IARPA

BROAD AGENCY ANNOUNCEMENT

IARPA-BAA-16-08

Functional Genomic and Computational Assessment of Threats (Fun GCAT)

IARPA-BAA-16-08

Release Date: September 22, 2016

IARPA

BROAD AGENCY ANNOUNCEMENT: IARPA-BAA-16-08

Functional Genomic and Computational Assessment of Threats (Fun GCAT)

Table of Contents

GENERAL INFORMATION

This publication constitutes a Broad Agency Announcement (BAA) and sets forth research of interest in the area of bioinformatics, DNA sequence screening, functional genetics, biological threat assessment, and characterizing unknown nucleic acid sequences. 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 –** Functional Genomic and Computational Assessment of Threats (Fun GCAT)
- **Announcement Type –** Initial
- **Funding Opportunity Number –** IARPA-BAA-16-08
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – Not applicable
- **Dates**
  - Posting Date: **September 22, 2016**
  - Proposal Due Date for Initial Round of Selections: 5:00 pm Eastern Time **November 8, 2016**
  - BAA Closing Date: **February 13, 2017**
- **Anticipated individual awards** – Multiple awards anticipated
- **Types of instruments that may be awarded** – Procurement contracts, grants, cooperative agreements and other transactions
- **Agency Points of contact**
  ATTN: IARPA-BAA-16-08
  Office of the Director of National Intelligence
  Intelligence Advanced Research Projects Activity
  Washington, DC 20511
  Electronic mail: dni-iarpa-BAA-16-08@iarpa.gov
  Unclassified Fax: 301-851-7678
- **Program Manager** – Dr. John Julias, IARPA
- **Program website** – https://www.iarpa.gov/index.php/research-programs/fun-gcat
- **BAA Summary** – The Functional Genomic and Computational Assessment of Threats (Fun GCAT) program intends to develop new approaches and tools for the screening of nucleic acid sequences, and for the functional annotation and characterization of genes of concern, with the goal of preventing the accidental or intentional creation of a biological threat. Advances in biotechnology and synthetic biology over the past decade have the potential to address important societal challenges in food, energy, and medicine. Despite the promising advances these technologies might enable, the potential for their deliberate or accidental misuse exists, warranting the development of approaches to help prevent the creation of biothreats. Currently, biological threats are organized based on genetic relatedness, resulting in static, threat-based lists that fail to emphasize biological functions, or assess the risks of unknown sequences. In order to better address biosecurity concerns, the Fun GCAT program intends to develop next-generation computational and bioinformatics tools to improve DNA sequence screening, to augment biodefense capabilities through the characterization of threats based on function, and to advance our understanding of the relative risks posed by unknown nucleic acid sequences. These tools will enhance the ability to computationally and functionally analyze nucleic acid

sequences, ascribe threat potential to known and unknown genes through comparisons to the functions of known threats, and facilitate the ability to screen and identify sequences of concern, including genes responsible for the pathogenesis and virulence of viral threats, bacterial threats, and toxins.

- **Questions** – Submit questions on administrative, technical, or contractual issues by email to dni-iarpa-BAA-16-08@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/fun-gcat/questions.html). IARPA will accept questions until **October 12, 2016.** No answers will go directly to the submitter.

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-16-08) is for the Fun GCAT Program. IARPA is seeking innovative solutions for the Fun GCAT Program in this BAA. The Fun GCAT Program is envisioned to begin in April 2017 and end by October 2020.

1.A. Program Overview

The biological sciences have experienced extraordinary growth over the past decade. Advances in DNA synthesis, DNA sequencing, DNA assembly, and other complementary technologies are expanding biological research and the bioeconomy. These technological advancements are likely to enable revolutionary advances in medicine, agriculture, and materials, with enormous potential benefits to humankind. At the same time, security concerns have intensified around the potential misuse of DNA synthesis techniques that could result in the intentional or accidental creation of new biological threats.

Today, most global DNA synthesis activity is not screened for health or environmental risks, and existing screening tools are limited to matching sequences to known organisms. Current capabilities offer little ability to predict the properties or risk potential of novel sequences, whether natural or engineered. Additionally, current DNA screening practices are costly due to high false positive rates for which extensive manual follow up is required, which has deterred voluntary screening.[1]

In the United States, most commercial DNA providers voluntarily screen DNA synthesis orders in accordance with HHS Guidance.[2] While several aspects of voluntary screening have been effective, there are many areas in which improvements are needed.[1] A fundamental issue is the relatively large number of hits for sequences that are ultimately not of concern, which is further complicated by ambiguity regarding which sequences to screen. Under current standards, 4.3% of orders are flagged as "yellow", meaning that there is some similarity to a gene from a pathogen species but the gene itself is harmless, and 0.7% of sequences are flagged as "red", indicating that the sequence is unambiguously linked to toxicity or pathogenesis. These "yellow"

---

[1] Carter, Sarah R.; and Friedman, Robert M.; DNA SYNTHESIS AND BIOSECURITY: Lessons Learned and Options for the Future. October 2015, from the J. Craig Venter Institute. http://www.jcvi.org/cms/fileadmin/site/research/projects/dna-synthesis-biosecurity-report/report-complete.pdf.U.S. Department of Health & Human Services. Screening Framework Guidance for Providers of Synthetic Double-Stranded DNA. 2015. http://www.phe.gov/Preparedness/legal/guidance/syndna/Documents/syndna-guidance.pdf

[2] U.S. Department of Health & Human Services. Screening Framework Guidance for Providers of Synthetic Double-Stranded DNA. 2015. http://www.phe.gov/Preparedness/legal/guidance/syndna/Documents/syndna-guidance.pdf

and "red" flagged sequences require time for manual review and customer follow-up, resulting in increased costs to gene synthesis providers and, ultimately, researchers. In addition to increasing the cost of gene synthesis, current practices have shortcomings in effectiveness. For example, sequences are often screened in 200 bp windows, limiting the ability to detect smaller sequences that can be used as building blocks to assemble larger fragments. It is also challenging to ascribe a level of risk to smaller sequences, which are more likely to have spurious hits. Additionally, for novel sequences there is a limited capacity to predict the encoded function, increasing the difficulty in screening sequences for which there are no direct comparators. Advances in the prediction of the functions of genes are needed to address these gaps.

