IARPA

BROAD AGENCY ANNOUNCEMENT

IARPA-BAA-16-04

Thor

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Release Date: June 15, 2016

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OVERVIEW INFORMATION

This publication constitutes a Broad Agency Announcement (BAA) and sets forth research of interest in the area of biometrics, machine learning, computer vision, pattern recognition, and sensors. Awards based on responses to this BAA are considered to be the result of full and open competition.

- **Federal Agency Name** – Intelligence Advanced Research Projects Activity (IARPA)
- **Funding Opportunity Title –** Thor
- **Announcement Type –** Initial
- **Funding Opportunity Number –** IARPA-BAA-16-04
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – Not applicable
- **Dates**
  - Posting Date: June 15, 2016
  - Proposal Due Date for Initial Round of Selections: **5:00 pm Eastern Time August 15, 2016**
  - BAA Closing Date: November 14, 2016
- **Anticipated individual awards** – Multiple awards anticipated
- **Types of instruments that may be awarded** – Procurement contract
- **Agency Points of contact**
  ATTN: IARPA-BAA-16-04
  Office of the Director of National Intelligence
  Intelligence Advanced Research Projects Activity
  Washington, DC 20511
  Electronic mail: dni-iarpa-BAA-16-04@iarpa.gov
- **Program Manager** – Dr. Chris Boehnen, IARPA
- **Program website** – http://www.iarpa.gov/index.php/research-programs/odin
- **BAA Summary** – The Thor program seeks to develop biometric presentation attack (PA) detection technologies to detect when someone is attempting to disguise their biometric identity to circumvent biometric security systems. Proposed approaches must be capable of detecting known and unknown presentation attacks. Biometric modalities of interest are face, finger, and iris.
- **Questions** – Submit questions on administrative, technical, or contractual issues by email to dni-iarpa-BAA-16-04@iarpa.gov. All requests must include the full name and affiliation of a point of contact. Do not send questions with proprietary content. A consolidated Question and Answer response will posted on the Federal Business Opportunities website (http://www.fbo.gov) and linked from the IARPA website (http://www.iarpa.gov/index.php/research-programs/odin/questions.html). No answers will go directly to the submitter. IARPA will accept questions until **July 12, 2016**.

FULL TEXT OF ANNOUNCEMENT

SECTION 1: FUNDING OPPORTUNITY DESCRIPTION

The Intelligence Advanced Research Projects Activity (IARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. The use of a BAA solicitation allows a wide range of innovative ideas and concepts. The BAA will appear first on the FedBizOpps website, http://www.fedbizopps.gov/, then the IARPA website at http://www.iarpa.gov/. The following information is for those wishing to respond to this Program BAA.

This BAA (IARPA-BAA-16-04) is for the Thor Program. Thor is a component of the Odin Program. Selected Performers in Thor will be interacting with components of Odin over the course of the Thor program. IARPA is seeking innovative solutions for the Thor Program in this BAA. The Thor Program is envisioned to begin January 2017 and end by January 2021.

1.A. Thor Program Overview

The goal of this program is to utilize Presentation Attack Detection (PAD) to identify known and unknown Presentation Attacks (PA) in a biometric collection system. A biometric PA, also commonly referred to as biometric spoofing, is a method which inhibits the intended operation of a biometric capture system, interfering with the recording of the true sample/identity, ultimately preventing the subject from being correctly identified. Typical PAs utilize a prosthetic to conceal the biometric signature or present an alternative biometric signature.

Existing technology in use primarily relies upon a human security presence to ensure the integrity of the process and that a PA is not being utilized. There are some minimal PAD technologies in use, primarily focused on detecting a specific subset of known PAs. It is anticipated that the use of biometric collection systems will continue to increase. As we become increasingly reliant upon this technology to adjudicate identity, it is important that the technology cannot be easily deceived utilizing a PA. Additionally, reliance upon a human in the loop is cost prohibitive for many applications. Existing PAD approaches focus on methods such as Liveness Detection, Intrinsic Sample Properties, or Artificial Indicators as shown in Table 1. Current sensor hardware captures limited information pertinent to PAD with no intelligence to identify zero-day unknown PAs. A need exists to capture more robust information from a biometric sample to identify, or measure likelihood of, PAs. There needs to be an ‘intelligent’ approach that can identify unknown presentation attacks based on knowledge of what a true sample should look like (e.g., normalcy modeling for anomaly detection).

Table 1: Existing approaches to Presentation Attack Detection (PAD)

Approaches	Examples
Liveness detection	Oxygen hemoglobin sensors, heartbeat, pupil dilation, and more
Intrinsic Properties	Multi-layer fingerprint, color texture, electrical resistance, biometric specific features such as iris texture analysis, and more
Artificial Indicators	Dot matrix pattern detection, spectral examination, and more

The program is anticipated to be divided into three phases. Phase 1 will last for a period of 18 months and will focus on the ability to detect known PAs. Phase 2 will be 18 months and will focus on the ability to detect unknown PAs. Phase 3 will be 12 months and will focus on operationally relevant performance requirements. Following the conclusion of Phases 1 and 2, respectively, down-selection is possible for a variety of reasons including but not limited to underperforming PAD modalities or proposals.

1.A.1 Examined Modalities

Thor will examine PAD for three biometric recognition modalities: 1) face, 2) finger, and 3) iris. Proposals to the Thor BAA are required to address all three modalities of interest, however, IARPA reserves the right to fund only a subset of the proposed modalities based upon an individual assessment of that approach. Additionally, offerors may propose PAD for a single biometric collection comprising face, finger, and iris or individual collection systems for each. A single piece of hardware does not need to be able to capture all three; three separate hardware items are acceptable.

While proposed solutions are required to capture and produce conventional face, finger, and iris data, it is permissible to capture other data in order to perform presentation attack detection. For example, when capturing facial information offerors may capture information on ears if they feel that can improve their ability to detect presentation attacks. If an offeror's system is able to contiguously capture the additional information (such as with the ear being physically connected to the face), this may make sense and be very effective.

However, the biometric capture system (not a live human being) is responsible for ensuring the integrity of the process, including the capture of additional data (e.g. the ear in the previous example), and cannot rely upon having a priori knowledge of what the additional data (such as an ear) is for that person. For example, when performing fingerprint recognition, if the system captured additional data on the ear to detect a presentation attack an attacker should not be able to trivially present a prosthetic finger to the system and use their actual ear. Further, as the system may not have access to a previous ear sample to compare to, utilizing ear recognition in a multi-modal biometric recognition capacity is of limited usefulness.

Utilizing generic indicators of deception detection as a proxy for detecting presentation attacks may be proposed, but are not the focus of this program. Prescribed program testing scenarios are

not anticipated to facilitate research subjects intentionally deceiving or lying. Testing will not incorporate deception from subjects and so is unlikely to improve PAD performance.

1.A.2 Representative Use Cases

Many considerations affect applicability to different use cases. Below is a list of use factors and their definitions. Depending upon a specific use case the values or priorities of these use factors may change.

- PA False Detect Rate – The probability that when there is no PA, the system will incorrectly believe there is a PA
- PA True Detect Rate – The probability that when there is a PA, the system will correctly identify it
- Cost – The total cost of the system in dollars
- Time – How long it takes to capture, process, and return the result of the capture (including whether or not a PA is present)
- Biometric Recognition Performance – How accurately the biometric collection system can identify or verify the biometric identity of the person, typically reported as a TAR (True Accept Rate) at FAR (False Accept Rate) value

Note that the previous descriptions represent the operational factors which in many cases are subtly different from the metrics and constraints required for the BAA. For example, operationally the total time a biometric system takes is important. This includes capture, processing, and returning the results. However, for this BAA we are only focused on the temporal representation of the data not including processing and returning results (as will be explained in more detail later).

Representative use cases of interest to IARPA (in no particular order) include Travel Checkpoints, Identity Verification, Facility Access, and Cyber Authentication. Different use cases place priorities on different use factors necessitating harder or easier requirements than average. For example, Travel Checkpoints require a lower than average False Detect Rate (FDR) due to the high volumes of people they service and limited resources to accommodate additional screening due to false alarms. Conversely, high security facilities require a higher True Detect Rate (TDR), but can accept a higher FDR. The table below summarizes use factor values where the use case needs drive the deviation from average.

Table 2: Representative use cases for PAD and tradeoff between performance, cost, and processing time

	False Detect Rate	True Detect Rate	Cost ($)	Time	Biometric Recognition
Travel Checkpoint	Small FDR			Fast	High Accuracy
Visa Applications			High Cost	Long	High Accuracy
Facility Access	High FDR	High TDR	High Cost	Long	High Accuracy
Cyber Authentication		High TDR		Fast	

The differences in these use cases indicate that there may need to be different solutions for different use cases. As will be outlined later in the BAA, proposals must address what use cases and use factors their approach can satisfy. Proposals are allowed to satisfy only a subset of use cases, may be tunable to different use cases, or may propose developing more than one solution to satisfy different use cases. Proposals capable of addressing most or all of the use cases listed are encouraged, but the government recognizes that tailoring to specific use cases may be necessary.

The focus of this program is on cooperative subject capture, not surveillance applications. Thus, it can be assumed that the biometric modality/sample is visible and presented willingly to the system by the subject. However, the subjects' behavior **may** increase the effectiveness of a PA technique such as by choosing to place different portions of a finger against a flat 'slap' fingerprint sensor to minimize overlapping data. In a surveillance environment, subjects may be inadvertently preventing/obfuscating capture of their biometric naturally by normal activities such as wearing gloves, dark sunglasses, or covering their face with cloth. However, for this program subjects can be assumed to be aware of the biometric capture system and to be willingly participating in their sample being captured.

Thus for this program, if subjects are obfuscating capture of their biometrics, the biometric collection system should either not capture/save a biometric sample or report the occurrence of obfuscation as a presentation attack if it records/reports a sample. The system is not required to 'see through' an obfuscation such as gloves to capture fingerprints. Similarly, the biometric collection system does not need to record the true biometric sample when presented with a presentation attack, provided it identifies that a presentation attack is occurring.

1.A.3 Out of Scope

Presentation attacks not involving data capture on live subjects such as latent fingerprints or digital manipulations are outside of the scope of this BAA. Additional examples of research areas that are considered out of scope for this program are described below.

Psychological Factors

It is not anticipated that the human subject testing will incorporate psychological factors. For example, no special care will be taken to instruct subjects to lie when utilizing a PA in testing. As

a result, methods that attempt to identify PAs by psychological measures such as a polygraph device are outside of the scope of this BAA.

Safety and Usability

Systems that pose a health or safety concern are out of scope. Proposed approaches must be safe and pose no health concerns. Additionally, if systems are likely to pose a perceived health or safety concern (such as an iris scanner requiring physical contact with the iris), user acceptance may create a problem. The system should not cause any categories of risks not already encountered in everyday life.

Legacy Biometric Matching Technology

Development/improvement of legacy biometric matching technology is outside the scope of this BAA. For example, developing a fingerprint matching algorithm focused solely on traditional optical fingerprints is outside of scope. Performers may utilize legacy technology as a part of their proposal, or customize it for their specific sensor package.

Commercialization or cost reduction

Proposals that focus on reducing the cost of a given technology or commercializing a technology are outside of scope of this BAA.

1.A.4 Select Program Metrics and Definitions

Program metric and constraints are listed in Table 3. The final goals of the program are shown. Each program phase will have different expected targets representing the program's intermediate goals.

Table 3: Thor Programmatic Metrics (Final requirements)

Category	Metric	Final Goal
PAD	TDR @ 0.002FDR (or TDR @ ATCFD < 0.03 minutes)	0.97
	Constraint	**Final Objective**
Biometric Performance	Single Iris[1]	$FNMR$ FNMR = False Non [1]
	Single Finger[1]	$FNMR(t) < 0.01$
	Face[2]	$FNMR(t) < 0.01$
Operational	Projected Components Cost	$5,000 per modality
	Temporal Representation	30 Seconds

[1,2] t - decision threshold set to give: [1]FMR of 0.0001, [2]FMR of 0.001

[3] If building one sensor to handle all three modalities, cost ceiling is $15,000

Metrics measure progress towards specific technical goals. Metrics are the focus of the program and the program's goal is for the systems offerors deliver to meet and exceed the metrics to the greatest degree possible. The constraints listed here provide a minimum objective within which the

[1] FNMR = False Non Match Rate

problem must be solved. Improvements upon the minimum constraint objective are good, but secondary to the overall program.

