AIR FORCE OFFICE OF SCIENTIFIC RESEARCH
FUNDING OPPORTUNITY ANNOUNCEMENT
 # FOA-AFRL-AFOSR-2021-0007

FY21 DEFENSE ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE RESEARCH (DEPSCoR) – RESEARCH COLLABORATION (RC)

OVERVIEW INFORMATION

The Department of Defense (DoD) announces the fiscal year 2021 (FY21) Defense Established Program to Stimulate Competitive Research (DEPSCoR) – Research Collaboration (RC). The program is sponsored and managed by the Basic Research Office, Office of the Under Secretary of Defense for Research and Engineering (OUSD [R&E]), awarded by the Air Force Office of Scientific Research (AFOSR), and administered through the Office of Naval Research (ONR). The DoD plans to award FY21 DEPSCoR appropriations through this announcement.

DEPSCoR's objectives are to: (1) increase the number of university researchers in eligible States/Territories capable of performing S&E research responsive to the needs of the DoD; and (2) enhance the capabilities of institutions of higher education (IHE) in eligible States/Territories (listed below) to develop, plan, and execute science and engineering (S&E) research that is relevant to the mission of the DoD, and competitive under the peer-review systems used for awarding Federal research assistance; (3) increase the probability of long-term growth in the competitively awarded financial assistance that IHE in eligible States receive from the Federal Government for S&E research.

Consistent with these long-term objectives of building research infrastructure, the DoD intends to competitively make, and fund from fiscal year 2021 appropriations, multiyear awards for S&E research in areas relevant to the DoD’s mission and important to national security.

This funding opportunity aims to create basic research collaborations between a **pair** of researchers, namely 1) Applicant/Principal Investigator (PI), henceforth referred to as Applicant, a full-time faculty member who has never served as a PI on a prior DoD directly funded research Prime award and 2) Collaborator/co-Principal Investigator (co-PI), henceforth referred to as Collaborator, an investigator who will provide mentorship to the Applicant **and** has served as a PI on a DoD directly funded research Prime award actively between 1 October 2014 and 30 September 2021. This structure is aimed at introducing potential applicants to the DoD's unique research challenges and its supportive research ecosystem.

Prime award defined in the context of this announcement is the DoD legal instrument (assistance or acquisition) that a Principal Investigator receives directly from a DoD awarding agency and not indirectly from a non-DoD pass-through entity to carry out scientific research.

- You are eligible to apply as the Applicant under the DEPSCoR-RC FOA as long as you were NOT listed as the Principal Investigator on a previous DoD funded research award, and are a full-time faculty member in a tenured or tenure track position in a DEPSCoR eligible State/Territory. Being a "Co-PI" or "sub PI" on a prior DoD funded award does not count as being a "PI" for the purposes of eligibility of the Applicant for the DEPSCoR-RC FOA.

- The DEPSCoR-RC white paper package must include prior research award documentation which indicates that the Collaborator was a PI on a previous DoD directly funded research Prime award between 1 October 2014 and 30 September 2021. If the Collaborator is not identified as the PI within the award document, a letter from the awarding agency point of contact should be furnished supporting the assertion within the timeframe identified.

- The Collaborator must have served as a Principal Investigator on a directly funded DoD research Prime award during the eligibility period and not have been subcontracted by: other PIs, non-DoD entities, or companies as a Co-Principal Investigator. Subawards indirectly funded by the DoD where the Collaborator has served as a Co-Principal Investigator do not count as eligible criteria for the Collaborator for the purposes of this funding opportunity announcement.

- The flow charts below serve as a guide for determining Applicant and Collaborator eligibility. Each diamond shape is an eligibility criterion question which elicits either a "yes" or "no" response. You are not eligible to submit a White Paper or proposal if any "yes" or "no" response leads to the "Not eligible" outcome. Submissions found to be "Not eligible" will not be subject to technical review. You are not

eligible to submit a White Paper or proposal if you do not meet this requirement.

Tenured or tenure-track faculty members with appointments at IHE, in the following States/Territories are eligible to apply for DEPSCoR opportunities under this announcement: Alabama, Alaska, Arizona, Arkansas, Connecticut, Delaware, District of Columbia, Guam, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Oregon, Puerto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, U.S. Virgin Islands, Vermont, West Virginia, Wisconsin, and Wyoming.

Hyperlinks have been embedded within this document and appear as underlined, and blue-colored words in the midst of paragraphs. The reader may "jump" to the linked section within this document by "clicking" (CTRL + CLICK, or CLICK).

SUMMARY OF FUNDING OPPORTUNITY INFORMATION

1. FEDERAL AWARDING AGENCY NAME

Air Force Office of Scientific Research
875 North Randolph Street, STE 325, Room 3112
Arlington, VA 22203

2. FUNDING OPPORTUNITY TITLE

Defense Established Program to Stimulate Competitive Research (DEPSCoR) – Research Collaboration (RC)

3. ANNOUNCEMENT TYPE

Initial Funding Opportunity Announcement (FOA)

4. FUNDING OPPORTUNITY NUMBER

FOA-AFRL-AFOSR-2021-0007

5. CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER(S)

12.431 – Basic Scientific Research

6. KEY DATES

Schedule of Events		
Event	**Date**	**Eastern Standard Time**
nVision website open for registration and submission (https://dod-basicresearch.nvision.noblis.org/program/depscor)	Wednesday, 23 June 2021	NLT 11:59PM
Virtual DEPSCoR Day	Wednesday, 23 June 2021	TBD
nVision Registration (strongly suggested by) Cut-off date for Q&As with Program Officers	Thursday, 16 September 2021	NLT 11:59PM
White Paper and Supporting Documentation submission on nVision website (https://dod-basicresearch.nvision.noblis.org/program/depscor) (required by)	Monday, 20 September 2021	NLT 11:59PM
Notification of White Paper Selection	Friday, 3 December 2021	NLT 11:59PM
Request for written feedback on your white paper submission (required by) (Email request to: DEPSCoR-feedback@noblis.org	Friday, 10 December 2021	NLT 11:59PM
Full Proposal Submission (by invitation only) electronically on Grants.gov website (submitted by)	Tuesday, 22 February 2022	NLT 11:59PM
Notification of Selection for Award	Monday, 2 May 2022	NLT 11:59PM

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I. PROGRAM DESCRIPTION

A. OBJECTIVES

The aim of DEPSCoR is to improve the research capabilities at institutions of higher education (IHE) in eligible States/Territories to perform competitive basic research in science and engineering that is relevant to the DoD mission and reflect national security priorities. As defined in the DoD Financial Management Regulation:

> Basic research is systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It is farsighted high payoff research that provides the basis for technological progress (DoD 7000.14-R, vol. 2B, chap. 5, para. 050105.A).

The DoD's basic research program invests broadly in many scientific fields to ensure that it has early cognizance of new scientific knowledge.

To address the program's aim, DEPSCoR will focus on capacity building through human and technical resources by soliciting applications in a DEPSCoR – Research Collaboration (RC) competition. DEPSCoR – RC seeks proposals that advance knowledge in basic science involving bold and ambitious research that may lead to extraordinary outcomes such as disrupting accepted theories and perspectives.

Authority for a grant award under this announcement is established in 10 U.S.C. 2358 for basic research. Authority for DEPSCoR specifically was established in the National Defense Authorization Act for Fiscal Year 1995, and has subsequently been amended and reauthorized over the years since (see also a specific note within 10 U.S.C. 2358 referring to DEPSCoR).

B. COLLABORATION COMPOSITION

This funding opportunity aims to create basic research collaborations between a **pair** of researchers, namely 1) Applicant/Principal Investigator

(PI), henceforth referred to as Applicant, a full-time faculty member who has never served as a PI on a prior DoD directly funded research Prime award and 2) Collaborator/co-Principal Investigator (co-PI), henceforth referred to as Collaborator, an investigator who will provide mentorship to the Applicant **and** has served as a PI on a DoD directly funded research Prime award actively between 1 October 2014 and 30 September 2021. This structure is aimed at introducing potential applicants to the DoD's unique research challenges and its supportive research ecosystem.

Applicants must be aware of the following eligibility criteria:

- You are eligible to apply as the Applicant under the DEPSCoR-RC FOA as long as you were NOT listed as the Principal Investigator on a previous DoD funded research award, and are a full-time faculty member in a tenured or tenure track position in a DEPSCoR eligible State/Territory. Being a "Co-PI" or "sub PI" on a prior DoD funded award does not count as being a "PI" for the purposes of eligibility of the Applicant for the DEPSCoR-RC FOA.

- The DEPSCoR-RC white paper package must include prior research award documentation which indicates that the Collaborator was a PI on a previous DoD directly funded research Prime award between 1 October 2014 and 30 September 2021. If the Collaborator is not identified as the PI within the award document, a letter from the awarding agency point of contact should be furnished supporting the assertion within the timeframe identified.

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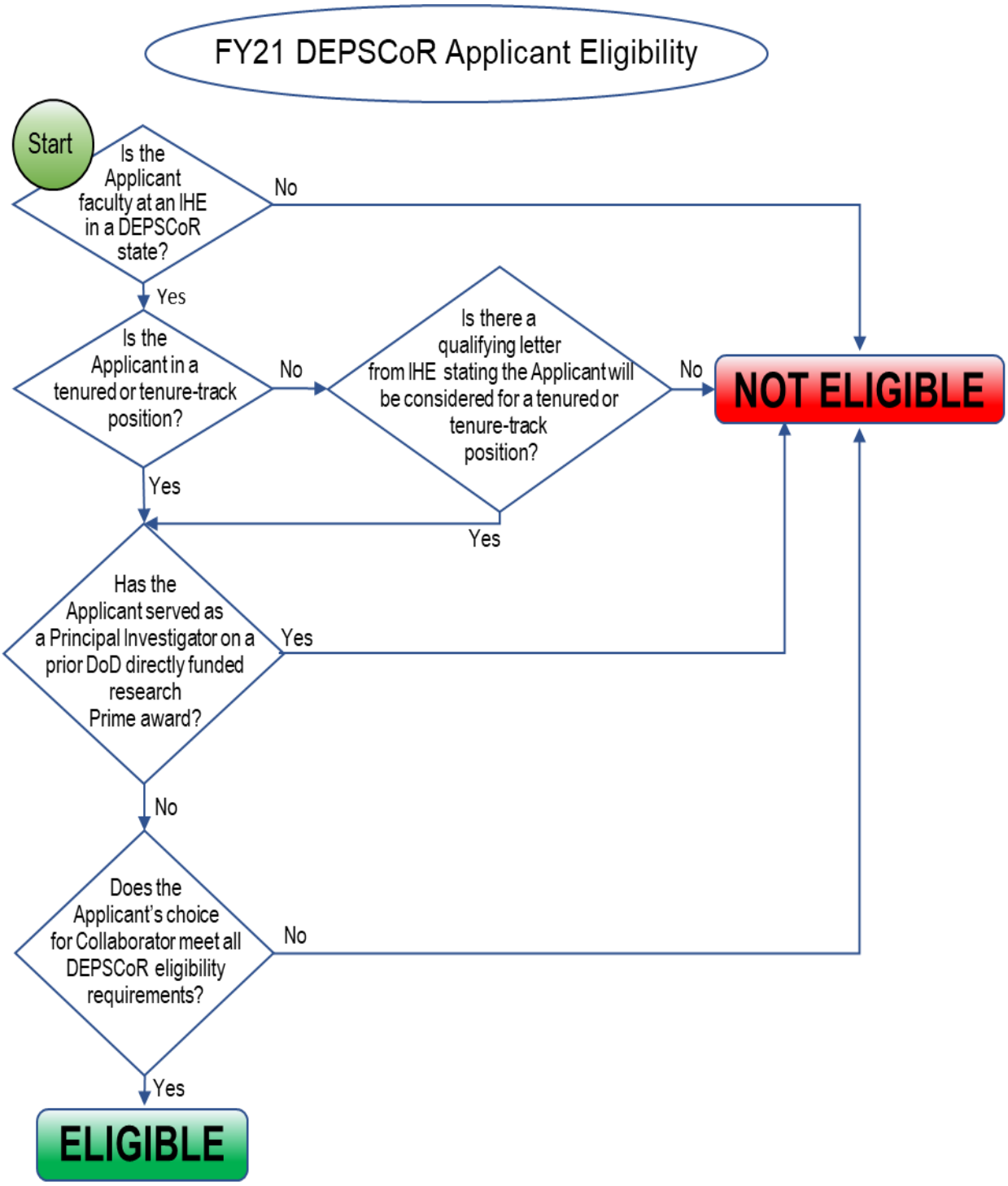
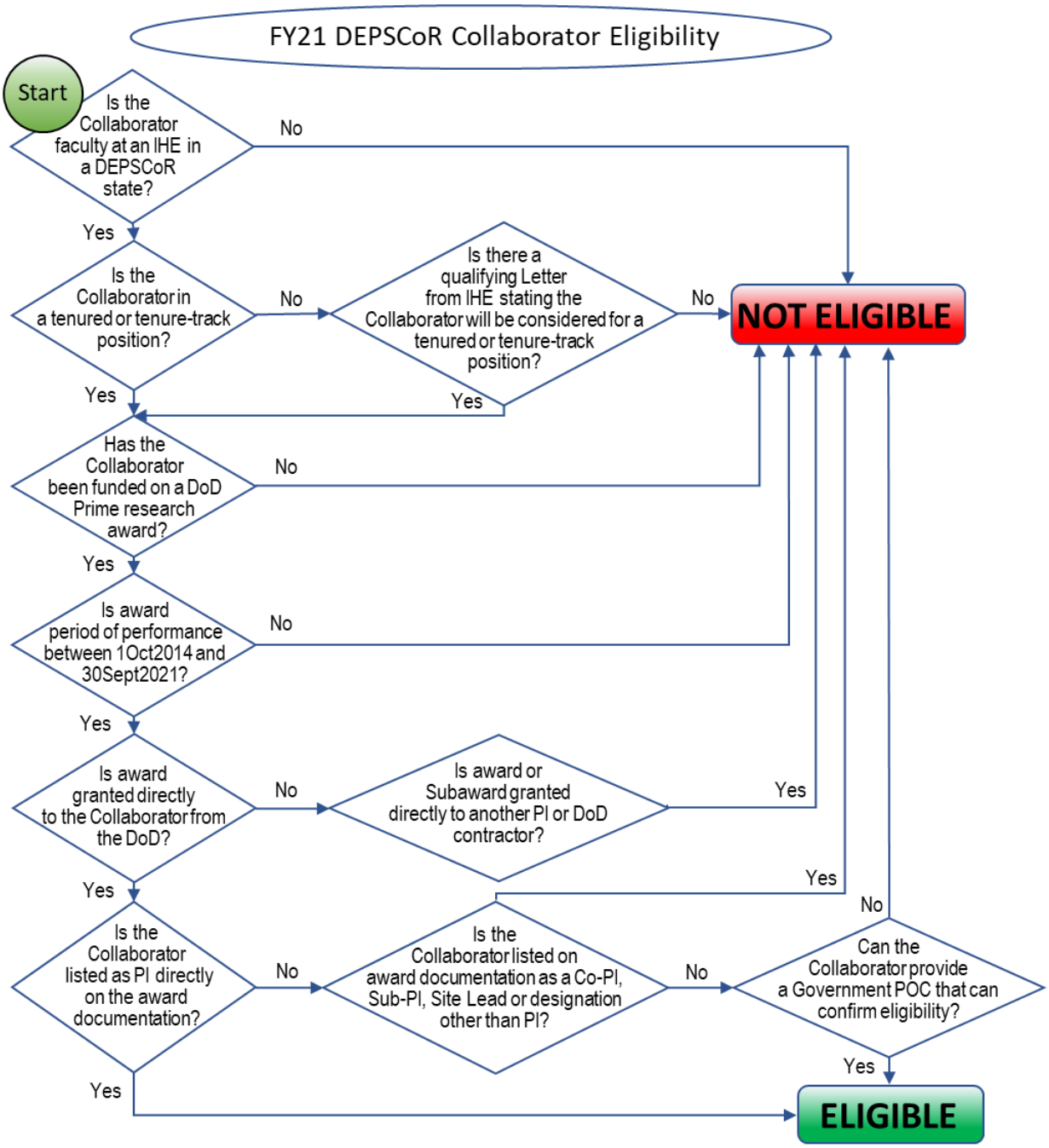
- The flow charts below serve as a guide for determining Applicant and Collaborator eligibility. Each diamond shape is an eligibility criterion question which elicits either a "yes" or "no" response. You are not eligible to submit a White Paper or proposal if any "yes" or "no" response leads to the "Not eligible" outcome. Submissions found to be "Not eligible" will not be subject to technical review. You are not eligible to submit a White Paper or proposal if you do not meet this requirement.