Establishing criteria for which sequences are flagged as risks is critical to the effectiveness of nucleic acid screening methods. The Biological Select Agents and Toxins (BSAT) list provides a good starting point for the development of a functionally annotated screening database, and includes bacteria, viruses, and toxins that are deemed potentially harmful to human, animal, and plant health. Existing data and comparative genomics approaches examining virulent and avirulent strains of bacteria and various strains of viruses have the potential to provide further insight into the sequences responsible for the phenotypes BSAT possess. Additionally, over the past decade, the role of the host and host-pathogen interactions in pathology has become better understood. In order to develop models for understanding genetic elements of concern, the role of host response needs to be considered to help define the mechanisms that underlie why a sequence is a threat. Similarly, factors relating to cellular and host tropism play important roles in the assignment of risk to a sequence.

Experimental approaches and computational tools are needed to identify and extract relevant features within sequences of concern. The ability to characterize pathogen function along with host-pathogen interactions has revolutionized our understanding of biological systems. Advances in experimental approaches such as transcriptomics and proteomics, along with improvements in data analysis, have extended our ability to view biological systems from a network-based perspective. Together with an improved understanding of host-pathogen interactions, these approaches have advanced our knowledge of the expansive and diverse roles that proteins play, and hold promise in providing the data needed to develop better predictive models of phenotype. Examples that highlight the potential power of a network approach include the identification of conserved regulators for influenza and SARS.[3] The ability to understand complex protein interactions at a systems level within the host, combined with comparative genomics approaches, has the potential to provide insight into functional interactions and sequences of concern, and is important to understanding biodefense elements such as host range, pathogenesis, and virulence. Additionally, advances in other fields ranging from computational biology to machine learning should provide further capability in the identification of features of concern that could be experimentally validated using appropriate model systems.

[3] Mitchell H.D.; Eisfeld A.J.; Sims A.C.; McDermott J.E.; Matzke M.M.; et al. A Network Integration Approach to Predict Conserved Regulators Related to Pathogenicity of Influenza and SARS-CoV Respiratory Viruses. PLoS ONE 2013, 8(7): e69374.

The Fun GCAT program aims to leverage these advances, and others, to decrease the risks from DNA synthesis. Fun GCAT should result in a new set of computational and bioinformatics tools that assess the threat potential of genes, regulatory nucleic acid sequences, and uncharacterized nucleic acid sequences.

1.B. Program Structure

The Fun GCAT Program is anticipated to have a duration of 3.5 years comprised of three Phases. These three Phases are being solicited under this BAA. Phase One (1) is anticipated to be 18 months in duration and Phase Two (2) and Phase Three (3) will each be 12 months in duration. All Phases will be composed of two Thrusts:

- Thrust 1: Develop bioinformatic and computational tools and approaches that allow faster sequence comparison and assess threat potential. Various approaches are anticipated, and could include prediction of protein structure and/or function for both known and uncharacterized sequences.

- Thrust 2: Significantly advance experimental methods for the characterization of genetic sequence function. Performers will choose sequences from model systems (e.g. bacteria, viruses, and toxins), or host elements involved in pathogenesis or the response to infection.

Proposers may propose to either Thrust 1, Thrust 2, or to both Thrusts. The page limit for the Technical & Management Proposal volume to either Thrust 1 or 2 is 30 pages, and the page limit for proposers responding to both Thrusts is 50-pages (See BAA Section 4).

Collaborative efforts and teaming among potential performers is highly encouraged. It is anticipated that teams will be multidisciplinary, including expertise in fields such as virology, microbiology, immunology, proteomics, transcriptomics, functional genomics, bioinformatics, computational modelling of structure, and statistical analysis. It is anticipated that the efforts will be coordinated by a Principal Investigator, and that the primary organization will employ a project manager to coordinate the effort.

Out of Scope
The following are examples of topics that are considered to be out of scope for this program:

- Commercial off-the-shelf technology or other off-the-shelf tools that require a proprietary system architecture.
- Commercialization and/or commercialization plan development technology.
- Dual Use Research of Concern (DURC)[4]

[4] U.S. Department of Health and Human Services, United States Government Policy for Oversight of Life Sciences Dual Use Research of Concern. March 2012. http://www.phe.gov/s3/dualuse/Documents/us-policy-durc-032812.pdf

1.B.1 Thrust 1: Computational Approaches

The development and integration of three to five tools useful in the assignment of threat levels to sequences is preferred. In terms of priorities, improvements in tools that accelerate DNA sequence comparison and provide better functional information are needed. The types of tools are not specified per se, but must be capable of extending genomic or proteomic data into knowledge that can be used to ascribe a level of risk to sequences. Notional examples are tools that accelerate DNA sequence comparison, predict protein folding of gene sequences to identify motifs similar to proteins that have a high threat potential, determine differences in epitope content as evidence of host adaptation, predict unannotated sequence function, predict regulatory motifs for expression or identification of virulence/pathogenesis/resistance determinants through computational comparison, predict function of unannotated genes by modelling protein folding and comparing to structures with known function. This list is not intended to be prescriptive or exhaustive, but rather is demonstrative of the broad net being cast. Proposed approaches should incorporate the development of a simple user interface to facilitate test and evaluation during the program.