1.A.5 Metrics Definition

Traditionally PAD system performance is quantified by a Receiver Operating Characteristic (ROC) curve plotting PA TDRs as a function of corresponding PA FDRs, with specific point(s) on the curve selected as metrics based on desired operating thresholds. For traditional modes of operation (processing using only one sample) the target metric for this BAA can be simplified to a PAD TDR > 0.97, at FDR equal to 0.002. In this simplified case, the PAD system would only be collecting one sample. However, for this program, the metrics are expanded and generalized to accommodate approaches that utilize multiple sample collections while maintaining a level metric for direct performance comparisons with respect to anticipated impact on usage.

For many high volume scenarios every false detection requires time for further analysis, such as in a secondary screening process. This secondary screening can cost a substantial amount of time, motivating approaches that will limit the total number of False Detections requiring further examination. By capturing additional samples/data some PAD systems may be able to decrease the False Detections and corresponding secondary inspections required. However, the price of capturing additional samples/data is likely to be a longer overall system capture time.

In order to accommodate PAD systems that benefit from capturing additional data while ensuring it still results in a total time saving, we define the FDR rate as a time metric. This metric accounts for the additional data collection, corresponding reduction in time spent on secondary inspections, and impact on the FDR. A definition of Average Time Cost False Detect (ATCFD) rate and an example calculation are provided below.

ATCFD rate
We define an ATCFD as:

$$ATCFD = FDR_1 * (R + FDR_2 * S)$$

Where $FDR_1$is the initial FDR (primary Thor processing using single sample) and FDR_2 is the FDR after collecting additional samples (secondary Thor processing using additional samples). R is the amount of time for Thor PAD system to collect additional samples and for inspection after initial False Detect. S is the amount of time required for secondary screening.

FDR_1, R, and FDR_2 are defined based upon Thor performers' research approaches. S is defined operationally for testing here as $S = 15\,minutes$. Based upon this, $ATCFD$ using primary and secondary processing is defined as the following:

$$ATCFD = FDR_1 * (R + FDR_2 * 15)$$

While the above metric should allow for flexibility in system design, it is not required to have a secondary processing procedure. If an offeror would like to propose a system that only has a

single processing node, then FDR_2=1.00 (there would be no additional data to reduce FDR_1) and R =0 (you would not be capturing any new data).

$$ATCFD = FDR_1 * (0 + 1.00 * S)$$

This simplifies to:

$$ATCFD = FDR * (S) = FDR * (15)$$

The FDR constraint for this program is 0.002, leading to an ATCFD requirement of less than 0.03 minutes. As long as ATCFD < 0.03 minutes, using the appropriate calculation depending on the system setup, and the system's TDR is above the specified value, the system has met this goal. The following provides an example of two system designs and ATCFD calculations.

Layered processing node example

A system initially collects and processes a single face, finger, or iris image. If a false detect is encountered, the system collects additional data for secondary processing which takes 5 minutes. The system FDR for initial stage is calibrated at $FDR_1 = 0.003$ and the secondary processing is calibrated to $FDR_2 = 0.001$. The ATCFD is calculated as following:

$$ATCFD = FDR_1 * (R + FDR_2 * S) = 0.003 * (5 + 0.001 * 15) = 0.015\ minutes$$

This scenario would meet the ATCFD constraint assuming that the system's TDR is greater than 0.97. If the system's TDR were less than 0.97 for this scenario, the system would need to adjust to a different point on the ROC curve using the three variables which may be adjusted to gain the necessary improvement. For example, the system can reduce either FDR_1, FDR_2, and/or secondary processing time, R, to improve the TDR while maintaining the required ATCFD.

While these are hypothetical scenarios, the point is to show how having a multi-layered processing chain, while adding an additional time cost, can accommodate a higher initial FDR. Additionally, this calculation does not account for time to perform initial processing. This is purposefully designed as this is taken into account in the Temporal Representation constraint.

1.A.6 Constraints Definition

Biometric Performance Constraint

The biometric performance constraint describes the minimum expected operating performance of the offeror's complete biometric collection system as illustrated in Figure 1. Solutions must be capable of continuing to provide biometric identification/recognition capabilities at least as well as existing technology. To achieve this, systems must include a matching capability/algorithm. It is acceptable to achieve this by incorporating existing technology or developing new technology. Additionally, the system must be capable of producing a sample that can be matched using

existing technology. The constraint will be measured utilizing the biometric False Non-Match Rate (FNMR).

The anticipated size of datasets collected under this program are too low to reliably measure performance at low false match rates. As a result, an operating threshold, t, will be measured for a system that produces a set False Match Rate (FMR) on a larger dataset likely not collected under this program. Then, *t* can be used to measure FNMR on this program. The constraint values for iris and fingerprint is the same, but are higher for face biometric. This target is derived from known limitations of a face signature as a biometric modality and not a reflection of the difficulty in designing a PAD for one modality over another.

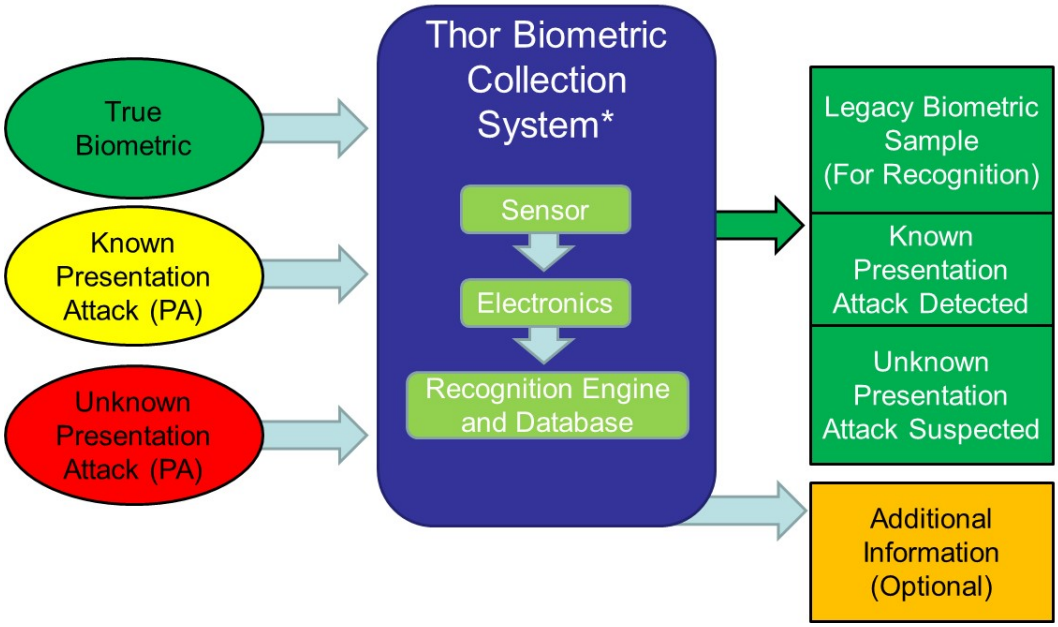

Figure 1: Conceptual workflow diagram illustrating expected Thor PAD system responsibilities

The offeror's PAD system should detect Presentation Attacks at the level specified while producing legacy biometric samples that provide as good (or better) performance with current state-of-the-art biometric recognition engines. An operating threshold, t, for FNMR will be found using conventional finger, face, and iris data containing a plurality of genuine/imposter samples. The offeror's system is required to be interoperable with existing biometric data and datasets. It is acceptable to produce a 'custom' matching algorithm for the new type of data, but must also be capable of producing data that can be matched utilizing existing Commercial-Off-The-Shelf (COTS) algorithms. For example, if a 3D fingerprint scanner is utilized the system must be capable of generating a 2D representation of the fingerprint that can be matched using 2D fingerprint algorithms. It is expected that the offeror's PAD system may operate independently of the recognition engine; in this case, a COTS recognition algorithm will be used to validate performance constraints using data collected by the offeror's PAD system.

Projected Component Cost Constraint

This constraint limits the total cost of the components of the PAD system. The cost does not include computation resources (e.g., a computer), assembly, a housing, or profit. It only includes the sensor component costs required for PAD. If the actual costs of the specific components used

is less than the constraint ($5,000), then a summation of intended components is sufficient. Performers may change the components used during the program at any point. However, at each government test a program component cost analysis is needed that represents the hardware utilized in the government tests. It is anticipated that changes will regularly occur as new technology is released or discovered by your team. The Program Manager may independently review the submitted analysis and has the right to reject any analysis/approaches submitted if they are deemed to not comply with this constraint.

If the cost of the actual components you will use is higher than the constraint, then you may attempt to justify the higher cost by identifying similar components to the ones you intend to use sold at volume. Components used for comparison do not need to be a perfect match. The Government's goal is to allow cutting edge solutions that may be expensive at this research phase but could cost much less if produced at volume in the future beyond the life of this program. This program's focus is **not** on reducing the cost of or commercializing technology. For example, using an RGB (Red Green Blue) sensor as a cost stand-in for an expensive multispectral imaging (MSI) sensor may be acceptable if you can argue that at volume the cost of the MSI sensor would be lower. Components cost can be determined using rates projecting bulk ordering of parts.

As an example, suppose you want to build a PAD system for face that required a pair of cameras and illuminators. The exact specifications you need in terms of lensing etc. may not be available as a volume package below the $5,000 constraint. Additionally, you may want more flexibility to alter the design at the research phase than a custom package would afford. As a result, you may specify the specific components and assemble the package yourself. As shown in Table 4, those raw components may be much more expensive than similar packages at volume. In our example, two sets of these components would cost $5,400 ($400 over the constraint). However, we can find a camera, illuminator, lens, and a gimbal at volume for only $60 for a pair. Additionally, a short justification would have to be provided explaining that the components in the volume priced sensor are the same and could be achieved at volume.

Table 4: Cost example illustrating individual component cost versus bulk order savings.

	Your System			Volume Comparison			
Item	Name	Cost	Link	Name	Cost	Link	Justification/Description
Camera With Illuminator	Image Sensor 1628 x 1236	1200	http://www.edmundoptics.com/cameras/usb-cameras/basler-ace-usb-3-0-cameras/88324/	Camera, Lens, Illuminator Gimbal Package 2 MP	30	http://www.alibaba.com/product-detail/2-mp-full-hd-1080-p_60189439358.html?spm=a2700.7724838.0.0.O9r1m9&s=p	At volume camera packages and illuminators can be made as a single unit and at low cost. The specifications we need are not available in an existing package, but the one specified here is comparable to the quality and type ours would need at volume. Additionally, we require more control over the components at the research phase to customize.
	Lens	850	http://www.edmundoptics.com/imaging-lenses/fixed-focal-length-lenses/3-ccd-fixed-focal-length-lenses/63242/				
	Illuminator	650	http://www.edmundoptics.com/illumination/led-illumination/led-ring-lights/compact-led-ring-lights/63305/				
	Total	2700			30		

*Links provided for informational purposes. This is provided as an example of a comparison. No specific vendors, suppliers, or websites are endorsed or required.

It is the responsibility of the proposers to justify and convince the Government (in the proposal or during the program, if changes are made during the course of the program) that their proposed components are similar or would be within cost if made in bulk and their justification is acceptable. The Government reserves the right to reject justifications based upon its technical analysis.

For example, using a 1 mW laser as a substitute for a 10,000 W laser is unlikely to be an acceptable substitution as the several orders of magnitude power difference is likely to always cost more. At a minimum a table in the format of Table 4 must be provided. However, supporting text documentation is encouraged if more justification than can fit in the table is warranted.

Temporal Representation Constraint

This constraint limits the amount of time a subject is required to be present to capture a biometric sample from the fielded system. It does not include processing time, or time spent returning results. If your prototype meets the constraint (e.g., takes less than 30 seconds to capture the sample), you do not need to do anything other than state that. If the prototype does not meet the constraint (e.g., takes longer than 30 seconds to acquire), the offeror will need to justify that it could be possible to speed up the process with engineering/hardware improvements. For example, a 3D laser scanner can take a while to raster a laser line over a scene, but you may argue it could be sped up with further development to satisfy this constraint. On the other hand, requiring an hour worth of data to analyze a heartbeat or facial expressions does not meet this constraint. This does not include processing time to analyze the data.

If it takes longer than 30 seconds to capture the data it is the responsibility of the proposers to justify and convince the Government (in the proposal and during the program, if changes are made during the course of the program) that their temporal representation is less than 30 seconds. The Government reserves the right to reject justifications based upon its technical analysis.

1.A.7 Test and Evaluation

A total of 12 tests will be conducted throughout the duration of the program with each test consisting of several hundred live human subjects with and without PAs. Tests are organized as Performer Self-Reported Tests and Government Controlled Tests, where results from all tests will be shared. Additionally, Government-only testing will be conducted using PAs unknown to the performer. Results from these tests will not be shared among the performers. The Thor testing structure is illustrated in Figure 2.

