BROAD AGENCY ANNOUNCEMENT (BAA)

1. Agency Name United States Air Force Academy (USAFA), US Air Force Academy, CO

2. Funding Opportunity Number- USAFA-BAA-2021

3. Funding Opportunity Title- Research Interests of the United States Air Force Academy

4. Types of Instruments Awarded- Research and development contracts, grants, cooperative agreements and other types of agreements

5. Announcement Type- Initial Announcement

6. Catalog of Federal Domestic Assistance (CFDA) Numbers- 12.800

7. Opportunity Overview

USAFA's Dean of Faculty Research Office is announcing to business and academia the intent to solicit white papers/proposals for USAFA research efforts through this BAA. This strategy provides USAFA an acquisition tool with the flexibility to solicit proposals and make awards to develop technologies to meet present and future Air Force research needs as technology issues are identified. USAFA invites white papers and proposals for research in many broad areas. These areas are described in detail in Section I, Funding Opportunity Description. Additional information regarding USAFA Research Centers, Departments and Institutes may be found at www.usafa.edu.

USAFA is seeking unclassified research white papers and proposals that do not contain proprietary information. Requests for white papers/proposals are also transmitted via calls which may be published separately from the BAA at various times during the open period of the BAA.

It is anticipated awards will be made in the form of any appropriate contract type under the FAR or Non-FAR instruments (i.e., Other Transaction (OT) for research efforts, or grants and cooperative agreements). USAFA reserves the right to select and fund for award all, some, or none of the white papers/proposals in response to this announcement. All awards are contingent upon funds availability for the program areas identified. Unless specifically indicated in a Request for Proposal (RFP) or a call, cost sharing is permitted and encouraged, but not required.

Awards based on responses to this BAA are considered to be the result of full and open competition. The North American Industry Classification System (NAICS) code, unless otherwise stated in the BAA amendments shall be: 541714, Research and Development in Biotechnology (except Nanobiotechnology) and 541715, Research and Development in the Physical, Engineering and Life Sciences (except Nanotechnology and Biotechnology).

Interested offerors should be alert for any BAA amendments, calls, or other changes to the requirements of this BAA or its subsequent amendments. Amendments to and/or calls on this BAA will be posted to the beta.sam.gov and Grants.gov website and published when they occur. Interested parties are encouraged to periodically check these websites for updates and amendments. White papers and proposals submitted in response to this BAA shall be in accordance with the requirements of this BAA and its appropriate amendments.

USAFA will not issue paper copies of this announcement. The costs of white papers and/or complete proposals in response to this BAA are not considered an allowable direct charge to any award resulting from this BAA or any other award. Technical and cost proposals, or any other material, submitted in response to this BAA will not be returned.

This publication constitutes a competitive BAA as contemplated in Federal Acquisition Regulation (FAR) 35.016, Defense Federal Acquisition Regulation (DFARS) 235.016, FAR 6.102(d)(2) and the DoD Grants and Agreements Regulation (DoDGARs) Subpart 22.315(a), 2 CFR 200.319.

This BAA supersedes USAFA-BAA-2015, which limited research to basic and applied, fundamental studies. USAFA-BAA-2021 uses DFARs 235.016 to expand research areas to the following:

1. Basic Research (budget activity 6.1)
2. Applied Research (budget activity 6.2)
3. Advanced technology development (budget activity 6.3)
4. Advanced component development and prototypes (budget activity 6.4).

8. Response Dates

This announcement remains open until superseded. White papers are reviewed and evaluated as they are received and may be submitted at any time. The white paper/proposal submission process is discussed in sections IV and V of this BAA. Proposals will be due according to specific instructions contained in a separate RFP notice resulting from favorable white paper evaluations or calls issued against this BAA. Calls may be placed against this BAA and specific information related to due dates will be provided in each call. Proposals or white papers submitted in response to calls should be submitted according to directions contained within each individual call and in accordance with this BAA. Late bid and proposal provisions in accordance with (IAW) Federal Acquisition Regulations (FAR) 52.215-1(c) (3)) will apply to this BAA.

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I. Opportunity Description

The USAFA invests in an active research program for three main reasons. First and foremost, research significantly enhances the cadet learning experience. Our research is done by, for and with cadets who work alongside fellow cadets and faculty mentors. Research provides cadets with rich independent learning opportunities as they tackle ill-defined problems and are challenged to apply their knowledge and abilities.

Second, our research program provides opportunities essential for faculty development. Research broadens and deepens the experience base of the faculty. This infuses current, relevant, state-of-the-art and cutting-edge applications and examples into the curriculum. This also helps our faculty remain current in their respective fields.

Third, at USAFA we strive to conduct research to enhance the ability of the Air Force to perform its mission. There are ongoing research projects spanning topics as diverse as super hypersonics, cyber security, spatial disorientation, athletic performance and homeland defense. This BAA offers a vehicle for research to be performed to satisfy these three objectives, while also meeting research needs of industry counterparts/serve a public purpose. USAFA's partnerships with non-Government firms enables development in the public arena, stimulating the studies in the greater technical community. All awards issued against this BAA must serve to benefit the objectives identified above.

a. Research Centers

1. Aeronautics (Aeronautics Research Center)

The Aeronautics Research Center (ARC) performs a range of aeronautical research tasks in support of Air Force (AF), Department of Defense (DoD), National Aeronautics and Space Administration (NASA) and other government and commercial sponsors. Making use of the highly diverse and advanced experimental facilities housed in the USAFA Department of Aeronautics, the ARC pursues a range of aeronautic and propulsion research efforts. The research program in this center is geared toward providing all undergraduates with a rich, relevant research experience while answering critical research needs of our highly varied customer base. Researchers may expect extensive access to premier facilities, tremendous latitude of pursuits and single-minded focus on research tasks, but must seek to incorporate student participation in their projects, typically two to four students per semester. Substantial effort in this center is directed toward the solution of multi-disciplinary problems which may require skills beyond classical aeronautics disciplines, including plasma and laser physics, optics, automatic controls and applied mathematics. The ARC, in partnership with the USAFA High Performance Computing Research Center, is a leader in the complementary employment of experiment and simulation to solve complex fluid, aerodynamic and control problems.

Current research strengths include several complementary thrusts. Closed loop flow control efforts focus on aero-optic control and control of flexible structures under aerodynamic loading. There is extensive effort in the development of automatic control algorithms and techniques, experimental flow control methodologies, fluid-structure interactions and computational fluid dynamics (CFD) simulations. Well-developed and modern force and moment measurement capabilities in low speed ($M < 0.1$) and subsonic (up to Mach 0.6) wind tunnels are employed in the investigation of numerous air vehicle modifications as well as development of new aircraft and Unmanned Aerial Systems

(UAS) designs. Flight test of small air vehicles using USAFA facilities is a strength of the program. A Mach-6 Ludwieg tube is now available, complementing an existing Mach 4.4 blow down facility for supersonic and hypersonic investigations, emphasizing shock wave-boundary layer interactions. Operating engines, including an F-109 turbo fan and several internal combustion engines, are used for fuels and flow quality investigations, with a current emphasis in ejectors, ducted fans, and propellers for small air vehicles. Researchers are encouraged to propose topics in these areas and other allied aeronautics subjects. USAFA is a pioneer in arranging for wind tunnel concepts to be field tested in flight vehicles, both "test mules" and small air vehicles designed and built in-house. Vehicles are then flown in USAFA-controlled airspace.

A list of current and available research facilities can be found at www.usafa.edu.

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2. Aeronautics (High Performance Computing Research Center)

The High Performance Computing Research Center (HPCRC) is a multi-disciplinary center which shares a dual mission of providing high performance computing resources to USAFA cadets and research/teaching personnel, as well as conducting physics-based modeling and simulation research tasks in support of AF, DoD, NASA and other government and commercial sponsors. Making use of distributed/shared memory computing systems and a dedicated research network, the Center pursues a range of computational research efforts. The research program in this center is geared toward providing undergraduates with scientific computing experience supported by the DoD High Performance Computing Modernization Program and projects which answer critical research needs of our highly varied customer base. Researchers may expect extensive access to premier facilities, tremendous latitude of pursuits and single-minded focus on research tasks, but must seek to incorporate cadet participation in their projects, typically two to four cadets per semester.

The HPCRC, in partnership with the USAFA Aeronautics Research Center, is a leader in the complementary employment of experiment and simulation to solve complex fluid, aerodynamic and control problems. Current fluid/aerodynamic research interests include:

- Massively-separated flow aerodynamics, including turbulence modeling
- Reduced-order modeling for aircraft stability and control characterization
- Fluid-structure interaction as applied to aero-elasticity as well as other linear and non-linear problem sets
- Non-equilibrium gas dynamics typical of high-altitude, rarefied flows as well as hypersonic atmospheric re-entry
- Gas turbine propulsion devices (including inlets, compressors, turbines and nozzles), high-speed propulsion devices such as ramjets and scramjets
- Other topics of interest involving the use of high performance computing resources for the solution of complex scientific and engineering problems.