FY21 DEPSCoR Applicant Eligibility
Start
Is the Applicant faculty at an IHE in a DEPSCoR state?
No
Yes
Is the Applicant in a tenured or tenure-track position?
No
Is there a qualifying letter from IHE stating the Applicant will be considered for a tenured or tenure-track position?
No
NOT ELIGIBLE
Yes
Yes
Has the Applicant served as a Principal Investigator on a prior DoD directly funded research Prime award?
Yes
No
Does the Applicant's choice for Collaborator meet all DEPSCoR eligibility requirements?
No
Yes
ELIGIBLE



The Applicant is permitted to submit only one DEPSCoR-RC White Paper per this DEPSCoR-RC FOA. Each white paper is permitted a single Applicant and a single Collaborator.

Collaborators are allowed to work with more than one Applicant and thus aren't restricted from participating in more than one white paper. However, please note it is expected that Collaborators serve as a vital component of the proposed team and commit to providing time for research collaboration and mentorship throughout the entire process.

The website https://discover.dtic.mil/products-services/ is a non-comprehensive repository of government-funded scientific, technical, and engineering information for the DoD. Researchers and Applicants new to DoD are encouraged to visit the site as a starting point for identifying past and present DoD-funded researchers.

The Basic Research Office has also established a "Connect and Collaborate" site where prospective Applicants and Collaborators, seeking collaboration in this DEPSCoR opportunity can post their interest. Please see (https://dod-basicresearch.nvision.noblis.org/program/depscor) for more information. Posting your interest is NOT a requirement.

While each member of the collaboration should be in a tenure-track appointment or tenured at IHE in DEPSCoR-eligible States/Territories, you do not need to be in the same State/Territory. Likewise, the Applicant and Collaborator can have appointments at the same IHE.

Proposals should name the Applicant as the PI and their IHE as the primary institution. Awards will be issued to the IHE where the Applicant resides. It is anticipated but not a requirement that the Collaborator will be funded through a sub-award. The Applicant IHE must receive greater than 50% of the funding. The relationship among participating institutions and their respective roles, as well as the apportionment of funds including sub-awards, if any, shall be described in both the proposal text and the budget. In addition to providing technical expertise to the project, the Collaborator is strongly encouraged to provide guidance and mentorship to the Applicant in the DoD application process.

In this announcement, the term "you/your" refers to the Applicant.

C. TOPICS

The FY21 DEPSCoR – Research Collaboration competition seeks proposals addressing the topics listed below. You are strongly encouraged to contact the Topic Area Program Officer prior to submitting a white paper, preferably by email to discuss the current state of the art in his/her area of interest and how your research would advance it. This information will be requested in the IV.C.4 White Paper Package.

SECTION	Topic Number	SERVICE	TOPIC AREA	PROGRAM OFFICER
I.C.1	1	Air Force Office of Scientific Research (AFOSR)	Physics of Sensing	Dr. Michael Yakes
I.C.2	2	AFOSR	Space Propulsion and Power	Dr. Mitat A. Birkan
I.C.3	3	AFOSR	Complex Networks	Dr. Donald K. Wagner
I.C.4	4	AFOSR	Atomic and Molecular Physics	Dr. Boyan Tabakov
I.C.5	5	Army Research Office (ARO)	Modeling of Complex Systems	Dr. Rad Balu
I.C.6	6	ARO	Biomathematics	Dr. Virginia Pasour
I.C.7	7	ARO	Solid Mechanics	Dr. Denise C. Ford
I.C.8	8	ARO	Environmental Chemistry	Dr. Elizabeth King-Doonan
I.C.9	9	ARO	Electronic Sensing	Dr. Tania Paskova
I.C.10	10	Office of Naval Research (ONR)	Nanoscale Computing Devices and Systems	Dr. Ian Appelbaum
I.C.11	11	ONR	Marine Mammals and Biology	Dr. Mike Weise
I.C.12	12	ONR	Additive Manufacturing	Dr. Jennifer Wolk
I.C.13	13	ONR	Social Networks and Computational Social Science	Dr. Rebecca Goolsby
I.C.14	14	ONR	Hypersonic Aerothermodynamics	Dr. Eric Marineau

Topic 1: Physics of Sensing

Program Description: This portfolio seeks to understand the fundamental scientific limits of sensing and to develop revolutionary concepts for detection with improved accuracy, sensitivity, and robustness. The research spans experimental, theoretical, and computational studies. Although the principal domain of activity focuses on the electromagnetic spectrum, the areas of interest to the Air Force and Space Force are broad and include chemical and gravitational measurements. We seek to expand the basic physical understanding in

propagation of electromagnetic radiation, interactions of radiation with matter, image formation, sensor tasking, data fusion, remote object detection and identification, and the effects of the atmosphere or space environment on sensing systems. Proposals are sought in all areas of ground-, air-, and space-based sensing with applications in tracking, detecting, and characterizing. Fundamental understanding which leads to development of sensors of higher sensitivity or smaller cost or form factor is of relevance. Passive and active sensing methods, particularly multimodal detection and multifunctional sensors, are of interest.

Basic Research Objectives: Research goals include, but are not limited to:

- Researching detection phenomena and the physics of ideal and real sensor systems including multimodal, hyperspectral, and hypertemporal, sensors.

- Discovering fundamental limits to restrictions such as limited aperture size, time of day, and imperfections in the optics, and techniques to approach or circumvent these limitations.

- Understanding irregularities in the optical path including imaging though obscured, degraded, and non-line of sight conditions and developing novel methods for imaging in these conditions.

- Creating new materials, systems, and techniques to approach the fundamental detection limits.

- Characterizing propagation of coherent and incoherent electromagnetic radiation through a turbulent atmosphere.

- Developing experimental methods and models to describe the spectral, thermal, and polarimetric signature from objects of interest.

- Understanding and predicting dynamics of space objects as it relates to identification and space domain awareness.

- Innovating techniques for on-orbit characterization, including radiation tolerant optical and non-optical sensors such as electrostatic field measurements, accelerometers and radiation dosimeters.

DR. MICHAEL YAKES, AFOSR/RTB1
Email: remote.sensing@us.af.mil
(703) 696-8427

Topic 2: Space Propulsion and Power

Program Description: Research activities are focused as multi-disciplinary, multi- physics, multi-scale approach to complex problems, and fall into four areas: Coupled Material and Plasma Processes far from Equilibrium, Nano-energetics in solid propellant combustion, High Pressure Combustion Dynamics in rocket engines, and structural batteries.

Basic Research Objectives: Research in the first area is to significantly advance the state-of-the-art in our ability to understand the fundamental aspects of a coupled plasma/material system in non-equilibrium states, for a variety of potential applications, including plasma-based space propulsion systems and plasma-spacecraft interactions. The typical conditions of interest are characterized by critical phenomena in small spatial and temporal scales which affect the behavior over a much wider range of scales. Detailed understanding and control of non-equilibrium and multiscale effects have the potential to overcome the limitations of traditional plasma in thermodynamic equilibrium, leading to improved system designs; preventing or leveraging dynamic features such as instabilities, coherent structures, and turbulence; and realizing chemical pathways, structural changes or electromagnetic processes for novel devices with unprecedented level of control. Research interest also includes the use of data-driven methods to generate dynamic databases for accurate, and efficient computational predictions. For Very low Earth Orbit, research is needed to identify and assess the suitability of new electric propulsion candidates that may make use of large amounts of beamed energy and the harvesting of air as a propellant. Concepts may include pulsed and/or continuous (steady-state) electric propulsion schemes that include understanding issues associated with efficient collection, conditioning, ionization, and subsequent acceleration of air to produce thrust at a sufficient specific impulse needed to maintain orbit. The potential use of beam energy introduces the possibility of directly coupling the beamed energy into ablative thrusters, or air flows for ionization to produce plasma ejections and thrust.

Research in the second area focuses on smart, functional Nano-energetics for propulsion purposes only. There has been tremendous progress in the synthesis and fabrication of Nano-sized reactive materials. With significant advances in quantum chemistry and molecular dynamics over the last decade, as well as a broader understanding of the properties of nanomaterials, it may now be feasible to design a priori nanostructured reactive materials according to desired performance objectives and including controlling mechanisms at the nanoscopic and microscopic scale. Instead of being subject to uncontrolled combustion, smart Nano-energetics may be activated by external electromagnetic stimuli, such as

an electrical field or light. For example, it may be desirable to initiate a reaction at a particular temperature, to release a particular compound at a particular temperature, to turn on or turn off a reaction, have tailored ignition properties, to achieve extinguishment of a propellant, or to accelerate or slow a reaction with time or location.

Research in the third area would allow the Air Force and Space Force to capitalize on the higher efficiencies, and increased performance options made possible by taking rocket and other propulsion systems to increasingly high pressures. As this necessarily pushes materials and structures to correspondingly extreme limits, it becomes essential to take into consideration the dynamics of combustion processes, as higher pressures lead to increased amplitudes of fluid-dynamic and thermochemical events and fluctuations, in a wider spectrum of time scales. Mathematical and experimental analysis of these dynamics at higher levels of fidelity also lead to a "big data" problem. It becomes necessary to combine and dynamically integrate multi-fidelity simulations and experimental measurements or monitoring, with the goal of systematically performing modeling, analytics, statistics, and dynamic data driven validation for chemical propulsion.

Research in the fourth area aims to combine both electrochemical and mechanical functionalities in a single unit in which energy storage can be accomplished by materials and structures that simultaneously manage mechanical stress, including peak values encountered during launch.

DR. MITAT A. BIRKAN, AFOSR/RTA1
Email: space.power@us.af.mil
(703) 696-7234

Topic 3: Complex Networks

Program Description: Complex networks are pervasive in military, commercial, and civilian operations. Complex networks consist of a graph (directed or undirected) together with a set of attributes. These attributes can include scalar or multi-dimensional weights on the edges or nodes of the graph, topological characteristics of the graph, flows over the graph, and processes that define the dynamics of the graph. Complex networks cut across many scientific disciplines (e.g., mathematics, computer science, engineering, socio-economics, etc.) and many application domains (e.g., communications, sensing, information systems, transportation, etc.). Networks fundamentally describe the structural aspects of interactions between individual agents. Networks can be extremely large and can have multiple characteristic scales. They can be static or dynamic. They can be physical or virtual. Networks can consist of multiple heterogeneous subnetworks (i.e., a network- of-networks), with explicit and implicit interdependencies. For example, transportation

networks are intimately coupled to computer and electrical-power networks. Thus, the failure of a critical node or arc in one network can trigger failures in another, which can create a cascade event with catastrophic consequences. All of these characteristics of networks can make the analysis, understanding, and utilization of networks difficult and computationally prohibitive.

This basic-research program is focused on developing fundamental mathematical and algorithmic techniques to design, analyze, utilize, and understand complex networks. The program seeks innovative approaches with far-reaching potential, meaning any mathematical and algorithmic approaches ideally should be applicable to broad classes of problems and not tied to a particular application domain. The networks of interest can have arbitrary topologies, can be static or dynamic, and can be subject to uncertain conditions, ranging from a stochastic environment to deliberate adversarial actions affecting both nodes and links.

Basic Research Objectives: This program is aimed at developing mathematical and algorithmic tools for the design, analysis, understanding, and utilization of complex networks. Problems of interest include, but are not limited to:

- Network resilience and robustness: This includes techniques for defining and measuring the resilience of a dynamic network; techniques for predicting, identifying, and mitigating adversarial actions against a network; techniques for network interdiction.

- Network analytics: This includes algorithmic techniques for solving important classes of problems on networks, such as optimal resource allocation and information dissemination; algorithmic techniques for inference problems on networks that extract global information about network structure and function from local information. The algorithms can be exact or approximate with performance guarantees. Of particular interest are decentralized algorithms and understanding the tradeoff between centralization and decentralization.

- Complexity reduction of networks: This includes techniques for decomposition, sparsification, and dimensionality reduction of networks with the goal of making networks easier to analyze, understand, and visualize; techniques for analyzing and exploiting graph-theoretic structure such as multi-layer networks.

- Extension of network-analysis techniques to more general combinatorial, algebraic, or analytical structures: This includes network-relevant research in submodular functions, hypergraphs, matroids, graphons, etc.

Approaches may draw upon, but are not limited to, techniques from graph theory, optimization, complexity theory, algorithmic game theory, combinatorics, linear algebra, statistics, and probability.

DR. DONALD K. WAGNER, AFOSR/RTA2
Email: complex-networks@us.af.mil
(703) 696-9705

Topic 4: Atomic and Molecular Physics

Program Description: This program encompasses fundamental experimental and theoretical Atomic and Molecular Physics research that is primarily focused on studies of cold and ultra-cold quantum gases, precision measurement, matter-wave optics, and non-equilibrium quantum dynamics. These research areas support technological advances in application areas of interest to the U.S. Air and Space Force, including precision navigation, timekeeping, remote sensing, metrology, and novel materials for the U.S. Air and Space Force needs in the future.