Performers need to develop approaches that are amenable for screening sequences smaller than the current 200 bp guidance (ultimate goal of 50 bp). Additionally, achieving improvements in the rate of both false positive and false negative hits will be required in this thrust. Proposers are encouraged to be creative and drive toward tools that help ascribe a level of risk to sequences with goal of extensibility toward sequences of unknown function. The deliverable is source code; if a proposer's approach is reliant on a unique system architecture, the approach must also be demonstrable on conventional high performance computer systems for the purposes of Test and Evaluation (T&E). Any advantages gained through a unique computer system architecture can be demonstrated within the context of the program reviews for the benefit of Government attendees.

1.B.2 Thrust 2: Experimental Approaches

The goal of this thrust is to make meaningful advances in the understanding of the genetic basis of phenotype. Approaches that are high throughput (through rapid analysis or parallel analysis) and applicable to known or unknown sequences are being sought. In Phase 1, proposers should carefully consider model systems for the functional characterization of sequence elements determined or predicted to have an easily discernable phenotype in response to an insult (e.g. bacteria, virus, toxin, etc.). In Phase 1, proposers are expected to develop and demonstrate experimental approaches that produce data elucidating the hallmark activities of the genetic elements largely responsible for the phenotype of their model system. Two or more model systems are encouraged in this phase. Model systems need not be based upon select agents, but select agents are acceptable if the lab has expertise in such systems. It is anticipated that sequences chosen for characterization will come from the select agent list for the second and third phases of the program. A candidate list of model systems shall be proposed for Phases 1, 2, and 3. Performers shall develop model systems and experimental approaches that are able to provide the data necessary to identify the hallmark features and protein-protein interactions that occur in their model system. It is recognized that this may entail the use of animal models, organotypic models, or cell-based models depending on the system. Proposers shall justify that

the proposed system is both required and adequate for the effort. If proposers have access to existing data, the ability to leverage and use that data is encouraged.

It is expected that carefully linked budgets will be used to track performance and that robust statistical validation plans will be incorporated into the effort to ensure reproducibility of the data.

Table 1 provides a summary of program goals.

Table 1: Fun GCAT Program Goals Across Program Thrusts and Phases

Phase 1, 18-month duration		
Thrust	1: Computational Approaches	2: Experimental Approaches
Goals	• Develop bioinformatic and computational tools and approaches that that allow faster sequence comparison and assess the threat potential of both known and uncharacterized sequences. • Significant reductions in the length of oligonucleotides whose threat potential can be evaluated are desirable.	• Significantly advance the experimental characterization of genetic sequence function. Choose sequences from pathogen model system, or host genetic elements involved in the response to insult. • Focus on model sequences and systems to demonstrate and validate experimental approaches, methods development, data analysis, and validation of the approaches for the characterization of genetic elements. • Data and approaches inform development of models applied to sequences of concern and identify hallmarks and features of concern that can be used to predict function of novel genetic elements that pose risk. • Apply with the Select Agent Registry and develop capabilities to work with BSAT by end of Phase 1.
Phases 2 and 3, 12-months in duration each		
Goals	Integration of "discovered" threats with experimental evidence of accuracy in prediction of function and virulence.	The functional characterization of genes of concern from BSAT and/or USG furnished gene sequences advancing methods developed in previous Phases.

1.C Independent Test and Evaluation

IARPA will employ a Government T&E team to assist in evaluating progress and success of the Fun GCAT program. The T&E team will measure each performer's system performance against the following metrics:

Thrust 1: Computational assessment of unknown DNA sequences
In Thrust 1, performers need to choose their own body of sequences to train their rapid computational assessment pipeline. The Government will measure success by performance of the performer delivered software on at least 300 test sequences of variable length and origin, provided for analysis by the Government near the completion of Phase 1, Phase 2, and Phase 3. The majority of sequences for evaluation in Phase 1 will be 150 bp and in Phases 2 and 3 will be 100 bp; however, sequences will range from 50-1000 bp in length. In Thrust 1, performers will be rated on the combined sum of three weighted metrics (weights provided as percentages below). Numerous approaches may be used by performers to characterize genetic elements. In the event data is generated with a structure that fails to conform to proposed metrics, performers may suggest alternate means by which their performance may be effectively evaluated.
To optionally gauge progress at mid-points in all phases, performers will be provided with a small set of sequences for characterization to evaluate performance against the metrics listed below; this exercise is intended to be solely diagnostic in nature and will not be as rigorous as the final evaluation at the conclusion of each phase.

1. **Predictive Ability (70%)**: Performers must demonstrate correct prediction of the identity, function, and threat status of genetic sequences.

a. **Species of origin (10%)**: Sequences should first be assigned a probable identity. Identity should be provided at the lowest possible taxonomic classification, with genus-level classification being acceptable and species-level classification being optimal. Where multiple sequences are analyzed, 95% should be correctly assigned at a species level in Phase 1, regardless of sequence length; modified sequences (e.g. codon optimized, etc.) should be assigned to the species of origin with greater than 80% accuracy. In Phase 2, performers should achieve 97% or greater accuracy in assigning sequences to a species of origin over all sequence lengths; accuracy of assignment of modified sequences should reach over 85%. In Phase 3, performers should achieve 98% or greater accuracy in assigning sequences to a species of origin over all sequence lengths; accuracy of assignment of modified sequences should reach over 90%.