The HPCRC also works in partnership with other USAFA academic departments and research centers to develop computational simulation capabilities using high performance computing (HPC) resources. Current research interests in this area include:

- Development of tools and techniques to ease the delivery of HPC services to users and researchers without a significant computational background (including undergraduate students)
- Development of software methods, processes, tools and utilities to solve complex science and engineering problems using HPC resources (including General Purpose Graphical Processing Units or GPGPUs)
- Development of parallel software processes and tools to improve maintainability, efficiency and scalability

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3. Aeronautics (Hypersonic Vehicle Simulation Institute)

The Hypersonic Vehicle Simulation Institute (HVSI) funds and performs a range of hypersonic research tasks in support of the DoD High Performance Computing Modernization Program (HPCMP). HPCMP desires to improve computational simulations of hypersonic vehicles in support of Department of Defense goals by accelerating the successful development of HPC software and hardware. HVSI has the objectives to: facilitate the development and documentation of a national vision for hypersonic vehicle simulation; co-fund projects in the gaps of current DoD, DoE, NASA, and Industry research efforts critical to achieving DoD hypersonic vehicle simulation; facilitate transition of hypersonic research into production quality simulation software available to government, academic, and industry acquisition partners; create a national repository for hypersonic simulation verification and validation data; provide computational resources to provide a measurable leap forward in hypersonic system simulation capability for DoD hypersonic system acquisition. The HVSI improves computational simulation approaches including numerical methods, modeling approaches, and simulation of a variety of aerothermodynamic and propulsion aspects of hypersonic flight. Specific science and technology areas include turbulence, boundary layer transition, fluid-structure-thermal interactions, non-equilibrium chemistry, ablation, and combustion, among others.

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4. Astronautics (Space Systems Research Center)

The Space Systems Research Center performs a wide range of activities involving the design, assembly, integration, test, launch and flight of small satellites to conduct research for the AF and the DoD. The goal of the SSRC is to provide opportunities for cadets to “learn space by doing space” and to facilitate on-orbit technology demonstration. This unique program blends science, technology and organizational skills like none other at the USAFA. The Center is currently operating FalconSAT-6 (launched 2018) and FalconSAT-8 (launched 2020) and developing FalconSAT-X. All three spacecraft host experiments sponsored by the Air Force Research Lab. Other research

areas are educational nanosatellites of the CubeSat form factor. Designing a satellite is a complex, multi-disciplinary undertaking requiring expertise across a number of technical disciplines. Department of Astronautics, in partnership with the Space System Research Center, aims to extend this expertise through researching and applying design experiences and examples to support the AF and DoD.

Currently available facilities, instrumentation and research efforts can be found at www.usafa.edu.

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5. Biosystems and Natural Materials (Life Sciences Research Center)

The Life Sciences Research Center's (LSRC) primary mission is to support United States Air Force (USAF) and DoD research directives, especially those within the Air Force Office of Scientific Research (AFOSR) and Air Force Research Laboratories (AFRL). Within the Department of Biology at USAFA, LSRC is seeking research partnerships to investigate changes in metabolism towards improving human performance. Probing the cellular response of this process is very germane to basic science and relevant to recovery and adaptation from physical exertion, wound healing, tissue regeneration, and transplantation. Further, our center also wishes to uncover the unique adaptation properties of select organisms in terms of providing natural materials. Additional study may include molecular biology/genetic engineering methods, which allow for further insights concerning property/structure relationships to enhance biomaterial products.

Critical aspects of human performance and physiology are controlled by metabolic circuits that provide cellular ATP. These circuits are especially responsive to O2 levels (influenced by exertion or altitude), reactive O2 species (ROS), and the types/levels of dietary biochemical fuels. The DoD is interested in rapidly modulating human cell metabolic rates in response to a myriad of physiological and environmental cues. This can enable high-levels of ATP production in stressful conditions, even when energetic constraints exist because of sleep/caloric limitations (especially fatigue prevention). Despite extensive characterizations of the primary protein/enzyme machinery contributing to cellular ATP production, very little is known. To illustrate, much needs to be understood how this machinery is controlled or how these pathways are dynamically regulated in response to signaling events and alterations in cellular redox status. There is growing interest in establishing fundamental mechanisms of metabolic regulation by redox sensors in model systems. One such approach could involve using bacterial, yeast and mammalian cell systems in parallel, to probe how cells respond to physiological changes brought about by varying levels of oxygen (the "Crabtree Effect") and nutrients. This would involve interrogating the control mechanisms cells use to regulate energy transformation when faced with dynamic redox conditions, e.g., fluctuating levels of energy carriers and/or O2.

The LSRC is also intrigued by biomaterials found in nature, which use unique biologic design principles and processes to form novel structures. In certain instances, these novel structures are the basis for highly resilient biomaterials capable of withstanding harsh environmental conditions. For example, the USAF requires lighter, tougher materials, which can hold up under extreme temperature, pressure or loading conditions. Research would essentially reveal mechanisms of existing natural systems, methods to incorporate present biological materials in nature, or disclose

new capabilities within existing systems and/or materials. Unraveling the complexities behind the aforementioned areas could perhaps be accomplished through molecular biology/genetic engineering, which may lead to more expedient understanding of property and structure relationships within the biomaterial.

Research activities in these areas could be carried out by a commercial or academic partner with experience in conducting and participating in R&D relating to the previously mentioned areas along with placing an exceptional research scientist at USAFA. Applications for on-site USAFA research are encouraged from individuals from a variety of backgrounds; microbiology, biochemistry, molecular biology, electrochemistry, genetic engineering, and materials science. We are currently examining select microorganisms that have resilient proteins which help form the basis of many biomaterials. Our scientists are centered on isolation and identification of these robust microorganisms, and are developing methods for making them tractable to genetic manipulation. These research thrusts have applications for the U.S. Air Force ranging from protein stability under harsh conditions to energy transfer across biotic/abiotic interfaces to the development of biosensors for threat detection and mitigation. Collaboration should include leadership and guidance on the proposed research areas for laboratory technicians/students, partner scientists, biologists, chemists and engineers on experimental work at the intersection of chemistry, biology, and biochemistry. Because of the USAFA mission to prepare young men and women for leadership positions within the Air Force, cadet participation with researchers is expected as part of our independent study projects (499s) and cadet summer research program (visiting partner labs). Additionally, there is potential for cross-disciplinary involvement from a number of academic departments other than Biology, such as Chemistry (biochemistry), Engineering (model development), and Management (project analysis). There are also potential collaboration opportunities with other academic institutions, private companies and other Air Force research agencies. Interested inquiries should contact the LSRC POC before submission to ensure proposals are feasible for funding and of technical interest to the Air Force and the DoD.

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6. <u>Chemistry (Chemistry Research Center)</u>

The opportunity to participate in basic and applied research by faculty, staff, and cadets is important to the overall mission of the Air Force Academy. The Chemistry Research Center (CRC) provides for professional development of faculty members and resident researchers in addition to enhanced education of cadets through research programs in support of the Air Force as well as DoD R&D directives. In order to accomplish a portion of this, the CRC has had proven success by external partnering with academia, industry, and national laboratories in order to leverage an expanding technology base.

Current topics of interest in the CRC are renewable materials, light harvesting organic electronics, fluoropolymers, energetic composites, smart coatings, liquid crystalline elastomers, and high temperature composite resins and fibers. Research partnerships usually take place on-site using the laboratories and analytical instrumentation located in the Department of Chemistry at USAFA.

Interested inquiries should contact the CRC POC before submission to ensure proposals are feasible for funding and of technical interest to the CRC.

A short description of the CRC research and capabilities is available at www.usafa.edu/research/research-centers/chemistry-research-center/

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7. Computer Science (Academy Center for Cyberspace Research)

The Academy Center for Cyberspace Research (ACCR) conducts research in a wide range of areas within the fields of Computer and Cyber Science in support of the AF, DoD and other government and commercial sponsors. All cadets in the Computer Science and Cyber Science majors receive research experience through independent studies, course projects and summer research opportunities. ACCR has four primary research focus areas: system security analysis, immersive environments (augmented and virtual reality), artificial intelligence and autonomy, and big-data analytics. In addition to these four primary focus areas, ACCR can conduct research in any topics related to the field of Computer and Cyber Science provided there is sufficient faculty and cadet interest. State of the art facilities are available to students and researchers providing capabilities for network and platform vulnerability analysis; industrial control system/supervisory control and data acquisition security analysis and development; provably secure software development; network security stack analysis; virtual and augmented reality applications; high-performance computing; robotics and unmanned systems design, analysis, and operation; unmanned aerial swarms and multi-vehicle cooperation. ACCR is especially interested in research that incorporates proposed student projects. Current topics of research include operational network penetration testing techniques and tools, provably secure network applications, network security stack capability and shortfall analysis, virtual reality exposure therapy, augmented reality for distributed command and control, emergency response augmentation through virtual reality, counter-unmanned aerial systems swarm techniques, unmanned aerial swarm behaviors, and business process automation. Researchers are encouraged to propose topics in these areas as well as other cyberspace and computer science topics.

Currently available facilities, publications and research efforts can be found at www.usafa.edu.

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8. Mechanical Engineering (Center for Aircraft Structural Life Extension)

The Center for Aircraft Structural Life Extension (CAStLE) has a two-fold mission in support of the safe, economical sustainment and improved readiness of aging systems and other material degradation related fields.