Basic Research Objectives: AMO (Atomic, Molecular, and Optical) physics today offers an unprecedented level of coherent control and manipulation of atoms and molecules and their interactions, allowing for significant scientific advances in the areas of cold and ultra-cold matter and precision measurement. Specific research topics of interest in this program include, but are not limited to, the following: physics of quantum degenerate atomic and molecular gases; precision control techniques; strongly-interacting quantum particles; new quantum phases of matter; non-equilibrium dynamics of cold quantum particles; ultra-cold chemistry; precision spectroscopy; and high-precision techniques for navigation, guidance, and remote sensing.

DR. BOYAN TABAKOV, AFOSR/RTB1
Email: amphysics@us.af.mil
(703) 696-9518

Topic 5: Modeling of Complex Systems

The Modeling of Complex Systems Program is a program of fundamental mathematic oriented research, the broad objectives of which are twofold. First, the program seeks to develop and analyze new, innovative, and robust modeling frameworks that may be adapted and generally applied across a variety of disciplines. The second goal is to develop both quantitative and qualitative models of specific complex phenomena in areas in which current models are either not fully based on first/basic principles or are based on empirical and ad hoc metrics for which the

first/basic principles are not yet well known. Although they break down into more specific research directions, the three thrust areas of interest to the Modeling of Complex Systems Program are 1) development and analysis of new, general modeling frameworks; 2) geometric and topological modeling – which can be further broken down into more specific thrust areas, as noted below – and; 3) small and large group social modeling and social informatics.

Metrics – in the general, non-mathematical sense of the word – are a natural part of the mathematical modeling framework. Traditional metrics, when they exist, often do not measure the characteristics in which observers in general and the Army in particular are interested. For many complex phenomena, new metrics need to be developed at the same time as new models. As is the case for the modeling effort, these metrics should preferably be in a complete mathematical analytical framework, which is to say, in part, that they should derive from the problem in question as opposed to a situation in which one forces the model to fit an a priori chosen metric. The research in modeling of complex phenomena supported by the Modeling of Complex Systems Program is primarily mathematical analysis and not numerical analysis or computational mathematics. One expects computation to play some role in any modeling endeavor, but the innovation in research carried out in the Modeling of Complex Systems program should be largely in the areas of modeling and analysis, and not in the computational techniques.

Furthermore, any modeling research effort that could be of benefit to military or intelligence applications but that might not fall directly under one or more of the program thrust areas will still be considered, particularly if the innovation in the modeling and analysis are significant and noteworthy.

The three major areas of research of the Modeling of Complex Systems Program are:

Modeling Frameworks and Analysis. Mathematical and physical modeling is fundamental to nearly every other direction of research in the physical, social, and computational sciences. A common element of modeling – even if the phenomenon in question is highly complex – is to incorporate simplifying assumptions that sacrifice realistic application and utility for computational ability. For Army and DoD applications, however, such simplifications often render the model impractical. Modeling frameworks are desired that are able to eschew the usual computational simplification assumptions and realistically capture, adequately govern and/or control, and effectively operate within the particular complexities of real world environments and phenomena, while still maintaining some degree of computational tractability. Of specific

interest are causal and predictive modeling frameworks, hybrid model frameworks that capture both causal and predictive features, statistical modeling frameworks, and abstract categorical models (cf. Homotopy Type Theory). Models of particular complex systems that address and are to be utilized for more specific purposes and objectives will be assessed within the context of one of the program's other modeling thrust areas described below. Research carried out under this section should address the general theory and analysis of mathematical modeling from a broader perspective.

Geometric and Topological Modeling. Representation of complex, irregular geometric objects and complicated, often high-dimensional, abstract phenomena, functions, and processes is fundamental for Army, DoD, and civilian needs. Such needs arise in the modeling of urban and natural terrain, geophysical features, biological objects (e.g. human brain mapping), information flow, and many other contexts. Any research that incorporates an innovative geometric and/or topological approach to address a problem with military, defense, and intelligence applications is welcome and will be considered, but there are two specific threads that are of particular interest to this thrust of the program: 1) geometric data analysis, and 2) multiscale geometric modeling, including dynamics and physical modeling on domains with fine, complex, geometric and/or topological structure.

Geometric data analysis includes – among other subfields – topological data analysis, subspace analysis, principal component analysis, and dimension reduction techniques. Current research directions of importance to Army applications include video, audio, and image processing (i.e. mathematical signal analysis), fast and accurate face/object recognition (i.e., reconstructing and matching geometric data through queries over a database), geometrically motivated methods and structures for working effectively with large – and often real-time extracted – data sets that may be corrupted in some way (e.g. missing or distorted data), and the application of persistent homology in the detection and classification of signals by shape. For instance, although good progress has been made in this direction, real-time capture, representation, and visual reproduction of 3D terrain – not just as a height field but with multivalent height functions and clearly defined topological obstructions – obtained directly from real-time or stored point-cloud data cannot be fully achieved with current techniques like the multitude of variations of piecewise planar surfaces that are presently studied. New approximation theory that does not require the classical assumptions – primarily smoothness – and that provides structure for the many new non-smooth approximation techniques currently under investigation is required. Concurrently, research on the metrics by which we measure and evaluate the approximation is needed.

Additionally, approximation theory for information flow and other abstract phenomena in large wireless communication, sensor and social networks is also of interest. The approximation theory developed under support of this program is expected to provide building blocks for computational geometry, pattern recognition, automatic target recognition, visualization systems, information processing and network information flow.

Multiscale geometric modeling, analysis, and dynamics are of particular interest, both in the context of models of physical phenomena over real-world terrain and in the aforementioned complex, high-dimensional data structures. Models that make use of self-similar structures and recursively defined spaces (e.g. fractals, solenoids, etc.) would be of great interest in adapting or enhancing current techniques in areas such as data mining, fluid and heat flow, and search, evasion, deployment, and maneuver over complex terrain that exhibits self-similar properties (e.g. urban or mountainous terrain). Current techniques for dealing with complex dynamical processes and large, noisy, and possibly corrupted data sets could be greatly improved in both the time and efficiency realms by employing techniques from scale symmetry, which often allows one to reduce a large and unwieldy number of variables to a more manageable problem if the variables are appropriately scaled. Models that adapt self-similarity and automata theory, in particular, can oftentimes lead to mapping complex dynamical systems problems into an algebraic and/or topological category, which then may allow for entirely new tools and approaches to be used. Homotopy Type Theory and its applications are such an area that is of significant interest in military applications.

Small and Large Group Social Modeling. Both qualitative and quantitative analytical models of social group dynamics and information flow are required for operations, training, simulation (computer generated forces) and mission planning, as well as real-time analysis, processing, and dissemination of information. Current models have limited accuracy. Research focused on mathematically justified, practically useful, computationally tractable and data-tractable models is needed. ("Data-tractable" means "does not require more data or more detailed data than is realistically likely to be available."). Research on the metrics in which the accuracy of the models should be measured is also vitally important.

The broad term for this research pursuit would be social informatics, which is an important area in which more significant progress is needed, especially in the military and intelligence realms. Social informatics, briefly, is the study of the role played in society by information-based technology. This includes examinations of how the spread of information through technology effects social and organizational changes in society, as well as the converse – how social organization of information and use

of technology to spread information are affected by social structures and practices. Modeling of the flow, dissemination, and possible evolution of belief systems and cultural factors through physical group migration or through social networking is an important tool in being able to predict where social and military issues might arise in the world. This could lead to better preparation and the avoidance of "caught-off-guard" situations in global politics and military affairs.

Included within the social informatics realm are narrower but equally important research directions. These would include – but not be limited to – the dynamics of information flow across physical groups of people as well as social/technological networks, pattern detection in information flow and language, which would lead to more efficient surveillance and pre-emptive threat detection, as well as security in information transmission. In this latter direction, new and unique data structures and encryption techniques would be hugely beneficial. Complex but tractable multiscale data structures and viable fractal or self-similar encryption techniques – which heretofore have proved to be of academic but not very practical interest – are just a few examples of many that could prove useful.

Paralleling the pursuit of social informatics, information flow analysis, and pattern recognition in information and data is the quickly developing field of deep machine learning. The Army is particularly interested in developing programming models and training algorithms that can automate as much of these processes as possible. This involves a great deal of research into pattern recognition and data analysis, as well as model analysis. The interplay between causal, data-based models and predictive modeling are of special interest and an active area of military research.

DR. RAD BALU
Email: radhakrishnan.balu.civ@usa.army.mil
(301) 233-5292

Topic 6: Biomathematics

The introduction of Biomathematics as a separate area of basic research recognizes the importance and specialized nature of quantitative methods, specifically mechanistic modeling, in the biological sciences. Biology involves a large number of entities that interact with each other and their environment in complex ways and at multiple scales.

This complexity makes biomathematics a highly interdisciplinary field that requires unique and highly specialized mathematical competencies to quantify structure in these relationships. In fact, progress in

mathematical models of biological systems has traditionally been achieved by making convenient simplifications; major advances in Biomathematics research continue to require removing these assumptions (for example, stationarity, ergodicity and deterministic nature) and finding ways to effectively model the essential complexity. Modeling techniques currently utilized in the field range from agent-based approaches for determining the results of individual behavior, whether those individuals be molecules, zooplankton, or humans, to multi-compartmental modeling in physiology, epidemiology and neurobiology, to network models involved in understanding ecosystem and human social dynamics, as well as encompassing both deterministic and stochastic approaches. Research in control techniques is also valuable for its potential application in militarily important areas such as bio warfare and disease spread. Exciting new opportunities to advance the field are found in high risk attempts to develop modeling techniques in areas of mathematics, such as algebra and topology, not traditionally brought to bear on biological problems, advances in Bayesian statistics, a growing recognition that the diffusion approximation is not necessarily adequate for many systems, and the availability of large amounts of complex biological data.

The ultimate goal of the Biomathematics Program focuses on adapting existing mathematics and creating new mathematical techniques to uncover fundamental relationships in biology, spanning different biological systems as well as multiple spatial and temporal scales. One area of special interest to the Program is Neuromathematics, the mechanistic mathematical modeling of neural processes. Recent advances in neuroscience provide important foundations to begin understanding how the brain works. Combined with experimental data, innovative mathematical modeling provides an unparalleled opportunity to gain a revolutionary new understanding of brain physiology, cognition (including sensory processing, attention, decision-making, etc.), and neurological disease. With this new understanding, improved soldier performance, as well as treatments for Post-Traumatic Stress Disorder, Traumatic Brain Injury, and other brain-related disorders suffered by the warfighter will be able to be achieved more effectively, efficiently, and ethically than via experimentation alone.

Thrust areas of the Biomathematics Program are as follows:

Fundamental Laws of Biology. The field of physics has long been "mathematized" so that fundamental principles such as Newton's Laws are not considered the application of mathematics to physics but physics itself. The field of biology is far behind physics in this respect; a similar process of mathematization is a basic and high-risk goal of the ARO Biomathematics Program. The identification and mathematical

formulation of the fundamental principles of biological structure, function, and development applying across systems and scales will not only revolutionize the field of biology but will motivate the creation of new mathematics that will contribute in as-yet-unforeseen ways to biology and the field of mathematics itself.

Multiscale Modeling/Inverse Problems. Biological systems function through diversity, with large scale function emerging from the collective behavior of smaller scale heterogeneous elements. This "forward" problem includes creating mechanistic mathematical models at different biological scales and synchronizing their connections from one level of organization to another, as well as an important sub problem, how to represent the heterogeneity of individual elements and how much heterogeneity to include in the model. For example, the currently increasing ability to generate large volumes of molecular data provides a significant opportunity for biomathematical modelers to develop advanced analytical procedures to elucidate the fundamental principles by which genes, proteins, cells, etc., are integrated and function as systems through the use of innovative mathematical and statistical techniques. The task is complicated by the fact that data collection methods are noisy, many biological mechanisms are not well understood, and, somewhat ironically, large volumes of data tend to obscure meaningful relationships. However, traditionally "pure" mathematical fields such as differential geometry, algebra and topology, integration of Bayesian statistical methods with mathematical methods, and the new field of topological data analysis, among others, show promise in approaching these problems. Solutions to these types of multiscale problems will elucidate the connection, for example, of stem cells to tissue and organ development or of disease processes within the human body to the behavior of epidemics.

The "inverse" problem is just as important as the forward problem. From an understanding of the overall behavior of a system, is it possible to determine the nature of the individual elements? For example, from knowledge of cell signaling, can we go back and retrieve information about the cell? Although inverse problems have been studied for a long time, significant progress has been elusive. This thrust area involves innovations in spatial and/or temporal modeling of multi-level biological elements with the goal of achieving a deeper understanding of biological systems and eventually connecting top-down (data-driven) and bottom-up (model-based) approaches.

Modeling at Intermediate Timescales. Biological processes operate at a variety of timescales; understanding the dynamics of a system at intermediate timescales, as opposed to its long term, asymptotic behavior, is critically important in biology, more so than in many other

fields. For example, an epidemic is a necessarily transient phenomenon. In addition, deterministic models are an approximation that often is not good enough to be informative about the system. Yet, intermediate timescales of nonlinear dynamics with stochasticity, both internal and external, are not well understood. This thrust area attempts to fill the gap in the basic understanding of modeling of systems, as well as their control, at intermediate timescales.

DR. VIRGINIA PASOUR
Email: virginia.b.pasour.civ@mail.mil
(919) 602-8348

Topic 7: Solid Mechanics

The Solid Mechanics Program supports investigations of the behavior of material systems under extreme high loading and loading rate events, such as impact and blast, repetitive loading, temperature and pressure extremes, and prolonged operation. Development of new computational and experimental techniques and enhanced understanding of the physical processes taking place during deformation, fracture initiation, and failure are sought.

Advances in computational techniques should aim to connect phenomena occurring at different spatial and/or temporal scales, substantially improve efficiency and/or accuracy of predictions, integrate new physical relationships, apply a novel approach to studying a physical process, or expand the range of conditions at which processes can be studied. Development of experimental methods that can validate new models or visualize stress fields in complex situations are also of interest.

Maximizing strength and damage tolerance while minimizing weight and cost are key considerations for the development of new material systems; therefore, studies of all material types will be considered, and novel composites, geometries, and bioinspired structures are particularly encouraged. The effects of structure, geometry, composition, defects, and bonding across interfaces on the damage propagation across a material system are of interest.

DR. DENISE C. FORD
Email: denise.c.ford2.civ@mail.mil
(919) 549-4244

Topic 8: Environmental Chemistry

The Environmental Chemistry program seeks to provide a more complete and practical understanding of transport, degradation, and transformation for chemicals and compounds of interest. The goal of the research is to develop theories that comprehensively account for the interdependent nature of heterogeneous environments. The program will identify fundamental research opportunities in two main thrusts: (i) *Chemical structure and reactivity in multiphase environments;* and (ii) *Novel techniques for detection and prediction.*

Chemical structure and reactivity in multiphase environments aims to determine the properties and processes that govern the fate and transport of compounds in environments where chemical reactions and transport processes occur between solid, liquid, and gaseous matter. Army-relevant multiphase environments are soils, sediments, dust, water (e.g. lacustrine, riverine, subterranean, and snow and ice), and films (e.g. biological and urban). The reactions in these environments occur synergistically and dynamically and are a function of the species present, their structure and partitioning, and their chemical and physical properties. Therefore, understanding multiphase environments relies on basic research to quantify the structure and physio-chemical evolution of a compound over a wide range of spatial and temporal scales. Complementary studies involving novel experimental and computational approaches are essential to overcome the research challenges of multiphase environments.