b. **Functional characterization (20%)**: Performers will characterize sequences by assigning functional attributes to predicted products of interrogated genetic elements. The Gene Ontology (GO) project provides a controlled vocabulary to describe the function of many genes. To address the multifaceted nature of genetic element function, GO includes three different functional categories: cellular component, molecular function, and biological process. Performers will be evaluated on their ability to predict accurately the GO term(s) associated with an unknown sequence; PathGO (proposed pathogenesis gene ontology) terms may be used to complement GO terms as GO has documented shortcomings in modeling pathogenesis. Performers should first provide a functional description of the probable sequence product. For example, in Phase 1, a sequence could be classified as "Botulinum toxin from species *C. botulinum*". When confronted with an unknown and potentially artificial (i.e. designer) sequences in Phases 2 and 3, performers must be able to provide a general identifiable function; an appropriate classification may be "hemopexin-like heme-binding motif with homology to various marine species." In addition to this descriptive classification, performers will also

provide a minimum of one leaf-node (terminal) GO/PathGO term which best describe a sequence's function. Each sequence of interest will be assigned GO/PathGO classification consisting of a minimum of one GO term describing molecular function and/or pathogenic role based on public protein databases (known sequences) or experimental T&E findings (unknown sequences). Performers will be evaluated on their ability to match or improve upon the assigned GO terms for a given sequence. In the event a single sequence is to be characterized, the assigned GO/PathGO term should exhibit maximal specificity (i.e. be a leaf node) and provide a similar characterization to that determined by the T&E team. If multiple sequences are to be characterized, the final percentage of sequences with correctly matched GO terms is expected to achieve a minimum of 95% (for all sequences ≥200 bp). Improvements to this metric will be viewed favorably, and will be readily achievable for longer sequences. Given the lack of context for shorter (<50 bp) sequences, it is anticipated it will be more challenging, but ultimately necessary, to meet these standards. The minimum percentage of correctly matched GO terms for these shorter sequences will be 75%.

c. T**hreat determination (40%).** Performers will classify each sequence as either a "potential threat" or "non-threat" based on identity and functional characterization. The assignment of "potential threat" should indicate that the sequence, in either its current state or as part of a larger construct, is capable of causing harm to humans, human cells, agriculture, and/or the environment given a typical dosage. An example threat would be a shiga toxin subunit, but not a flagellum sequence, from *V. alginolyticus*. A threat/non-threat binary classification appropriate for each performer's system will need to be developed by the performer as part of the program, and will be used to calculate the positive and negative predictive value of each performer's software. A true positive call will be defined as having both the correct sequence identity (part a), accurate functional characterization (part b), and a correct threat call (part c). Positive predictive value (PPV) will then be defined as the number of true positive calls divided by the total number of positive calls. Conversely, negative predictive value (NPV) is defined as the number of true negative calls divided by the total number of negative calls. Phase 1 performers are expected to reach a PPV of 90% and a NPV of 90% for sequences over 200 bp, with increases to each of these metrics being viewed as favorable. For shorter sequences, (<200 bp), 80% PPV/NPV values will be acceptable, however 90% is optimal. In Phases 2 and 3, performers will be expected to exceed 95% PPV and NPV for all sequences analyzed.

2. **Analysis Time and Resources Required (15%)**: Rapid identification of unknown sequences will be determined by decreasing time and computational resources required to predict function. Performers will ideally seek to reduce both time and resources required to predict function as to increase throughput and make their platform more extendable to systems with limited resources. Performers will be expected to not exceed 1TB of required memory, with reductions being viewed favorably.

3. **Ease of implementation (15%)**: Ability to deploy code on provided computing infrastructure. T&E team will provide a computational infrastructure running either Red Hat or Ubuntu 14 with standard installation libraries ("out of box"). Performers will be restricted to 10TB of working

space (total) and 1TB of RAM (per analysis run). It is expected that the performer will develop its software such that it can easily be installed on the T&E team-provided computational infrastructure via use of either a "make" command (make config, make install, etc.), or a script which executes its installation. Performers will be scored on both total space consumed (in bytes;), and also CPU time needed to run installation commands (including generation of custom libraries and installation of dependencies). The final implementation should consume <1TB of space, and require <12 CPU hours to install. Additionally, performers should consider scalability of their software to smaller systems with fewer resources, and the resources needed for periodic required maintenance (updating or rebuilding libraries, etc.).

Thrust 2: Experimental assessment of unknown DNA sequences

The goal of Thrust 2 is to experimentally annotate function(s) of unknown nucleotide sequences by developing new and/or improving existing "-omics" or other experimental methods and performing integrative analyses using computational tools. In Phase 1, performers will select the sequence or set of sequences to analyze. The teams should design approaches to demonstrate clear characterization of sequences. Phase 1 performers will be limited to sequences with evident effects at the cellular level (i.e. the primary effect should occur at the cellular or molecular level, not at an organ level, etc.); example model systems may include cell culture, microbial systems, cell-free systems. In Phases 2 and 3, the Government will provide unknown sequences to performers to evaluate the performance of their designed systems. To optionally gauge progress, performers will be provided with a test sequence for characterization at mid-points in all phases to evaluate performance against the metrics listed below; this exercise is intended to be solely diagnostic in nature. Numerous approaches may be used by performers to characterize genetic elements. In the event data is generated with a structure that fails to conform to proposed metrics, performers may suggest alternate means by which their performance may be effectively evaluated. Phase 3 will continue in the development and demonstration of new methods, focusing on the scalability and throughput of the methods in performer model systems as well as the characterization of Government furnished sequences.

1. **Experimental Accuracy (15%)**: Experimental accuracy is defined as the frequency of capturing functional interactions rather than experimental artifacts. Performers must demonstrate specific and statistically significant effects, resulting from expression of the unknown sequence. Performers will assess sequences in vitro and are encouraged to use multiple experimental models (e.g. varying cell types) to identify experimental artifacts and aid in identification of legitimate effects. Output will vary by experiment type and performer, but should result in precision (positive predictive value, PPV) of >90% and sensitivity (true positive rate, TPR) of >90%. These metrics are intended to ensure that the experiments chosen by Performers are suited for identifying all of the true functions of an unknown sequence, and not identifying only the most obvious or apparent incorrect functions as a result of limited experimental approaches or conditions.