The first aspect of the CAStLE mission is to perform a wide range research and technology development projects focused on delivering science and technology (S&T) products required to understand material degradation in structures and systems to various government, academic and commercial sponsors. Making use of the extensive experimental and computational facilities housed in the USAFA Department of Mechanical Engineering and elsewhere, CAStLE pursues a range of research projects in a wide variety of fields. These fields include engineering mechanics, mechanical engineering, aerospace engineering, corrosion engineering, and material science. CAStLE places more emphasis on applied research and that part of development not related to the development of a specific system or hardware procurement. CAStLE is a leader in the complementary employment of experiment and simulation to solve complex static stability, static strength and fracture mechanics problems. Current research strengths include advanced barrier coatings; static strength and static stability design; corrosion modeling, prevention and control; validation testing, analysis and methods development; computational structural and fracture mechanics; root-cause (failure) analysis; flight data acquisition system development, installation, maintenance and data analysis; educational curriculum research and development; structural risk analysis; forensic structural teardown analysis and research tied to the USAF Aircraft Structural Integrity Program (ASIP). The interaction between corrosion, cracking, and other material degradation/damage mechanisms and their effect on structural integrity has been a long-standing interest of CAStLE. There is DoD-level interest in material degradation in structures—to include corrosion, cracking and other service-related damage mechanisms.

The second and no less important aspect of the CAStLE mission is to educate, train, inspire, and otherwise prepare future generations that might become the core of the S&T community within the government and the general professional population. To this end CAStLE seeks to leverage research and S&T products to provide inspirational educational experiences in relevant fields that support obtaining solutions to material degradation issues in structures. Past research programs have provided service academy cadets, college students, primary students, and faculty with rich, relevant research experiences while answering critical research needs of our highly varied customer base. New research projects must likewise seek to directly incorporate students or in some way educationally benefit students. Besides student participation elements in our S&T product development projects, CAStLE has education-based projects in distance learning, primary education curriculum research, science center education programs, and the creation of a wide variety of web-based video-delivered educational products. Producing individuals to form the material degradation technical core naturally requires those individuals to be prepared in the sciences, math and other technical areas related to engineering and technical topic areas which are appropriate to the age and background of the target audience. There is DoD-level interest in educationally preparing and inspiring future generations to pursue careers in material degradation of systems—to include corrosion, cracking and other service-related damage mechanisms.

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9. <u>Laser and Optical Physics (Laser & Optics Research Center)</u>

The Laser and Optics Research Center (LORC) performs a range of research tasks in support of the AF, DoD, DARPA, National Science Foundation and other government and commercial sponsors.

Making use of the extensive experimental facilities housed in the USAFA Department of Physics, the Center pursues a range of research efforts. The research programs in this center are geared toward providing all undergraduates with a rich, relevant research experience while answering critical research needs of our highly varied customer base. Researchers may expect extensive access to premier facilities, tremendous latitude of pursuits and single-minded focus on research tasks, but must also seek to incorporate student participation in their projects, typically one to four students per semester.

The Laser and Optics Research Center at the Air Force Academy is involved in a variety of experimental AMO physics basic research. Current projects include precision measurement of atomic lifetimes, atomic polarizabilities and matrix elements of atoms, laser cooling of metastable inert gases, diode pumped alkali lasers (DPAL), and nuclear spectroscopy of Th 229m. Future possible projects might include high harmonic generation, atom interferometry and quantum computing. Research projects are dependent on obtaining external funding.

Interested inquiries should contact the LORC POC before submission to ensure proposals are feasible for funding and of technical interest to the LORC. Researchers are encouraged to propose topics in the above areas and other related subjects.

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10. <u>Physics (Space Physics & Atmospheric Research Center)</u>

The Space Physics and Atmospheric Research Center (SPARC) studies the natural environment from the troposphere to the sun in support of AF, DoD, NASA, NSF and other government and commercial sponsors. Making use of the extensive experimental facilities housed in the USAFA Department of Physics, the SPARC pursues a range of efforts. The research program in this center is geared toward providing all undergraduates with a rich, relevant research experience while answering critical research needs of our highly varied customer base. Researchers may expect extensive access to premier facilities, tremendous latitude of pursuits and single-minded focus on research tasks, but must seek to incorporate student participation in their projects, typically two to four students per semester. Substantial effort in this center is directed toward the solution of multi-disciplinary problems which may require skills beyond classical physics disciplines, including plasma and laser physics, advanced miniaturization techniques, use of Micro-Electro-Mechanical-Systems, development of miniaturized automated satellite constellations and advanced data mining techniques for large data systems. The SPARC is a leader in the development of miniaturized payloads for small satellites, and the application of data provided by these payloads to relevant Department of Defense problems. SPARC research interests vary depending on the sponsoring agencies interests.

Current research strengths include several complementary thrusts. Space physics and space weather study the relationship of the space environment and the effects this environment have on mankind. Topics in space weather can range from experimental, such as developing new instrumentation to measure the space environment, to theoretical, such as developing assimilative models which can be used to predict the space environment into the future. Linked with space physics and space weather, the micro- and nano-satellite thrust develops aggressively miniaturized spacecraft for use in small

inexpensive constellations devoted to exploiting the entire range of space activities of interest to sponsors. The applied physics thrust considers all applications of physics to the practical applications of technology of interest to sponsors. In the past, research has included studies of plasma actuators, high speed spectroscopy in support of brief duration phenomena in the troposphere, mesosphere and the ionosphere, studies of the aurora and applications of weather modeling to highly dynamic small scale areas such as the USAFA. Finally, the Department supports a wide range of basic research in astronomy and astrophysics in support of the USAFA observatory.

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11. Center for Physics Education Research (CPER)

The Center for Physics Education Research (CPER) was founded in 1994 to build a USAFA center of gravity providing impetus, opportunities and pedagogical tools for physics faculty at USAFA. The CPER also engages in and applies Scholarship of Teaching and Learning-like (SoTL) research activities within the Department of Physics and across the institution, to include science and mathematics faculty at the Preparatory School. The CPER maintains extensive ties and collaborations with similar research programs nationwide.

The primary goals of the CPER are to:

- Engage in research initiatives that quantify gains in student understanding and appreciation of physics. Efforts in this category leverage the random assignment of students within Core Physics sections to categorize and assess student learning gains in performance within a single semester and across multiple semesters. In addition to analyzing performance on standardized assessments, there is considerable interest in analyzing student response patterns, developing assessment rubrics and understanding prior student knowledge and correlating learning gains with other metrics such as instruction techniques and student engagement.
- Develop and share tools for enhancing teaching and student learning in physics. Of particular interest is the research and development related to pedagogical techniques and supporting tools for the Just-in-Time Teaching (JiTT) pedagogy, which is a core competency within the Department of Physics. This effort includes the extension of JiTT to develop student self-explanations under a Worked Example model of instruction. Additional efforts include the development of Worked Example tutorials (to include computer simulations) for both introductory and advanced physics students.
- Maintain a connection between course and curriculum development (i.e., content, assessment methods, pedagogical approach) and physics education research. CPER is actively and intimately involved with several national level efforts to engage in collaborative education research and bring proven research results into classroom, both nationally and at USAFA, as soon as warranted by the assessment results.

Current projects:

- Investigating predictors for students who switch from a STEM major to a non-STEM major and vice versa.

- Evaluating math interventions to improve success rates in introductory physics courses.
- Developing physics modules that incorporate engineering design scenarios.
- Proliferating lessons learned on a national level by disseminating research results through conference presentations, workshops and publications.
- Compiling and publishing JiTT content for global distribution via Open Educational Resources (OER).
- Improving meteorology education. Of particular interest is evaluating the utility of textbooks for the Physics of Space Weather and designing/testing an assessment of student learning gains in general meteorology courses.

Researchers and faculty are encouraged to propose research topics in these areas and other related subjects.

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12. Center for Unmanned Aircraft Systems Research (UAS)

The USAFA Center for UAS Research educates cadets as they prepare to become AF Officers, develops premiere UAS research capabilities and faculty and provides world-class UAS research facilities, supporting a real-world experience for our cadets and producing needed research solutions for our military partners and sponsors. The research in support of this Center focuses on providing autonomous, decentralized solutions for systems of UAS that may also incorporate the use of land and water assets. Researchers may expect access to premier facilities, including lightweight UAS vehicles with supporting command and control infrastructure and test and development equipment. Current research areas support the Center's goals. These include control system algorithms to direct autonomous vehicles; robotic control and navigation; robust communication systems that meet the challenges of dynamic and unpredictable network topology changes; inexpensive sensor network designs that incorporate fusion techniques for target identification, localization and tracking; and event-driven, multithreaded software architectures. The center is also interested in research related to Sense and Avoid, GPS-denied navigation, and Counter-UAS. Researchers are encouraged to propose topics in these areas or in areas they feel will complement the Center's work.

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13. Civil and Environmental Engineering Research

The Department of Civil and Environmental Engineering performs research to help cadets learn how to solve complex problems within the fields of civil and environmental engineering. Our interests include interdisciplinary topics, and reflect the interests of individual faculty members. White papers that demonstrate a link to DoD civil and environmental engineering needs will be considered. Cadet involvement is highly prioritized.