Performer Self-Reported Tests

The Performer Self-Reported Tests will be conducted by the performer/offeror at the performer's location, where the PAD operator and PA operator will both be provided by the performer. Presentation attacks will be provided by Odin T&E for use by the Thor performer and will be known to performers a priori. To simulate 'unknown' PAs during testing, a subset of PAs may be withheld from training. These tests will be performed at Thor performer locations and may be observed by Odin T&E team.

Government Controlled Tests

The Government Controlled Tests will be conducted by both the Thor performer and Odin T&E team. The performer will operate the PAD system and Odin T&E team will provide the PA and subjects to test it along with subjects not utilizing PAs. A mixture of known and unknown attacks will be presented to the offeror's PAD system. The tests will be conducted at common USG location and results will be shared with all performers.

Government-only Testing

Government-only Testing will be performed privately at a Government location and operated solely by the Odin T&E team. Results may not be shared with Thor performers.

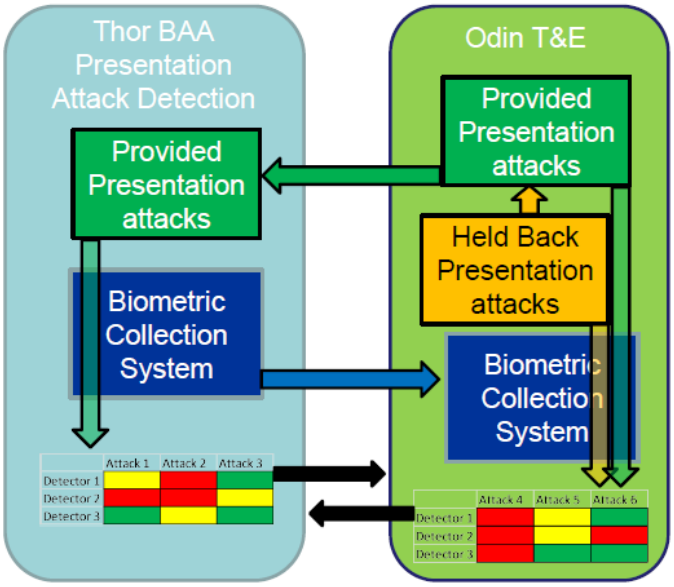

Figure 2: Illustration of Thor program testing structure

1.A.8 Presentation Attacks

In order to test PAD system performance, PAs will have to be produced. It is anticipated that the majority of the PAs tested in this BAA will be provided by the Government. Performers under this BAA (Thor) may not develop or produce PAs without the express written permission of the Government. It is anticipated that PAs will be provided by the government as Government Furnished Information or Government Furnished Equipment. These will be provided for use at the performer's facility. The provided PAs may be physical samples or a recipe (information) on how to produce a PA that a Thor team can utilize to make PAs for themselves.

Thor performers may want specific types of PAs the Government has not anticipated. **Thor performers will not be permitted to develop any PA technology with IARPA funds without the express written permission of the Government. Approval is at the Government's discretion based upon technical, programmatic, and security considerations. Thor performers will not be permitted to use non-IARPA funds to develop PAs and co-mingle research or testing of PAs developed independently with IARPA funds or equipment.**

However, Thor performers may request permission to implement a PA approach or request that IARPA do so for them.

As it is outside of the scope of this BAA (Thor) to develop new PA technology, PA approaches that require research are unlikely to be approved. However, implementing known PAs that are found in the open literature are likely to be approved. Proposals should include information on any PA types that will be requested if those are important to the approach. Performers may request permission for additional PAs not included in the proposal once the program is ongoing if you are selected. Offerors are cautioned against making their ability to produce new PAs a critical part of their proposal because if the proposed PAs are not acceptable this could introduce a flaw to the proposal.

Practical considerations may necessitate that some PAs are digitally simulated or provided for testing as traditional biometric images not captured on new sensor technology. Two examples are fingerprint mutilation and facial plastic surgery. The Government will not mutilate fingerprints or perform plastic surgery on any test subjects. It is the Government's intent to attempt to find individuals who already have these types of effects (scarred fingerprints due to an accident, cosmetic plastic surgery, and more) for testing in the program. However, it is possible that the Government will be unable to find a sufficiently large number of these subjects for recruitment and will have to provide digital images already captured. The evaluation challenge this presents is that it would prevent any new sensor technology from being involved since the data would have already been captured.

1.B Program Milestones, Metrics, and Waypoints

The Government will use the following Program Milestones and Metrics to evaluate the effectiveness of proposed solutions in achieving the stated program objectives, and to determine whether satisfactory progress is being made to warrant continued funding of the program. The metrics and constraints are intended to bind the scope of effort, while affording maximum flexibility, creativity, and innovation in proposing solutions to the stated problem. The offeror may also propose additional milestones and metrics as needed. Additional program milestones should be included to provide evidence that the technical and programmatic risks associated with the proposed approach are being addressed. Any such milestones and metrics must be clear and well-defined, with a logical connection to enabling offeror decisions and/or Government decisions.

Table 5: Thor Milestones and Metrics for Government Controlled Tests

Test		G1	G2	G3	G4	G5
Phase		1	2	2	3	3
Year		2	3	3	4	4
Month		14	26	32	41	46
Category	**Metric**					
PAD	TDR @ ATCFD < 0.03 minutes	.85	.9	.95	.96	0.97
Category	**Constraint**					
Biometric Performance	Single Iris[1]	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$
	Single Finger[1]	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$
	Face[2]	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$	$FNMR(t) < 0.01$
Operational	Projected Components Cost	$5,000 per modality	$5,000 per modality	$5,000 per modality	$5,000 per modality	$5,000 per modality
	Temporal Representation	30 Seconds	30 Seconds	30 Seconds	30 Seconds	30 Seconds

[1,2] t - decision threshold set to give: [1]FMR of 0.0001, [2]FMR of 0.001

[3] If building one sensor to handle all three modalities, cost ceiling is $15,000

In order to increase the likelihood that the above milestones will be met, several Waypoints are outlined in Table 6. The intent of these waypoints is to provide a measure of progress toward meeting the program milestones so that the Government can provide more effective program management. The Government will use these waypoints to assess whether the program as a whole is on the right path or whether course correction is needed to ensure program success. Offerors are free to use these waypoints as a guide to constructing their own schedule and deliverables, but offerors should not feel limited by these waypoints. The intent is to provide guidance, not to inhibit innovation.

1.C. Program Timeline and Deliverables

In addition to the milestones in Table 5, the Government will use the following timeline with programmatic gates to help the program maintain its 48-month program schedule:

Table 6: Program Review and Deliverable Timeline

Phase	Month	Event	Description	Comments	Deliverables
Phase 1	1	Waypoint	Kickoff Meeting in DC Metro Area		Presentation
	5	Milestone	IRB Approval		Report and IRB documentation
	6	Waypoint	Prototype Hardware Configuration or Simulated Results		Report on Prototype
	9	Waypoint	Self-Submitted Initial Results (simulation ok)	Live humans, or simulations ok	IRB approval, results and report
	13	Waypoint	Self-Submitted Results on Real data	Working Hardware, expect limited software 'abnormality' detection, results on live human subjects only from here on in official results	Results, and report on results
	14	Milestone	Government Test and Evaluation	Meet Phase 1 Metrics (minus Project Component Cost)	Working prototypes with software to be left with the government
	16.5		Preliminary Phase 1 Final Report		Preliminary report
	16.5	Milestone	Phase 1 Final Report		Report, final prototypes

Phase	Month	Event	Description	Comments	Deliverables
Phase 2	19		Phase 2 Kickoff Meeting in DC Metro Area		Presentation
	23	WayPoint	Self-Reported Performance	First 'unknown' PA performance test	Data, report
	25	WayPoint	Self-Reported Performance		Data, report
	26	Milestone	Government T&E		Working prototypes, report, and data
	32		Self-Reported Performance		Data, report
	33	Milestone	Government T&E	Meet Phase 2 Metrics	Working prototypes, report, and data
	34.5	Waypoint	Preliminary Phase 2 Final Report, Code/Design Submission		Preliminary report
	36	Milestone	Phase 2 Final Report		Report, final prototypes

Phase	Month	Event	Description	Comments	Deliverables
Phase 3	37	Waypoint	Phase 3 Kickoff Meeting		Presentation
	38		Self-Reported Performance		Data, report
	39	Milestone	Government T&E		Working prototypes, report, and data
	45		Self-Reported Performance		Data, report
	46	Milestone	Government T&E	Capture of final performance metrics to inform transition partners of capabilities	Working prototypes, report, and data
	48	Milestone	Final Reports Due		Report, final prototypes

Table 6 also includes a schedule for the key deliverables the performer shall provide. The offeror may add other deliverables in addition to the minimum set listed in the table. At a minimum, after the first USG test (G1), offeror must have a complete system to leave with the government for testing. This prototype system can be updated periodically at each USG-led test.

SECTION 2: AWARD INFORMATION

The Thor Program is envisioned as a 4-year effort that is intended to begin in January 2017. Phase 1 of the Program will last 18 months, Phase 2 will last 18 months, and Phase 3 will last 12 months. The Base Period is 18 months with two possible Option Periods of 18 months and 12 months, respectively. Costs associated with the commercialization of technology are not covered under this solicitation.

The BAA will result in awards for all phases of the program. Funding for the Option Period(s) will depend upon performance during the Base Period (and succeeding Option Periods), as well as program goals, the availability of funding, and IARPA priorities. Funding of Option Periods is at the sole discretion of the Government.

Multiple awards are anticipated. The amount of resources made available under this BAA will depend on the quality of the proposals received and the availability of funds.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation and to make awards without discussions with offerors. The Government also reserves the right to conduct discussions if the Source Selection Authority determines them to be necessary. Additionally, IARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for negotiations for award. In the event that IARPA desires to award only portions of a proposal, negotiations may be opened with that offeror.

Awards under this BAA will be made to offerors on the basis of the Evaluation Criteria listed in Section 5, program balance, and availability of funds. Proposals selected for negotiation may result in a procurement contract. However, the Government reserves the right to negotiate the type of award instrument it determines appropriate under the circumstances.

The Government will contact offerors whose proposals are selected for negotiations to obtain additional information required for award. The Government may establish a deadline for the close of fact-finding and negotiations that allows a reasonable time for the award of a contract. Offerors that are not responsive to Government deadlines established and communicated with the request may be removed from award consideration. Offerors may also be removed from award consideration should the parties fail to reach agreement within a reasonable time on contract terms, conditions, and cost/price.

SECTION 3: ELIGIBILITY INFORMATION

3.A. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal. Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations' participation due to the impracticality of reserving discrete or severable areas for exclusive competition among these entities. Other Government Agencies, Federally Funded

Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), Government-Owned, Contractor-Operated (GOCO) facilities, Government Military Academies, and any other similar type of organization that has a special relationship with the Government, that gives them access to privileged and/or proprietary information or access to Government equipment or real property, are not eligible to submit proposals under this BAA or participate as team members under proposals submitted by eligible entities. An entity of which only a portion has been designated as a UARC may be eligible to submit a proposal or participate as a team member subject to an organizational conflict of interest review described in section 3.A.1.

Foreign entities and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws and other governing statutes applicable under the circumstances. Proposers are expected to ensure that the efforts of foreign participants do not either directly or indirectly compromise the laws of the United States, nor its security interests. As such, offerors should carefully consider the roles and responsibilities of foreign participants as they pursue teaming arrangements to propose to the Thor BAA.

3.A.1. Organizational Conflicts of Interest (OCI)

"Organizational conflict of interest" means that because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the Government, or the person's objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage.

If a prospective offeror, or any of its proposed subcontractor teammates, believes that a potential conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with IARPA and submit a notification by e-mail to the mailbox address for this BAA at dni-iarpa-baa-16-04@iarpa.gov. All notifications must be submitted through the prime offeror, regardless of whether the notification addresses a potential OCI for the offeror or one of its subcontractor teammates. A potential conflict of interest includes, but is not limited to, any instance where an offeror, or any of its proposed subcontractor teammates, is providing either scientific, engineering and technical assistance (SETA) or technical consultation to IARPA. In all cases, the offeror shall identify the contract under which the SETA or consultant support is being provided. Without a waiver from the IARPA Director, neither an offeror, nor its proposed subcontractor teammates, can simultaneously provide SETA support or technical consultation to IARPA and compete or perform as a Performer under this solicitation.

All facts relevant to the existence of the potential conflict of interest, real or perceived, should be disclosed in the notification. The request should also include a proposed plan to avoid, neutralize or mitigate such conflict. The offeror, or subcontractor teammate as appropriate, shall certify that all information provided is accurate and complete, and that all potential conflicts, real or perceived, have been disclosed. Offerors may submit this notification after release of the BAA, however, the Government may not respond prior to the proposal due date. Submission of a proposal is not dependent on a Government response. If, in the sole opinion of the Government, after full consideration of the circumstances, the conflict situation cannot be resolved or waived,

any proposal submitted by the offeror that includes the conflicted entity will be excluded from consideration for award.