2. **Reproducibility (15%)**: Consistency between biological and technical replicates is a necessary indicator of success. Performers are expected to demonstrate reproducibility between technical replicates performed for a sample, as well as reproducibility between different biological replicates. Metrics for reproducibility will vary by experiment type, but generally, a

coefficient of variation (CV) should be <0.5, ideally <0.2, and no larger than 1.0 for a given output.

3. **Characterization of Function (40%)**: Metrics will determine the extent to which all native functional interactions are identified. Performers are free to select experimental methods they deem appropriate for assessing predicted function. Similar to Thrust 1, metric 1b, performers should assign GO/PathGO terms to describe the function of their chosen DNA sequence.

a. **Precision (20%)** will be determined by what percent of the performer-provided GO terms match experimentally determined GO terms for a given sequence, over all provided sequences. Precision = true positives predicted / total predicted positives. This metric penalizes performers for mismatches as well as extraneous terms. Precision should meet or exceed 90%.

b. **Sensitivity (20%)** will be determined by what percent of the experimentally determined GO terms for a given sequence match with the GO terms provided by performers, over all provided sequences. Sensitivity = true positives predicted / true positives actual. This metric encourages performers to identify all possible functions of a given gene, rather than the most well-known ones. Sensitivity should meet or exceed 90%. Phase 1 sequences will be performer chosen, whereas Phases 2 and 3 sequences will be provided by the Government from a database.

True positives will be calculated using GO terms obtained from publicly available databases of protein function as well as experimentation performed by Government T&E agents.

4. **Analysis Time (20%):** Real time (days) of analysis is defined as the duration from provision of known (Phase 1) or unknown (Phases 2 and 3) sequence to prediction of function. This metric will be compared across performers and used by the T&E team. Response times of 1 week or less will be considered best, 1-3 weeks acceptable, and 6 weeks the maximum permissible.

5. **Cost (5%):** Total cost of analysis for a given sequence using the final framework. Cost will be calculated to include materials and labor (e.g. staff hours) and exclude overhead costs. Cost per sequence will be compared across performers, and to T&E team, with lower costs being viewed favorably.

6. **Scalability (5%):** Throughput of analyses and the ability to parallelize serve as metrics for future utility. Through parallelization, performers are expected to achieve moderate throughput of at least 30 sequences per month. Performers will provide a scalability estimate as measured by sequences characterized over time and relevant resources.

Table 2 and Table 3 provides a summary of metrics to be utilized in Testing and Evaluation.

Table 2: Thrust 1 T&E Metrics

Thrust 1	T&E Percentile Scoring	Metrics
1. Predictive ability	70%	Correct prediction of the identity, function, and threat status of genetic sequences.
	1a. Species of origin (10%)	• Lowest possible taxonomic classification • Phase 1: 95% of analyzed sequences correctly assigned • Phase 1: 80% of modified sequences correctly assigned • Phase 2: 97% of analyzed sequences correctly assigned • Phase 2: 85% of modified sequences correctly assigned • Phase 3: 98% of analyzed sequences correctly assigned • Phase 3: 90% of modified sequences correctly assigned
	1b. Functional characterization (20%)	• Define sequence as gene product or homology to known entity • Assign GO/PathGO term as leaf node that aligns to T&E team • If analyzing multiple sequences, 95% of sequences ≥200 bp should have correct GO/PathGO term/s assigned; 75% for short (<200 bp) sequences
	1c. Threat determination (40%)	• Classify as either "potential threat" or "non-threat" • Phase 1: PPV and NPV of 90% for sequences ≥200 bp • Phase 1: 80% for shorter (<200 bp) sequences; 90% is optimal • Phases 2 and 3: PPV and NPV >95% for all sequences analyzed
2. Analysis time and resource consumed	15%	Time and computational resources required to predict function of a given unknown sequence.
	2a. System time (10%)	• Performers will ideally seek to reduce both time and resources required to predict function as to increase throughput and make their platform more extendable to systems with limited resources.
	2b. Maximum memory (5%)	• Should not exceed requirement for 1TB required memory

3. Ease of implementation	15%	Ability to deploy code on provided computing infrastructure.
	3a. Total space consumed (10%)	• Must be able to deploy code on T&E team system • Final implementation should consume <1TB space, including all relevant databases
	3b. CPU time (5%)	• System requires <12 CPU hours to install

Table 3: Thrust 2 T&E Metrics

Thrust 2	T&E Percentile Scoring	Metrics
1. Experimental accuracy	15%	Frequency of capturing functional interactions rather than experimental artifacts.
		• Demonstrate statistically signification interactions due to sequence of interest • Precision (PPV): >90% • Sensitivity (TPV): >90%
2. Reproducibility	15%	Consistency between biological and technical replicates.
		• Coefficient of variation <0.5 • Ideally <0.2, no larger than 1.0
3. Characterization of Function	40%	Extent to which all native functional interactions are identified.
	3a. Precision (20%)	• Percentage of performer-provided GO terms that match experimentally determined GO terms for a given sequence • True positives predicted / total predicted positives >90%
	3b. Sensitivity (20%)	• Percentage of experimentally determined GO terms for a given sequence match with GO terms provided by performers, over all provided sequences • True positives predicted / true positives actual >90%
4. Analysis time	20%	Real time (days) from provision of known (Phase 1) or unknown (Phases 2 and 3) sequence to prediction of function.
		• Best: ≤ 1 week • Acceptable: 3 weeks • Max permissible: 6 weeks
5. Cost	5%	Total cost of analysis for a given sequence using final framework.
		• Lower costs are viewed favorably

6. Scalability	5%	Throughput of analyses and the ability to parallelize.
		• Ability to accommodate >30 sequences per month.

1.D Program Metrics and Milestones

The Government will use the Program goals and metrics outlined in Table 1, Table 2 and Table 3 in order to evaluate the effectiveness of 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. In addition to the Government-specified metrics, offerors should also provide a clear listing of additional metrics relevant to their particular technical approach.