Current topics of faculty research interest are:

- Engineering education
- Subsurface contamination by a variety of contaminants with a focus on modeling
- (*e.g.*, chlorinated solvents, radionuclides, firefighting foam fluorosurfactants)
- Sustainable design and construction
- Design and construction in developing countries
- Building energy modeling
- Near-surface geothermal energy topics
- Soil classification techniques and refinements
- Laboratory pavement testing
- Critical infrastructure protection
- Static testing of structural components
- Dynamic testing of building and pedestrian structures
- Vibration serviceability.

On-site research is desired. USAFA has a large field site with heavy construction equipment that may be used to construct experimental earth structures and test beds. At this field site, USAFA has an operational Energy Pile system, consisting of 8 energy piles with 3 of the piles heavily instrumented for observation of thermo-mechanical response of the foundations under both service and artificially high thermal loading. The facility also has instrumentation related to optimizing performance, including measurement of inlet/outlet temperatures, current to HVAC equipment, and temperature and moisture content of the soil surrounding the piles. USAFA also has a fully functional soils laboratory. The department has a 30-ft by 60-ft bay with a 19-ft clear height beneath a 5-ton crane and multiple universal testing machines, including one with a capacity up to 300 kips. A structural component static testing capability is provided by a 25-ft-long, 8-ft gage width, reaction floor with an MTS hydraulic system and multiple 55-kip actuators. We have access to DoD's High-Performance Computing Center, which can be used to solve a computationally intensive problem in several civil and environmental engineering disciplines (e.g., discrete element modeling of airfield pavements, flow and transport modeling of contaminants in the subsurface, etc.).

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14. Electrical and Computer Engineering Research

The Department of Electrical and Computer Engineering (DFEC) conducts research to produce needed solutions for our military partners and sponsors while providing real-world engineering experience for our cadets and aiding in the professional development of our faculty. Research in the areas of energy security and smart grid technology are sought to include concepts associated with effective demand management, integration of multiple generation sources and communication of energy events.

The DFEC research program currently includes investigations in the following areas:

- RF measurement and systems development
- Circuit development
- Robotics
- Renewable energy.

Examples of existing research include improvised explosive device (IED) detection, radar cross section (RCS) analysis, antenna design, portable wind power generation and autonomous robot algorithms. Researchers are encouraged to propose topics in these areas or in areas they feel will complement the department's work.

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15. Center for Space Situational Awareness Research (Department of Physics)

The Center for Space Situational Awareness Research (CSSAR) in the Department of Physics (DFP) conducts research across a variety of areas in support of the AF, DoD, NASA and other government and commercial sponsors. Making use of USAFA's extensive facilities, DFP pursues a range of research efforts. The Space Situational Awareness (SSA) relevant research programs are geared toward providing all undergraduates with a rich, relevant research experience while answering critical research needs of our highly varied customer base. Researchers may expect extensive access to premier facilities, tremendous latitude of pursuits and single-minded focus on research tasks, but must seek to incorporate cadet participation in their projects, typically one to two cadets per semester.

With more nations building and launching satellites, space has become increasingly congested, contested and competitive. SSA is thus a vital component of U.S. national security due to the role space and cyberspace play in our military operations. CSSAR is developing world-class SSA capabilities and facilities at USAFA to include a 1-meter telescope, the Falcon Telescope Network (FTN), and the command and control services to operate these telescopes in an automated fashion. The FTN is a global network of small aperture optical telescopes focused primarily on satellite characterization through simultaneous observations from multiple illumination geometries. It can also be used for testing handoff and cueing techniques as well as smart network and resource management.

Current research areas of emphasis include space object characterization via resolvable and non-resolvable imaging using various optical remote sensing modalities (e.g., photometry, spectroscopy, and polarimetry), fusion of disparate data sources to maximize the situational awareness, and development of optical sensing capability. Researchers are encouraged to propose topics in these areas and other related subjects.

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b. Research Institute

1. Institute for Information Technology Applications

The Institute for Information Technology Applications (IITA) is an Air Force research institute operating at USAFA with core-funding from AFRL Information Directorate (AFRL/RI). The driving

concept of the institute is to provide opportunities for multidisciplinary research that will be of value in solving immediate operational problems for the Air Force, Space Force and Department of Defense, at novel price points.

IITA's vision is to serve as a renowned Air Force research institute for operational and educational information technology application. The IITA seeks proposals in the following relevant areas of research:

- AI/Machine Learning (AI/ML): organic algorithms used to inform and improve machine decision making.
- Human and Robot Teaming: optimization of swarm search methods and teaming with ground-based humans/robots.
- Air and Ground Robotic Autonomy: algorithms to improve decision making and awareness of small Unmanned Aerial Systems (sUAS).
- Counter-UAS technology: sensor fusion and related technologies to find, fix, ID, track, and mitigate one or more sUAS.
- RF datalink mitigation: detection, identification, and mitigation of RF datalinks.
- Data Integration: algorithms for consumption, processing and distribution of and from disparate data sources
- Visualization: presentation of information in user-defined methodologies that enable intuitive and rapid-decision making
- Trust and Autonomy: verifiable data integrity coupled with increased adaptation of operational and environmental conditions without human interaction

Research agreements with outside agencies are common. Researchers are encouraged to propose topics in these areas and other related subjects.
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2. Institute for National Security Studies

The United States Air Force Institute for National Security Studies (INSS) is a strategic policy research institute located within the faculty at the US Air Force Academy. It supports HQ USAF/A10 (Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration), the Defense Threat Reduction Agency (DTRA), and other members of the DoD strategic community, as well as other US Government organizations that have strategic interests. INSS serves as a locus for primarily DOD research related to national strategic security policy studies, emphasizing topics in the fields of enduring and emerging strategic security issues, developments shaping the strategic security environment, nuclear deterrence and arms control, nonproliferation/counter-proliferation, evolving concepts of integrated strategic conflict, and the broad changing context of US national security. In addition to its research efforts, the Institute conducts a broad range of other activities, including workshop planning and organization, curricula development and delivery, and scholarly publications.

This announcement specifically addresses additional research and analysis that INSS is conducting internally, through the USAFA and broader military academic communities, and externally as required to meet USAF, DoD, and USG needs. INSS research and analysis focuses on discovering,

disseminating, and applying new or expanded traditional and multi-disciplinary knowledge relevant to current and future deterrence and national security strategy and policy. INSS will focus its current efforts on the following areas:

Strategic Security
- Current and future deterrence challenges
- Regional/limited strategic conflicts involving at least one nuclear actor
- Extended deterrence and assurance today and into the future
- Adversary and ally perceptions of United States extended deterrence and assurance
- Arms control and cooperative security measures
- Countering weapons of mass destruction.

National Security
- Evolving nature of great power conflict; future directions and characteristics
- Regional security trends and challenges; perspectives on US policy and power
- Integrated warfare across traditional and emerging domains/technologies
- Global extremism as a strategic security challenge
- Core challenges to US domestic security.

Research proposals are invited that address these areas. An overview of INSS research is available at https://www.usafa.edu/research/research-centers/institute-national-security-studies/.

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3. Eisenhower Center for Space and Defense Studies

The Eisenhower Center for Space and Defense Studies is the research center of the Air Force Academy's Department of Political Science. The Eisenhower Center supports research and professional development programs for both cadets and faculty on national security and defense policy issues. In particular, the Eisenhower Center has established a reputation for innovative thinking on space security and deterrence. The Eisenhower Center's first project was the creation of its Space and Defense Policy textbook in 2009 used at the Academy and by Air Force Space Command's professional education programs. This project built upon the Department's tradition of applying the expertise of its faculty to the study of defense policy as evidenced by eight editions of its textbook, American Defense Policy. A ninth edition is currently in the publication process.

The Eisenhower Center publishes a new edition of its journal Space and Defense at least annually and invites contributions from writers representing both the academic and policy communities. There is no standard length for articles, but 7,500 to 10,000 words, including notes and references, is a useful target for research articles. Viewpoint essays are normally in the range of 2,500 to 5,000 words. Past editions of the journal can be found in the EbscoHost database and on the web at http://www.usafa.edu/df/dfe/dfer/centers/ecsds/defense_journal.cfm.

The Eisenhower Center has conducted studies in at the request of the office of the Secretary of Defense and others on topics such as space deterrence, verification, and governance. The Eisenhower Center's Space Deterrence Study developed the "layered deterrence" model adopted in the 2011 National Security Space Strategy and is currently working on a cross-domain deterrence study.

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c. Other

1. Department of Behavioral Sciences and Leadership Warfighter Effectiveness Research Center (WERC)

The Department of Behavioral Sciences and Leadership WERC is involved in multiple research efforts that span the domains of human behavior. Specifically, the WERC has expertise in areas such as human factors, leadership, sociology, social psychology, clinical psychology, social work, general psychology, organizational psychology, biopsychology, and cognition. Research programs in the department are designed to build upon what is learned in the classroom and provide undergraduates with relevant, applied experience in research. Cadets may participate in capstone research, independent study projects, summer research programs, and/or ongoing faculty research projects, leveraging the expertise of our diverse faculty as well as numerous DoD agencies, academic institutions, and private business collaborators.

