRACTING:

(1) Assistance Instruments: N/A

(2) Contracts: Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)), it is the policy of the Government to enable small business and small disadvantaged business (SDB) concerns to be considered fairly as subcontractors. All other than U.S. small businesses proposing contracts expected to exceed \$700,000 and that have subcontracting possibilities are required to submit a subcontracting plan IAW FAR 19.702(a), and shall do so with their proposal.

Subcontracting plans are determined to be acceptable or unacceptable based on the criteria established at FAR 19.705-4, DFARS 219.705-4, and AFARS 5119.705-4. Goals are established on an individual contract basis and should result in realistic, challenging and attainable goals that, to the greatest extent possible, maximize small business participation in subcontracting for Small Business, SDB, Woman-Owned Small Business (WOSB), Economically-Disadvantaged Women-Owned Small Business (EDWOSB), Service-Disabled Veteran-Owned Small Business (SDVOSB), Veteran-Owned Small Business (VOSB), and Historically Underutilized Business Zone (HUBZone) Small Business consistent with applicants' make-or-buy policy, the pool of and availability of qualified and capable small business subcontractors, their performance on subcontracts, and existing relationships with

suppliers.

Subcontracting goals should result in efficient contract performance in terms of cost, schedule, and performance and should not result in increased costs to the Government or undue administrative burden to the prime contractor. For reference, DoD Small Business Subcontracting Goals may be found at:

<https://business.defense.gov/About/Goals-and-Performance/>

vi. EXPORT CONTROL LAWS:

(1) Assistance Instruments: N/A

(2) Contracts: Applicants should be aware of current export control laws and are responsible for ensuring compliance with all International Traffic in Arms Regulation (ITAR) (22 CFR 120 et. Seq.) requirements, as applicable. In some cases, developmental items funded by the Department of Defense are now included on the United States Munition List (USML) and are therefore subject to ITAR jurisdiction. Applicants should address in their proposals whether ITAR restrictions apply or do not apply, such as in the case when research products would have both civil and military application, to the work they are proposing to perform for the Department of Defense. The USML is available online at <https://www.ecfr.gov/cgi-bin/text-idx?node=pt22.1.121>. Additional information regarding the President's Export Control Reform Initiative can be found at <https://2016.export.gov/ecr/index.asp>

vii. DRUG-FREE WORKPLACE:

(1) Assistance Instruments: The recipient must comply with drug-free workplace requirements in Subpart B of 2 CFR part 26, which is the DoD implementation of 41 U.S.C. chapter 81, "Drug-Free Workplace."

(2) Contracts: The appropriate clause(s) shall be added to the award.

viii. DEBARMENT AND SUSPENSION:

(1) Assistance Instruments: The recipient must comply with requirements regarding debarment and suspension in Subpart C of 2 CFR part 180, as adopted by DoD at 2 CFR part 1125. This includes requirements concerning the recipient's principals under an award, as well as requirements concerning the recipient's procurement transactions and subawards that are implemented in DoD Research and Development General Terms and Conditions PROC Articles I through III and SUB Article II.

(2) Contracts: The appropriate clause(s) shall be added to the award.

ix. REPORTING SUBAWARDS AND EXECUTIVE COMPENSATION:

(1) Assistance Instruments: The recipient must report information about subawards and executive compensation as specified in the award term in Appendix A to 2 CFR part 170, “Reporting subaward and executive compensation information,” modified as follows:

(a) To accommodate any future designation of a different Government wide Web site for reporting subaward information, the Web site “<http://www.fsr.gov>” cited in paragraphs a.2.i. and a.3 of the award provision is replaced by the phrase “<http://www.fsr.gov> or successor OMB-designated Web site for reporting subaward information”;

(b) To accommodate any future designation of a different Government wide Web site for reporting executive compensation information, the Web site “<http://www.sam.gov>” cited in paragraph b.2.i. of the award provision is replaced by the phrase “<https://www.sam.gov> or successor OMB-designated Web site for reporting information on total compensation”; and

(c) The reference to “Sec. __.210 of the attachment to OMB Circular A-133, “Audits of States, Local Governments, and Non-Profit Organizations” in paragraph e.3.ii of the award term is replaced by “2 CFR 200.330, as implemented in DoD Research and Development General Terms and Conditions SUB Article I of this award.”