1.E Program Timeline and Deliverables

The Government will use the following timeline (Table 4) to monitor, evaluate, and maintain overall program progress. In addition to technical oversight of progress, technical review will assess programmatic progress against proposed work plans. Offerors may add additional deliverables as needed to the minimum set listed in Table 4.

Table 4: List of Deliverables and Associated Timeline

Month	Deliverable
1	Program kickoff meeting (2-days) in Washington DC Metropolitan Area (WMA). Corrected slides provided within 15 days following meeting date.
4, 8, 14	Performer-site technical review. Slides from presentation due 15 days after visit.
10, 16	Systems available for independent Government testing & evaluation
12	Technical program review meeting (2-days) in WMA. Slides due 15 days following meeting date.
17	WMA workshop (3-days). Slides from workshop due 15 days after the meeting.
18	Final Report for Phase 1. Format provided upon contract award.
20, 23, 26	Performer-site technical review. Slides from presentation due 15 days after visit.
22	Systems available for independent Government testing & evaluation.
28	Systems available for independent Government testing & evaluation.
29	WMA workshop (3-days). Slides from workshop due 15 days after the meeting.
30	Final Report for Phase 2. Format provided upon contract award.
32, 36, 39	Performer-site technical review. Slides from presentation due 15 days after visit.
34	Systems available for independent Government testing & evaluation.
35	Technical program review meeting (2-days) in WMA. Slides due 15 days following meeting date.

40	WMA workshop (3-days). Slides from workshop due 15 days after the meeting.
40	Systems available for independent Government testing & evaluation.
42	Final Report for Phase 3. Format provided upon contract award.
Monthly, by the 10th day of the following month	Monthly technical and financial report due to Government.
TBD	System delivery to the Government upon completion of each performer's period of performance.

1.F 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. For the purposes of determining costs, plan on estimating travel to the WMA as outlined in Table 4. The trip should include the PI and project manager at a minimum.

1.F.1 Workshops and Program Reviews

The Fun GCAT Program intends to hold a Program-level Kickoff meeting in the first month of the Program and then similar Workshops every 12 – 18 months thereafter. The dates and location of these are to be specified at a later date by the Government. Workshops will focus on technical aspects of the Program and on facilitating open technical exchanges, interaction, and sharing among the various Program participants to facilitate test and evaluation, and receive input from transition partners. Program participants will be expected to present the technical status and progress of their projects to other participants and invited guests. Technical program review meetings are status update meetings with performers and the Government team where each performer will present progress to date on the technical and financial aspects of the program.

1.F.2 Site Visits

Site visits by the Contracting Officer Technical Representative and the Fun GCAT Program Manager will generally take place three times annually during the life of the Program. These visits will occur at the performer'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.

1.G Place of Performance

Performance will be conducted at the performer's site(s) as described in the performer's response to the BAA.

1.H Period of Performance

The Fun GCAT Program is envisioned as a 3.5 year effort that is intended to begin in April, 2017. Phase 1 of the Program (the Base Period) will last 18 months, Phase 2 (Option 1) will last 12 months, and Phase 3 (Option 2) will last 12 months.

SECTION 2: AWARD INFORMATION

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: PROPOSAL REVIEW INFORMATION, 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 3.A.1.
Organizational Conflicts of Interest (OCI)

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.

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-16-08@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 the BAA

Organizations may participate in more than one submission to the BAA, IARPA-BAA-16-08. However, if multiple submissions to the 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.

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. 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 4.C.1. Due Datesin 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.

The Government intends to use employees of Booz Allen Hamilton, Ops Consulting LLC, Strategic Analysis Inc., Quantitative Scientific Solutions LLC, Johns Hopkins University/Applied Physics Laboratory, Pacific Northwest National Laboratory, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory 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-16-08@iarpa.gov. Proposals must be submitted in accordance with the procedures provided in 4.C.2. Proposal Delivery

4.B. Proposal Format and Content

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 should 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

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

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

Volume 1 – Technical & Management Proposal (Limit to 30 Pages if responding to either Thrust 1 or Thrust 2, and 50 Pages if responding to both Thrust 1 and Thrust 2)
Section 1 - Cover Sheet & Transmittal Letter
Section 2 – Summary of Proposal (Estimated not to exceed 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 – Consultant Letters of Commitment
7 – Animal Use Documentation, if applicable (see 6.B.4. Animal Use)
8 – A Three Chart Summary of the Proposal (see APPENDIX H)

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

4.B.1. Volume 1, Technical & Management Proposal (Limit to 30 Pages if responding to either Thrust 1 or Thrust 2, and 50 Pages if responding to both Thrust 1 and Thrust 2)

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 30 Pages for Thrust 1 or Thrust 2 and 50 Pages for Both Thrust 1 and Thrust 2. 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. Section 3: Detailed Proposal Information 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.[5]

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,

[5] "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.

Copyright Laws, Terms of Service, and laws and policies regarding privacy protection of U.S. Persons.

Offerors should include the documentation required in 6.B.4. Animal Use. Documentation must be well written and logical; claims for exemptions from Federal regulations for animal subject protection must be accompanied by a strong defense of the claims. The Animal Use documentation and the written verification are not included in the total page count. Use of non-human primates is/is not permitted under this BAA.

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

E. Deliverables. Deliverables are identified in section **1.E** Program Timeline and Deliverables.

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 and DFAR Part 227, or as defined herein. If offerors propose intellectual property rights that are not defined in FAR part 27 or DFAR Part 227 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. A compelling explanation is required for any variation from this figure.

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 **1**) is recommended.