Current topics of interest range across the behavioral sciences and include:

- Human-Machine Teaming (HMT) has become a significant area of research emphasis within the DoD and USAFA. The goal of this line of research is to maximize team performance of humans working with autonomous systems in AF task environments. This includes studies in calibrated trust, team training, anthropomorphism, situational awareness, communication, and other related areas.
- Design of innovative systems that leverage a user-centered approach and can be assessed in ecologically-valid environments with cadets. Some application domains in command and control, intelligence, aviation, etc.
- The examination of leaders' decision making and performance in complex socio-cultural and technological contexts. The research goal is to enhance flexible and adaptive decision making and consequent behavior, which may include some or all of the following: civilian, military, interagency individuals and teams. Teams may cross the spectrum of civilian teams to current and potential military and civil-military (interagency and coalition) operations.
- Psychosocial resiliency. Research scenarios may range from civilians and first responders affected by 9/11 or the Boston Marathon bombing to soldiers who have deployed during Operation Iraqi Freedom and Operation Enduring Freedom.
- Research DoD policies, including changes therein, and their impact on civilian and military personnel (e.g.: Don't Ask, Don't Tell).
- Researching and accessing "Respect for human dignity."
- Reframing the discussion and researching and analyzing new methods or best practices surrounding suicide prevention in military, industry, civilian, and government environments.

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2. Department of Foreign Languages and the Office of International Programs

Our ever-expanding global AF mission demands increasing foreign language capability and intercultural competence in our officer corps to support national security strategies. Foreign language programs at USAFA seek to expand the opportunities for USAFA cadets to enhance their foreign language skills and their understanding of world cultures in Arabic, Chinese, French, German, Japanese, Russian, Portuguese or Spanish. Beyond the classroom, language acquisition and cultural understanding is enhanced through study abroad opportunities for cadets such as the Cadet Summer Foreign Language Immersion Program, the Cadet Cultural Immersion Program, the Semester Exchange Abroad Program, the Semester Study Abroad Program and the Cadet International Academy Visits Program. Research and assessment tools within these programs and in-classroom curricula are essential to produce officers with some level of foreign language proficiency and intercultural competence. Research interests in foreign language and international programs include but are not limited to the following areas:

- Methods to assess foreign language proficiency of students in different levels,
- Methods to assess foreign language proficiency in various modalities,
- The impact of language and/or cultural immersions on language and intercultural competence development of students,
- The use and effectiveness of various technologies in teaching and assessing foreign languages.

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3. Interdepartmental Program of Operations Research and Analytics

This interdepartmental program leverages the talents of faculty members across multiple departments in the disciplines of operations research, systems engineering, management and others. These individuals provide exceptional educational opportunities for cadets primarily supporting capstone projects in operations research. In addition, the program supports cadet projects such as new venture analyses, systems engineering process improvements, as well as a number of independent study projects and summer research programs. This is accomplished through numerous collaborations with other governmental and nonprofit agencies. The program supports local organizations as our students work with real clients in real agencies addressing real issues. While local organizations provide USAFA cadets an opportunity to experience organizational dynamics, the program also supports defense and homeland security agencies worldwide.

Each year cadets enrolled in Mathematical Sciences, Operations Research, Management and Systems Engineering Management Capstone courses develop projects that solve real world problems for client organizations with tools they have learned at the USAFA. Faculty and staff directly support these initiatives through both mentorship and research. While mathematics and management are well known fields, the operations research and analytics disciplines have developed within the advent of computer technology. Operations research and analytics methods focus on analyses that combine

mathematical, econometric, computer systems and managerial concepts to improve operations and processes.

Current topics of interest range across operations research and the management sciences and include, but are not limited to:

- Scheduling, routing, assignment and resource allocation issues,
- Modeling and simulation of organizational operations and processes,
- Statistical analysis of organizational processes and business functions,
- Decision models supporting both strategic and tactical decisions.

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4. Air Force (AF) CyberWorx

AF CyberWorx:

AF CyberWorx engages with cadets, industry, academia, and government partners to apply human-centric design principles toward modeling and concepting solutions to hard AF problems. AF CyberWorx is dedicated toward creating solutions and delivering them to the warfighter quickly through a mix of RDT&E, tech transfer and direct industry development. The problems AF CyberWorx selects can be technical or process oriented and includes cyber operations related challenges and challenges that improve the effectiveness of the service and individual airmen across all warfighting domains. Additionally, AF CyberWorx investigates human-centered design methodologies and how they can be applied to governmental problem sets. AF CyberWorx is seeking solutions centered on advanced algorithmic applications, IoT, mobility, critical infrastructures and advancing user interfaces and experiences.

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5. Digital Humanities Center

The USAFA Digital Humanities Center works to advance research, engage conversation, and develop courses to bridge the perceived gap between STEM disciplines and the humanities in order to champion a human-centric understanding of leadership, technology, and warfare. Interdisciplinary

and cross-institutional in its orientation, the center leverages digital methods to explore and illuminate how people process and document the human experience. Even as the center grows its intellectual and system foundations to support research and coursework across the humanities (for example, in the fields of history, language, religion, and philosophy), faculty and cadets are conducting significant research and completing important projects that focus on better understanding and responding to the human experience as it expressed through literature and art.

Housed in the Air Force Academy's Department of English and Fine Arts, the Digital Humanities Center:

- Nurtures efforts using technology to pursue traditional research and learning in the humanities.
- Encourages innovative use of technology in the creative arts.
- Helps understand how advances in technology influence what it means to be human.
- Offers opportunities to explore how the use of technology expands the potential for scholarship in the humanities.

A current venture is *The Red Badge of Courage* Project, a collaborative effort between computer scientists and scholars at MIT, Hofstra University, and Boise State, led by USAFA faculty with cadets included as significant project partners. This effort has involved the development and application of cutting-edge software to study, annotate, and analyze the original, handwritten drafts of Stephen Crane's canonical work, one of America's most important war novels and one of the nation's most culturally significant texts. During academic year 2017-2018, sixty-two cadets enrolled in the required core literature course and worked with the online software to perform essential primary editing tasks. These tasks included very close examination of the manuscript leaves and correlating them with previous research done by Fredson Bowers, a distinguished bibliographer and textual scholar. The work done by the cadets demanded intense attention to detail, and it began to lay the foundation for scholars who will follow them in coming years.

In addition to the *Red Badge of Courage* project, the Digital Humanities Center also supported cadets engaged in studying cadet creative writing from the 1960s through 2017. The cadets focused their attention on the Academy's creative arts publication *Icarus.* Their idea for this project was sparked by attendance at the Digital Humanities Summer Workshop offered at the University of Victoria during June, 2017. There, under the supervision of English Department faculty members they attended hands-on classes learning how to preserve and examine text using digital research techniques and tools. Their project required them to locate and digitize all editions of *Icarus.* Their immediate goal was to ensure digital preservation of cadet creative writing, but their work went beyond initial preservation. They applied a range of digital tools to perform what digital scholars call a "distant reading" of text. The result of this reading allowed them to develop and test hypotheses about how cadet writing has changed over the years as the Academy itself has matured. Their research was selected for presentation at the Colorado Undergraduate Research Forum.

In addition to participating in original research, center-affiliated faculty work to engage broad conversations about the critical intersections between the humanities and science and technology and with other digital humanities centers and academic disciplines. During summer, 2017, two faculty members affiliated with the center traveled with three cadets enrolled in the Cadet Summer Research Program to the Digital Humanities Summer Institute in Victoria, British Columbia, attending seminars and courses with faculty and students from around the globe as they collaborate in the world's premier program for the digital advancement of the humanities. USAFA's Digital

Humanities Center participated in the first digital humanities symposium for Front Range colleges and Universities.

Other ongoing and completed ventures can be viewed on the Center's website at http://afaDigitalHumanities.com.

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6. Military and Strategic Studies (Center for Airpower Studies)

The Center for Airpower Studies (CAPS) provides virtual and constructive environments for cadet and faculty research and education in air, space, and cyberspace strategy and operations in support of multi-domain warfighting. The CAPS consists of two laboratories, the Cadet Battle Lab (CBL) which provides an environment similar to an Air Operations Center (AOC) for cadets to explore joint warfighting concepts at the operational level of war. The Air Warfare Lab (AWL) houses a variety of educational instruments to include flight simulators and virtual reality learning devices to facilitate cadet education and research at the tactical level of war. The AWL provides these environments for the Department of Military and Strategic Studies, Department of Behavioral Sciences and Leadership, the Department of Aeronautics, and cadet clubs for a variety of education and training experiences. By fall of 2020, the CBL and AWL will be replaced by the Cadet Battle Lab – Next project, evolving our laboratories into an multi-domain air, space and cyberspace facility where cadets and researchers alike will be able to use Live-Virtual-Constructive environments to experience, educate and research the operational and tactical levels of joint airpower. On the horizon in 2021, CAPS' will provide a formal research program, the Future of Airpower Strategy and Technology (FAST), to host, collaborate, and publish research on future air, space, and cyberspace operational concepts, tactics and strategy.

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II. Award Information

The Government reserves the right to award the instrument best suited to the nature of the research proposed. Accordingly, the Government may award any appropriate contract type under the FAR or Non-FAR instruments (i.e., Other Transaction (OT) for research efforts, or grants and cooperative agreements). Terms and conditions will incorporate the FAR, DoDGARs, 2 CFR 1103 (and 2 CFR 1100 series upon implementation), 2 CFR 200 and/or other regulations as required. Offerors should familiarize themselves with these instrument types and the applicable regulations before submitting a white paper/proposal.