As part of their proposal, offerors who have identified any potential conflicts of interest shall include either an approved waiver signed by the IARPA Director, an IARPA Determination letter stating that no conflict of interest exists, or a copy of their notification. Otherwise, offerors shall include in their proposal a written certification that neither they nor their subcontractor teammates have any potential conflicts of interest, real or perceived. A sample certification is provided in APPENDIX D.

If, at any time during the solicitation or award process, IARPA discovers that an offeror has a potential conflict of interest and no notification has been submitted by the offeror, IARPA reserves the right to immediately withdraw the proposal from further consideration for award.

Offerors are strongly encouraged to read "Intelligence Advanced Research Projects Activity's (IARPA) Approach to Managing Organizational Conflicts of Interest (OCI)", found on IARPA's website at: http://www.iarpa.gov/index.php/working-with-iarpa/iarpas-approach-to-oci.

3.A.2 Multiple Submissions to BAAs under the Odin Program

Organizations may participate in more than one submission to the Thor BAA, IARPA-BAA-16-04. However, if multiple submissions to the Thor BAA which include a common team member are selected, IARPA will, at contract negotiation, ensure that there is no duplicative funding, i.e. no one entity can be paid twice to perform the exact same task.

The IARPA Odin program includes the Thor (IARPA-BAA-16-04) and Loki (IARPA-BAA-16-05) BAAs. A single organization may submit proposals to both the Thor and Loki BAAs. Similarly, a single organization may be a team member (subcontractor) on proposals responding to both the Thor and Loki BAAs. Note, however, that no individual may participate on both a Thor and Loki performer research team. The Government will not select both a Thor and Loki proposal in which an individual is on both teams. IARPA requires that knowledge, information, and results from Thor proposals, teams, technology, and research are not intentionally or unintentionally provided to the Loki teams and that Loki knowledge, information, and results are not shared with Thor teams without IARPA approval.

In order for a single organization to be eligible to be selected for participation in both Thor and Loki, either as a prime contractor/lead organization or subcontractor/team member, the offeror must submit a firewall plan for how knowledge, personnel, and technology will be kept separate between its Loki and Thor teams. The firewall plan must address several items. First, an individual cannot participate on both the Thor and Loki teams. Second, personnel on an offeror's Thor research team must acknowledge that they will not share any technical information regarding any aspect of Thor with Loki personnel. Third, the offeror must address how it will keep Thor-related materials and physical space separate from Loki-related materials and physical space and how the offeror will prevent its Loki research team from accessing Thor-related physical research space and Thor digital files. The plan need not be complex. For example, a lock on a lab or office doors maintaining separate physical space, simple user ID access control on cyber systems, and signed acknowledgement from staff may be sufficient.

If an offeror submits proposals to both the Thor and Loki BAAs, or an organization is included as a team member in proposals to both the Thor and Loki BAAs, both proposals will be independently reviewed using the same review process for evaluating all of the other proposals to that particular BAA. No preference is given to organizations that do or do not submit to both BAAs or are included as a team member in proposals to both BAAs. If both proposals are independently selected for negotiation for award, however, IARPA will then review the submitted firewall plan to determine whether it is sufficient to prevent program conflicts. If the initially proposed firewall plan is not sufficient, IARPA will attempt to negotiate an acceptable plan with the selected offeror. However, if a sufficient plan cannot be agreed upon, IARPA reserves the right to remove the offeror from further consideration for award.

Note that these restrictions apply regardless of whether an organization is serving as a prime or subcontractor. The nature or scale of the participation in a proposal does not impact the assessment or need. Organizations interested in participating in both Loki and Thor should include a firewall plan as Attachment 9 to their submissions to both BAAs with an estimate of three pages in length. This does not count as a part of any other page limitations.

3.B. US Academic Organizations

According to Executive Order 12333, as amended, paragraph 2.7, "Elements of the Intelligence Community are authorized to enter into contracts or arrangements for the provision of goods or services with private companies or institutions in the United States and need not reveal the sponsorship of such contracts or arrangements for authorized intelligence purposes. Contracts or arrangements with academic institutions may be undertaken only with the consent of appropriate officials of the institution."

It is ***highly*** recommended that offerors submit with their proposal a completed and signed Academic Institution Acknowledgement Letter for each U.S. academic institution that is a part of their team, whether the academic institution is serving in the role of prime, or a subcontractor or consultant at any tier of their team. A template of the Academic Institution Acknowledgement Letter is enclosed in APPENDIX A of this BAA. It should be noted that an appropriate senior official from the institution, i.e., typically the President, Chancellor, Provost, or other appropriately designated official, must sign the completed form. Note that this paperwork **must** be received before IARPA can enter into any negotiations with any offeror when a U.S. academic organization is a part of its team.

3.C. Other Eligibility Criteria

3.C.1. Collaboration Efforts

Collaborative efforts and teaming arrangements among potential performers are strongly encouraged. Specific content, communications, networking and team formations are the sole responsibility of the participants.

SECTION 4: PROPOSAL AND SUBMISSION INFORMATION

This notice constitutes the total BAA and contains all information required to submit a proposal. No additional forms, kits, or other materials are required.

4.A. Content and Form of Application Submission

4.A.1. Proposal Information

Interested offerors are required to submit full proposals in order to receive consideration for award. All proposals submitted under the terms and conditions cited in this BAA will be reviewed. Proposals must be received by the time and date specified in section 4.C.1 in order to be assured of consideration during the initial round of selections. IARPA may evaluate proposals received after this date but prior to BAA closing. Selection remains contingent on the evaluation criteria, program balance and availability of funds. The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be included in a single proposal.

Offerors shall submit proposals for a Base Period of 18 months, a Phase 2 option period of 18 months, and a Phase 3 option period of 12 months for a total of 48 months.

The Government intends to use employees of Booz Allen Hamilton Johns Hopkins Applied Physics Laboratory, Ops Consulting LLC, BRTRC, and Scitor to provide expert advice regarding portions of the proposals submitted to the Government and to provide logistical support in carrying out the evaluation process. These personnel will have signed and be subject to the terms and conditions of non-disclosure agreements. By submission of its proposal, an offeror agrees that its proposal information may be disclosed to employees of these organizations for the limited purpose stated above. Offerors who object to this arrangement must provide clear notice of their objection as part of their transmittal letter. If offerors do not send notice of objection to this arrangement in their transmittal letter, the Government will assume consent to the use of contractor support personnel in assisting the review of submittal(s) under this BAA.

Only Government personnel will make evaluation and award determinations under this BAA.

All administrative correspondence and questions regarding this solicitation should be directed by email to dni-iarpa-baa-16-04@iarpa.gov. Proposals must be submitted in accordance with the procedures provided in Section 4.C.2.

4.A.2. Proposal Format

All proposals must be in the format given below. Non-compliant proposals may be rejected without review. Proposals shall consist of two volumes: "Volume 1 - Technical and Management Proposal" and "Volume 2 - Cost Proposal." All pages shall be printed on 8-1/2 by 11 inch paper and IARPA desires that the font size not be smaller than 12 point. IARPA desires that the font size for figures, tables and charts not be smaller than 10 point. All contents must be clearly legible with the unaided eye. Excessive use of small font, for other than figures, tables, and charts or unnecessary use of figures, tables, and charts to present information may render the proposal non-compliant. Foldout pages shall not be used. The page limitation for full proposals

includes all figures, tables, and charts. All pages must be numbered. Unnecessarily elaborate brochures or presentations beyond what is sufficient to present a complete and effective proposal are not acceptable and will be discarded without review.

4.A.3 Proposal Classification

The Government anticipates proposals submitted under this BAA will be UNCLASSIFIED.

4.B. Proposal Content Specifics

Each proposal submitted in response to this BAA shall consist of the following:

Volume 1 – Technical & Management Proposal (Limit to 45 Pages)
Section 1 - Cover Sheet & Transmittal Letter
Section 2 – Summary of Proposal (Estimated at 10 pages)
Section 3 – Detailed Proposal
Section 4 – Attachments (Not included in page count, but number appropriately for elements included)

1 – Academic Institution Acknowledgment Letter Template, if required
2 – Restrictions on Intellectual Property Rights
3 – OCI Waiver, Determination, Notification or Certification
4 – Bibliography
5 – Relevant Papers (up to three)
6 - Human Use Documentation, if applicable (see Section 6.B.4)
7 – Consultant Letters of Commitment
8 – PAD Summary Worksheet (see APPENDIX H)
9 – Firewall Plan (if applicable) (Estimated at 3 pages)
10 – A Three Chart Summary of the Proposal (see APPENDIX I)

Volume 2 – Cost Proposal
Section 1 – Cover Sheet
Section 2 – Estimated Cost Breakdown
Section 3 – Supporting Information

4.B.1. Volume 1, Technical and Management Proposal {Limit of 45 pages}

Volume 1, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach on which the proposal is based. Copies of not more than three relevant papers can be included with the submission. The submission of other supporting materials along with the proposal is strongly discouraged and will not be considered for review. Except for the cover sheet, transmittal letter, table of contents (optional), and the attachments included in Volume 1, Section 4. Volume 1 shall not exceed **45** pages. Any pages exceeding this limit will be removed and not considered during the evaluation process. Full proposals should be accompanied by an official transmittal letter, using contractor format. All full proposals must be written in English.

4.B.1.a. Section 1: Cover Sheet & Transmittal Letter

A. Cover sheet: (*See APPENDIX B for Cover Sheet Template*)

B. Official Transmittal Letter.

4.B.1.b. Section 2: Summary of Proposal (Estimated not to exceed 10 pages)
Section 2 shall provide an overview of the proposed work as well as introduce associated technical and management issues. This section shall contain a technical description of technical approach to the research as well as a succinct portrayal of the uniqueness and benefits of the proposed work. It shall make the technical objectives clear and quantifiable and shall provide a project schedule with definite decision points and endpoints. Offerors must address:

A. A technical overview of the proposed research and plan. This section is the centerpiece of the proposal and must succinctly describe the proposed approach and research. The overview must provide an intuitive understanding of the approach and design, technical rationale, and constructive plan for accomplishment of technical goals and deliverable production. The approach must be supported by basic, clear calculations. Additionally, proposals must clearly explain the innovative claims and technical approaches that will be employed to meet or exceed each program metric and provide ample justification as to why approaches are feasible. The use of non-standard terms and acronyms should be avoided. This section will be supplemented with a more detailed plan in Volume 1, Section 3 of the proposal.

B. Summary of the products, transferable technology and deliverables associated with the proposed research results. Define measurable deliverables that show progress toward achieving the stated Program Milestones. All proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype shall be detailed in Attachment 2. If there are no proprietary claims, this should be stated. Should no proprietary claims be made, Government rights will be unlimited.

C. Schedule and milestones for the proposed research. Summarize, in table form and clearly legible for all activity, the schedule and milestones for the proposed research. Do not include proprietary information with the milestones.

D. Related research. General discussion of other research in this area, comparing the significance and plausibility of the proposed innovations against competitive approaches to achieve Program goals.

E. Project contributors. Include a clearly defined and clearly legible organizational chart of all anticipated project participants, organized under functional roles for the effort, and also indicating associated task number responsibilities with individuals.

F. Technical Resource Summary:
- Summarize total level of effort by labor category and technical discipline (i.e. research scientist/chemist/physicist/engineer/administrative, etc.) and affiliation (prime/ subcontractor/consultant). Key Personnel shall be identified by name. Provide a brief description of the qualifications for each labor category (i.e. education, certifications, years of experience, etc.)

- Summarize level of effort by labor category and technical discipline for each major task, by affiliation
- Identify software and intellectual property required to perform, by affiliation (List each item separately)
- Identify materials and equipment (such as IT) required to perform, by affiliation (List each item separately)
- Identify any other resources required to perform (i.e. services, data sets, facilities, government furnished property, etc., by affiliation, list each item separately)
- Estimated travel, including purpose of travel and number of personnel per trip, by affiliation

The above information shall cross reference to the tasks set forth in the offerors statement of work, as described in BAA section 4.B.1.c, and shall be supported by the detailed cost and pricing information provided in the offeror's Volume 2 Cost Proposal.

4.B.1.c. Section 3: Detailed Proposal Information

This section of the proposal shall provide the detailed, in-depth discussion of the proposed research as well as supporting information about the offeror's capabilities and resources. Specific attention must be given to addressing both the risks and payoffs of the proposed research and why the proposed research is desirable for IARPA to pursue. This part shall provide:

A. Statement of Work (SOW) - In plain English, clearly define the technical tasks and sub-tasks to be performed, their durations and the dependencies among them. For each task and sub-task, provide:
   - A general description of the objective;
   - A detailed description of the approach to be taken, developed in an orderly progression and in enough detail to establish the feasibility of accomplishing the goals of the task;
   - Identification of the primary organization responsible for task execution (prime, sub-contractor, team member, etc.) by name;
   - The exit criteria for each task/activity, i.e., a product, event or milestone that defines its completion;
   - Definition of all deliverables (e.g., data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

   Note: Do not include any proprietary information in the SOW.