Novel techniques for detection and prediction aims to develop cutting-edge analytical, computational, and experimental approaches to advance the theory and models required to detect and discern compounds of interest under relevant environmental conditions. Areas of interest include source partitioning, deconvolution of complex matrices for non-targeted detection, rapid recognition of compounds at ultra-trace levels, and the application of machine learning and artificial intelligence to enhance fate and transport modeling capabilities for compounds and their degradation products.

DR. ELIZABETH KING-DOONAN
Email: elizabeth.k.king-doonan.civ@mail.mil
(919) 549-4386

Topic 9: Electronic Sensing

This program focuses on basic research investigations leading to new electronic sensing concepts that enable 100% situational awareness to include day/night, all weather, non-line-of-sight and through natural and man-made obstructions for sensing of personnel, weapons, chemical and

biological threats, projectiles, explosives, landmines, improvised explosive devices and motion. Novel techniques that enhance the stimulus-response characteristics of nano-structures and semiconductor devices and explore the trade-offs between sensing and cooling are of interest. This includes ways to improve the absorption of the signal, conversion (transduction) of the signal to another form with higher efficiency, and techniques to lower the noise while increasing the detector sensitivity. Sensing modalities of interest to this research subarea currently include acoustic; seismic; passive electromagnetic; magnetic, and lightmatter interactions, and other modalities that meet Army needs for light, tunable and flexible sensors are also welcome.

The ES program supports research focused on device engineering and associated materials development, including experimental and computational studies that design, create, and understand novel materials functionalities and device operation principles through advances in the fields of electronics, photonics, photoacoustics and piezophototronics to enhance or enable new detection capabilities in both infrared and deep ultra-violet spectral regions. In both regions, fundamental studies involving growth, defects, interfaces, substrates, doping, and other material properties and device characteristics will be considered. Beyond the current detection paradigms, new artificially engineered nanomaterials, metamaterials and metasurfaces, microcavity and 2D stacked or twisted heterostructures in conjunction with photonics are sought to address current limitations and open new opportunities.

DR. TANIA PASKOVA
Email: tania.m.paskova.civ@mail.mil
(919) 549-4334

Topic 10: Nanoscale Computing Devices and Systems

Description: This program's objective is to study the electronic, optical and magnetic properties of nanometer-scale materials and structures that will enable revolutionary new electronic devices with a plausible route to either:

- Classical logic with size/weight/power/speed advantages over state-of-the-art, or;

- Robust quantum information processing.

Primary questions we seek to answer are:

- What is the fundamental building block of classical information handling beyond field-effect transistors at the scaling limit?

- Can information be experimentally "topologically protected" in quasiparticle qubit designs?

- What kind of alternative computing architectures will circumvent the von Neumann memory-compute information bottleneck?

- Are there reliable and cost-effective means to synthesize and fabricate electronic circuitry at atomic resolution, including schemes to grow, stabilize, and utilize novel 2D electronic materials?

POC: DR. IAN APPELBAUM
Email: ian.appelbaum@navy.mil
(703) 696-0483

Topic 11: Marine Mammals and Biology

Description: Navy is legally mandated to evaluate and mitigate the impacts of Navy testing and training activities on federally protected marine mammals under NEPA, MMPA, and ESA. The ONR Marine Mammals and Biology (MMB) program supports basic research related to understanding the effects of sound on marine mammals, including physiological, behavioral, ecological and population-level effects. Through integrated ecosystem research, ONR MMB seeks to understand the patterns and causes of variability in the distribution and abundance of marine mammals over space and time. Research often utilizes a multidisciplinary approach using tagging, visual surveys and passive acoustics to collect baseline measures of marine mammal behaviors and distributions relative to environmental features and prey fields.

Example research interests include:

- Using animal tagging and passive acoustic monitoring to study behaviors and distributions of marine mammals relative to key environmental properties (biotic and abiotic);

- Providing a context for interpreting behavioral responses to external stimuli (i.e., anthropogenic sound); providing basic knowledge needed for predictive models of species of concern;

- Mapping prey fields in relation to physical features and marine mammal distribution and behavior.

POC: DR. MIKE WEISE
Email: michael.j.weise@navy.mil
(703) 696-4533

Topic 12: Additive Manufacturing

Description: Additive manufacturing (AM), or 3-D printing, has advanced beyond rapid prototyping to the manufacturing of structural and functional components. AM enables a new design space to realize increased capabilities. However, unlike conventional materials, there are highly coupled and complex design, structure, process and performance relationships for AM parts. While the general use of AM for prototyping to advance science and technology is well noted, new and novel approaches in developing and understanding AM materials and manufacturing processes is necessary for broader implementation.

Advancements in computational modeling and simulation, digital design, and digital manufacturing is a rich and evolving landscape. At this intersection with AM, fundamental science can be explored to reduce current AM manufacturing and implementation costs for optimized AM materials and processes.

Research concentration areas for additive manufacturing materials and processes include:

- Computational approaches for understanding AM materials, processes, and performance relationships for structural materials;
- Discovery and development of AM materials and processes for defense applications;
- Advancing AM materials and processes at size and production scales of interest.

POC: DR. JENNIFER WOLK
(703) 696-5992
jennifer.wolk@navy.mil

Topic 13: Social Networks and Computational Social Science

Social Networks and Computational Social Science supports research in social dynamics, human geography and cyber-social science to understand naval concerns of conflict, civil instability, disaster and crisis response, humanitarian assistance and the transformation of military operations in the new information age. Supported work includes social science based models, new capabilities, and affordances to understand socio-cultural aspects of human behavior for conflict resolution in complex situations.

Research concentration areas include, but are not limited to:

- Ethnographic, social science and media studies of community impact of social media disinformation, focusing on holistic research and studies of real-world communities;

- Social science research, data development and community based studies of climate change concerns and US national security interests;

- Digital conflicts at the nation state, regional or community level.

Additional research challenges and opportunities exist in the areas of:

- Improving information flow in high tempo, high impact, multi-national disasters and humanitarian crises;

- Developing new methods in exploring the intrusion of social media acquired values and behaviors from online into the real world;

- Understanding cyber-social group behavior in conflict and its reflection in the real world;

- Moral psychology and the problem of social media and group polarization;

- Understanding and countering violent extremism at home and abroad;

- Cognitive dissonance and the problem of online radicalization.

The successful applicant will explore a set of problems through a social science focused program of study, including both online and offline research. Ethnographic studies, focus groups and sociological/anthropological interviews are key methods that are expected to be at the core of the research, in addition to social and digital media studies. New theory and a deeper understanding of these problems areas and the development of new techniques of intervention are the expected outcomes.

POC: DR. REBECCA GOOLSBY
Email: rebecca.goolsby@navy.mil
(703) 588-0558

Topic 14: Hypersonic Aerothermodynamics

Hypersonic flight provides an unprecedented capability by simultaneously extending range and reducing transit time—enabling

rapid reach and global targeting. The near sea-level launch of low-drag guided projectiles at hypersonic speeds poses unique aerothermal challenges. The computation and ground testing of such flows are demanding due to the large free-stream unit Reynolds numbers in excess of 100 million per meter. For projectiles, understanding the interplay between multiple competing boundary-layer transition mechanisms such as transient growth, entropy-layer instabilities, 1st mode, 2nd mode, and crossflow as a function of the flight conditions and surface finish remain an unsolved problem. Hypersonic glide vehicles involve complex flow physics due to the high flight enthalpies and wide range of operating conditions experienced during reentry, pull-up, glide, and terminal dive. The ability to predict the state of the boundary layer over the vehicle, including the control surfaces, is crucial to reducing design margins.

Research concentration areas are:

- Hypersonic boundary-layers;
- Shock-wave / boundary-layer interactions;
- Test facilities, instrumentation and diagnostics;
- Flight performance and control including the influence of non-continuum, non-equilibrium and aero-thermo-servo-elastic effects;
- Environment-material interactions.

POC: DR. ERIC MARINEAU
Email: eric.marineau@navy.mil
(703) 696-4771

II. FEDERAL AWARD INFORMATION

The Basic Research Office anticipates approximately $12.6 million in total funding will be made available for this program to fully fund at award approximately twenty one (21) grants up to $600,000 (total cost) each. Each grant award will be funded up to $200,000 (total cost) per year for three (3) years.

Awards are subject to funding availability. There is no guarantee of an award.

Cost sharing or matching is not required or considered as an evaluation criterion, but you may propose voluntary committed cost sharing or matching; for example, additional support for students. Any voluntary committed cost sharing amount will be included in the total award value.

The DEPSCoR-RC award is to an IHE. However, should the awardees transfer IHE, the agency may attempt to accommodate these changes if funds are available and approved by the Basic Research Office. Potential options may include: (1) grant remains at awarded DEPSCoR IHE with a new PI, identified by the DEPSCoR awardee, (2) sub-award to the new IHE of the DEPSCoR awardee (new IHE must be in a DEPSCoR-eligible state/territory), or (3) termination of DEPSCoR grant or any combination of the above. The new PI must meet the stated DEPSCoR-eligibility requirements.

The award start date is determined at the time of the award but is most likely projected for a JULY 2022 start date.

Authority for award under this competition is established in 10 U.S.C. 2358 for basic research. Regulations, terms, and conditions that will apply to the award can be found in Section VI. Federal Award Administration Information.

A. ADDITIONAL DEPSCoR FUNDING OPPORTUNITIES

In addition to this DEPSCOR - Research Collaboration FOA, the Basic Research Office anticipates funding one award under the DEPSCoR – Capacity Building FOA-AFRL-AFOSR-2021-0008 to support university capacity building activities in DoD-relevant fields. This additional competitive research funding is separate than this announcement and is also set aside for IHEs in DEPSCoR-eligible States/Territories.

You are strongly encouraged to examine and apply directly to this opportunity as well. The full FOA can be found on grants.gov.

III. ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

Though this is a collaboration between the Applicant and Collaborator, the Applicant's IHE will submit the proposal. The Applicant and Collaborator are eligible to apply to this announcement if both are a qualified and responsible IHE and in a DEPSCoR eligible State/Territory as listed in the table below. Applicant institutions are not limited in the number of applications that can be submitted under this FOA. Applicants (PIs) are permitted to submit only one DEPSCoR-RC White Paper per this DEPSCoR-RC FOA. Each white paper is permitted a single Applicant and a single Collaborator. Collaborators are allowed to work with more than one Applicant and thus aren't restricted from participating in more than one white paper. However, please note it is expected that Collaborators serve as a vital component of the proposed team and commit to providing time for research collaboration and mentorship throughout the entire process.

States/Territories are deemed eligible to submit proposals for DEPSCoR research grants based on meeting both of the following criteria:

Falls into a specific range of DoD R&D S&E funding to IHE in that State/Territory as defined in legislation. All activities supported by a DEPSCoR award must be performed in a DEPSCoR eligible State/Territory. Funding support for the Applicant and any potential subawardees is limited to those with addresses within one or more DEPSCoR eligible States/Territories.

AND

Contains an advanced degree granting program in science, mathematics, and/or engineering.

IHE in 37 States/Territories are eligible to receive awards under this announcement.

IHE do not need to submit proposals through an EPSCoR State Committee in response to this announcement. Awards made as a result of this announcement will be limited to IHE in States/Territories that are eligible under the DEPSCoR program authority.

STATES/TERRITORIES DoD HAS DETERMINED ELIGIBLE FOR FY21 DEPSCoR AWARDS[1]

Alabama	Delaware	Indiana	Maine	Nebraska	Oklahoma	South Dakota	Wisconsin
Alaska	District of Columbia	Iowa	Minnesota	Nevada	Oregon	Tennessee	Wyoming
Arizona	Guam	Kansas	Mississippi	New Hampshire	Puerto Rico	U.S. Virgin Islands	
Arkansas	Hawaii	Kentucky	Missouri	New Mexico	Rhode Island	Vermont	
Connecticut	Idaho	Louisiana	Montana	North Dakota	South Carolina	West Virginia	

The Basic Research Office and AFOSR will review your application, proposal, and Office of Management and Budget (OMB) designated repositories of government-wide public and non-public data, including

[1] ***The average annual amount of all DoD obligations for S&E R&D that were in effect with IHE in the state/territory for the 3 fiscal years preceding the fiscal year for which the designation is effective or for the last 3 fiscal years for which statistics are available is less than the amount determined by multiplying 60 percent times the amount equal to 1/50 of the total average annual amount of all DoD obligations for S&E R&D that were in effect with IHE in the U.S. for such 3 preceding or last fiscal years, as the case may be.***

comments you have made, as required by 31 U.S.C. 3321 and 41 U.S.C. 2313 and described in 2 CFR 200.205 and 32 CFR 22.410 to assess risk posed by applicants, and to confirm applicants are qualified, responsible, and eligible to receive an award.

B. INELIGIBLE ENTITIES

None of the following entity types are eligible to submit proposals as primary award or subaward recipients under this announcement.

1. Federally Funded Research and Development Centers (FFRDCs);
2. Federal agencies (to include Military Educational Institutions).

C. COST SHARING OR MATCHING

We do not require cost sharing or matching for proposals under this announcement. Cost sharing is not an evaluation or selection criterion.

D. OTHER

1. Employment Requirement

As the Applicant and Collaborator, both must hold a tenured or tenure-track position with your IHE, otherwise your white paper submission must include a letter from your IHE stating that you will be considered for a tenured or tenure-track position if you currently hold a short-term appointment. You are not eligible to submit a white paper or proposal if you do not meet this requirement; no exceptions.

2. Prior DoD-Funding Requirement

- You are eligible to apply as the Applicant under the DEPSCoR-RC FOA as long as you were NOT listed as the Principal Investigator on a previous DoD funded research award, and are a full-time faculty member in a tenured or tenure track position in a DEPSCoR eligible State/Territory. Being a "Co-PI" or "sub PI" on a prior DoD funded awarded does not count as being a "PI" for the purposes of eligibility of the Applicant for the DEPSCoR-RC FOA.

- The DEPSCoR-RC white paper package must include prior research award documentation which indicates that the Collaborator was a PI on a previous DoD directly funded research Prime award between 1 October 2014 and 30 September 2021. If the Collaborator is not identified as the PI within the award document, a letter from the awarding

agency point of contact should be furnished supporting the assertion within the timeframe identified.