It is anticipated that the cumulative amount for awards issued under this BAA will not exceed $99 million dollars. This information is only an estimate and does not obligate the Government in any way. Estimated funding amounts may increase or decrease at any time based on current and future

appropriations. The amount of resources made available to this BAA will depend on the quality of the proposals received and the funds availability. Awards may be proposed for up to five years and may start any time during the fiscal year.

III. Eligibility Information

All responsible, potential applicants from academia and industry are eligible to submit white papers/proposals. USAFA particularly encourages white paper/proposals from small businesses, historically black colleges and universities, minority institutions and minority researchers. However, no portion of this BAA is set aside for a specific group.

There is no set limit to the number of white papers/proposals an institution or organization can submit to this BAA. The amount and period of performance of each selected white paper/proposal may vary depending on the research area and the technical approach to be pursued by the selected Offeror.

White papers and proposals from Federal Agencies, including subcontracting/sub-Non-Federal Entity (NFE) efforts will not be evaluated under this BAA. Federal agencies should contact the Department of Research associated with the given technical area listed in Section I of the BAA to discuss funding through internal Government procedures.

Cost sharing is allowable but not required. IAW 31 U.S.C. 1342, the Government may not accept volunteer services, or employ personal services not authorized by law, except in cases of emergency involving the safety of human life or the protection of property. If potential NFEs propose time or effort to support a particular project under this BAA, all contributions and costs incurred must be quantified as either costs to be charged to the Government, or costs incurred by the NFE (NFE cost share).

IV. Application and Submission Information

a. Internet Address to Request Announcement Package – This announcement may be accessed at Grants.gov and/or beta.sam.gov.

b. Marking of White Papers and Proposals – As previously stated, **USAFA is seeking white papers which do not contain proprietary information.** If proprietary information is submitted, USAFA will make every effort to protect the confidentiality of the proposal and any evaluations. However, under the Freedom of Information Act (FOIA) requirements, such information (or portions thereof) may potentially be subject to release. If protection is desired for proprietary or confidential information, the proposer must mark the white paper and/or proposal with a protective legend found in FAR 52.215-1(e), Instructions to Offerors – Competitive Acquisition, (modified to permit release to outside non-government evaluators and support contractors retained by USAFA. See section V). **It is the offeror's responsibility to notify USAFA of proposals containing proprietary information and to identify the relevant portions of their proposals that require protection. The entire proposal (or portions thereof) without protective markings or otherwise identified as requiring protection will be considered to be furnished voluntarily to USAFA without restriction and will be treated as such for all purposes.** Because the Government anticipates the award of FAR and/or non-FAR-based instruments, this statement is applicable to proposals for all potential instruments.

c. Content and Form of White Paper Submissions

1. **Submission Requirements:** The initial request is for white papers, which minimizes the labor and cost associated with the production of detailed full proposals.

   White papers must be submitted to 10MSG.LGCC@us.af.mil; **they should not be submitted directly to the USAFA Technical POC**. Do not submit white papers through Grants.gov.

2. **White paper Format:**
   - Paper Size – 8.5 x 11 inch paper
   - Margins – 1 inch
   - Spacing – single or double spaced
   - Font – Times New Roman, 10 or 12 point
   - Page Limitation – None; although 3-5 pages is normal. Unnecessarily elaborate white papers are not desired
   - Offerors shall not send .ZIP files or password protected files.

3. **White paper Content:**
   - Cover Page: The Cover Page shall be titled "WHITE PAPER" and include the following:
     - BAA number "USAFA-BAA-2021"
     - Title of White paper that is descriptive of the research to be conducted
     - Center – identify which of the USAFA Research Centers the submission is to be sent to for evaluation
     - Estimated cost of proposed effort
     - Offeror's administrative and technical points of contact, with telephone numbers and email addresses.
     - NFEs must identify their individual and business citizenship, to be consistent with company incorporation and sam.gov registration. This shall be included on the cover page.

   - **Technical Concept:** White papers must briefly describe the proposed research:
     - Objective
     - Length of effort
     - General/technical approach
     - Rough-order of magnitude cost
     - Anticipated outcome
     - Impact of specific research
     - Government/cadet involvement
     - Public purpose.
     - The white paper may also contain any unique capabilities or experience you have (e.g., collaborative research activities involving AF, DoD, or other Federal laboratory).

4. **Evaluation Criteria:** Each white paper which conforms to the regulations listed above will be evaluated by the USAFA Technical POC to determine whether the proposed research appears to advance knowledge in the field, enhance understanding, and provide a direct benefit to the public (defined here as those outside the DoD who are in the public and/or

private sectors). This evaluation will also determine whether the proposed research appears to be of particular value to the USAFA research department.

Subject to funding availability, all white papers will be evaluated under the following four primary criteria, as well as any specific conditions identified in calls posted against the BAA, of equal importance as they are all integral to achieving USAFA objectives, as follows:

- Technical merits of the proposed research
- Potential relationship of the proposed research to the Department of Defense and/or USAFA
- Potential for cadet/Government involvement in the proposed research (cadet/government involvement is preferred; however, each NFE should identify and recommend a level of involvement that best fits their technical approach)
- The proposer's/principal investigator's/team leader's/key personnel's qualifications, capabilities, related experience, facilities, or techniques or a combination of these factors are integral to achieving USAF objectives.

Upon completion of the review, all white papers will be placed in one of three categories. Only white papers that meet agency needs will be funded. A breakdown of the criteria for each category follows:

Category I

- White paper is well conceived
- Scientifically and technically sound
- Pertinent to program goals and objective
- Offered by a responsible offeror
- Competent staff
- Supporting resources.

Category II

- Scientifically or technically sound but requires further development.

Category III

- Not scientifically or technically sound or does not meet agency needs.

Initial Government evaluations and feedback will be issued via formal letter from the USAFA Grants Officer, whether it be a letter denying the white paper for technical or budget reasons, or a RFP for a full Grants.gov proposal submission. For white papers that propose efforts that are considered of particular value but either exceed available budgets or contain certain tasks or applications that are not desired, USAFA may suggest a full proposal with reduced effort to fit within expected available budgets or an effort that refocuses the tasks or application of the effort to maximize the expected public benefit.

d. Content and Form of Invited Full Proposals

1. **Submission Requirements:** Detailed full proposals will be subsequently requested from those offerors whose proposed research projects have met the evaluation criteria listed above. Email notifications and discussions about white papers are not assurances of a subsequent award.

Full proposals must be submitted electronically through Grants.gov using the application template package associated with this BAA. There are several one-time actions your organization must have completed before it will be able to submit applications through Grants.gov. Well before the submission deadline, you should verify the person authorized to submit proposals for your organization has completed those actions. If not, it may take them up to 21 days to complete the actions before they will be able to submit applications.

Your organization must obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, registering with the System for Award Management (SAM) www.SAM.gov (previously Central Contractor Registry, or CCR), registering with the credential provider and registering with Grants.gov.
To apply for grants and other funding opportunities the applicant entity must be registered in SAM. Proposals will not be accepted through Grants.gov or other methods unless the entity is registered in SAM. Registration in SAM now includes the acceptance of Certifications and Assurances. SAM may be accessed at: https://sam.gov.

The Federal Assistance Certifications Report is an attestation that the entity will abide by the requirements of the various laws and regulations; therefore, as applicable, you are still required to submit any documentation, including the SF LLL Disclosure of Lobbying Activities (if applicable), and informing DoD of unpaid delinquent tax liability or a felony conviction under any Federal law.

- Applicants must:
  - Be registered in the System for Award Management (SAM) prior to submitting an application or proposal,
  - Maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or proposal under consideration by an agency, and
  - Provide its DUNS number in each application or proposal it submits to the agency.

Grants.gov Registration - The Grants.gov Organization Registration Checklist at http://www.Grants.gov/web/grants/applicants/grant-application-process.html will guide offerors through the necessary process to register. Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or email: support@grants.gov.

2. **Submitting the Application:** Application forms and instructions are available at Grants.gov. To access these materials, go to www.Grants.gov, select “Apply for Grants.” In the “Download a Grant Application Package” section, enter the funding opportunity number for this announcement (USAFA-BAA-2021). You can also search for the Catalog of Federal Domestic Assistance (CFDA) Number 12.800, for Research Interests of the U.S. Air Force Academy. On the Selected Grant Applications for Download page, click on 'download' under the heading “Instructions and Applications” to download the application package.