   At the end of this section, provide a Gantt chart, showing all the tasks and sub-tasks on the left with the performance period (in years/quarters) on the right. All milestones shall be clearly labeled on the chart. If necessary, use multiple pages to ensure legibility of all information.

B. A detailed description of the objectives, scientific relevance, technical approach and expected significance of the work. The key elements of the proposed work should be clearly identified and related to each other. Proposals should clearly detail the technical

methods and/or approaches that will be used to meet or exceed each program milestone, and should provide ample justification as to why the proposed methods/approaches are feasible. Any anticipated risks should be described and possible mitigations proposed. General discussion of the problem without detailed description of approaches, plausibility of implementation, and critical metrics will result in an unacceptable rating.

C. State-of-the-art. Comparison with other on-going research, highlighting the uniqueness of the proposed effort/approach and differences between the proposed effort and the current state-of-the-art. Identify advantages and disadvantages of the proposed work with respect to potential alternative approaches.

D. Data sources. Identification and description of data sources to be utilized in pursuit of the project research goals.

Offerors proposing to use existing data sets must provide written verification that all data were obtained in accordance with U.S. laws and, where applicable, are in compliance with End User License Agreements, Copyright Laws, Terms of Service, and laws and policies regarding privacy protection of U.S. Persons. Offerors shall identify any restrictions on the use or transfer of data sets being used, and, if there are any restrictions, the potential cost to the Government to obtain at least Government Purpose Rights in such data sets.[2]

Offerors proposing to obtain new data sets must ensure that their plan for obtaining the data complies with U.S. Laws and where applicable, with End User License Agreement, Copyright Laws, Terms of Service, and laws and policies regarding privacy protection of U.S. Persons.

It is anticipated that proposed research will involve human subjects. Offerors should include the documentation required in 6.B.4 (Human Use). Documentation must be well written and logical; claims for exemptions from Federal regulations for human subject protection must be accompanied by a strong defense of the claims. The Human Use documentation and the written verification are not included in the total page count.

The Government reserves the right to reject a proposal if it does not appropriately address all data issues.

[2] "Government Purpose Rights" (or "GPR") means the rights to use, modify, reproduce, release, perform, display, or disclose technical data and computer software within the Government without restriction; and to release or disclose technical data and computer software outside the Government and authorize persons to whom release or disclosure has been made to use, modify, reproduce, release, perform, display, or disclose that data or software for any United States Government purpose. United States Government purposes include any activity in which the United States Government is a party, including cooperative agreements with international or multi-national defense organizations, or sales or transfers by the United States Government to foreign governments or international organizations. Government purposes include competitive procurement, but do not include the rights to use, modify, reproduce, release, perform, display, or disclose technical data or computer software for commercial purposes or authorize others to do so.

E. Deliverables. Deliverables are identified in Section 1.C.

The Government requires at a minimum Government Purpose Rights for all deliverables; anything less will be considered a weakness in the proposal. However, if limited or restricted rights are asserted by the offeror in any deliverable or component of a deliverable, the proposal must identify the potential cost associated with the Government obtaining Government Purpose Rights in such deliverables. Proposals that do not include this information will be considered non-compliant and may not be reviewed by the Government.

In Attachment 2 of the proposal, offerors must describe the proposed approach to intellectual property for all deliverables, together with a supporting rationale of why this approach is in the Government's best interest. This shall include all proprietary claims to the results, prototypes, intellectual property or systems supporting and/or necessary for the use of the research, results and/or prototype, and a brief explanation of how the offerors may use these materials in their program. To the greatest extent feasible, offerors should not include background proprietary technical data and computer software as the basis of their proposed technical approach.

If offerors (including their proposed teammates) desire to use in their proposed approach, in whole or in part, technical data or computer software or both that is proprietary to offeror, any of its teammates, or any third party, in Attachment 2 they should: (1) clearly identify such data/software and its proposed particular use(s); (2) identify and explain any and all restrictions on the Government's ability to use, modify, reproduce, release, perform, display, or disclose technical data, computer software, and deliverables incorporating such technical data and computer software; (3) identify the potential cost to the Government to acquire GPR in all deliverables that use the proprietary technical data or computer software the offeror intends to use; (4) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and (5) provide possible nonproprietary alternatives in any area in which a Government entity would have insufficient rights to transfer, within the Government or to Government contractors in support of a Government purpose, deliverables incorporating proprietary technical data or computer software, or that might cause increased risk or cost to the Government under the proposed proprietary solutions.

Offerors also shall identify all commercial technical data and/or computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government's use of such commercial technical data and/or computer software. If offerors do not identify any restrictions, the Government will assume that there are no restrictions on the Government's use of such deliverables. Offerors shall also identify all noncommercial technical data and/or computer software that it plans to generate, develop and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights. If the offeror does not submit such information, the Government will assume that it has unlimited rights to all such noncommercial technical data and/or computer software. Offerors shall provide a short summary for each item (commercial and noncommercial) asserted with less than

unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

Additionally, if offerors propose the use of any open source or freeware, any conditions, restrictions or other requirements imposed by that software must also be addressed in Attachment 2. Offerors should leverage the format in APPENDIX G for their response. (See also section 6.B.2. Intellectual Property). The technical content of Attachment 2 shall include only the information necessary to address the proposed approach to intellectual property; any other technical discussion in Attachment 2 will not be considered during the evaluation process. Attachment 2 is estimated not to exceed 4 pages.

For this solicitation, IARPA recognizes only the definitions of intellectual property rights in accordance with the terms as set forth in the Federal Acquisition Regulation (FAR) part 27, or as defined herein. If offerors propose intellectual property rights that are not defined in FAR part 27 or herein, offerors must clearly define such rights in Attachment 2 of their proposal. Offerors are reminded of the requirement for prime contractors to acquire sufficient rights from subcontractors to accomplish the program goals.

F. Cost, schedule, milestones. Cost, schedule, and milestones for the proposed research, including estimates of cost by task, total cost, and company cost share, if any. The milestones must not include proprietary information.

G. Offeror's previous accomplishments. Discuss previous accomplishments and work in this or closely related research areas and how these will contribute to and influence the current work.

H. Facilities. Describe the facilities that will be used for the proposed effort, including computational and experimental resources.

I. Detailed Management Plan. The Management Plan should identify both organizations and individuals within organizations that make up the team, and delineate the expected duties, relevant capabilities, and task responsibilities of team members and expected relationships among team members. Expected levels of effort (percentage time or fraction of an FTE) for all key personnel and significant contributors should be clearly noted. A description of the technical, administrative and business structure of the team and the internal communications plan should be included. Project/function/sub-contractor relationships (including formal teaming agreements), Government research interfaces, and planning, scheduling, and control practices should be described. The team leadership structure should be clearly defined. Provide a brief biography of the key personnel (including alternates, if desired) who will be involved in the research along with the amount of effort to be expended by each person during the year. Participation by key personnel and significant contributors is expected to exceed 25% of their time. Participation by the PI is expected to exceed 30% of their time. A compelling explanation is required for any variation from this figure. Reductions/replacement of time commitments of key personnel requires approval from the Thor program manager.

If the team intends to use consultants, they must also be included in the organizational chart. Indicate if the person will be an "individual" or "organizational" consultant (i.e., representing themselves or their organization), and organizational affiliation.

A table such as the following (**Table 7**) is recommended.

Table 7: Key Personnel

Participants	Org	Role	Unique, Relevant Capabilities	Role: Tasks	Time Commitment
Jane Wake	LMN Univ.	PI/Key Personnel	Electrical Engineering	Program Mgr & Electronics: 10	100%
John Weck, Jr.	OPQ Univ.	Key Personnel	Mathematical Physics	Programming: 1-5	50%
Dan Wind	RST Univ.	Key Personnel	Physics	Design, Fab, and Integration: 6-8	90%
Katie Wool	UVW Univ.	Contributor	Quantum Physics	Enhancement witness design: 4	25%
Rachel Wade	XYZ Corp.	Co-PI/Key Personnel	Graph theory	Architecture design: 6	55%
Chris West	XYZ Corp.	Significant Contributor	EE & Signal Processing	Implementation & Testing: 8-9	60%
Julie Will	JW Cons.	Consultant (Individual)	Computer science	Interface design: 10	200 hours
David Word	A Corp.	Consultant (A. Corp.)	Operations Research	Applications Programming: 2-3	200 hours

It is anticipated that every proposal will involve Human Subjects experiments. As the amount of time required to complete the IRB review/approval process may vary, the management plan should identify any past experience with obtaining Institutional Review Board (IRB) approvals for human subject experimentation, and outline how IRB approval will be obtained for this proposal. An IRB submission or approval is not required prior to submission of a proposal, provided your timeline can meet the needs of the program. Some example items to cover in your IRB management plan include the following:

- What IRB will you be using and what is your relationship to that IRB (internal, external, commercial, etc.).
- Have you worked with this IRB before? How regularly?
- When do you anticipate submitting for and receiving IRB approval in your project timeline and how does that fit within your research plan?
- If time is tight, do you have a contingency plan for a delay?

J. Resource Share. Include the type of support, if any, the offeror might request from the Government, such as facilities, equipment or materials, or any such resources the offeror is willing to provide at no additional cost to the Government to support the research effort.

Cost sharing is not required from offerors and is not an evaluation criterion, but is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

K. The names of other federal, state or local agencies or other parties receiving the proposal and/or funding the proposed effort. If none, so state.

4.B.1.d. Section 4: Attachments

[NOTE: The attachments listed below must be included with the proposal, if applicable, but do not count against the Volume 1 page limit.]

Attachment 1: Signed Academic Institution Acknowledgement Letter(s) (if applicable). Template provided as APPENDIX A. See paragraph 3.B, US Academic Institutions.

Attachment 2: Restrictions on Intellectual Property Rights (if applicable). Template provided as APPENDIX G. This attachment is estimated not to exceed 4 pages.

Attachment 3: OCI Waiver/Determination/Notification or Certification. Template, provided as APPENDIX D. See paragraph 3.A.1., Organizational Conflicts of Interest (OCI).

Attachment 4: Bibliography. A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas on which the proposal is based.

Attachment 5: Relevant Papers. Copies of not more than three relevant papers may be included in the submission. The proposers should include a one page technical summary of each paper provided, suitable for individuals who are not experts in the field.

Attachment 6: Human Use Documentation, if applicable.

Attachment 7: Consultant Commitment Letters. If needed.

Attachment 8: PAD Summary Worksheet. The format for the PAD Summary Worksheet is provided in APPENDIX H. The worksheet must be filled out for every proposed PAD approach. At a minimum this is 3 times (one for face, finger, and iris). If more than one approach is proposed for the same modality then it should be filled out once for each approach. The items in green must be filled in. It may be no longer than 2 pages, but the spacing may be modified. It does not count against any page limits.

Attachment 9: Firewall Plan (if applicable) as described in section 3.A.2 Estimated not to exceed three pages in length.

Attachment 10: A Three Chart Summary of the Proposal. A PowerPoint that quickly and succinctly indicates the concept overview, key innovations, expected impact, and other unique aspects of the proposal. The format for the summary slides is included in APPENDIX I to this BAA and does not count against the page limit. Slide 1 should be a self-contained, intuitive

description of the technical approach and performance. These slides may be used during the evaluation process to present a summary of the proposal from the proposers view.

4.B.2. Volume 2: Cost Proposal {No Page Limit}

The Offeror's proposal shall contain sufficient factual information to establish the offeror's understanding of the project, the perception of project risks, the ability to organize and perform the work and to support the realism and reasonableness of the proposed cost.

IARPA recognizes that undue emphasis on cost may motivate offerors to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. IARPA discourages such cost strategies. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead.

4.B.2.a Section 1: Cover Sheet.

See APPENDIX C for Cover Sheet Template

4.B.2.b Section 2: Estimated Cost Breakdown.

Offerors shall submit numerical cost and pricing data using Microsoft Excel. The Excel document, in the format provided in APPENDIX E, shall include intact formulas and shall not be hard numbered. The base and option period cost data should roll up into a total cost summary. The Excel files may be write-protected but must not be password protected. The Cost/Price Volume must include the following:

A. Completed Cost/Price Template - Offerors must submit a cost element breakdown for the base period, each option period and the total program summary in the format provided in APPENDIX E[3].
B. Subcontractor/Inter-organizational Transfers (IOTs) and Consultants summary in the format provided in APPENDIX F. (After selection, offerors may be required to submit full cost proposals, see 4.B.2.c. Subcontracts.)
C. Total cost broken down by major task
D. Major program tasks by fiscal year
E. A summary of projected funding requirements by month
F. A summary table listing all labor categories used in the proposal and their associated direct labor rates, along with escalation factors used for each base and option period of the acquisition.
G. A summary table listing all indirect rates used in the proposal for each for each base and option period of the acquisition.