(2) Contracts: The appropriate clause(s) shall be added to the award.

3. Reporting:

Additional reports including number and types will be specified in the award document, but will include as a minimum quarterly technical and monthly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed upon before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A final report that summarizes the project and tasks will be required at the conclusion of the performance period for the award.

ARMY MANPOWER CONTRACTOR REPORTING: For Contracts Only. The Office of the Assistant Secretary of the Army (Manpower & Reserve Affairs) operates and maintains a secure Army data collection site where the contractor will report ALL contractor manpower (including subcontractor manpower) required for performance of this contract. The contractor is required to completely fill in all the information in the format using the following web address: <https://www.ecmra.mil/Default.aspx> The required information includes:

- (1) Contracting Office, Contracting Officer, Contracting Officer’s Technical Representative;
- (2) Contract number, including task and delivery order number;
- (3) Beginning and ending dates covered by reporting period;
- (4) Contractor name, address, phone number, e-mail address, identity of contractor employee entering data;

- (5) Estimated direct labor hours (including sub-contractors);
- (6) Estimated direct labor dollars paid this reporting period (including sub- contractors);
- (7) Total payments (including sub-contractors);
- (8) Predominate Federal Service Code (FSC) reflecting services provided by contractor (and separate predominant FSC for each sub-contractor if different);
- (9) Estimated data collection cost;
- (10) Organizational title associated with the Unit Identification Code (UIC) for the Army Requiring Activity (the Army Requiring Activity is responsible for providing the contractor with its UIC for the purposes of reporting this information);
- (11) Locations where contractor and sub-contractors perform the work (specified by zip code in the United States and nearest city, country, when in an overseas location, using standardized nomenclature provided on website);
- (12) Presence of deployment or contingency contract language; and
- (13) Number of contractor and sub-contractor employees deployed in theater this reporting period (by country).

As part of its submission, the contractor will also provide the estimated total cost (if any) incurred to comply with this reporting requirement. Reporting period will be the period of performance not to exceed 12 months ending 30 September of each government fiscal year and must be reported by 31 October of each calendar year.

Contractors may use a direct XML data transfer to the database server or fill in the fields on the website. The XML direct transfer is a format for transferring files from a contractor's systems to the secure web site without the need for separate data entries for each required data element at the web site. The specific formats for the XML direct transfer may be downloaded from the web site.

If the total Federal share exceeds \$500,000 on any Federal award under a notice of funding opportunity, the post-award reporting requirements reflected in Appendix XII to Part 200 of Title 2 CFR will be included in the award document. This requirement also applies to modifications of awards that: 1) increase the scope of the award, 2) are issued on or after January 1, 2016, and 3) increase the federal share of the award's total value to an amount that exceeds \$500,000.

H. Agency Contacts:

Questions of a technical nature or a programmatic nature shall be directed as specified below:

Technical Program Point of Contact (Army Research Office):

Dr. Cliff Wang

Email Address: cliff.x.wang.civ@mail.mil

Technical Program Point of Contact (Intelligence Advanced Research Projects Activity):

Dr. Jeff Alstott

Email Address: jeff.alstott@iarpa.gov

Questions of a business nature shall be directed to the cognizant Grants/Contracting Officer, as specified below:

Mr. Kevin Bassler

Contracting/Grants Officer

Email address: kevin.j.bassler.civ@mail.mil

Comments or questions submitted should be concise and to the point, eliminating any unnecessary verbiage. In addition, the relevant part and paragraph of the Broad Agency Announcement (BAA) should be referenced.

I. Other Information:

Below are 2 separate outlines of the informational requirements for a sample cost proposal. I.1. is for a procurement contract and I.2 for grants and cooperative agreements.