   All required forms to be submitted as part of the proposal will be listed as a “mandatory form” in the ‘Instructions and Applications’ section on Grants.gov. Individual calls may have additional requirements; these requirements will be specified in the applicable call.

i. **All Offerors must submit the application using the SF 424 Research & Related (R&R) series forms, which are further outlined in the following sections.**

- **SF 424 R&R:** The SF 424 (R&R) form can be downloaded from the USAFA BAA application package. In Grants.gov, some fields will self-populate based on the BAA selected. Please fill out the SF 424 first, as some fields on the SF 424 are used to auto populate fields in other forms. The completion of most fields is self-explanatory except for the following special instructions:
  Field 1: The Applicant Identifier may be left blank.
  Field 3: The Date Received by State and the State Application Identified are not applicable to research.
  Field 7: Complete as indicated. If Small Business is selected, please note if the organization is Woman-owned and/or Socially and Economically Disadvantaged. If the organization is a Minority Institution, select "Other" and under “Other Specify” note you are a Minority Institution (MI).
  Field 9: List USAFA as the reviewing agency. This field is pre-populated in Grants.gov.
  Field 16: Choose ‘No’ and check 'Program is Not Covered By Executive Order 12372'.
  Attachments: All attachments to all Grants.gov forms must be submitted in PDF format (Adobe Portable Document Format). Grants.gov provides links to PDF file converters.

ii. Registration in SAM now includes the acceptance of Certifications and Assurances.

iii. **R&R Other Forms:** The following other forms must be used for all electronic proposals: R&R Senior/Key Person Profile form, R&R Project/Performance Site Locations form, R&R Other Project Information form, the R&R Budget form and any other forms listed in the “Mandatory Forms” portion of Grants.gov. The R&R Subaward Budget Attachment Form is required when sub-awardees are involved in the effort. Primes should ensure that sub-NFEs’ cost information reflects the same level of detail as the primes’ cost information. The format should follow the Prime’s submission as well. See section 4. Cost Proposal on submissions of the Prime’s budget information.

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

1. **R&R Senior/Key Person Profile Form (Expanded):** Complete the R&R Senior/Key Person Profile Form for those key persons who will be performing the research. The principal purpose and routine use of the requested information are for evaluation of the qualifications of those persons who will perform the proposed research. For the principal investigator and each of the senior staff, provide a short biographical sketch and a list of significant publications (vitae) and attach it to the R&R Senior/Key Person Profile Form. The Degree Type and Degree Year fields on the Research and Related Senior/Key Person Profile (Expanded) form will be used by DoD as the source for career information. In addition to the required fields on

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

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

v. **R&R Project/Performance Site Locations Form:** Complete all information as requested.

vi. **R&R Other Project Information Form: Human Subject/Animal Use, Environmental Compliance and Certifications Regarding Lobbying Activities:**

Human Subject Use. Each proposal must address human subject involvement in the research by addressing Field 1 and 1a of the R&R Other Project Information Form. If Field 1 indicates "Yes," the U.S. Air Force must receive a completed OMB No. 0990-0263 form before a contract, grant, or cooperative agreement may be awarded to support research involving the use of human subjects. Attach the document to the R&R Other Project Information Form. If using Grants.gov, a completed OMB No. 0990-0263 form shall be attached in field 12 of the R&R Other Project Information Form.

Refer any questions regarding human subjects to the Institutional Review Board (IRB) Administrator at: 333-6593 or via email at usafa.irb@usafa.edu.

Animal Use. Each proposal must address animal use protocols by addressing Field 2 and 2a of the R&R Other Project Information Form. If selected for award, additional documentation IAW Air Force standards will be required. Refer any questions regarding animal subjects to Lt Col Chris McClernon, Chair of the USAFA Institutional Animal Care and Use Committee (IACUC) at: (719) 333-4185 or via e-mail at: chris.mcclernon@usafa.edu.

Environmental Compliance. Federal agencies making contract, grant or cooperative agreement awards and NFEs of such awards must comply with various environmental requirements. The National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. Sections 4321-4370 (a), requires agencies to consider the environmental impact of "major Federal actions" prior to any final agency decision. With respect to those awards which constitute "major Federal actions," as defined in 40 CFR 1508.18, federal agencies may be required to comply with NEPA and prepare an environmental impact

statement (EIS) even if the agency does no more than provide grant funds to the NFE. Questions regarding NEPA compliance should be referred to the USAFA INSS Director. USAFA will qualify for a categorical exclusion from the need to prepare an EIS. U.S. Air Force instructions/regulations provide for a categorical exclusion for basic and applied scientific research usually confined to the laboratory, if the research complies with all other applicable safety, environmental and natural resource conservation laws. Each proposal shall address environmental impact by filling in fields 4a through 4d of the R&R Other Project Information Form. This information will be used by USAFA to make a determination if the proposed research effort qualifies for categorical exclusion.

Certifications Regarding Lobbying Activities. Grants and Cooperative Agreement awards greater than $100,000 require a certification of compliance with a national policy mandate concerning lobbying. Applicants shall provide this certification by electronic submission of SF 424 (R&R) as a part of the electronic proposal submitted via Grants.gov (complete Block 17). The following certification applies to each applicant seeking federal assistance funds exceeding $100,000:

(1) No Federal appropriated funds have been paid or will be paid by or on behalf of the applicant, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the applicant shall complete and submit SF-LLL, "Disclosure Form to Report Lobbying," IAW its instructions.

(3) The applicant shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, and cooperative agreements) and that all sub-NFEs shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

vii. Policy Requirements: Any award issued as a result of this announcement is subject to the following administrative, cost and national policy requirements contained therein.

- DoD Grant and Agreement Regulations (DoDGARs 3210.6-R)
- Office of Management and Budget (OMB) Super-circular 2 CFR 200 "Uniform Administrative Requirements, Cost Principles, and Audit Requirement for Federal Awards".

- 2 CFR 1103, “Interim Grants and Cooperative Agreements Implementation of Guidance in 2 CFR part 200”, which will be superseded with 2 CFR 1100 series regulations in FY 2021.

3. Technical Proposal (Research and Related (R&R) Other Project Information Form: Project Narrative)

i. Format:

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single or double spaced
- Font – Times New Roman, 10 or 12 point
- Page Limitation – None, although unnecessarily elaborate proposals are not desirable
- Attachments – submit in PDF format (Adobe Portable Document Format)

ii. Content:

- **Cover Page Should Include:**
  - BAA number “USAFA-BAA-2021”
  - Title of proposal that is descriptive of the research to be conducted
  - Identity of prime NFE and complete list of sub-NFE, if applicable
  - NFEs must identify their individual and business citizenship, to be consistent with company incorporation and sam.gov registration. This shall be included on the cover page.
  - Technical Point of Contact (name, address, phone, email)
  - Administrative/Business Point of Contact (name, address, phone, email)
  - Length of proposed period of performance.

- **Executive Summary: *For grant awards only*** Concise abstract of the proposed research effort. The executive summary provides a brief overview of the proposed program topic, objectives, methodology, and expected results. In addition, the executive summary must state how the principal purpose of the research effort will support or stimulate a public purpose, beyond any benefits to the DoD.

- **Statement of Research Objectives (SRO):** A research description clearly detailing the scope and objectives of the effort and the technical approach. The proposed SRO may be incorporated as an attachment to the resultant award instrument. Thus, full proposals must include a severable self-standing SRO without any proprietary restrictions, which can be attached to the agreement award.

A major portion of the proposal should consist of a clear description of the technical approach being proposed. This discussion should provide the technical foundation/justification for pursuing this particular approach and why one would expect it to enable the research objectives of the proposal. Within the technical approach, include a detailed list of the research tasks/subtasks organized chronologically.

For all types of research, include a concise statement of how the proposed research supports or stimulates a public purpose, rather than providing a specific benefit to

DoD. This public-benefits statement is an important part of the evaluation and award process.

- **Project Schedule and Milestones:** A summary of the schedule of research and reporting activities/milestones. Because the date of award is not known at time of application, we recommend a "month 1," "month 2," format, as opposed to naming specific months and dates.

- **Reports:** The following are sample reports that are typically provided:
  - Technical and financial progress reports, quarterly
  - Presentation materials/deliverables
  - List of all award participants, quarterly and final
  - Technical and financial reports, final
  - Patent report, annual.

- **Management Approach:** A discussion of the overall approach to the management of this effort, including brief discussions of the total organization; responsibilities of the various personnel; project/function/subcontractor/sub-NFE relationships; government research interfaces; and planning, scheduling and oversight practices. Identify which personnel and subcontractors/sub-NFEs (if any) will be involved. Include a description of the facilities that are required for the proposed effort with a description of any Government-furnished equipment (GFE), hardware, software or information required, by version and/or configuration.

- **Offeror Qualifications:** A discussion of previous accomplishments and research by the Offeror institution in this or closely related areas; a discussion of the qualifications and/or resumes or curricula vitae of the proposed Principal Investigator and other key personnel.

- **Current and Pending Project and Proposal Submissions:** Principal Investigators and Key Personnel are required to provide information on all current and pending support for ongoing projects and proposals, including subsequent funding in the case of continuing contracts, grants, and other assistance agreements.

Offerors shall provide information of any related proposal submissions from whatever sources (e.g., USAFA, NPS, Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations).

4. Cost Proposal

i. Format: The offeror **must** use the Grants.gov budget forms (including the SF 24 R&R Budget Form).

The Cost Proposal must include all figures, calculations, and supporting documentation for determining cost *allowability, allocability and reasonableness*. Justifications for costs must be explicitly stated.

In addition to a narrative, Offerors may elect to include as part of their Cost Proposal a spreadsheet showing calculations, unit price, and number of units in more detail than is possible in the required SF Research and Related (R&R) Budget Form. However, inclusion of a more detailed spreadsheet is **not** a substitute for a detailed narrative that explains calculations, justifies inclusion of budget items, and states the basis for the amounts listed.

Estimate the total research project cost. Categorize funds by year and provide annualized budgets for projects lasting more than one year. **Each budget year cannot exceed 12 months** (for example, a 3 year project would consist of 3 separate 12 month budgets). In addition to the Research and Related (R&R) Budget forms available on Grants.gov, the budget proposal should include a budget justification for each year, clearly explaining the need for each item.

ii. Content: Costs proposed must conform to the award-appropriate regulations (FAR vs non-FAR).