4.B.2.c Section 3: Supporting Information

[3] **NOTE:** Educational institutions and non-profit organizations as defined in FAR Part 31.3 and 31.7, respectively, at the prime and subcontractor level may deviate from the cost template in APPENDIX E and APPENDIX F when estimating the direct labor portion of the proposal to allow for OMB guided accounting methods (2 CFR Part 220) that are used by their institutions. The methodology must be clear and provide sufficient detail to substantiate proposed labor costs. For example, each labor category must be listed separately; identify key personnel, and provide hours/rates or salaries and percentage of time allocated to the project.)

In addition to the above, supporting cost and pricing information must be provided in sufficient detail to substantiate the offeror's cost estimates. Include a description of the basis of estimate (BOE) in a narrative for each cost element and provide supporting documentation, as applicable:

Direct Labor – Provide a complete cost breakout by labor category, hours and rates (APPENDIX E). Specify all key personnel by name and clearly state their labor category and proposed rate. Describe the basis of the proposed rates and provide a copy of the most recent Forward Pricing Rate Agreement (FPRA) with the Government. If offerors do not have a current FPRA with the Government, provide payroll records or contingency hire letters with salary data to support each proposed labor category, including those for key individuals, and the most recent Forward Pricing Rate Proposal Submission, if applicable. Offeror should also address whether any portion of their labor rates is attributable to uncompensated overtime.

Labor Escalation Factor – State the proposed escalation rate and the basis for that rate (e.g., based upon Global Insight indices, Cost Index or historical data). If the escalation rate is based upon historical data, provide data to demonstrate the labor escalation trend. Provide a sample calculation demonstrating application of the factor to direct labor.

Subcontracts (to include consultants and IOTs) – The offeror is responsible for compiling and providing all subcontractor proposals with the Cost Volume. Subcontractor cost element sheets shall be completed for the base period, each option period and the total summary in the format provided in APPENDIX F (Excel is not required for initial submittal, see paragraph below). Consultant letter(s) of commitment shall also be attached.

If a proposal is selected for negotiations, the prime must be prepared to present full subcontractor proposals (if applicable per subcontract type) for the base period, each option period and total cost summary including all direct and indirect costs immediately upon request by the Contracting Officer. Information shall be presented in Excel with intact formulas using the format provided in APPENDIX E and addressing the supporting cost information as outlined in 4.B.2.b. and 4.B.2.c. In addition to the full and complete subcontractor cost proposal, the offeror shall also provide its analysis of the subcontractor's proposal including justification for why the subcontractor was selected and its determination that the cost/price is fair and reasonable (Reference FAR Part 44 and FAR clause 52.244-2). If subcontractors have concerns about proprietary cost information, subcontractors can submit their detailed cost proposals directly to the Contracting Officer.

Materials and Equipment – Provide copies of quotes, historical data or any other information including offeror's analysis to support proposed costs.

Other Direct Costs (ODCs) and Travel – ODCs shall be listed separately and supported by quotes, historical data or any other information including the offeror's analysis. The proposed travel supporting detail shall include destination and purpose of the trip,

number of travelers per trip and price per traveler in sufficient detail to verify the BOE. Proposed travel costs must comply with the limitations set forth in FAR Part 31.

Government Purpose Rights - If the offeror asserts limited or restricted rights in any deliverable or component of a deliverable, the cost proposal must separately identify the estimated cost associated with the Government obtaining Government Purpose Rights in such deliverables (reference sections 4.B.1.c.D. and 4.B.1.c.E).

Indirect Costs – The offeror shall show indirect cost calculations, identify the proposed indirect rate by contractor fiscal year and program period (base, option period) and provide information on indirect cost pools and allocation bases for each year and program period involved. If a Government agency recently audited the offeror's indirect rates, the offeror shall state by which agency the audit was conducted, when the rates were approved and the period for which they are effective. Include a copy of this rate agreement. Absent current Government rate recommendations, it is incumbent on the offeror to provide some other means of demonstrating indirect rate realism (e.g., 3 years of historical actual costs with applicable pools and bases). If proposed rates vary significantly from historical experience, the offeror must provide an explanation of the variance.

Cost sharing – Describe the source, nature and amount of cost-sharing, if any. Reference section 4.B.1.c.J.

Other Pricing Assumptions - Identify pricing assumptions which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/ Facilities/Information, access to Government Subject Matter Experts, etc.). Reference section 4.B.1.c.J.

Facilities Capital Cost of Money (FCCM) – If proposing FCCM, the offeror shall show FCCM cost calculations, identify the proposed FCCM factors by contractor fiscal year and program year and provide a copy of the FPRA, FPRS or FPRR, if available.

Profit/Fee - Identify the proposed profit/fee percentage and the proposed profit/fee base. Provide justification for your proposed fee/profit.

Systems: For the Systems listed below, provide a brief description, the cognizant federal agency and audit results. If the system has been determined inadequate, provide a short narrative of the steps your organization has taken to address the inadequacies and the current status. If a formal audit has been performed by a Government Agency, please provide a complete copy of the audit report or adequacy determination letter. If the system has never received a formal Government review/approval include a statement to that effect. Address whether your organization has contracts that are Cost Accounting Standards (CAS) covered and if so, whether they are subject to full or modified CAS coverage.

- Accounting system
- Purchasing system

Certified "cost or pricing data" may be requested after selection for procurement contract awards of $750,000 or greater, unless the Contracting Officer approves an exception from the requirement to submit cost or pricing data. (Reference FAR Part 15.403).

4.C. Submission Details

4.C.1. Due Dates

See BAA Overview Information Section for proposal due date and time.

4.C.2. Proposal Delivery

Proposals must be submitted electronically through the IARPA Distribution and Evaluation System (IDEAS). Offerors interested in providing a submission in response to this BAA must first register by electronic means in accordance with the instructions provided on the following web site: **https://iarpa-ideas.gov.** Offerors who plan to submit proposals for evaluation in the first round are strongly encouraged to register at least one week prior to the due date for the first round of proposals. Offerors who do not so register in advance do so at their own risk, and IARPA will not extend the due date for the first round of proposals to accommodate such offerors. Failure to register as stated will prevent the offeror's submission of documents.

After registration has been approved, offeror's should upload proposals, including Volume 1, Volume 2, scanned certifications and permitted additional information in 'pdf' format. Offerors are responsible for ensuring compliant and final submission of their proposals to meet the BAA submittal deadlines. Time management to upload and submit is wholly the responsibility of the offeror.

Upon completing the proposal submission the offeror will receive an automated confirmation email from IDEAS. Please forward that automated message to dni-iarpa-BAA-16-04@iarpa.gov**.** IARPA strongly suggests that the offeror document the submission of their proposal package by printing the electronic receipt (time and date stamped) that appears on the final screen following compliant submission of a proposal to the IDEAS website.

Proposals submitted by any means other than IDEAS (e.g., hand-carried, postal service, commercial carrier and email) will not be considered unless the offeror attempted electronic submission but was unsuccessful. Should an offeror be unable to complete the electronic submission, the offeror must employ the following procedure. The offeror must send an e-mail to dni-iarpa-BAA-16-04@iarpa.gov, prior to the first round proposal due date and time specified in the BAA, and indicate that an attempt was made to submit electronically but that the submission was unsuccessful. This e-mail must include contact information for the offeror. Following this email contact, additional guidance will be provided.

Proposals must be submitted by the time and date specified in the BAA in order to be assured of consideration during the first round of selections. IARPA may evaluate proposals received after this date until the closing date of the BAA. Selection remains contingent on proposal evaluation, program balance and availability of funds. Failure to comply with the submission procedures may result in the submission not being evaluated.

4.D. Funding Restrictions

Facility construction costs are not allowable under this activity. Funding may not be used to pay for commercialization of technology.

SECTION 5: PROPOSAL REVIEW INFORMATION

5.A. Technical and Programmatic Evaluation Criteria

The criteria to be used to evaluate and select proposals for this Program BAA are described in the following paragraphs. Because there is no common statement of work, each proposal will be evaluated on its own merits and its relevance to the Program goals rather than against other proposals responding to this BAA. The evaluation criteria in descending order of importance are: Overall Scientific and Technical Merit, Effectiveness of Proposed Work Plan, Contribution and Relevance to the IARPA Mission and Program Goal, Relevant Expertise and Experience, and Resource Realism. Specifics about the evaluation criteria are provided below, in descending order of importance.

Award(s) will be made to offerors on the basis of the evaluation criteria listed below in paragraphs 5.A.1 through 5.A.5, program balance, and availability of funds and subject to successful negotiations with the Government. Award recommendations will not be made to offeror(s) whose proposal(s) are determined not to be selectable. Offerors are cautioned that evaluation ratings may be lowered or proposals rejected if submission instructions are not followed.

5.A.1. Overall Scientific and Technical Merit

Overall scientific and technical merit of the proposal is substantiated, including unique and innovative methods, approaches, and/or concepts. The offeror 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 proposed research advances the state-of-the-art.

5.A.2. Effectiveness of Proposed Work Plan

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 proposal reflects a mature and quantitative understanding of the Program milestones and metrics, and the statistical confidence with which they may be measured. Any offeror-proposed milestones and metrics are clear and well-defined, with a logical connection to enabling offeror decisions and/or Government decisions. The schedule to achieve the milestones is realistic and reasonable.

The roles and relationships of prime and sub-contractors is clearly delineated with all participants fully documented. Work plans must demonstrate the ability to provide full Government visibility into and interaction with key technical activities and personnel, and a single point of responsibility for contract performance. Work plans must also demonstrate that key personnel have sufficient time committed to the Program to accomplish their described Program roles.

The requirement for and the anticipated use or integration of Government resources, including but not limited to all equipment, , facilities, information, etc., is fully described including dates when such Government Furnished Property (GFP), Government Furnished Equipment (GFE), Government Furnished Information (GFI) or other similar Government-provided resources will be required.

The offeror's proposed intellectual property and data rights are consistent with the Government's need to be able to effectively manage the program and evaluate the technical output and deliverables, communicate program information across Government organizations and support transition and further use and development of the program results to Intelligence Community users at an acceptable cost. The proposed approach to intellectual property rights is in the Government's best interest.

5.A.3. Contribution and Relevance to the IARPA Mission and Program Goal

The proposed solution meets the letter and intent of the stated program goals and all elements within the proposal exhibit a comprehensive understanding of the problem. The offeror clearly addresses how the proposed effort will meet and progressively demonstrate Thor Program goals. The offeror describes how the proposed solution contributes to IARPA's mission to invest in high-risk/high-payoff research that can provide the U.S. with an overwhelming intelligence advantage over its future adversaries.

5.A.4. Relevant Experience and Expertise

The offeror'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.

5.A.5. Resource Realism

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 and management proposal 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.

5.B. Method of Evaluation and Selection Process

IARPA's policy is to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy and programmatic goals. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

IARPA will only review proposals against the criteria described under Paragraph 5.A above, and will not evaluate them against other proposals, since they are not submitted in accordance with a common work statement. For evaluation purposes, a proposal is the document described in

Sections 4.A and 4.B. Other supporting or background materials submitted with the proposal will not be considered. Only Government personnel will make evaluation and award determinations under this BAA. Selections for award will be made on the basis of the evaluation criteria listed in paragraphs 5.A.1 through 5.A.5, program balance and the availability of funds. Selections for award will not be made to offeror(s) whose proposal(s) are determined to be not selectable.

5.C. Negotiation and Contract Award

Award of a contract is contingent on successful negotiations. After selection and before award, the contracting officer will determine cost/price realism and reasonableness, to the extent appropriate, and negotiate the terms of the contract.

The contracting officer will review anticipated costs, including those of associate, participating organizations, to ensure the offeror has fully analyzed the budget requirements, provided sufficient supporting cost/price information, and that cost data are traceable and reconcilable. Additional information and supporting data may be requested.

If the parties cannot reach mutually agreeable terms, a contract will not be awarded.

5.D. Proposal Retention

IARPA's policy is to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. Proposals will not be returned upon completion of the source selection process. The original of each proposal received will be retained at IARPA and all other non-required copies will be destroyed. A certification of destruction may be requested, provided that the formal request is sent to IARPA via e-mail within 5 days after notification of proposal results.