1. CONTRACT Proposals:

Cost Proposal – {No Page Limit} Cover sheet to include:

- (1) BAA number;
- (2) Technical area;
- (3) Lead Organization submitting proposal;
- (4) Type of business, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”;
- (5) Contractor’s reference number (if any);
- (6) Other team members (if applicable) and type of business for each;
- (7) Proposal title;
- (8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
- (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
- (10) Award instrument requested: cost-plus-fixed-fee (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (specify).
- (11) Place(s) and period(s) of performance;
- (12) Total proposed cost separated by basic award and option(s) (if any);
- (13) Name, address, and telephone number of the proposer’s cognizant Defense Contract

- Management Agency (DCMA) administration office (if known);
- (14) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (if known);
 - (15) Date proposal was prepared;
 - (16) DUNS number;
 - (17) TIN number; and
 - (18) Cage Code;
 - (19) Subcontractor Information; and
 - (20) Proposal validity period
 - (21) Any Forward Pricing Rate Agreement, other such approved rate information, or such other documentation that may assist in expediting negotiations (if available).

I. Reasoning for Submitting a Strong Cost Proposal

The ultimate responsibility of the Contracting Officer is to ensure that all prices offered in a proposal are fair and reasonable before contract award [FAR 15.4]. To establish the reasonableness of the offered prices, the Contracting Officer may ask the offeror to provide various supporting documentation that assists in this determination. The offeror's ability to be responsive to the Contracting Officer's requests can expedite contract award. As specified in Section 808 of Public Law 105-261, an offeror who does not comply with a requirement to submit information for a contract or subcontract in accordance with paragraph (a)(1) of FAR 15.403-3 may be ineligible for award.

II. DCAA-Accepted Accounting System

- A) Before a contract can be awarded, the Contracting Officer must confirm that the offeror has a Defense Contract Audit Agency (DCAA)-accepted accounting system in place for accumulating and billing costs under Government contracts [FAR 53.209-1(f)]. If the offeror has DCAA correspondence, which documents the acceptance of their accounting system, this should be provided to the Contracting Officer (i.e. attached or referenced in the proposal). Otherwise, the Contracting Officer will submit an inquiry directly to the appropriate DCAA office and request a review of the offeror's accounting system.
- B) If an offeror does not have a DCAA-accepted accounting system in place, the DCAA review process can take several months depending upon the availability of the DCAA auditors and the offeror's internal processes. This will cause a delay in contract award.
- C) For more information about cost proposals and accounting standards, view the link titled "Information for Contractors" on the main menu on their website.

III. Field Pricing Assistance

During the pre-award cost audit process, the Contracting Officer will solicit support from DCAA to determine commerciality and price reasonableness of the proposal [FAR 15.404-2].

Any proprietary information or reports obtained from DCAA field audits will be appropriately identified and protected within the Government.

IV. Sample Cost Proposal – “Piece by Piece”

- A) To help guide offerors through the pre-award cost audit process, a sample cost proposal is detailed below. This sample also allows the offeror to see exactly what the Government is looking for; therefore, all cost and pricing back-up data can be provided to the Government in the first cost proposal submission. Review each cost element within the proposal, and take note of the types of documentation that the Contracting Officer will require from the offeror.

- B) Direct Labor: The first cost element included in the cost proposal is Direct Labor. The Department of Defense (DoD) requires each proposed employee to be listed by name and labor category.

Below is the Direct Labor as proposed by our sample offeror:

DIRECT LABOR		YEAR 1			YEAR 2		
Employee Name	Labor Category	Direct Hourly Rate	Hours	Total Direct Labor	Direct Hourly Rate	Hours	Total Direct Labor
Andy Smith	Program Manager	\$55.00	720.00	\$39,600.00	\$56.65	720.00	\$40,788.00
Bryan Andrew	Senior Engineer	\$40.00	672.00	\$26,880.00	\$41.20	672.00	\$27,686.40
Cindy Thomas	Principal Engineer	\$50.00	512.00	\$25,600.00	\$51.50	512.00	\$26,368.00
David Porter	Entry Level Engineer	\$10.00	400.00	\$4,000.00	\$10.30	400.00	\$4,120.00
Edward Bean	Project Administrator	\$25.00	48.00	\$1,200.00	\$25.75	48.00	\$1,236.00
Subtotal Direct Labor				\$97,280.00			\$100,198.40