Table 1: 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

If you intend to utilize animals as a part of your testing, the management plan should address how Institutional Animal Care and Use Committee (IACUC) approval will be obtained for this proposal. The IACUC management plan must identify whether the IACUC protocol, lab space, or IACUC will be classified. If unclassified aspects are

proposed, a justification/explanation of how this will be accomplished within the security classification guidelines of the program is required. An IACUC 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 IACUC management plan include the following:

- What IACUC will you be using and what is your relationship to that IACUC (internal, external, commercial, etc.)?
- Have you worked with this IACUC before? How regularly?
- When do you anticipate submitting for and receiving IACUC 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?
- If classified, has this IACUC handled classified protocols before, and is it authorized to do so currently?

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 section 3.B. US Academic Organizations.

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: Consultant Commitment Letters. If needed.

Attachment 7: Animal Use Documentation, if applicable.

Attachment 8: 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 H 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 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[6].

[6] **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

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

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

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.)

intact formulas using the format provided in APPENDIX E and addressing the supporting cost information as outlined in 4.B.2.b. Section 2: Estimated Cost Breakdown. and 4.B.2.c. Section 3: Supporting Information. 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 General Information Section for proposal due dates and times.

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-16-08@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-16-08@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 proposals will be evaluated on the basis of the evaluation criteria listed in this section 5.A, program balance, and availability of funds. The evaluation criteria of this section 5.A, 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 the 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 evaluation criteria described under section 5.A above, program balance, and availability of funds, 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
4.A.
Proposal Information and
4.B.
Proposal Format and Content. 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

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.

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

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 program.

6.B.3 Human Use

No research proposals involving human subjects will be accepted under this BAA.

6.B.4. Animal Use

The offeror's care and use of any animals[7]in the proposed research must conform with the applicable laws of the United States, regulations of the Department of Agriculture (see 7 U.S.C. § 2131 et seq. and 9 C.F.R. subchapter A, parts 1-4), and the Department of Health and Human Service's Public Health Service Policy on Humane Care and Use of Laboratory Animals. Offerors shall acquire animals from dealers licensed by the Secretary of Agriculture under 7 U.S.C. § 2133 and 9 C.F.R. §§ 2.1 through 2.11, or from a source that is exempt from licensing under those sections [8].

[7] The term "animal" shall have the meaning provided in 9 C.F.R. § 1.1.

[8] Offerors may request registration of their facility and obtain a current listing of licensed dealers from the Regional Office of the Animal and Plant Health Inspection Service (APHIS), USDA, for the region in which its research facility is located. The location of the appropriate APHIS Regional Office, as well as information concerning this program may be obtained by contacting the Animal Care Staff, USDA/APHIS, 4700 River Road, Riverdale, Maryland 20737 (E-mail: ace@aphis.usda.gov ; Web site:
(http://www.aphis.usda.gov/animal_welfare).(End of Clause)Article H.29 Introduction of Rodents and Rodent Products: No rodent or rodent product shall be delivered into the NIH, NIA environment directly, or through collaborative research or holding facilities under contract to NIA except by permit.

Institutions awarded funding for research involving animals must register with the Secretary of Agriculture in accordance with 7 U.S.C. § 2136 and 9 C.F.R.§ 2.30 and furnish evidence of such registration to the Contracting Officer before undertaking work under this contract4. Performers shall maintain their registration and comply with the requirements of 9 C.F.R. part 2, subpart C throughout all Phases of the program.

For all proposed research that will involve animals, the offeror must provide a plan for review by the cognizant Institutional Animal Care and Use Committee(s) (IACUC). If selected for award, the offeror must provide IARPA a copy of the cognizant Institutional Animal Care and Use Committee(s)'s (IACUC) approval of the animal research protocols, along with the protocols, before beginning any animal research. Consult the designated IACUC for guidance on writing the protocol. An awardee will not be authorized to begin animal research using IARPA funding until IACUC approval is granted and IARPA receives and accepts the IACUC approval documents.

Use of non-human primates is not permitted under this BAA.

6.B.5. 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.6. 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 C.F.R. Parts 120 through 130, and the Export Administration Regulations (EAR), 15 C.F.R. 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.7. 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.8. Reporting

Fiscal and management responsibility are important to the 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 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 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.9. 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.10. 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.11. 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.12. 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[9], 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 Fun GCAT, all reports to IARPA, and all Fun GCAT-based publications must follow the suggestions of the Center for Open Science. Insofar as

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

possible, all Fun GCAT Program, publications should qualify for Open Science's[10] Open Data and Open Materials badges.

To the extent possible, all awardee reports to IARPA and all Fun GCAT-based publications should be consistent with the statistical and methodological requirements for publication found in the 2014 Psychological Science editorial "Not Business as Usual"[11]. 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.13. 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.

[10] Open Science (2013). Badges to acknowledge open practices. https://opensciencefframework.org/project/TVyXZ/
[11] Psychological Science (2014) http://pss.sagepub.com/content/25/1/3

APPENDIX A

Academic Institution Acknowledgement Letter Template

IARPA Broad Agency Announcement

Fun GCAT Program

(IARPA-BAA-16-08)

-- Please Place on Official Letterhead --

<Insert date>

To: Contracting 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-16-08 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)

Fun GCAT Program

(IARPA-BAA-16-08)

(1) BAA Number	**IARPA-BAA-16-08**
(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 the specified page limit	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)

Fun GCAT Program

(IARPA-BAA-16-08)

(1) BAA Number	**IARPA-BAA-16-08**
(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)

Fun GCAT Program

(IARPA-BAA-16-08)

(Month DD, YYYY)

Office of the Director of National Intelligence
Intelligence Advanced Research Projects Activity (IARPA)
PROGRAM NAME
ATTN: PROGRAM MANAGER NAME
Washington, DC 20511

Subject: OCI Certification

Reference: <Insert Program Name>, IARPA-BAA-16-08, (Insert assigned proposal ID#, if received)