SECTION 6: AWARD ADMINISTRATION INFORMATION

6.A. Award Notices

As soon as practicable after the evaluation of a proposal is complete, the offeror will be notified that: 1) its proposal has been selected for negotiations, or, 2) its proposal has not been selected for negotiations.

6.B. Administrative and National Policy Requirements

6.B.1 Proprietary Data

It is the policy of IARPA to treat all proposals as competitive information, and to disclose their contents only for the purpose of evaluation. All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the offeror's responsibility to clearly define to the Government what the offeror considers proprietary data.

6.B.2. Intellectual Property

6.B.2.a. Noncommercial Items (Technical Data and Computer Software)

Offerors responding to this BAA requesting a procurement contract shall identify in Volume 1, Attachment 2 of the proposal all noncommercial technical data and noncommercial computer software that it plans to generate, develop and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables, the basis for such restrictions, the potential cost to the Government to acquire GPR in all deliverables incorporating such noncommercial technical data and computer software, and the intended use of the technical data and noncommercial computer software in the conduct of the proposed research and development of applicable deliverables. If offerors intend to incorporate noncommercial, proprietary technical data or computer software into any deliverable, offerors should provide in Volume 1, Attachment 2 of their proposals all of the information regarding such proprietary technical data or computer software as described in sections 4.B.1.c.D and 4.B.1.c.E of this BAA.

In the event that offerors do not submit such information, the Government will assume that it automatically has unlimited rights to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed and/or delivered under any award instrument, then offerors should identify the data and software in question and that the Government will receive GPR in such data and software. The Government will automatically assume that any such GPR restriction is limited to a period of five years, at which time the Government will acquire unlimited rights unless the parties agree otherwise. A sample format for complying with this request is shown in APPENDIX G. If no restrictions are intended, then the offeror should state "NONE."

Offerors are advised that the Government will use this information during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the offeror, as may be necessary, to evaluate the offeror's assertions.

For all technical data and computer software that the offeror intends to deliver with other than unlimited rights that are identical or substantially similar to technical data and computer software that the offeror has produced for, delivered to, or is obligated to deliver to the Government under any contract or subcontract, the offeror shall identify the contract number under which the data, software, or documentation were produced; the contract number under which, and the name and address of the organization to whom, the data and software were most recently delivered or will be delivered; and any limitations on the Government's rights to use or disclose the data and software, including, when applicable, identification of the earliest date the limitations expire.

6.B.2.b. Commercial Items (Technical Data and Computer Software)

Offerors shall identify in Section 4 (Attachment 2, template provided as APPENDIX G) of its proposal all commercial technical data and commercial computer software that may be incorporated in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government's use of such commercial technical data and/or commercial computer software. In the event that offerors do not submit the list, the Government will assume that there are no restrictions on the Government's use of such

commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the offeror, as may be necessary, to evaluate the offeror's assertions. A sample format for complying with this request is shown in APPENDIX G. If no restrictions are intended, then the offeror should state "NONE."

6.B.2.c. All Offerors – Patents

Include documentation using the format provided in APPENDIX G, proving ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under the proposal for the IARPA program. If a patent application has been filed for an invention that the proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, the offeror may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title, together with either: 1) a representation that the offeror owns the invention, or 2) proof of possession of appropriate licensing rights in the invention.

If offerors intend to incorporate patented technology into any deliverable, i.e., if offerors intend for any deliverable to embody any invention covered by any patent or patent application the offerors list in APPENDIX G, offerors should also provide in Volume 1, Attachment 2 of their proposals all of the information described in section 4.B.1.c.E of this BAA.

6.B.2.d. All Offerors – Intellectual Property Representations

The offeror shall provide a good faith representation that they either own or possess appropriate licensing rights to all other intellectual property that will be utilized under their proposal for the Thor program.

6.B.3. Meeting and Travel Requirements

Performers are expected to assume responsibility for administration of their projects and to comply with contractual and Program requirements for reporting, attendance at Program workshops, and availability for site visits.

6.B.3.a. Workshops

The Thor Program intends to hold a Program-level Kick-Off meeting by the third month of the Program and then similar Workshops annually thereafter. The dates and location of these are to be specified at a later date by the Government. The three- to four-day annual Workshops will focus on technical aspects of the Program and on facilitating open technical exchanges, interaction, and sharing among the various Program participants. Program participants will be expected to present the technical status and progress of their projects to other participants and invited guests.

6.B.3.b. Site Visits

Site visits by the Contracting Officer Representative and the Thor Program Manager will generally take place up to twice yearly during the life of the Program and will occur during the period between Program-level Workshops. These visits will occur at the Contractor's facility. Reports on technical progress, details of successes and issues, contributions to the Program

goals, and technology demonstrations will be expected at such visits.

6.B.4. Human Use

All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with the federal regulations for human subject protection, namely 45 CFR Part 46, *Protection of Human Subjects* (http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance (http://www.hhs.gov/ohrp). All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition to a local IRB approval, IARPA will review and approve the HSR documentation before HSR may begin. However, IARPA does not require a secondary review by a Government IRB.

For all proposed research that will involve human subjects, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) with the final proposal submission to IARPA as outlined in the management plan. The IRB conducting the review must be the IRB identified on the institution's Assurance. The informed consent document must comply with federal regulations (45 CFR Part 46).

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time should be allotted to complete the approval process. No IARPA funding can be used towards human subject research until ALL approvals are granted.

In limited instances, human subject research may be exempt from Federal regulations for human subject protection, for example, under Department of Health and Human Services, 45 CFR 46.101(b). Offerors claiming that their research falls within an exemption from Federal regulations for human subject protection must provide written documentation with their proposal that cites the specific applicable exemption and explains clearly how their proposed research fits within that exemption.

6.B.5. Animal Use

IARPA does not anticipate the use of animal testing in this BAA. If the proposed research involves laboratory animals, please contact IARPA immediately. The Government reserves the right to reject a proposal if it does not appropriately address all data issues.

6.B.6. Publication Approval

It is anticipated that research funded under this Program will be unclassified research that will not require a pre-publication review. However, performers should note that pre-publication approval of certain information may be required if it is determined that its release may result in the disclosure of sensitive intelligence information. A courtesy soft copy of any work submitted for publication must be provided to the IARPA Program Manager and the Contracting Officer Representative (COR) a minimum of 5 days prior to release in any forum.

6.B.7. Export Control

(1) The offeror shall comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the offeror shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of (including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

(2) The offeror shall be responsible for obtaining export licenses, if required, before utilizing non-U.S. persons (as defined in the ITAR and EAR, as applicable) in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technologies, including technical data or software.

(3) The offeror shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(4) The offeror shall appropriately mark all contract deliverables controlled by ITAR and/or EAR.

(5) The offeror shall be responsible for ensuring that the provisions of this section apply to its sub-contractors**.**

(6) The offeror may be required to certify knowledge of and intended adherence to these requirements in the representations and certifications of the contract.

6.B.8. Subcontracting

It is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as sub-contractors to contractors performing work or rendering services as prime contractors or sub-contractors under Government contracts and to assure that prime contractors and sub-contractors carry out this policy. Each offeror that is selected for negotiation for award and is expected to be awarded a contract which exceeds the simplified acquisition threshold may be asked to submit a sub-contracting plan before award in accordance with FAR 19.702(a) (1). The plan format is outlined in FAR 19.704.

Offerors must declare teaming relationships in their proposals and must specify the type of teaming arrangement in place, including any exclusive teaming arrangements. IARPA neither promotes nor discourages the establishment of exclusive teaming agreements within offeror teams. Individuals or organizations associated with multiple teams must take care not to over-commit those resources being applied.

6.B.9. Reporting

Fiscal and management responsibility are important to the Thor Program. Although the number and types of reports will be specified in the award document, all performers will, at a minimum,

provide the Contracting Office, Contracting Officer Representative and the Thor Program Manager with monthly technical reports and monthly financial reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed upon before award. Technical reports will describe technical highlights and accomplishments, priorities and plans, issues and concerns, evaluation results, and future plans. Financial reports will present an on-going financial profile of the project, including total project funding, funds invoiced, funds received, funds expended during the preceding month, and planned expenditures over the remaining period. Additional reports and briefing material may also be required, as appropriate, to document progress in accomplishing program metrics.

The performer will prepare and provide a research report of their work annually by month 12. The reports shall be delivered to the Contracting Officer, Contracting Officer Representative and the Thor Program Manager. The reports will include:

- Problem definition
- Findings and approach
- System design
- Possible generalization(s)
- Information on performance limitations and potential mitigation
- Anticipated path ahead
- Final identification of all commercial, third-party, or proprietary hardware, software, or technical data integrated into any deliverable and all applicable use restrictions.

6.B.10. System for Award Management (SAM)

Selected offerors not already registered in the Systems for Award Management (SAM) may be required to register in SAM prior to any award under this BAA. Information on SAM registration is available at http://www.sam.gov**.**

6.B.11. Representations and Certifications

Selected offerors may be required to complete electronic representations and certifications at http://www.sam.gov and may also be required to complete additional representations and certifications prior to award.

6.B.12. Lawful Use and Privacy Protection Measures

All data gathered by the performer must be obtained in accordance with U.S. laws and in compliance with the End User License Agreement, Copyright Laws, Terms of Service, and laws and policies regarding privacy protection of U.S. Persons. Before using such data, the performer must provide proof that the data was acquired in accordance with U.S. laws and regulations.

6.B.13. Public Access to Results

IARPA is committed to making the results of this research available and maximally useful to the public, industry, government, and the scientific community, in accordance with the policy set forth in the White House Office of Science and Technology Policy's memorandum "Increasing Access to the Results of Federally Funded Scientific Research," dated February 22, 2013[4],

[4]

consistent with all other applicable law and policy; agency mission; resource constraints; and U.S. national, homeland, and economic security.

Awardees will be required to submit to IARPA the final version of peer-reviewed publication manuscripts related to research funded under awards made under this BAA. Awardees will be required to authorize IARPA to release these manuscripts to the public no later than twelve (12) months after the manuscript's official publication date in a journal or other publication. In addition, IARPA intends to make unclassified data sets, samples, and other supporting materials developed or delivered under awards available to the public, unless IARPA stipulates otherwise or to the extent that such public release would compromise the ability to file for intellectual property protection on any invention arising from the data.

Insofar as possible, all data produced for Thor, all reports to IARPA, and all Thor-based publications must follow the suggestions of the Center for Open Science. Insofar as possible, all Thor publications should qualify for Open Science's[5] Open Data and Open Materials badges.

To the extent possible, all awardee reports to IARPA and all Thor-based publications should be consistent with the statistical and methodological requirements for publication found in the 2014 Psychological Science editorial "Not Business as Usual"[6]. For example, wherever appropriate, effect sizes and confidence intervals (or the Bayesian equivalents) should be reported, and the data and methodology must be presented so that it is easily used for meta-analysis and independent re-analysis of the data. All offerors are encouraged to include statisticians and methodologists who are expert in these areas. All offerors must describe the plans to ensure that the above requirements are satisfied.

6.B.14. Cloud Compatibility

Software deliverables must be deployable to cloud platforms for testing and must be approvable for production use in the cloud. Technical approaches should generally avoid the following: requiring high-performance, special-purpose, or excessive quantities of virtual hardware not readily available in the cloud; requiring an obscure operating system, middleware, or plug-in code not readily available for use in the cloud or on the desktops used to access the cloud; leveraging inherently risky protocols, e.g., Telnet, or software packages, e.g., FOCI-relevant; or including custom code that is not inspectable by Information System Security professionals.

SECTION 7: AGENCY CONTACTS

Administrative, technical or contractual questions concerning this BAA should be sent via e-mail to dni-iarpa-baa-16-04 @iarpa.gov. If e-mail is not available, fax questions to 301-851-7673, Attention: IARPA-BAA-16-04. All requests must include the name, email address (if available), and phone number of a point of contact for the requested information. Do not send questions

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https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

[5] Open Science (2013). Badges to acknowledge open practices. https://openscienceframework.org/project/TVyXZ/

[6] Psychological Science (2014) http://pss.sagepub.com/content/25/1/3

with proprietary content. IARPA will accept questions until July 12, 2016. A consolidated Question and Answer response will be periodically posted on the IARPA website (www.IARPA.gov); no answers will go directly to the submitter.

The technical POC for this effort is:

Chris Boehnen Ph.D., IARPA,
ATTN: IARPA-BAA-16-04
Office of the Director of National Intelligence
Intelligence Advanced Research Projects Activity (IARPA)
Washington, DC 20511
Fax: (301) 851-7673
Email: dni-iarpa-baa-16-04@iarpa.gov

All emails must have the BAA number (IARPA-BAA-16-04 in the Subject Line).