- 1) For this cost element, the Contracting Officer requires the offeror to provide adequate documentation in order to determine that each labor rate for each employee/labor category is fair and reasonable. The documentation will need to explain how these labor rates were derived. For example, if the rates are DCAA- approved labor rates, provide the Contracting Officer with copies of the DCAA documents stating the approval. This is the most acceptable means of documentation to determine the rates fair and reasonable. Other types of supporting documentation may include General Service Administration (GSA) contract price lists, actual payroll journals, or Salary.com research. If an employee listed in a cost proposal is not a current employee (maybe a new employee, or one contingent upon the award of this contract), a copy of the offer letter stating the hourly rate - signed and accepted by the employee - may be provided as adequate documentation. Sometimes the hourly rates listed in a proposal are derived through subjective processes, i.e., blending of multiple employees in one labor category, or averaged over the course of the year to include scheduled payroll increases, etc. These situations should be clearly documented for the Contracting Officer.
- 2) Another cost element in Direct Labor is labor escalation, or the increase in labor rates from Year 1 to Year 2. In the example above, the proposed labor escalation is 3% (ex., Andy Smith increased from \$55.00/hr in Year 1, by 3% to \$56.65/hr in Year 2). Often times, an offeror may not propose escalation on labor rates during a 24-month period. Whatever the proposed escalation rate is, please be prepared to explain why it is fair and reasonable [ex., A sufficient explanation for our sample escalation rate would be the Government's General Schedule Increase and Locality Pay for the same time period (name FY) in the same location (name location) was published as 3.5%, therefore a 3% increase is fair and reasonable].

C) Other Direct Costs (ODCs): This section of the cost proposal includes all other directly related costs required in support of the effort i.e., materials, subcontractors, consultants, travel, etc. Any cost element that includes various items will need to be detailed in a cost breakdown to the Contracting Officer.

- 1) Direct Material Costs: This subsection of the cost proposal will include any special tooling, test equipment, and material costs necessary to perform the project. Items included in this section will be carefully reviewed relative to need and appropriateness for the work proposed, and must, in the opinion of the Contracting Officer, be advantageous to the Government and directly related to the specific topic.

a) The Contracting Officer will require adequate documentation from the offeror to determine the cost reasonableness for each material cost proposed. The following methods are ways in which the Contracting Officer can determine this [FAR 15.403-1].

i) Adequate Price Competition. A price is based on adequate price competition when the offeror solicits and receives quotes from two or more responsible vendors for the same or similar items or services. Based on these quotes, the offeror selects the vendor who represents the best value to the Government. The offeror will be required to provide copies of all vendor quotes received to the Contracting Officer.

Note: Price competition is not required for items at or below the micropurchase threshold (\$3,000) [FAR 15.403-1]. If an item's unit cost is less than or equal to \$3,000, price competition is not necessary.

However, if an item's total cost over the period of performance (unit cost * quantity is higher than \$3,000, two or more quotes must be obtained by the offeror.

ii) Commercial Prices. Commercial prices are those published on current price lists, catalogs, or market prices. This includes vendors who have prices published on a GSA-schedule contract. The offeror will be required to provide copies of such price lists to the Contracting Officer.

iii) Prices set by law or regulation. If a price is mandated by the Government (i.e. pronouncements in the form of periodic rulings, reviews, or similar actions of a governmental body, or embodied in the laws) that is sufficient to set a price.

b) Below is the list of Direct Material costs included in our sample proposal:

i)

DIRECT MATERIAL COSTS:	YEAR 1	YEAR 2
Raw Materials	\$35,000.00	\$12,000.00
Computer for experiments	\$4,215.00	\$0.00
Cable (item #12-3657, 300 ft)	\$1,275.00	\$0.00
Software	\$1,825.00	\$1,825.00
Subtotal Direct Materials Costs (DM):	\$42,315.00	\$13,825.00