- The Collaborator must have served as a Principal Investigator on a directly funded DoD research Prime award during the eligibility period and not have been subcontracted by: other PIs, non-DoD entities, or companies as a Co-Principal Investigator. Subawards indirectly funded by the DoD where the Collaborator has served as a Co-Principal Investigator do not count as eligible criteria for the Collaborator for the purposes of this funding opportunity announcement.

- The flow charts above serve as a guide for determining Applicant and Collaborator eligibility. Each diamond shape is an eligibility criterion question which elicits either a "yes" or "no" response. You are not eligible to submit a White Paper or proposal if any "yes" or "no" response leads to the "Not eligible" outcome. Submissions found to be "Not eligible" will not be subject to technical review. You are not eligible to submit a White Paper or proposal if you do not meet this requirement.

3. Acknowledgment of Support and Disclaimer Requirements

- You must include the VI.C.3. Acknowledgement of Research Support on all materials created or produced under our awards.

- The VI.C.4. Disclaimer Language for Research Materials and Publications must be included on materials as required.

- Our award document may provide additional instructions about specific distribution statements to use when you provide research materials to us. You are not eligible to submit a white paper or proposal if you cannot accept these terms.

4. Expectation of Public Dissemination of Research Results

We expect research funded by this announcement will be basic research. We expect public dissemination of research results if you receive an award. This is a basic requirement for unclassified research results.

We intend, to the fullest extent possible, to make available to the public all unclassified, unlimited peer-reviewed scholarly publications and digitally formatted scientific data arising from research and programs funded wholly or in part by the DoD as

described in the OUSD Memorandum, *"Public Access to Department of Defense-Funded Research"* dated 9 JULY 2014.

We follow DoDI Directive 5230.24 and DoDI 5230.27 policies and procedures to ensure broad dissemination of unclassified research results to the public and within the Government. The DoDI 5230.27 policy and procedures allowing publication and public presentation of unclassified fundamental research results, and DoDD 5230.25 policy and procedures regarding withholding of unclassified technical data from public disclosure, will apply to all research proposed under this competition unless the Basic Research Office gives you an explicit, written exclusion to these policies with the Grants Officer's advice and consent. All exclusions must be authorized or required by law, and must cite a valid legal authority.

You must provide a copy of all peer-reviewed publications developed or produced from research conducted with DoD funds to the Basic Research Office.

You are not eligible to submit a white paper or proposal if you cannot accept these terms.

5. Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements

You must complete the "Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements" form provided with the Grants.gov package. We provide more specific information about this requirement in section IV.D.3.B.

We cannot determine you are eligible for funding unless we receive this form.

6. Conflict of Interest (COI) / Conflict of Commitment (COC)

Definitions

- **Conflict of interest (financial conflict of interest):** is a situation in which an individual, or the individual's spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.[2]

[2] The White House Office of Science and Technology Policy, Enhancing the Security and Integrity of America's Research Enterprise (Washington, D.C.: June 23, 2020).

- **Conflict of commitment (non-financial conflict of interest):** is a situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities. Many institutional policies define conflicts of commitment as conflicting commitments of time and effort, including obligations to dedicate time in excess of institutional obligations, including obligations to improperly share information with, or withhold information from, an employer or funding agency, can also threaten research security and integrity, and are an element of a broader concept of conflicts of commitment.[3]

7. General Requirement for Disclosure

You and your IHE must disclose any potential or actual scientific or nonscientific COI/COC to us. You must also disclose any potential or actual COI/COC for any sub-recipient you include in your proposal. You must provide enough information for us to evaluate your disclosure. We may have to ask you more questions if we need more information.

At our discretion, we may ask you for a COI/COC mitigation plan after you submit your proposal. Your plan is subject to our approval.

8. Scientific COI/COC

Scientific collaborations on research and development projects are generally the result of close collaboration prior to the submission of applications for support. Accordingly, these collaborations should be given consideration for potential conflicts of interest and commitment, and any undue influence on the integrity of research, national security, and economic security. A potential conflict is mitigated by the appropriate disclosure of these collaborations, foreign affiliations, associations, and activities, and the list of current and pending support you provide for senior and key researchers for both prime and subrecipients.

Examples that increase risk and can harm the DoD research enterprise.

Failures to disclose:

- Financial conflicts of interest (both domestic and foreign)
- Conflicts of commitment

[3] The White House Office of Science and Technology Policy, Enhancing the Security and Integrity of America's Research Enterprise (Washington, D.C.: June 23, 2020).

- External employment arrangements
- Financial support that overlaps with U.S. funding
- Shadow laboratories or other parallel research activities
- Diversion of intellectual property
- Peer review violations

Examples of Behaviors that May Violate Laws:
- Theft or diversion of materials and intellectual capital
- Grant fraud

E. PROGRAM ELIGIBILITY SUMMARY

Please refer to the flow charts in Collaboration Composition (Section I.B) and the Eligibility Checklist questions below (Section IV.B) that serve as a guide for determining Applicant and Collaborator eligibility.

IV. APPLICATION AND SUBMISSION PROCESS

The application and submission process is completed **in three stages**:

1. Completed online registration via nVision. **(Required)**

2. White Paper and Supporting Documentation submission via nVision. **(Required)**

3. Full Proposal Submission Package. **(via grants.gov - Required)** (This is by invitation only. Must include acceptance email as an attachment in block 20 of the SF424.)

A. ONLINE REGISTRATION VIA nVISION

The nVision Online Registration portal opens on **Wednesday, 23 June 2021.** It is strongly encouraged that you register on the nVision website no later than **11:59 PM Eastern Standard Time on Thursday, 16 September 2021** (see Section IV.G.5 Submission Dates and Times).

Note: If you registered at the AcquTrak website in a prior competition, you must re-register for this competition using the new nVision portal. Usernames and passwords used to submit previous applications will not be retrieved.

While registration in nVision and submission of your white paper can be done at the same time, we HIGHLY recommend that you register in nVision and submit your white paper and supporting documentation well before the deadline in case you encounter any questions or problems.

There are two DEPSCoR competitions running concurrently. Make sure you are applying for this DEPSCoR – Research Collaboration FOA-AFRL-AFOSR-2021-0007.

B. WHITE PAPER AND SUPPORTING DOCUMENTION SUBMISSION

During the nVision submission process, you will be asked to verify eligibility by answering a series of questions in an "Eligibility Checklist." If you (Applicant) or your Collaborator are determined to be ineligible, you will not be permitted to submit a white paper. We encourage you to start the submission process early and confirm eligibility as soon as possible.

The Eligibility Checklist questions:

- Are the Applicant/Principal Investigator (PI), henceforth referred to as Applicant, and Collaborator/co-Principal Investigator (co-PI), henceforth referred to as Collaborator, faculty at Institutes of Higher Education (IHE) in a DEPSCOR eligible State/Territory and with an advanced degree granting program in science, mathematics, and/or engineering?
- Applicant - [Fill in Name of Institution] - [Fill in Eligible State/Territory]
- Collaborator [Fill in Name]
- Collaborator [Fill in Name of Institution] - [Fill in Eligible State/Territory]
- Is the Applicant a full-time tenured or tenure-track faculty member?
    - If not in a tenure-track position, is there a qualifying letter from the IHE stating the Applicant will be considered for a tenured or tenure-track position?
        - If applicable, a qualifying letter for the Applicant will need to be uploaded to nVision.
- To be eligible to serve as the Applicant, the individual must have never served as a PI on a prior DoD directly funded research Prime award. Is this statement applicable to the Applicant?"
    - NOTE: If you served as a Principal Investigator on a research Subaward indirectly funded by the DoD, you still qualify to serve as an Applicant."
- Is the Collaborator a full-time tenured or tenure-track faculty member?
    - If not in a tenured or tenure-track position, is there a qualifying letter from the IHE that you can furnish stating the Collaborator will be considered for a tenured or tenure-track position?

        - If applicable, a qualifying letter for the Collaborator will need to be uploaded to nVision.
- Has the Collaborator *served actively as a Principal Investigat*or on a prior *DoD directly funded research Prime award between 1 OCTOBER 2014 and 30 SEPTEMBER 2021* of which they will furnish a copy as proof?
    - NOTE: If you served ONLY as a PI or Co-PI on a research Subaward indirectly funded by the DoD, this does not satisfy the qualification requirements to serve as a DEPSCoR collaborator.
- Is the Collaborator identified as the PI on the face of the award document? [Provide Research Project: [Fill in Title] - [Fill in Collaborator's Research Project Prime Award Number]
    - If not, is there a qualifying letter from the awarding agency POC that states they served as Principal Investigator on the award between 1 OCTOBER 2014 and 30 SEPTEMBER 2021?
        - A copy of the award document or qualifying letter will need to be uploaded to nVision.
- Will the Collaborator provide active mentorship & guidance to the Applicant?
- Have all criteria on this list been marked Yes? Anything marked No is a disqualifier and will be determined a non-eligible factor.
- The undersigned (Applicant) states to the best of their knowledge and belief, that they have completed this eligibility checklist in accordance with the criteria in the FOA.

You will not be able to proceed with the rest of the submission process if you or your Collaborator are determined to be ineligible.

White papers and supporting documentation are a **MANDATORY** component for this three-stage application and submission process to minimize the labor and cost associated with the production of detailed proposals that have very little chance of being selected for funding.

If you do not register and submit a White Paper and Supporting Documentation before the due dates and times, you will not be eligible to participate in the remaining Full Proposal submission process and are not eligible for funding.

To submit White Papers and Supporting Documentation, **you are strongly encouraged to register** on nVision (https://dod-basicresearch.nvision.noblis.org/program/depscor) **by 11:59 PM Eastern Time on Thursday, 16 September 2021** (see Section IV.G.5 Submission Dates and Times).

White Papers and Supporting Documentation **must be submitted** to nVision (https://dod-basicresearch.nvision.noblis.org/program/depscor) **by 11:59 PM Eastern Time on Monday, 20 September 2021** (see Section IV.G.5 Submission Dates and Times).

The submission process could take several minutes depending on the network connection and the size of the file being submitted. You are responsible for allowing enough time to complete the online form, upload the documents and press the submit button before the deadline. An email confirmation will be sent to the applicant upon receipt of the submission.

Documents submitted after the deadline or found to be non-compliant will not be reviewed.

Evaluation of the white paper will be issued via email notification. You are ineligible to submit a full proposal package under this FOA if your white paper was not identified as being of "particular value" to the DoD.

Only electronic submissions will be accepted and reviewed.

C. CONTENT AND FORMAT OF THE WHITE PAPER

1. Pre-White Paper Inquiries and Questions

For help with technical matters, you should contact the Program Officer (PO) identified as the POC for your topic of interest as listed in section I.C. TOPICS. All technical discussions must take place prior to white paper submission. After the white paper deadline, applicants may no longer contact the program officers listed in section I.C.TOPICS.

If you have general questions about this announcement or administrative matters, **please submit your question in writing by email** to the **Grants Officer** (see section VII.B GENERAL INQUIRIES AND QUESTIONS).

The PO does not have the authority to make commitments. Grants Officers acting within their warranted capacity are the only people authorized to make commitments for the Government.

2. White Paper and Supporting Documentation (as a whole)

White papers and supporting documentation submitted under this FOA are expected to be unclassified; classified proposals are not permitted.

All white paper submissions will be protected from unauthorized disclosure in accordance with applicable law and DoD regulations. You are expected to appropriately mark each page of the submission that contains proprietary information.

IMPORTANT NOTE: Titles given to white papers should be descriptive of the basic research they cover and not be merely a copy of the topic title.

Applicants must submit the following white paper and supporting documentation components. All components are required unless specified "when applicable":

(1) White Paper (required)
- Cover Page
- Abstract
- Program Description Narrative
- Collaboration Composition Statement
- Basic Research Statement
- Anticipated human subjects or vertebrate animals subject research, when applicable
- [2] Curriculum Vitae (2-page limit each) for Applicant and Collaborator
- [2] List all previous DoD funding (both the Applicant and Collaborator must submit a list)

(2) Previous Collaborator Prime Award Document (required)
(3) Qualifying Letter(s) (when applicable)

Each White Paper and Supporting Documentation component is described in detail in Section 4 "White Paper Package." All Applicants must submit their White Paper Package using the guidelines established in Section 4.

3. Marking Requirements for Confidential Proprietary Information

You must mark any white paper sections that contain proprietary or confidential information. However, under Freedom of Information Act (FOIA) requirements, some or all proposal information may be subject to release.

Your entire white paper, or any portions thereof, without protective markings or otherwise identified as requiring protection will be considered voluntarily furnished to us without restriction, and will be treated as such for all purposes. White papers may be disclosed to reviewers for training purposes in future competitions.

4. White Paper Package

The due date for receipt of white papers and supporting documentation is **Monday, 20 September 2021 by 11:59 PM Eastern Time** (see Section IV.G.5 Submission Dates and Times)**.** White papers received after the published deadline will not be considered under any circumstance. Early submission of white papers is welcomed and highly encouraged.

All documents in the white paper package must be submitted in PDF format in compliance with the guidelines and file naming conventions below. When submitting the white paper and supporting documents, you must upload the following as three (3) separate PDF files:

(1) White Paper (required)
(2) Previous Collaborator Prime Award Document (required)
(3) Qualifying Letter(s) (when applicable)

White Paper (required):

a. ***Cover page*** (one (1) page limit, single-sided): Include your name, IHE, proposed title, topic number addressed, and the name of the program officer contacted about the proposed work (if engaged). Include a protective legend for proprietary information, if applicable.

b. ***Abstract*** (not to exceed 300 words): Describe the research problem and objective, technical approaches, and anticipated outcomes of the research. The abstract must be submitted without proprietary restrictions. Therefore, this non-proprietary abstract must be a version that is releasable under the Freedom of Information Act without changes.

c. ***Program Description Narrative*** (three (3) page limit, single-sided): State the defense challenge or topic area of research. Describe the basic scientific research approach. Summarize the state of the field and describe what is innovative about the proposed approach. What results, new knowledge, or insights might this approach afford compared to alternate approaches other researchers in this field have taken. Include approximate yearly costs for the project. Reference citations are not required but may be included within the three-page limit.

d. ***Collaboration Composition Statement*** (one (1) page limit, single-sided): Describe the composition of the collaboration and how the collaborator will provide mentorship. Describe how the collaboration fulfills the purpose of DEPSCoR.

e. ***Basic Research Statement*** (one (1) page limit, single-sided): Describe how the proposed research meets the DoD definition of basic research. Describe the extraordinary outcomes that may be achieved as a result of the proposed project.

f. ***Identify anticipated human subject or vertebrate animal subject research*** (one (1) page limit, single-sided) (where applicable).

g. ***Curriculum Vitae*** (CV) (two (2) page limit, single-sided): The Applicant and Collaborator must each submit a two (2) page limit CV. The CV should include relevant experience, collaborations, publications, foreign affiliations, associations, and activities, and a list of current and pending funding support received in the area of interest, and any previous involvement and experiences with the DoD.

h. ***List all previous DoD funding active between 1 October 2014 and 30 September 2021 for both the Applicant (if they served as a Co-PI / sub-PI) and the Collaborator to include project title(s), award number(s), and the name of the PI on each listed award***. The role of both the Applicant and Collaborator must be demonstrably noted for each prior DoD funded award such as PI, co-PI, etc.