APPENDIX A

Academic Institution Acknowledgement Letter Template

IARPA Broad Agency Announcement

Thor

(IARPA-BAA-16-04)

-- Please Place on Official Letterhead --

<Insert date>

To: Mr. Tarek Abboushi
Chief Acquisition Officer
ODNI/IARPA
Office of the Director of National Intelligence
Washington, D.C. 20511

Subject: Academic Institution Acknowledgement Letter

Reference: Executive Order 12333, As Amended, Para 2.7

This letter is to acknowledge that the undersigned is the responsible official of <insert name of the academic institution>, authorized to approve the contractual relationship in support of the Office of the Director of National Intelligence's Intelligence Advanced Research Projects Activity and this academic institution.

The undersigned further acknowledges that he/she is aware of the Intelligence Advanced Research Projects Activity's proposed contractual relationship with <insert name of institution> through IARPA-BAA-16-04 and is hereby approved by the undersigned official, serving as the president, vice-president, chancellor, vice-chancellor, or provost of the institution.

_____

<Name> Date
<Position>

APPENDIX B

SAMPLE COVER SHEET

For

VOLUME 1: Technical/Management Details

BROAD AGENCY ANNOUNCEMENT (BAA)

Thor

(IARPA-BAA-16-04)

(1) BAA Number	**IARPA-BAA-16-04**
(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: Title, First Name, Last Name, Street Address, City, State, Zip Code, Telephone, Fax (if available), Electronic Mail (if available)	
(9) Administrative Point of Contact to Include: Title, First Name, Last Name, Street Address, City, State, Zip Code, Telephone, Fax (if available), Electronic Mail (if available)	
(10) Volume 1 no more than 45 pages?	Yes/No
(11) Restrictions on Intellectual property rights details provided in APPENDIX G format?	Yes/No
(12) OCI Waiver Determination, Notification or Certification [see Section 3.A.1] Included?	Yes/No
(12a) If No, is written certification included (APPENDIX D)?	Yes/No
(13) Are one or more U.S. Academic Institutions part of your team?	Yes/No
(13a) If Yes, are you including an Academic Institution Acknowledgement Statement with your proposal for each U.S. Academic Organization that is part of your team (Appendix A)?	Yes/No
(14) Total Funds Requested from IARPA and the Amount of Cost Share (if any)	$
(15) Date Proposal as Submitted.	

APPENDIX C

SAMPLE COVER SHEET

For

VOLUME 2: Cost Proposal

BROAD AGENCY ANNOUNCEMENT (BAA)

Thor

(IARPA-BAA-16-04)

(1) BAA Number	**IARPA-BAA-16-04**
(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: Title, First Name, Last Name, Street Address, City, State, Zip Code, Telephone, Fax (if available), Electronic Mail (if available)	
(9) Administrative Point of Contact to Include: Title, First Name, Last Name, Street Address, City, State, Zip Code, Telephone, Fax (if available), Electronic Mail (if available)	
(10) Contract type/award Instrument Requested: 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, Telephone Number of the Offeror’s Defense Contract Management Agency (DCMA) Administration Office or Equivalent Cognizant Contract Administration Entity, if Known	
(14) Name, Address, Telephone Number of the Offeror’s Defense Contract Audit Agency (DCAA) Audit Office or Equivalent Cognizant Contract Audit Entity, if Known	
(15) Date Proposal was Prepared	
(16) DUNS Number	
(17) TIN Number	
(18) CAGE Code	
(19) Proposal Validity Period [minimum of 180 days]	
(20) Cost Summaries Provided (APPENDIX E and APPENDIX F)	
(21) Size of Business in accordance with NAICS Code 541712	

APPENDIX D

Letter Template

For

Organizational Conflicts of Interest Certification Letter Template

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

(Month DD, YYYY)

Office of the Director of National Intelligence
Intelligence Advanced Research Projects Activity (IARPA)
Thor
ATTN: Christopher B. Boehnen
Washington, DC 20511

Subject: OCI Certification

Reference: <Insert Program Name>, IARPA-BAA-16-04, (Insert assigned proposal ID#, if received)

Dear Dr. Boehnen,

In accordance with IARPA Broad Agency Announcement IARPA-BAA-16-04, Section 3.A.1, *Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest (OCI)*, and on behalf of (offeror name) I certify that neither (offeror name) nor any of our subcontractor teammates has as a potential conflict of interest, real or perceived, as it pertains to the (insert Program name) program.

If you have any questions, or need any additional information, please contact (Insert name of contact) at (Insert phone number) or (Insert e-mail address).

Sincerely,

(Insert organization name) (Must be signed by an official that has the authority to bind the organization)

(Insert signature)

(Insert name of signatory)
(Insert title of signatory)

APPENDIX E

Sample Prime Contractor Cost Element Sheet

For

VOLUME 2: Cost Proposal

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

PRIME CONTRACTOR COST ELEMENT SHEET [SAMPLE]			
Complete a Cost Element Sheet for the Base Period and <u>each</u> Option Period			
COST ELEMENT	**BASE**	**RATE**	**AMT**
DIRECT LABOR (List each labor category separately. Identify Key Personnel by name.)	# of Hours	$	$
TOTAL DIRECT LABOR			$
FRINGE BENEFITS	$	%	$
TOTAL LABOR OVERHEAD	$	%	$
SUBCONTRACTORS, IOTS, CONSULTANTS (List separately. See below table.)			$
MATERIALS & EQUIPMENT (List each material and equipment item separately.)	Quantity	$ unit price	$
SOFTWARE & INTELLECTUAL Property (List separately. See table below.)	$	$	$
TOTAL MATERIALS & EQUIPMENT			$
MATERIAL OVERHEAD	$	%	$
TRAVEL (List each trip separately.)	# of travelers	$ price per traveler	$
TOTAL TRAVEL			$
OTHER DIRECT COSTS (List each item separately.)	Quantity	$ unit price	$
TOTAL ODCs			$
G&A	$	%	$
SUBTOTAL COSTS			$
COST OF MONEY	$	%	$
TOTAL COST			$
PROFIT/FEE	$	%	$
TOTAL PRICE/COST			$
GOVERNMENT SHARE, IF APPLICABLE			$
RECIPIENT SHARE, IF APPLICABLE			$

SUBCONTRACTORS/INTERORGANIZATIONAL TRANSFERS (IOT) & CONSULTANTS PRICE SUMMARY

A	B	C	D	E	F
SUBCONTRACTOR IOT & CONSULTANT NAME	**SOW TASKS PERFORMED ***	**TYPE OF AWARD**	**SUBCONTRACTOR, IOT & CONSULTANT QUOTED PRICE**	**COST PROPOSED BY PRIME FOR THE SUBCONTRACTOR, IOT & CONSULTANT**	**DIFFERENCE (Column D - Column E) IF APPLICABLE**
TOTALS					

*Identify Statement of Work, Milestone or Work Breakdown Structure paragraph, or provide a narrative explanation as an addendum to this Table that describes the effort to be performed.

Software and Intellectual Property Costs		
Item	**Cost**	**Date of Expiration**
(List)		

NOTE: Educational institutions and non-profit organizations as defined in FAR part 31.3 and 31.7, respectively, at the prime and subcontractor level may deviate from the cost template in APPENDIX E and APPENDIX F when estimating the direct labor portion of the proposal to allow for OMB guided accounting methods that are used by their institutions. The methodology must be clear and provide sufficient detail to substantiate proposed labor costs. For example, each labor category must be listed separately; identify key personnel, and provide hours/rates or salaries and percentage of time allocated to the project.

APPENDIX F

Sample Subcontractor Cost Element Sheet

For

VOLUME 2: Cost Proposal

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

SUBCONTRACTOR COST ELEMENT SHEET [SAMPLE]			
Complete a Cost Element Sheet for each applicable period			
COST ELEMENT	**BASE**	**BURDENED RATE**	**AMT**
DIRECT LABOR (List each labor category separately. Identify Key Personnel by name.)	# hrs	$	$
TOTAL DIRECT LABOR			$
SUBCONTRACTORS, IOTS, CONSULTANTS			$
MATERIALS & EQUIPMENT (List each material and equipment item separately.)	qty	$ unit price	$
TOTAL MATERIALS & EQUIPMENT			$
TRAVEL (list each trip separately)	# of travelers	$ price per traveler	$
TOTAL TRAVEL			$
OTHER DIRECT COSTS (List each item separately.)	qty	$ unit price	$
TOTAL OTHER DIRECT COSTS			$
TOTAL PRICE/COST			$

Software and Intellectual Property Costs		
Item	**Cost**	**Date of Expiration**
(List)		

NOTE: Educational institutions and non-profit organizations as defined in FAR part 31.3 and 31.7, respectively, at the prime and subcontractor level may deviate from the cost template in APPENDIX E and APPENDIX F when estimating the direct labor portion of the proposal to allow for OMB guided accounting methods that are used by their institutions. The methodology must be clear and provide sufficient detail to substantiate proposed labor costs. For example, each labor category must be listed separately; identify key personnel, and provide hours/rates or salaries and percentage of time allocated to the project.

APPENDIX G

Restrictions on Intellectual Property Rights

For

VOLUME 1: Technical and Management Proposal

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

Noncommercial Items (Technical Data and Computer Software)

NONCOMMERCIAL ITEMS			
Technical Data, Computer Software To be Furnished With Restrictions	**Basis for Assertion**	**Asserted Rights Category**	**Name of Person Asserting Restrictions**
(LIST)	(LIST)	(LIST)	(LIST)

Description of restrictions on Government's ability to use, modify, reproduce, release, perform, display, or disclose technical data, computer software, and deliverables incorporating technical data and computer software listed above:

Potential cost to the Government to acquire GPR in all deliverables incorporating the technical data and computer software listed above:

Intended use of the technical data and computer software listed above in the conduct of the proposed research:

Commercial Items (Technical Data and Computer Software)

COMMERCIAL ITEMS			
Technical Data, Computer Software To be Furnished With Restrictions	**Basis for Assertion**	**Asserted Rights Category**	**Name of Person Asserting Restrictions**
(LIST)	(LIST)	(LIST)	(LIST)

Patents

PATENTS			
Patent number (or application number)	**Patent name**	**Inventor name(s)**	**Patent owner(s)**
(LIST)	(LIST)	(LIST)	(LIST)

APPENDIX H

PAD Summary Worksheet

For

VOLUME 1: Technical and Management Proposal; Section 3

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

The following worksheet must be filled out for every proposed PAD approach. At a minimum this is 3 times (one for face, finger, and iris). If more than one approach is proposed for the same modality then it should be filled out once for each approach. The items in green must be filled in. It may be no longer than 2 pages, but the spacing may be modified. It does not count against any page limits.

Proposal Name		
PAD System Name	E.g. Face1, Face2, Finger 1, etc.	
Biometric Modality	Face, Finger, or Iris	
Brief Description	Comments	
Probability of Success	High, Medium, Low	Comments
Types of information collected to detect a PA	E.g. heartbeat, movement, pupil dilation, multispectral, electrical/capacitive, multi-layer, texture analysis, 3D, etc.	Comments
Types of PAs this is not likely to detect	E.g. Altered Fingerprints, face makeup, 3D printed, etc.	Comments
Types of PAs this is expected to detect	E.g. Altered Fingerprints, face makeup, 3D printed, etc.	Comments

Method used to detect unknown PAs	Description, e.g. anomaly detection, one class classifier, etc.	Comments

Sensor Technology Maturity Status	How mature is the sensor technology you want to use, commercial off the shelf, custom commercially available, research prototype, does not exist yet (will be under this proposal)	Comments
Sensor Risk Level	How risky is your approach (high, medium, low).	Comments
Analysis Algorithms Maturity Status	How mature is the analysis algorithm technology you want to use, commercial off the shelf, custom commercially available, research prototype, does not exist yet (will be under this proposal)	Comments
Analysis Algorithm Risk Level	How risky is your approach (high, medium, low).	Comments

How much data do the offeror need to achieve this goal	# subjects, # samples per subject, temporal window	Comments
Where will this data come from	Will you collect it under this proposal, is it already available, etc.	Comments
What is the offeror's relationship with the IRB it will be using	Internal, External, Commercial, etc.	Comments
Has the offeror worked with this IRB before?	Yes or No	Comments

APPENDIX I

Templates for Three Chart Summary of the Proposal

For

VOLUME 1: Technical and Management Proposal; Section 2

IARPA Broad Agency Announcement (BAA)

Thor

(IARPA-BAA-16-04)

Chart 1: Overview

- Self-contained, intuitive description of the technical approach and performance
  - Avoid acronyms! Especially those that are contractor specific.

Chart 2: Key Innovations

- Innovation 1
- Innovation 2
- Innovation 3

Graphics / Data

Chart 3: Expected Impact

- Deliverable 1; Performance and Impact
- Deliverable 2; Performance and Impact
- Unique aspects of the proposal