- ii) “Raw Materials”: This is a generic label used to group many material items into one cost item within the proposal. The Contracts Officer will require a detailed breakout of all the items that make up this cost. For each separate item over \$3,000 (total for Year 1 + Year 2), the offeror must be able to provide either competitive quotes received, or show that published pricing was used.
 - iii) “Computer for experiments”: Again, this item is most likely a grouping of several components that make up one system. The Contracts Officer will require a detailed breakout of all the items that makeup this cost. For each separate item over \$3,000 (total for Year 1 + Year 2), the offeror must be able to provide either competitive quotes received, or show that published pricing was used.
 - iv) “Cable”: Since this item is under the simplified acquisition threshold of \$3,000, competitive quotes or published pricing are not required. Simply provide documentation to show the Contracting Officer where this price came from.
 - v) “Software”: This cost item could include either one software product, or multiple products. If this includes a price for multiple items, please provide the detailed cost breakdown. Note: The price for Year 1 (\$1,825) is below the simplified acquisition threshold; however, in total (Year 1 + Year 2) the price is over \$3,000, so competitive quotes or published pricing documentation must be provided.
- c) Due to the specialized types of products and services necessary to perform these projects, it may not always be possible to obtain competitive quotes from more than one reliable source. Each cost element over the simplified acquisition threshold (\$3,000) must be substantiated. There is always an explanation for HOW the cost of an item was derived; show us how you came up with that price!
- d) When it is not possible for an offeror to obtain a vendor price through competitive quotes or published price lists, a Contracting Officer may accept other methods to determine cost reasonableness. Below are some examples of other documentation, which the Contracting Officer may accept to substantiate costs:
- i) Evidence that a vendor/supplier charged another offeror a similar price for similar services. Has the vendor charged someone else for the same product? (Two (2) to three (3) invoices from that vendor to different customers may be used as evidence.)

- ii) Previous contract prices. Has the offeror charged the Government a similar price under another Government contract for similar services? If the Government has already paid a certain price for services, then that price may already be considered fair and reasonable. (Provide the contract number, and billing rates for reference.)
 - iii) DCAA approved. Has DCAA already accepted or verified specific cost items included in your proposal? (Provide a copy of DCAA correspondence that addressed these costs.)
- 2) Below is the remaining ODC portion of our proposal including equipment, subcontractors, consultants, and travel. Assume in this scenario that competitive quotes or catalog prices were not available for these items:

OTHER DIRECT COSTS:	YEAR 1	YEAR 2
Equipment Rental for Analysis	\$5,500.00	\$5,600.00
Subcontractor – Lockheed	\$25,000.00	\$0.00
Consultant: John Bowers	\$0.00	\$12,000.00
Travel	\$1,250.00	\$1,250.00
Subtotal Other Direct Costs (ODC):	\$31,750.00	\$18,850.00

- a) “Equipment Rental for Analysis”: The offeror explains that the Year 1 cost of \$5,500 is based upon 250 hours of equipment rental at an hourly rate of \$22.00/hr. One (1) invoice from the vendor charging another vendor the same price for the same service is provided to the Contracting Officer as evidence. Since this cost is over the simplified acquisition threshold, further documentation to determine cost reasonableness is required. The offeror is able to furnish another invoice charging a second vendor the same price for the same service.
- b) “Subcontractor – Widget, Inc.”: The offeror provides a copy of the subcontractor quote to the Contracting Officer in support of the \$25,000 cost. This subcontractor quote must include sufficient detailed information (equivalent to the data included in the prime’s proposal to the Government), so that the Contracting Officer can make a determination of cost reasonableness.
 - i) As stated in Section 3.5(c)(6) of the DoD Cost Proposal guidance, “All subcontractor costs and consultant costs must be detailed at the same level as prime contractor costs in regards to labor, travel, equipment, etc. Provide detailed substantiation of subcontractor costs in your cost proposal.”