Items a – h constitute the white paper and must be included in the white paper package. The white paper must be submitted in the following format as a single PDF file with the following naming convention:

- Applicant Last Name_First Name_DEPSCoR FY21RC

Previous Collaborator Prime Award Document (required)

i. ***Provide a copy of at least one Collaborator DoD directly funded research Prime Award active between 1 October 2014 and 30 September 2021 where the collaborator served as the PI***. "Co-PIs", "sub-PIs", and "site leads" do not qualify. Having served as a PI on a research Subaward that is indirectly funded by the DoD does not count for the purposes of this funding opportunity announcement.

That is, the Collaborator **must be listed** as the PI on the previous award directly from the DoD or its agencies. Only one prior qualifying award is required, however you may submit as many as you would like. If a copy of the DoD award cannot be furnished, a letter from the awarding agency point of contact should be furnished supporting the assertion within the timeframe identified.

Item i constitutes the previous collaborator prime award document and must be included in the white paper package. The prime award document(s) must be submitted in the following format as a single PDF file with the following naming convention:

- Applicant Last Name_First Name DEPSCoR FY21RC_award

Qualifying Letter(s), when applicable

j. Qualifying letter (when applicable): The Applicant and Collaborator must both hold a tenured or tenure-track position with their respective IHE. If otherwise, a letter from the IHE stating that the Applicant or Collaborator will be considered for a tenured or tenure-track position must be included.

Item j constitutes as the qualifying letter(s) and must be included in the white paper package, when applicable. Qualifying letter(s) must be submitted in the following format as a single PDF file with the following naming convention:

- Applicant Last Name_First Name DEPSCoR FY21RC_letter

Documents must be submitted in the following format as two (or three) PDF files:

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single-spaced
- Font – Times New Roman, 12 point
- Use the file naming conventions for White Paper, Previous Collaborator Prime Award Document, and Qualifying Letter(s) specified above.

Concurrent submission of a proposal to other organizations will not prejudice review. Send any changes as they become known.

D. FULL PROPOSAL SUBMISSION PACKAGE

1. **Full Proposal Packages will only be accepted from collaborations invited to submit proposals.**
   All the application forms you need are available electronically on Grants.gov. From the "View Grant Opportunity" page, you can click on the "Package" tab to download the application package. These same application forms will also be available in the "Related Documents" tab to download individually.

   We will not issue paper copies of this announcement.

   Proposal packages must be submitted electronically to Grants.gov **no later than 11:59 p.m. Eastern Time on Tuesday, 22 February 2022** (see Section IV.G.5 Submission Dates and Times).

   Please contact us to request a reasonable accommodation for any accessibility requirements you may have.

2. **Content and Form of Application Submission**

   a. **The application as a whole**

      You must submit your proposal electronically through Grants.gov. We will not accept or evaluate any proposal submitted by any means other than through Grants.gov. We must receive your proposal before the IV.G.1. Proposal Submission Deadline.

      DO NOT password protect any attachments.

      You must use the electronic Standard Form (SF) 424 Research and Related (R&R) Form Family, OMB Number 4040-0001. The SF 424 (R&R) Application for Federal assistance form must be your cover page. No pages may precede the SF 424 (R&R).

      You must mark your application with the FOA number.

   b. **A summary of what is required for a complete proposal is summarized below:**

      - **We require the forms and attachments in bold text with all applications**
      - *Some applications require the attachments in italic*

- We provide more instructions in IV.D.3. Component Pieces of the Application

R&R FORM, OMB No. 4040-0001	FIELD	ATTACHMENT
SF 424 (R&R) Application for Federal Assistance, including an authorized signature (Required)	**18** *18* **20** 21	**Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements (Required)** *Disclosure of Lobbying Activities (SF-LLL) (If Applicable)* **Invitation email to submit a full proposal (Required)** Cover Letter Attachment (Not Required)
R&R Other Project Information Form (Required)	**7** **8** **9** *10* *11* *12*	**Project Summary / Abstract (Required)** **Project Narrative Attachment Form to attach the Project Narrative (Required)** **Bibliography & References Cited (Required)** *Facilities and Other Resources (If Applicable)* *Equipment (If Applicable)* *Other Attachments (If Applicable)*
R&R Senior/Key Person Profile Form Expanded (Required)		**Biographical Sketch (Required)** **Current & Pending Support (Required)**
R&R Budget Form (Required)		**Budget Justification (Required)**
R&R Subaward Budget (If Applicable) Attachments Form		*Subaward Budget Justification*
R&R Project/Performance Site Locations Form (Required)		**None**
R&R Personal Data (Required)		**None**

The SF 424 (R&R) must include the signature of an authorized representative from your IHE. The signature is affixed electronically by Grants.gov upon submission. This signature is considered the signature for the application as a whole.

c. Proposal Format

- Paper Size – 8.5 x 11-inch paper
- Margins – 1 inch
- Spacing – 1.5-line spacing

- Font – Times New Roman, 12 point
- Page Limitation – please see proposal length below
- Content – As described below

d. Proposal Length

Your Research Effort section must not exceed twelve (12) single-sided pages. We will not consider more than the maximum number of project narratives pages in our evaluation.

You must not include elaborate brochures, reprints, or presentations beyond those sufficient to present a complete and effective proposal.

We created this table to help you understand how to calculate your page count

INCLUDED IN PAGE COUNT	NOT INCLUDED IN PAGE COUNT
Research Effort (Required) Data Management Plan (Optional)	Everything else

You must include enough budget related information in your proposal to support your costs as necessary, reasonable, allocable, realistic, and in compliance with 2 CFR 200 Subpart E – Cost Principles

Not having enough information in your proposal to understand if your costs are necessary, allowable, reasonable, allocable, and realistic is the most common reason awards are delayed.

e. Marking Requirements for Confidential or Proprietary Information

You must mark the proposal sections that contain proprietary or confidential information. However, under the Freedom of Information Act (FOIA) requirements, some or all proposal information may be subject to release.

Your entire proposal, or any portions thereof, without protective markings or otherwise identified as requiring protection will be considered voluntarily furnished to us without restriction, and will be treated as such for all purposes.

f. Advance Preparation for Electronic Submission through Grants.gov

Your proposal must be submitted electronically through Grants.gov. You should verify that the person authorized to submit proposals for your organization has completed Grants.gov registration well in advance of the submission deadline. Grants.gov electronic proposal submissions cannot be accomplished before your organization is fully registered. Registration with Grants.gov may take up to twenty-one (21) days.

- A Grants.gov getting started checklist is available at: https://www.grants.gov/en/web/grants/learn-grants/grants-101/getting-started-%20checklist.html.

- Guidance for registering with Grants.gov as an organization may be found at: https://www.grants.gov/web/grants/applicants/organization-registration.html.

- Questions relating to the Grants.gov registration process, system requirements, how an application works, or the proposal submittal process can be answered by email at support@grants.gov, telephone at 1-800-518-4726, or at https://www.grants.gov/web/grants/support.html.

- An active Dun and Bradstreet Data Universal Numbering System (DUNS) number and an active System for Award Management (SAM) registration are required to register through Grants.gov. Section IV.F.1 SAM Registration Required provides more information.

3. Component Pieces of the Application

IMPORTANT NOTE: Titles given to proposals should be descriptive of the basic research they cover and not be merely a copy of the topic title.

a. SF-424 Form (R&R) Application for Federal Assistance (Required)

The SF 424 (R&R) Application for Federal assistance form must be your cover page. No pages may precede the SF 424 (R&R).

Complete all required fields in accordance with the "pop-up" instructions on the SF 424 (R&R) form. You can turn on Grants.gov "Help Mode" to provide additional instructions for forms. "Help Mode" is turned on by the icon with the pointer and question mark at the top of the form.

We have special instructions for completion of several SF 424 (R&R) form fields in your application.

Our instructions are:

FIELD	INSTRUCTION
2.	You may leave "Applicant Identifier" blank
3.	You may leave "Date Received by State" and "State Application Identifier" blank
4.	For block 4.a. Federal Identifier - Enter "FA9550" For block 4.b. Agency Routing Identifier – Enter the Topic # and Program Officer's name (last name first) in brackets (e.g., Topic # 14 [Doe, Jane]). For block 4.c. Previous Grants.gov Tracking ID – If this submission is for a changed/corrected application, enter the Grants.gov tracking number of the previous proposal submission; otherwise, leave blank.
5.	Application Information: DoD agencies recommend that organizations provide a global business address
7.	Complete as indicated.
9.	You must list Air Force Office of Scientific Research as the reviewing agency if Grants.gov has not pre-populated this answer.
10.	You must list the Catalog of Federal Domestic Assistance Number as "12.431" and the title as "Basic Scientific Research" if Grants.gov has not pre-populated this answer
12.	The award start date is determined at the time of the award but is most likely projected for JULY 2022. The award ending date will be 3 years after.
16.	You should check "No." and "Program is Not Covered by Executive Order 12372"
17.	All awards require some form of certifications of compliance with national policy requirements. By checking "I Agree" on the SF 424 (R&R) block 17 you agree to abide by the following statement: "By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001).

18.	You must attach the completed IV.D.3.b Representation Regarding an Unpaid Delinquent Tax Liability or a Felony Conviction under Any Federal Law – DoD Appropriations & Representation Regarding the Prohibition on Using Funds under Grants and Cooperative Agreements with Entities that Require Certain Internal Confidentiality Agreements Form. You must attach your completed Grants Certifications Report from SAM.gov which addresses your Certification Regarding Lobbying, as required by 31 U.S.C. 1352 as implemented by DoD in 32 CFR Part 28. The full text of this certification is also found at Appendix A to Part 28 of 32 CFR at *http://www.ecfr.gov/*. You *may* have to attach the completed Disclosure of Lobbying Activities (SF-LLL) *if you have lobbying activity that you must disclose.* Concatenate these documents into a single document and attach the concatenated document into Field 18.

b. Representation Regarding an Unpaid Delinquent Tax Liability or a Felony Conviction under Any Federal Law – DoD Appropriations & Representation Regarding the Prohibition on Using Funds under Grants and Cooperative Agreements with Entities that Require Certain Internal Confidentiality Agreements & SAM.gov Grants Certifications Report (Required)

You must attach these representations to field 18 of the SF 424 (R&R).

You must complete, sign, and attach the "Representations Regarding Unpaid Tax and Internal Confidentiality Agreements" form provided with the Grants.gov package. We cannot fund an award if this information is not provided.

If you answer "is" a corporation that has an unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and is not being paid in timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and/or "is" a corporation that was convicted of a felony criminal violation under any Federal law within the preceding 24 months on this representation form, you may not be eligible for an award if your proposal is selected. You should contact us right away to discuss your situation to find out if you can submit your application.

If you do not attach this form to the SF 424, we may request the representation after you submit your application.

c. Disclosure of Lobbying Activities (SF-LLL) (If Applicable)

If applicable, you must attach this disclosure to field 18 of the SF 424 (R&R).

If you have lobbying activity that you must disclose under 31 U.S.C. 1352 as implemented by the DoD in 32 CFR Part 28, you must attach the completed Disclosure of Lobbying Activities (SF-LLL). Instructions for completing this form are available here. If you do not have lobbying activities to disclose, you do not need to complete the SF-LLL.

d. R&R Other Project Information Form (Required)

Complete this form as indicated. You must include all necessary attachments. Additional guidance on each field on the form is located here.

FIELD	INSTRUCTION
1, 1a.	You must address all prospective human subject involvement by answering these questions. Additional documentation pursuant to National Policy and U.S. Air Force standards is required for all proposals with human use or involvement. Your inquiries about our human subject requirements should be sent by email directly to the Topic Program Officer who will coordinate an answer with the AFOSR Human Research Protections Officer.
2, 2a.	You must address all prospective animal subject and/or recombinant deoxyribonucleic acid (rDNA) involvement by answering these questions. Additional documentation pursuant to National Policy and U.S. Air Force standards is required for all proposals with animal or rDNA use or involvement. Your inquiries about our requirements should be sent by email directly to our Animal Subject Research Protections Officer at brett.j.taylor2.mil@mail.mil with a copy to the Basic Research Office Program Officer for the announcement topic.
3.	Is proprietary/privileged information included in the application? Select "Yes" or "No".
4a.	For any proposal that has an actual or potential impact on the environment, answer yes and provide the answers and attachments required for fields 4b, 4c, and 4d. Additional documentation in accordance with National Policy and U.S. Air Force standards is required for any proposal with an actual or potential impact on the environment.

5.	Is the research performance site designated, or eligible to be designated, as a historic place? Select "Yes" or "No".
5.a.	If you checked the "Yes" box indicating any performance site is designated, or eligible to be designated, as a historic place, provide the explanation in Block 5.a.
6.	Does this project involve activities outside of the United States or partnerships with international collaborators? Select "Yes" or "No".
6.a.	If you checked the "Yes" box identify the countries with which international cooperative activities are involved.
6.b.	Enter an explanation for involvement with outside entities (optional).
7.	Attach your IV.D.3.e. Publicly Releasable Project Summary/Abstract
8.	Attach your IV.D.3.f. Project Narrative to the Project Narrative Attachment Form and attach that form to field 8.
9.	Attach your IV.D.3.g Bibliography and References Cited
10.	Attach your IV.D.3.h. Facilities & Other Resources description document here if you need to supplement your IV.D.3.f. Project Narrative facilities and resources section.
11.	You may supplement your IV.D.3.k. Budget Justification by attaching an IV.D.3.l. Equipment Justification here. Do not duplicate information included on your budget justification. If you attach an Equipment Justification, make sure you reference the attachment in your budget justification.
12.	Other Attachments – Attach your IV.D.3.m. R&R Sub-award Budget Attachments Form (If Applicable) Attach your IV.D.3.q. Data Management Plan (Optional) Attach your IV.D.3.r. Letter of Support (Required)

e. Publicly Releasable Project Summary/Abstract (Required)

You must attach the Project Summary/Abstract to field 7 of the R&R Other Project Information form.

You should identify the Program Officer and topic area your proposed research falls under (see section I.C. TOPICS).

You must provide a concise abstract of 300 words or less with your proposal. Do not include proprietary or confidential information. The project summary/abstract must be marked by the applicant as "Approved for Public Release." The abstract should use terms the public can understand to describe the research objective, technical approach, anticipated outcome, and potential impact of the specific research.

Use only characters available on a standard QWERTY keyboard. Spell out all Greek letters, other non-English letters, and symbols. Graphics are not allowed.