Dear PROGRAM MANAGER NAME,

In accordance with IARPA Broad Agency Announcement IARPA-BAA-16-08, 3.A.1. 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)

Fun GCAT Program

(IARPA-BAA-16-08)

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
SUB-CONTRAC-TOR IOT & CONSULTANT NAME	**SOW TASKS PERFORMED ***	**TYPE OF AWARD**	**SUB-CONTRAC-TOR, IOT & CONSULTANT QUOTED PRICE**	**COST PROPOSED BY PRIME FOR THE SUBCONTRAC-TOR, 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)

Fun GCAT Program

(IARPA-BAA-16-08)

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)

Fun GCAT Program

(IARPA-BAA-16-08)

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

Templates for Three Chart Summary of the Proposal

For

VOLUME 1: Technical and Management Proposal; Section 2

IARPA Broad Agency Announcement (BAA)

Fun GCAT Program

(IARPA-BAA-16-08)

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

Dr. John G. Julias
Program Director
301-851-7486
john.julias@iarpa.gov
IARPA

Biosketch:
Joined IARPA in 2016
Dr. John Julias joined DARPA in 2010 as a Program Manager for the Strategic Technology Office and transferred to DSO in 2013. Prior to joining DARPA, Dr. Julias was with Booz Allen Hamilton, where he was a consultant working with clients in the government and non-profit sectors whose missions focus on life sciences research and development.

Previously, Dr. Julias was employed at SAIC-Frederick where he conducted research in the field of retrovirology. His research focused on the molecular biology of HIV replication with an emphasis on enzyme structure-function relationships, understanding the effects of drug resistance mutations on replication, and the development of antivirals that are efficacious against drug resistant viral variants.

Apr 2010 – Present	Program Manager, DARPA
Dec 2006 – Apr 2010	Associate Booz Allen Hamilton
2003 – 2006	Scientist II, SAIC-Frederick, Inc.
1999 – 2003	Research Fellow, NCI-Frederick

Education
BA in Chemistry from Vanderbilt University
PhD in Biochemistry from West Virginia University.

Program:
Generic Interests - Synthetic biology, bioinformatics, computational modelling of biological interactions, systems biology, host pathogen interactions, pathogen evolution, weapons of mass destruction

Projects while at DARPA:

Functional Genomic and Computational Assessment of Threats IARPA-BAA-16-08
The Functional Genomic and Computational Assessment of Threats (Fun GCAT) program intends to develop new approaches and tools for the screening of nucleic acid sequences, and for the functional annotation and characterization of genes of concern, with the goal of preventing the accidental or intentional creation of a biological threat

7-Day Biodefense
The 7-Day Biodefense program will seek to develop novel technologies focused on preventing infection by any emerging pathogen, sustaining survival once infected, and building immunity.

Chronicle of Lineage Indicative of Origins (CLIO)
The Chronicle of Lineage Indicative of Origins (CLIO) program aims to use recent advances in synthetic biology to develop genomic and proteomic capabilities that

promote safe, secure biological research, protect intellectual property and prevent unwanted release of microorganisms.

H1N1 Acceleration (BLUE ANGEL)

The Blue Angel program is an accelerated and integrated effort to deliver effective interventions for pandemic influenza. Blue Angel brings together the following technologies to form a comprehensive approach in response to a pandemic influenza or manmade outbreak: Predicting Health and Disease (PHD), a program to predict and diagnose individuals exposed to influenza before they are symptomatic; Modular IMmune In vitro Constructs (MIMIC®)

a program to identify safe and effective treatments in a test tube; and Accelerated Manufacture of Pharmaceuticals (AMP), a capability for rapidly mass producing low-cost, vaccine-grade recombinant protein that has the potential for scale up to tens of millions of doses per month.

Prophecy (Pathogen Defeat)

The Prophecy (Pathogen Defeat) program will explore the evolution of viruses in the hopes of predicting viral mutations and ultimately developing drugs and vaccines in advance of need.

Illustrative Papers Reflecting Personal Research Interests:

Flexible Use of Nuclear Import Pathways by HIV-1
Lee, KyeongEun; Ambrose, Zandrea; Martin, Thomas D.; et al.
Cell Host & Microbe 7(3), 221-233 MAR 18 2010

The nucleoside analogs 4 ' C-Methyl thymidine and 4 ' C-Ethyl thymidine block DNA synthesis by wild-type HIV-1 RT and excision proficient NRTI resistant RT variants
Boyer, Paul L.; Julias, John G.; Ambrose, Zandrea; et al.
Journal of Molecular Biology 371(4), 873-882 AUG 24 2007

Effects of mutations in the G tract of the human immunodeficiency virus type 1 polypurine tract on virus replication and RNase H cleavage
Julias, JG; McWilliams, MJ; Sarafianos, SG; et al.
Journal of Virology 78(23), 13315-13324 DEC 2004

Mutation of amino acids in the connection domain of human immunodeficiency virus type 1 reverse transcriptase that contact the template-primer affects RNase H activity
Julias, JG; McWilliams, MJ; Sarafianos, SG; et al.
Journal of Virology 77(15), 8548-8554 AUG 2003

Replication of phenotypically mixed human immunodeficiency virus type 1 virions containing catalytically active and catalytically inactive reverse transcriptase
Julias, JG; Ferris, AL; Boyer, PL; et al.
Journal of Virology 75(14), 6537-6546 JUL 2001

E(-)-Vectors - Development of Novel Self-Inactivating and Self-Activating Retroviral Vectors for Safer Gene-Therapy
Julias, JG; Hash, D; Pathak, VK

Journal of Virology 69(11), 6839-6846 NOV 1995

Retrovirus variation and RT template switching during retroviral reverse transcription: Development of novel retroviral vectors for gene therapy
Julias, John George
PhD Dissertation, West Virginia University, 1997