- ii) In accordance with FAR 15.404-3, “the Contracting Officer is responsible for the determination of price reasonableness for the prime contract, including subcontracting costs”. This means that the subcontractor’s quote/proposal may be subject to the same scrutiny by the Contracting Officer as the cost proposal submitted by the prime. The Contracting Officer will need to determine whether the subcontractor has an accepted purchasing system in place and/or conduct appropriate cost or price analyses to establish the reasonableness of proposed subcontract prices. Due to the proprietary nature of cost data, the Subcontractor may choose to submit their pricing information directly to the Contracting Officer and not through the prime. This is understood and encouraged.
- iii) When a subcontractor is selected to provide support under the prime contract due to their specialized experience, the Contracting Officer may request sole source justification from the offeror.
- c) “Consultant – John Bowers”: Again, the offeror shall provide a copy of the consultant’s quote to the Contracting Officer as evidence. In this example, the consultant will be charging an hourly rate of \$125 an hour for 96 hours of support. The offeror indicates to the Contracting Officer that this particular consultant was used on a previous contract with the Government (provide contract number), and will be charging the same rate. A copy of the consultant’s invoice to the offeror under the prior contract is available as supporting evidence. Since the Government has paid this price for the same services in the past, determination has already been made that the price is fair.
- d) “Travel”: The Contracting Officer will require a detailed cost breakdown for travel expenses to determine whether the total cost is reasonable based on Government per diem and mileage rates. This breakdown shall include the number of trips, the destinations, and the number of travelers. It will also need to include the estimated airfare per round trip, estimated car rental, lodging rate per trip, tax on lodging, and per diem rate per trip. The lodging and per diem rates must coincide with the Joint Travel Regulations. Please see the following website to determine the appropriate lodging and per diem rates:
<http://www.defensetravel.dod.mil/site/perdiemCalc.cfm> Additionally, the offeror must provide why the airfare is fair and reasonable as well. Sufficient back up for both airfare and car rental would include print outs of online research at the various travel search engines (Expedia, Travelocity, etc.) documenting the prices for airfare and car rentals thus proving why your chosen rate is fair and reasonable.

i) Below is a sample of the travel portion:

TRAVEL		Trips	Travelers	Nights	Days	Unit Cost	Total Travel
Airfare	per roundtrip	1	1			\$996.00	\$996.00
Lodging	per day	1	1	1		\$75.00	\$75.00
Tax on							
Lodging							
(12%)	per day	1	1	1		\$9.00	\$9.00
Per Diem	per day	1	1		2	\$44.00	\$88.00
Automobile					2		
Rental	per day	1	1			\$41.00	\$82.00
Subtotal Travel							\$1,250.00

D) Indirect Rates: Indirect rates include elements such as Fringe Benefits, General & Administrative (G&A), Overhead, and Material Handling costs. The offeror shall indicate in the cost proposal both the indirect rates (as a percentage) as well as how those rates are allocated to the costs in the proposal.

Below is the Indirect portion of our sample proposal

INDIRECTS	YEAR 1	YEAR 2
Subtotal Direct Labor (DL):	\$97,280.00	\$100,198.40
Fringe Benefits, if not included in Overhead, rate (15.0000 %) X DL =	\$14,592.00	\$15,029.76
Labor Overhead (rate 45.0000 %) X (DL + Fringe) =	\$50,342.40	\$51,852.67
Total Direct Labor (TDL):	\$162,214.40	\$167,080.83

- 1) In this example, the offeror includes a Fringe Benefit rate of 15.00% that it allocated to the Direct Labor costs. They also propose a Labor Overhead rate of 45.00% that is allocated to the Direct Labor costs plus the Fringe Benefits.
- 2) All indirect rates and the allocation methods of those rates must be verified by the Contracting Officer. In most cases, DCAA documentation supporting the indirect rates and allocation methods can be obtained through a DCAA field audit or proposal

review. Many offerors have already completed such reviews and have this documentation readily available. If an offeror is unable to participate in a DCAA review to substantiate indirect rates, the Contracting Officer may request other accounting data from the offeror to make a determination.

E.) Cost of Money (COM): If Cost of Money (an imputed cost that is not a form of interest on borrowings (see FAR 31.205-20); an “incurred cost” for cost-reimbursement purposes under applicable cost-reimbursement contracts and for progress payment purposes under fixed-price contracts; and refers to— (1) Facilities capital cost of money (48 CFR 9904.414); and (2) Cost of money as an element of the cost of capital assets under construction (48 CFR 9904.417)) is proposed in accordance with FAR 31.205-10, a DD Form 1861 is required to be completed and submitted with the contractor’s proposal.

F.) Fee/Profit: The proposed fee percentage will be analyzed in accordance with DFARS 215.404, the Weighted Guidelines Method.

G.) Subcontracting Plan: If the total amount of the proposal exceeds \$700,000 and the offeror is a large business or an institute of higher education (other than HBCU/MI) and the resultant award is a contract, the offeror shall be prepared to submit a subcontracting plan for small business and small disadvantaged business concerns. A mutually agreeable plan will be included in and made a part of the contract.