Abstracts of all funded research projects will be posted on the public DTIC website: https://dodgrantawards.dtic.mil/grants/#/home.

f. Project Narrative (Required)

You must attach your Project Narrative to the Project Narrative Attachment Form and attach the form to field 8 of the R&R Other Project Information Form. The narrative must be complete and self-contained to qualify for review.

You must identify the Program Officer and topic number your proposed research falls under. You must clearly describe your research, including your research objective and approach. Your project narrative will be evaluated using the criteria listed in section V.A CRITERIA. You should show strength in as many of the evaluation and selection areas as practicable to demonstrate maximum competitiveness.

Your narrative should include the following elements:

1. **Statement of Objectives**

   You must summarize your proposed research on a single-page titled "Statement of Objectives." We may decide to incorporate your statement of objectives into the award as a description of the work instead of incorporating the whole technical proposal.

   You should use active verbs when you prepare the statement of objectives, e.g., "conduct" research in a subject area, "investigate" a problem, "determine" to test a hypothesis.

2. **Research Effort**

   This section must not be longer than twelve (12) single-side pages. Please number them. The Basic Research Office will not review proposals that exceed this page limit.

You should describe the basic scientific or technical concepts that will be investigated in great detail. State the research objectives and approach, and the relationship and comparable objectives to research progress elsewhere. Describe your research team's knowledge in the field. Discuss the nature of the expected results.

The adequacy of this information will influence the overall evaluation in accordance with the criteria and procedures specified in section V. APPLICATION REVIEW INFORMATION below.

3. Applicant (PI), Collaborator (co-PI), and Senior/Key Personnel Time

a. You must provide an estimate of the time the Applicant and Collaborator will devote to the research. Your estimate must include information pertaining to the proportion of time anticipated to be devoted to this research, to other research, and to other commitments of time such as sabbatical, extended leave, and teaching duties.

You should budget time for two required trips per year to DEPSCoR-related activities, which include attending a program review (Washington, DC area) and participating in a DoD-organized workshop (in a nearby metropolitan area).

b. State the number of graduate students that will engage in the project for whom each senior staff member is responsible.

c. If the Applicant, Collaborator, or other Senior/Key personnel have current, pending, or expected research supported by other sources (e.g. Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations) during the period you seek our support the following information must be provided for each project:

List of Current and Pending Support:

- Title of Proposal and Summary;

- Source and amount of funding (annual direct costs; provide contract and/or grant numbers for current contracts/grants);
- Percentage of effort devoted to each project;
- Identity of prime applicant and complete list of subawards, if applicable;
- Technical contact (name, address, phone, electronic mail address);
- Period of performance (differentiate basic effort);
- The proposed project and all other projects or activities requiring a portion of time of the Applicant (Principal Investigator) and other senior personnel must be included, even if they receive no salary support from the project(s);
- The total award amount for the entire award period covered (including indirect costs) must be shown as well as the number of person-months or labor hours per year to be devoted to the project, regardless of source of support; and
- State how project(s) is/are related to the proposed effort and indicate degree of overlap.

Concurrent submission of a proposal to other organizations will not prejudice review. Send any changes as they become known.

4. Your Facilities

a. Describe the facilities available for performing the proposed research, and any additional facilities or equipment the organization proposes to acquire at its own expense for the work.

b. Indicate any government-owned facilities that will be used. Indicate any government-owned equipment possessed presently that will be used. The facilities contract number, or in absence of a facilities contract, the specifics of the facilities or equipment, and the number of the award under which they are accountable are required.

c. Government Furnished Equipment: List any special Government-owned property or test equipment possessed or required to complete the research. When possible and practicable, give a description or title for each item, the current location, and an estimated cost as applicable. If you do not have information about individual items, group items you require by class and provide an estimate of values.

g. Bibliography and References Cited (Required)

You must attach your narrative Bibliography and References Cited to field 9 of the R&R Other Project Information Form.

h. Facilities & Other Resources (If Applicable)

Attach a Facilities and Other Resources description document to field 10 of the R&R Other Project Information Form if you need to supplement your IV.D.3.f.4. Project Narrative facilities and resources section.

i. R&R Senior/Key Person Profile Form Expanded (Required)

You must list all key persons proposed for the research effort on the R&R Senior/Key Person Profile (Expanded) Form. Senior/Key Persons are generally the Applicant, Collaborator, and Senior Staff.

Failure to submit this information may cause the proposal to be returned without further review.

This information will be used to support protection of intellectual property, controlled information, senior/key personnel, and information about critical technologies relevant to national security. Additionally, this information will be used to limit undue influence, including foreign talent programs, by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise.

You must attach a short biographical sketch and list of significant publications (vitae) for each Senior/Key Person, whether or not the individuals' efforts under the project are to be funded by DoD.

You must also attach the list of current and pending support from the Project Narrative.

j. R&R Budget Form (Required)

You must provide all information requested. You must estimate the total research project cost. You must categorize funds by year and provide separate annual budgets for projects lasting more than one year. A **budget justification** must be attached.

You must include enough budget related information in your proposal to support your costs as necessary, allowable, reasonable, allocable, realistic, and in compliance with 2 CFR 200, Subpart E – Cost Principles.

Not having enough information in your proposal to understand if your costs are necessary, reasonable, allocable, and realistic is the most common reason awards are delayed.

k. Budget Justification (Required)

You must provide a detailed budget justification for each year that clearly explains the need for each item. The entire budget justification and supporting documentation must be combined into a single file and attached to field L of the R&R Budget Form. The budget narrative submitted with the application must match the dollar amounts on all required forms. Please explain each calculation and provide a narrative that supports each budget category. This detailed budget justification must match the proposed budget categories. Each year of the budget justification narrative must stand alone; lump sum budget justifications are not allowed. If options are proposed, option detailed budget justifications must stand alone as well, no lump sum justifications allowed.

You must itemize travel. State the purpose of each trip proposed, the number of trips, the number of travelers, the destination, the duration, and the basis for calculating costs such as airlines and hotels.

You must itemize materials, supplies, and equipment. List all material/equipment by type and kind with associated costs. Indicate what your costs are based on, such as vendor quotes, historical data and/or engineering estimates. You should include vendor quotes and/or catalog pricing data.

Proposals including requests to purchase equipment must include equipment quotes or vendor agreements. "Equipment" is nonexpendable, tangible personal property with a unit cost of $5,000 or more having a useful life of more than 1 year. Items that do not meet the "equipment" definition can be included under supplies. List each piece of equipment to be purchased and provide a description of how it will be used in the project. The budget narrative should explain why the equipment is necessary for successful completion of the project. Provide quotes in the English language (US Dollars) if available, or indicate the basis of the equipment cost. If you have any sub-award(s), you should describe how you determined sub-award costs were determined fair and reasonable. Your business office usually makes this determination.

DHHS/ONR Rate Agreement: If you use a Government rate agreement to propose indirect cost rates and/or fringe benefit rates, attach a copy of the agreement you used.

Helpful Cost Principle Reference Information

(i) 2 CFR 200, Subpart E – Cost Principles

(ii) General Provisions for Selected Items of Cost in 2 CFR 200.420 through 2 CFR 200.476

l. Equipment Justification (If Applicable)

If applicable attach your Equipment Justification to field 11 of the R&R Other Project Information Form.

You may list any special Government-owned property or test equipment required to complete the research. When possible and practicable, give a description or title for each item, the current location, and an estimated cost as applicable with a supporting vendor quote. If you do not have information about individual items, group items you require by class and provide an estimate of values.

m. R&R Sub-award Budget Attachments Form (If Applicable)

You must attach all sub-award budgets to the R&R Subaward Budget Attachments Form.

You must provide a budget at the same level of detail as your D.3.j. Prime budget for each proposed sub-award.

You must attach the R&R Sub-award Budget Attachments Form to field 12 of the R&R Other Project Information Form.

n. Sub-award Budget Justification (If Applicable)

The entire sub-award budget justification and supporting documentation must be combined into a single file and attached to field L of the R&R Sub-award Budget Attachments Form.

You must provide a sub-award budget justification at the same level of detail as your D.3.k. Prime budget justification for each proposed sub-award.

o. R&R Project/Performance Site Locations Form (Required)

You must complete all information as requested. You must include the ZIP+4 for each performance location you list.

p. R&R Personal Data Form (Required)

This form will be used by DoD as the source of demographic information, such as gender, race, ethnicity, and disability information for the Principal Investigator and all other persons identified as Co-Principal Investigator(s). Each application must include this form with the name fields of the Principal Investigator and any Co-Principal Investigator(s) completed; however, provisions of the demographic information in the form is voluntary. If completing the form for multiple individuals, each Co-Principal Investigator can be added by selecting the "Next Person" button. The demographic information may be accessible to the reviewer, but will not be considered in the evaluation. Applicants who do not wish to provide some or all of this information should check or select the "Do not wish to provide" option.

q. Data Management Plan (Optional) – limited to two (2) single-sided pages

Attach your Data Management Plan to field 12 of the R&R Other Project Information Form.

You can decide if you want to include a Data Management Plan with your application. If you do, attach your Data

Management Plan to field 12 of the R&R Other Project Information Form.

Your "Data Management Plan" should be two (2) single-sided pages or less in length and discuss:

1. The types of data, software, and other materials to be produced in the course of the project, and include a notation marking items that are publicly releasable;

2. How the data will be acquired;

3. Time and location of data acquisition if they are scientifically pertinent;

4. How the data will be processed;

5. The file formats and the naming conventions that will be used;

6. A description of the quality assurance and quality control measures during collection, analysis, and processing;

7. If existing data are to be used, a description of their origins;

8. A description of the standards to be used for data and metadata format and content;

9. Plans and justifications for archiving the data;

10. The timeframe for preservation; and;

11. If for legitimate reasons the data cannot be preserved, the plan must include a justification citing such reasons.

r. Letter Of Support (Required)

Attach a **letter of support** from the Collaborator that discusses how they will foster a ***mentorship*** relationship with the Applicant to field 12 – Other Attachments in the R&R Other Project Information Form.

E. INFORMATION YOU MUST SUBMIT IF SELECTED FOR POSSIBLE AWARD

Our Grants Officer may request additional necessary information from you during negotiations, or as required for award considerations. You must respond promptly.

If you do not fully comply with our information requests by the time we are ready to make an award, we may determine that you are not qualified to receive an award, and use that determination as a basis for making an award to another applicant.

F. DUNS UNIQUE ENTITY IDENTIFIER, CAGE, AND SYSTEM FOR AWARD MANAGEMENT (SAM)

1. SAM Registration Required

As required in 2 CFR 25 all applicants, unless exempted, must:

- Be registered in SAM.gov before submitting its application;
- Complete their Grants Certifications in SAM.gov to be eligible to apply for a Federal financial assistance project or program;
- Provide a valid DUNS unique entity identifier; and
- Continue to maintain an active SAM registration with current information at all times any Federal award is active, or when any application is under consideration by a Federal awarding agency.

A Commercial and Government Entity (CAGE) code is obtained or specified as part of the SAM registration process. A CAGE code is required.

2. SAM Exemption or Exceptions Not Available Under This Announcement

We will not issue an Agency level exemption to SAM registration under 2 CFR 25.110(d) for applicants under this announcement.

You must comply with SAM registration requirements and include an Organizational DUNS code in field 5 of the SF 424 (R&R) application or we cannot make an award.

3. Questions about SAM Registrations and Updates

You can get questions about SAM registration and entity updates answered by live chat at https://www.fsd.gov/gsafsd_sp and telephone at (866) 606-8220. Top help topics for SAM.gov are available at https://www.fsd.gov/gsafsd_sp?id=kb_category&kb_category=f56ee43edbfadc102c5f368f7c961906.

4. Consequences of Non-Compliance with SAM Registration Requirements

We cannot make an award to you unless you comply with SAM requirements. If you are non-compliant, we may determine you are not qualified to receive an award, and use that determination to make an award to someone else as authorized by 2 CFR 25.205(b). You cannot receive payments without an active SAM record and CAGE code.

G. SUBMISSION DATES AND TIMES

1. Proposal Submission Deadline

We must receive your validated proposal electronically through Grants.gov **no later than 11:59 PM Eastern Time on Tuesday, 22 February 2022** to be considered for selection (see Section IV.G.5 Submission Dates and Times). This is the final due date. We recommend you submit your application early.

You are responsible for making sure your application is submitted, received, and validated by Grants.gov before the application deadline. If you submit your application late, your proposal is not eligible for consideration.

Timely Receipt Requirements and Proof of Timely Submission

Online Submission: All applications must be validated by Grants.gov **no later than 11:59 PM Eastern Time on Tuesday, 22 February 2022**. Proof of timely submission is automatically recorded by Grants.gov. The applicant AOR will receive an acknowledgement of receipt and a tracking number (GRANTXXXXXXXX) from Grants.gov with the successful transmission of their application. Applicant AORs will also receive the official date/time stamp and Grants.gov tracking number in an email.

A second confirmation is provided by email when your application has passed Grants.gov validation and the status is updated from received to validated. **Your application is not complete until you receive the validation confirmation.** Your submission must be validated before the submission deadline.

When the administering agency successfully retrieves the application from Grants.gov, and acknowledges the download of submissions, Grants.gov will provide an electronic acknowledgement of receipt of the application to the email address of the applicant with the AOR role.

Applications received by Grants.gov after the established due date will be counted as late and will not be considered.

Applicants using slow internet, should be aware that transmission can take some time before Grants.gov receives your application. Again, Grants.gov will provide either an error or a successfully received transmission in the form of an email to the applicant with the AOR role. The Grants.gov Support Center reports that some applicants end the transmission because they think that nothing is occurring during the transmission process. *Please be patient and give the system time to process the application.*

2. How Proposal Submission Time is Determined

We use the system-generated Grants.gov time stamp to determine when you submitted your successfully validated proposal. Grants.gov policies and procedures for application submission and processing apply.

3. Grants.gov Tracking Number is Application Receipt

Grants.gov generates a confirmation page when you submit your application. A second confirmation is provided by email when your application has passed Grants.gov validations and the status is updated from received to validated. Your application is not complete until you receive the validation confirmation.

The validation confirmation page includes a system-generated Grants.gov tracking number; this serves as your receipt. You should keep a copy of all confirmations.

You can verify the submission time and application status with your tracking number through Grants.gov at

http://www.grants.gov/web/grants/applicants/track-my-application.html.

4. Other Submission Requirements

If Grants.gov rejects your electronic application submission for any reason, you must correct all errors and resubmit your application before the proposal submission deadline as outlined in section IV.G.1. Proposal Submission Deadline.