2. GRANT and COOPERATIVE AGREEMENT Proposals:

Before award it must be established that an approved accounting system and financial management system exist.

A.) Direct Labor: Show the current and projected salary amounts in terms of man-hours, man-months, or annual salary to be charged by the principal investigator(s), faculty, research associates, postdoctoral associates, graduate and undergraduate students, secretarial, clerical, and other technical personnel either by personnel or position. State the number of man-hours used to calculate a man-month or man-year. For proposals from universities, research during the academic term is deemed part of regular academic duties, not an extra function for which additional compensation or compensation at a higher rate is warranted. Consequently, academic term salaries shall not be augmented either in rate or in total amount for research performed during the academic term. Rates of compensation for research conducted during non-academic (summer) terms shall not exceed the rate for the academic terms. When part or all of a person's services are to be charged as project costs, it is expected that the person will be relieved of an equal part or all of his or her regular teaching or other obligations. For each person or position, provide the following information:

- i. The basis for the direct labor hours or percentage of effort (e.g., historical hours or estimates).

- ii. The basis for the direct labor rates or salaries. Labor costs should be predicted upon current labor rates or salaries. These rates may be adjusted upward for forecast salary or wage cost-of-living increases that will occur during the agreement period. The cost proposal should separately identify the rationale applied to base salary/wage for cost-of-living adjustments and merit increases. Each must be fully explained.
- iii. The portion of time to be devoted to the proposed research, divided between academic and non-academic (summer) terms, when applicable.
- iv. The total annual salary charged to the research project.
- v. Any details that may affect the salary during the project, such as plans for leave and/or remuneration while on leave.

B.) Fringe Benefits and Indirect Costs (Overhead, General and Administrative, and Other): The most recent rates, dates of negotiation, the base(s) and periods to which the rates apply must be disclosed and a statement included identifying whether the proposed rates are provisional or fixed. If the rates have been negotiated by a Government agency, state when and by which agency. A copy of the negotiation memorandum should be provided. If negotiated forecast rates do not exist, offerors must provide sufficient detail to enable a determination to be made that the costs included in the forecast rate are allocable according to applicable OMB Circulars or FAR/DFARS provisions. Offerors' disclosure should be sufficient to permit a full understanding of the content of the rate(s) and how it was established. As a minimum, the submission should identify:

- 1) All individual cost elements included in the forecast rate(s);
- 2) Bases used to prorate indirect expenses to cost pools, if any;
- 3) How the rate(s) was calculated;
- 4) Distribution basis of the developed rate(s);
- 5) Bases on which the overhead rate is calculated, such as "salaries and wages" or "total costs," and
- 6) The period of the offeror's fiscal year.

C.) Permanent Equipment: If facilities or equipment are required, a justification why this property should be furnished by the Government must be submitted. State the organization's inability or unwillingness to furnish the facilities or equipment. Offerors must provide an

itemized list of permanent equipment showing the cost for each item. Permanent equipment is any article or tangible nonexpendable property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit. The basis for the cost of each item of permanent equipment included in the budget must be disclosed, such as:

- 1) Vendor Quote: Show name of vendor, number of quotes received and justification, if intended award is to other than lowest bidder.
- 2) Historical Cost: Identify vendor, date of purchase, and whether or not cost represents lowest bid. Include reason(s) for not soliciting current quotes.
- 3) Engineering Estimate: Include rationale for quote and reason for not soliciting current quotes. If applicable, the following additional information shall be disclosed in the offeror's cost proposal:
- 4) Special test equipment to be fabricated by the awardee for specific research purposes and its cost.
- 5) Standard equipment to be acquired and modified to meet specific requirements, including acquisition and modification costs, listed separately.
- 6) Existing equipment to be modified to meet specific research requirements, including modification costs. Do not include equipment the organization will purchase with its funds if the equipment will be capitalized for Federal income tax purposes. Proposed permanent equipment purchases during the final year of an award shall be limited and fully justified.
- 7) Grants and cooperative agreements may convey title to an institution for equipment purchased with project funds. At the discretion of the contracting/grants officer, the agreement may provide for retention of the title by the Government or may impose conditions governing the equipment conveyed to the organization per the governing laws and regulations.