5. Submission Dates and Times

Schedule of Events		
Event	**Date**	**Eastern Standard Time**
nVision website open for registration and submission (https://dod-basicresearch.nvision.noblis.org/program/depscor)	Wednesday, 23 June 2021	NLT 11:59PM
Virtual DEPSCoR Day	Wednesday, 23 June 2021	TBD
nVision Registration (strongly suggested by) Cut-off date for Q&As with Program Officers	Thursday, 16 September 2021	NLT 11:59PM
White Paper and Supporting Documentation submission on nVision website (https://dod-basicresearch.nvision.noblis.org/program/depscor) (required by)	Monday, 20 September 2021	NLT 11:59PM
Notification of White Paper Selection	Friday, 3 December 2021	NLT 11:59PM
Request for written feedback on your white paper submission (required by) (Email request to: DEPSCoR-feedback@noblis.org	Friday, 10 December 2021	NLT 11:59PM
Full Proposal Submission (by invitation only) electronically on Grants.gov website (submitted by)	Tuesday, 22 February 2022	NLT 11:59PM
Notification of Selection for Award	Monday, 2 May 2022	NLT 11:59PM

H. INTERGOVERNMENTAL REVIEW

N/A - This program is excluded from coverage under Executive Order (E.O.) 12372.

I. FUNDING RESTRICTIONS

1. Proposal Preparation Costs

Your proposal or application preparation costs are not considered an allowable direct charge to any award under this announcement. Your costs are, however, an allowable expense to the normal bid and proposal indirect cost as specified in 2 CFR 200.460 proposal costs if you receive a grant or cooperative agreement.

2. Pre-award Costs

You must request our prior approval if your research requires a specific date pre-award costs become allowable, or if you need more than ninety (90) days pre-award cost authorization as described in 2 CFR 200.308(e)(1) and 2 CFR 200.458. **Your business office must provide this request in writing.** You must document why pre-award costs are necessary and essential for the research in the request, and identify a specific date for our Grants Officer to consider.

Our grants include up to ninety (90) calendar days pre-award costs in accordance with the DoD Research and Development General Terms and Conditions, (DoD T&C) FMS Article IV.C. Pre-award costs section; however, the actual date costs become allowable is not final until an award is made. We recommend you ask for a specific date as described above to prevent misunderstandings.

All costs incurred before a grant or cooperative agreement award are at the recipient's risk as described in 2 CFR 200.308(e)(1). We are under no obligation to reimburse your costs if for any reason you do not receive an award, or if your award is less than anticipated and inadequate to your pre-award costs.

V. APPLICATION REVIEW INFORMATION

A. CRITERIA

DEPSCoR seeks to increase the number of researchers at and improve the capabilities of IHE in eligible States/Territories to perform competitive S&E research relevant to the DoD.

Proposed research should describe cutting-edge efforts on basic scientific problems. White papers deemed to be applied research, as opposed to basic research, will not advance to the proposal stage of the competition.

You should show strength in as many of the evaluation and selection areas as practicable to demonstrate maximum competitiveness.

1. Evaluation Criteria

Your white paper and proposal will be evaluated against the following four (4) criteria. Criteria 1, 2, and 3 are equally important to each other; Criteria 4 is of least importance:

(1) Scientific and technical merits of the proposed research.

(2) The Applicant's and Collaborator's qualifications, ability to perform the proposed work, and the overall management approach.

(3) Relevance of the proposed research to the DoD.

(4) (**Full Proposal Evaluation Only**) Realism and reasonableness of proposed costs, with the Applicant IHE receiving greater than 50% of funding.

All, some, one, or none of the applicants may be contacted after the proposal review process by phone by the Director of the Basic Research Office, USD (R&E) to clarify certain aspects of their proposed research efforts.

2. No Further Evaluation Criteria or Criterion will be used for Proposal Selection.

B. REVIEW PROCESS

1. Cost Analysis

If your proposal is selected for possible award, we will analyze the cost of the work for realism and reasonableness. We must make sure the costs you propose are necessary, allowable, reasonable, realistic, and allocable to the proposed research before we can make an award. We may analyze your technical and cost information at the same time.

2. Agency Review of Risk Posed by Applicants

a. We must review information available about you and entities included in your proposal through the Office of Management and Budget (OMB) designated repositories of government-wide eligibility qualification and financial integrity information. Our risk review is required by **31 U.S.C. 3321** and **41 U.S.C. 2313** and includes both public and non-public information. You must be qualified and responsible as described at **32 CFR 22.415** to receive a grant award.

b. We must consider the non-public segment of the Federal Awardee Performance and Integrity Information System (FAPIIS) system accessible through **SAM.gov** for all awards exceeding the current simplified acquisition threshold of $250,000.

c. At a minimum, the information in the system for a prior Federal award recipient must demonstrate a satisfactory record of executing programs or activities under Federal grants, cooperative agreements, or procurement awards; and integrity and business ethics. We will consider any comments you provide, in addition to the other information in the designated integrity and performance system, when making our risk judgment about your integrity, business ethics, and record of performance under Federal awards.

d. We may make an award to a recipient who does not fully meet our standards as described at **2 CFR 200.206(a)(2)** if it is determined that the information is not relevant to the current Federal award under consideration or there are specific conditions that can appropriately mitigate the effects of the non-Federal entity's risk in accordance with **2 CFR 200.208**.

e. We must comply with the guidelines on government-wide suspension and debarment described in **2 CFR 200.214**, and must require you to comply with these provisions for all work we fund.

f. These provisions restrict Federal awards and sub-awards with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

C. DISCLOSURE OF ADMINISTRATIVE PROCESSING BY CONTRACTOR PERSONNEL

We use support contractor personnel to help us with administrative proposal processing. These contractor personnel are employees of commercial firms that have a contract with us. We make sure all of our support contracts include nondisclosure agreements that prohibit disclosure of any information you submit to other parties.

D. NO GUARANTEED AWARD

We do not guarantee that any award will be made under this competition.

VI. FEDERAL AWARD ADMINISTRATION INFORMATION

A. WHITE PAPER SELECTION AND NONSELECTION NOTICES

1. Electronic Notification of White Paper Selection by Friday, 3 December 2021

If your white paper is selected for a full proposal submission and possible award, a notification will be sent to the Applicant via email.

If your white paper is not selected for a full proposal submission for this year's DEPSCoR- RC funding opportunity, a notification will be sent to the Applicant via email.

If you would like to request written feedback on your white paper submission, you must send the request to the following email address **no later than 11:59 PM Eastern Time on Friday, 10 December 2021**:

DEPSCoR-feedback@noblis.org

2. Selection for Possible Award Does Not Authorize Work

Our selection notice is not an authorization to start work, and is not an award guarantee. We will contact your business office to get answers to any questions we have about your proposal, and negotiate specific award terms.

B. AWARD NOTICES

1. Electronic Notification of Full Proposal Selection by Monday, 2 May 2022.

If your full proposal submission is selected for award, a notification will be sent to the Applicant via email.

If your full proposal submission is not selected for award for this year's DEPSCoR-RC funding opportunity, a notification will be sent to the Applicant via email.

If you would like to request written feedback on your full proposal submission, instructions will be provided in the notification email.

2. Federal Award Document

A grant signed by a warranted Grants Officer is the only official notice that an award has been made.

3. Electronic Federal Award Distribution

We send award documents to the Applicant and their IHE business office by email. This is called award distribution.

C. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

1. Reporting of Matters Related to Recipient Integrity and Performance

You must report recipient integrity and performance information as required by Appendix XII to 2 CFR Part 200 – Award Term and Condition for Recipient Integrity and Performance Matters, incorporated here by reference. You should read the full text of this award term now using the link above to make sure you understand our requirements. You can also find this term at http://www.ecfr.gov.

2. Cross-Cutting National Policy Requirements

You must comply with all applicable national policy requirements as a condition of award. Key national policy requirements may be found in the DoD Research and Development General Terms and Conditions, (DoD T&C); and, 32 CFR Part 22 Subpart E, incorporated here by reference.

3. Acknowledgement of Research Support

You must acknowledge support provided by the Government in all materials based on or developed under our awards in accordance with DoDM 5200.01, Volume 2 policy. The requirement extends to copyrighted and non-copyrighted materials published or displayed in any medium.

The following language must be used unless the award document provides different instructions:

"This material is based upon work supported by the Office of the Under Secretary of Defense for Research and Engineering under award number_____."

You must require any sub-recipients under your award to also include this acknowledgement.

4. Disclaimer Language for Research Materials and Publications

All materials based on or developed under our awards except scientific articles or papers published in scientific journals must use the following language unless the award document provides different instructions:

"Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Defense."

You must require any sub-recipients under your award to also include this acknowledgement.

5. Grants - Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards

Our grants are governed by the guidance in Title 2, Code of Federal Regulations (CFR) Part 200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards" as modified and supplemented by the Department of Defense's (DoD) interim implementation in 2 CFR Part 1104 and 2 CFR Part 1125. Provisions of Chapter 1, Subchapter C of Title 32, CFR, "DoD Grant and Agreement Regulations" other than parts 32 and 33 continue to be in effect and apply as stated.

These regulations are incorporated by reference into this announcement.

6. Conditions of Award for Recipients Other Than Individuals

You must agree to comply with the requirements at 2 CFR Part 182, Subpart B "Requirements for Recipients Other Than Individuals" as a condition of award.

7. Minimum Record Retention Requirements

You must keep records related to our awards for at least three years after completion and the final Federal Financial Report is submitted. This requirement is described further in 2 CFR 200.334, incorporated here by reference. For grant awards, the most recently dated DoD R&D T&C's - OAR Article II. Records retention and access describes additional requirements.

Sometimes records must be retained for more than three years.

D. REPORTING

1. Monitoring and Reporting Program Performance

All of our awards require at least annual and final technical performance reports as required in 2 CFR 200.328, 2 CFR 200.329, and 2 CFR 200.330. The DoD R&D T&C's - REP Article I. Performance management, monitoring, and reporting will apply to grant awards. Some of our awards require more frequent technical reports.

You must provide your reports on time. Our awards include a schedule specifying the latest date for submission of each required report.

You must use a completed SF 298 Report Documentation Page as the first page of the final report. You can download an electronic SF 298 from http://www.gsa.gov/portal/forms/download/116146.

2. Technical Performance Report Format

Interim and final RPPRs are to be submitted in accordance with reporting requirements identified in the grant document. Typically interim RPPRs are due annually, however the report due dates can vary. A link to the report submission site will be included in the grant award document.

3. Department of Defense (DD) Form 882 Report of Inventions and Sub-awards

a. Invention Reports

(1) You must provide a final invention report on a DD Form 882. Our award documents specify the due date.

You can get the form at: https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd0882.pdf

(2) You must submit this report even if you do not have a patent to report.

b. Sub-Award Reporting

You must report information about sub-awards and executive compensation in accordance with the terms in REP Article IV. of the DoD R&D T&C's.

4. Standard Form (SF) 425 Federal Financial Report

a. If you request any advance payment(s) under your award, you must submit quarterly SF 425 Federal Financial reports for the life of the grant. Our awards include specific instructions.

You can get the form at:
https://www.gsa.gov/forms-library/federal-financial-report

b. You do not have to submit quarterly SF 425 Federal Financial reports if you only request payments by reimbursement.

5. Electronic Payment Requests and Electronic Payment

You must submit payment requests electronically using the Wide Area Work Flow application. All payments must be made using the electronic funds transfer (EFT) method.

You must register to use WAWF in the Procurement Integrated Enterprise Environment (PIEE) e-Business Suite at https://piee.eb.mil/. The website includes registration instructions.

If you have WAWF or PIEE questions or problems, you can get help by telephone at (866) 618-5988, or by electronic mail at disa.global.servicedesk.mbx.eb-ticket-requests@mail.mil, or via the Internet at:
https://piee.eb.mil/xhtml/unauth/web/homepage/vendorCustomerSupport.xhtml

6. Property Reports

If we furnish any property owned by the Government under an award, you must submit periodic property status reports as described in 2 CFR 200.330 and further implemented for grants by the most recently dated DoD T&C's - REP Article III. Reporting on Property.

7. Other Reports

The Basic Research Office may ask for quarterly reports as needed. We use these informal reports for program purposes, such as

preparation for meetings and other technical purposes. We highly recommend you provide this information in a timely manner by electronic mail directly to the Basic Research Office.

8. Electronic Submission of Reports

You must plan on submitting reports electronically through our online service specific portals or by email. Our award documents will provide the specific instructions.

VII. AGENCY CONTACTS

A. TECHNICAL INQUIRIES AND QUESTIONS

Questions of a technical nature on a specific topic must be directed to one of the program officers identified in Section I.C.TOPICS. You should **submit your questions in writing by email.** You should include FOA-AFRL-AFOSR-2021-0007 in the subject line. All technical discussions must take place prior to white paper submission. After the white paper deadline, applicants may no longer contact the program officers listed in section I.C.TOPICS.

If you submit a question by telephone call, fax machine, or other means you may not receive a response.

B. GENERAL INQUIRIES AND QUESTIONS

General questions about this announcement **must be sent to us by email**. You should include FOA-AFRL-AFOSR-2021-0007 in the subject line.

MRS. ELAINA BARKER
Grants Officer
Email: elaina.barker@us.af.mil

If you submit a question by telephone call, fax machine, or other means you may not receive a response.

C. PROGRAMMATIC QUESTIONS

Overall DEPSCoR questions can be directed to the Basic Research Office and **must be sent in writing by email**. You should include this FOA number in the subject line.

DR. JENNIFER BECKER
Program Manager
Email: jennifer.j.becker.civ@mail.mil

If you submit a question by telephone call, fax machine, or other means you may not receive a response.

VIII. OTHER INFORMATION

A. OMBUDSMAN

An Ombudsman has been appointed to hear and facilitate the resolution of concerns from offerors, potential offerors, and others for this acquisition. When requested, the Ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the Ombudsman does not affect the authority of the Government Program Officer, Grants Officer, or evaluation officials. Further, the Ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of protests or formal grant disputes. The Ombudsman may refer the party to another official who can resolve the concern.

Before consulting with an Ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the Grants Officer for resolution. Consulting the Ombudsman does not alter or postpone the timelines for any other processes.

If resolution cannot be made by the Grants Officer, concerned parties may contact the AFRL Ombudsman, Director of Contracting, HQ AFRL/PK. The AFRL Alternate Ombudsman is the Deputy Director of Contracting, HQ AFRL/PK. Please send an email to afrl.pk.workflow@us.af.mil with the subject of "Ombudsman".

The Ombudsman has no authority to render a decision that binds the agency.

Do not contact the Ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries must be directed to the Grants Officer.

B. GRANTS OFFICERS AUTHORITY

Grants Officers acting within their warranted capacity are the only individuals legally authorized to make commitments or bind the Government.

No other individuals are authorized to make commitments or otherwise bind the DoD.

C. ADDITIONAL FUNDING OPPORTUNITIES

New funding opportunities are posted throughout the year on the AFOSR, ARO, and ONR sites, we encourage you to monitor them for future opportunities and announcements.

AFOSR: http://www.wpafb.af.mil/afrl/afosr
ARO: https://www.arl.army.mil/business/broad-agency-announcements/
ONR: https://www.onr.navy.mil/en/work-with-us/funding-opportunities

Thank you for your interest in this announcement.