D.) Travel: Forecasts of travel expenditures (domestic and foreign) that identify the destination and the various cost elements (airfare, mileage, per diem rates, etc.) must be submitted. The costs should be in sufficient detail to determine the reasonableness of such costs. Allowance for air travel normally will not exceed the cost of round-trip, economy air accommodations. Specify the type of travel and its relationship to the research project. Individuals other than the principal investigator(s) are considered postdoctoral associates, research associates, graduate and undergraduate students, secretarial, clerical, and other technical personnel. Additional travel may be requested for travel to government facilities to enhance agreement objectives and to

achieve technology transfer.

E.) Participant Support Costs: This budget category refers to costs of transportation, per diem, stipends, and other related costs for participants or trainees (but not employees) in connection with ARO-sponsored conferences, meetings, symposia, training activities, and workshops (see the "Other Programs" section as described earlier in this BAA). Generally, indirect costs are not allowed on participant support costs. The number of participants to be supported should be entered in the parentheses on the budget form. These costs should also be justified in the budget justification page(s) attached to the cost proposal.

F.) Materials, Supplies, and Consumables: A general description and total estimated cost of expendable equipment and supplies are required. The basis for developing the cost estimate (vendor quotes, invoice prices, engineering estimate, purchase order history, etc.) must be included. If possible, provide a material list.

G.) Publication, Documentation, and Dissemination: The budget may request funds for the costs of preparing, publishing, or otherwise making available to others the findings and products of the work conducted under an agreement, including costs of reports, reprints, page charges, or other journal costs (except costs for prior or early publication); necessary illustrations, cleanup, documentation, storage, and indexing of data and databases; and development, documentation, and debugging of software.

H.) Consultant Costs: Offerors normally are expected to utilize the services of their own staff to the maximum extent possible in managing and performing the project's effort. If the need for consultant services is anticipated, the nature of proposed consultant services should be justified and included in the technical proposal narrative. The cost proposal should include the names of consultant(s), primary organizational affiliation, each individual's expertise, daily compensation rate, number of days of expected service, and estimated travel and per diem costs.

I.) Computer Services: The cost of computer services, including computer-based retrieval of scientific, technical, and educational information, may be requested. A justification/explanation based on the established computer service rates at the proposing organization should be included. The budget also may request costs, which must be shown to be reasonable, for leasing automatic data processing equipment. The purchase of computers or associated hardware and software should be requested as items of equipment.

J.) Subawards (subcontracts or subgrants): A precise description of services or materials that are to be awarded by a subaward must be provided. For subawards totaling \$10,000 or more, provide the following specific information:

- 1) A clear description of the work to be performed.
- 2) If known, the identification of the proposed subawardee and an explanation of why and how the subawardee was selected or will be selected.
- 3) The identification of the type of award to be used (cost reimbursement, fixed price, etc.).
- 4) Whether or not the award will be competitive and, if noncompetitive, rationale to justify the absence of competition.
- 5) A detailed cost summary.

K.) Other Direct Costs: Itemize and provide the basis for proposed costs for other anticipated direct costs such as communications, transportation, insurance, and rental of equipment other than computer related items. Unusual or expensive items shall be fully explained and justified.

L.) Profit/ Fee: Profit/ fee is not allowed for the Recipient of or subaward to an assistance instrument, where the principal purpose of the activity to be carried out is to stimulate or support a public purpose (i.e., to provide assistance), rather than acquisition (i.e., to acquire goods and services for the direct benefit of the United States Government). A subaward is an award of financial assistance in the form of money, or property in lieu of money, made under a DoD grant or cooperative agreement by a recipient to an eligible subrecipient. The term includes financial assistance for substantive program performance by the subrecipient of a portion of the program for which the DoD grant or cooperative agreement was made. It does not include the recipient's procurement of goods and services needed to carry out the program.

M.) Subcontracting Plan: Subcontracting plans do not apply to assistance instruments.

CONTRACT FACILITIES CAPITAL COST OF MONEY: If cost of money is proposed, a completed Contract Facilities Capital Cost of Money (FCCM) (DD Form 1861) is required.