The budget narrative must include the following:

Direct Labor: Provide individual labor categories and unburdened direct labor rates (number of total hours and hourly rate must be provided). For persons yet to be identified, provide general tables or schedules by labor category, which labor category will be used and why that labor category is appropriate.

Fringe Benefits: If the rates have been approved/negotiated by a Government agency, **provide a copy of the memorandum/agreement**. If the rates applied have not been approved/negotiated, provide sufficient detail to enable a determination of allowability, allocability, and reasonableness of the allocation bases, and how the rates are calculated according to applicable OMB Circulars or FAR/Defense Federal Acquisition Regulations (DFARS) provisions. Applicable rates must be broken out by each budget year and clearly identify bases used.

Travel: The proposed travel cost should include the following for *each trip:*

- The purpose of the trip/how it supports the research objectives
- Origin and destination, if known (origin is typically known; if destination is unknown, state basis for estimating travel cost)
- Estimated duration
- Number of travelers
- Estimated cost per trip (based on current federal travel regulations).

Subcontractor/Sub-NFE Costs: Submit all subcontractor/sub-NFE proposals and analysis with your cost proposal (See FAR 15.404-3(b), DoDGARs and 2 CFR 200, Sub-NFE Monitoring and Management). If the subcontractor/sub-NFE will not submit cost and pricing information to the offeror, the subcontractor/sub-NFE must submit this information directly to the Government for analysis.

Consultants: Offerors are expected to utilize the services of their own staff to the maximum extent possible in managing and performing the project's effort. If the

need for consultant services is anticipated, the nature of the proposed consultant services must be justified and included in the Technical Proposal.

The Cost Proposal must include the name of the consultant(s), primary organizational affiliation, each individual's expertise, and a breakdown of the consultant's hours, the hourly rate proposed, and any other proposed consultant costs, such as estimated travel costs and per diem rates.

Materials & Supplies: Provide an itemized list of proposed materials and supplies including quantities, unit prices, proposed vendors, and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists). Include supporting documentation for the estimates. Provide a copy of your organization's purchasing policy/processes.

NFE-Acquired Equipment or Facilities: If acquisition of equipment and/or facilities is proposed, a justification for the purchase of the items must be provided. Provide an itemized list of all equipment and/or facilities costs as well as the basis for them and supporting documentation for the estimate (e.g., quotes, prior purchases, catalog price lists). Allowable items would be limited to research equipment not already available for the project. General purpose equipment (i.e., equipment not used exclusively for research, scientific or other technical activities, such as personal computers, office equipment and furnishings, etc.) should not be requested unless they will be used primarily or exclusively for the project. For computer/laptop purchases and other general purpose equipment, if proposed, include a statement indicating how each item of equipment will be integrated into the program or used as an integral part of the research effort.

Other Direct Costs: Provide an itemized list of all other proposed direct costs such as graduate assistant tuition, laboratory fees, report and publication costs, and the basis for the estimate (e.g., tuition schedules, quotes, prior purchases, catalog price lists). In addition to stating the basis for the cost estimates, include supporting documentation where possible.

Indirect Costs (i.e., Facilities and Administrative (F&A), Overhead, General and Administrative (G&A), etc.): Describe the rates and calculation of the costs for each rate category, listing the base on which the rate is applied. If the rates have been approved/negotiated by a Government agency, provide a copy of the memorandum/agreement.

- Non-FAR Instrument- For-Profit Entities: IAW 32 CFR Part 34, for-profit entities are bound by the cost principles located at 48 CFR parts 31 and 231. Additionally, 48 CFR 31.203 (b) states that after direct costs have been determined and charged directly to the contract or other work, indirect costs are those remaining to be allocated to intermediate or two or more final cost objectives. Therefore, if indirect costs are applicable to the federal award being proposed, provide the proposed indirect cost rate and adequate documentation to determine whether the indirect costs are reasonable, allowable, and necessary for the effort.
- Non-FAR Instrument- All other non-Federal Entities: IAW 2 CFR 200.56, indirect (F&A) costs means those costs incurred for a common or joint

purpose benefitting more than one cost objective, and not readily assignable to the cost objectives specifically benefitted, without effort disproportionate to the results achieved. 2 CFR 200.414 requires previously negotiated indirect cost rates to be accepted by the Federal entity. If the non-Federal entity has never received a negotiated indirect cost rate they may elect one of the following options:

- Utilize the de minimis rate of 10% of Modified Total Direct Costs (MTDC) indefinitely
- Utilize the de minimis rate of 10% of MTDC until the non-Federal entity chooses to negotiate a rate, which they may do so at any time
- Elect not to use an indirect cost rate for the duration of the award. This option tends to be utilized by small non-profit entities that have very few federal awards and can directly charge all costs associated with their business to each federal award, consistently and appropriately.

Fee/Profit: Fee/profit is **unallowable** under grants or cooperative agreements at both the prime and sub levels.

NOTE: Failure to adequately provide detailed cost data will require the USAFA Grants Officer to contact the proposing organization for the requisite information. This will result in a delay of the award. All Offerors are required to submit a thoroughly detailed cost breakdown. The USAFA Grant Officer must be able to determine that all proposed costs are allocable, allowable and reasonable. A detailed budget and budget narrative will facilitate this cost analysis.

e. Grants.gov Application Receipt Notices – The applicant's approved account holder for Grants.gov will receive a confirmation page upon completing the submission to Grants.gov. This confirmation page is a record of the time and date stamp that is used to determine whether the proposal was submitted by the deadline. If there is an error, the system sends a rejection email notification to the institution and the institution must resubmit the application package. Applicants can track and are responsible for the status of their application by logging in to Grants.gov.

V. Application Review Information

Proposals submitted under this BAA are evaluated through a peer or scientific review process. If selected for contract award, evaluation will be on a competitive basis according to FAR 35.016(e), Public Law 98-369, Competition in Contracting Act of 1984, 10 USC 2361, and 10 USC 2374. If selected for grant/assistance instrument award, evaluation will use merit-based competitive procedures according to DoDGARs citation of 32 CFR Sec 22.315. In accordance with 2 CFR 200.205, an evaluation of risk posed by applicants is required before they receive Federal awards. This evaluation may incorporate results of the evaluation of the applicant's eligibility or the quality of its application. If the Federal awarding agency determines that a Federal award will be made, special conditions that correspond to the degree of risk assessed may be applied to the Federal award. In evaluating risks posed by applicants, the Federal awarding agency may use a risk-based approach and may consider any items such as the following:

a. Financial stability;

b. Quality of management systems and ability to meet the management standards prescribed in this part;
c. History of performance. The applicant's record in managing Federal awards, if it is a prior NFE of Federal awards, including timeliness of compliance with applicable reporting requirements, conformance to the terms and conditions of previous Federal awards, and if applicable, the extent to which any previously awarded amounts will be expended prior to future awards;
d. Reports and findings from audits performed under Subpart F—Audit Requirements of this part or the reports and findings of any other available audits; and
e. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

Proposals may be evaluated by the appropriate USAFA Research Directors and USAFA Staff, other military services, DoD agencies, civilian agencies and non-Government sources. Non-Government sources can include academia, nonprofit institutions, and support contractor personnel. Non-Government evaluators are authorized access only to those portions of the proposal data and discussions that are necessary to enable them to perform their respective duties. Non-Government evaluators are also required to sign non-disclosure agreements which prohibit them from disclosing proprietary information submitted by contractors. Employees of commercial firms under contract to the Government may be used to administratively process proposals and may gain access to proprietary information contained in proposals and/or post award documentation. These support contracts include non-disclosure agreements prohibiting their contractor employees from disclosing any information submitted by other contractors. Subject to funding availability, all other proposals will be evaluated under the following six primary criteria, of equal importance, as follows:

a. Technical merits of the proposed research;
b. Potential relationship of the proposed research to the DoD and/or USAFA;
c. Potential for cadet/government involvement in the proposed research (cadet/government involvement is preferred however each NFE should identify and recommend a level of involvement that best fits their technical approach);
d. The proposer's, principal investigator's, team leader's, or key personnel's qualifications, capabilities, related and past experience, facilities, or techniques or a combination of these factors are integral to achieving USAF objectives;
e. The likelihood of the proposed effort to develop new research capabilities and broaden the research base in support of U.S. national defense.

Following the evaluation, proposals will be placed in one of three categories. Category I proposals will be funded as possible, Category II proposals would only be funded following those in Category I and proposals considered to be Category III will not receive funding.

Category I
- Proposal is well conceived
- Scientifically & technically sound
- Pertinent to program goals and objective
- Offered by a responsible offeror
- Competent staff
- Supporting resources.

Category II

- Scientifically or technically sound but requires further development.

Category III

- Not scientifically or technically sound or does not meet agency needs.

Offerors must indicate in their proposal, unless a match is required, if they are "not willing or able to cost share" or "able to cost share and/or offer these facilities/equipment/etc."

Further, be advised as funds are limited, otherwise meritorious proposals may not be funded. Therefore, it is important that proposals show strength in as many of the evaluation areas as practicable for maximum competitiveness.

The technical and cost information will be analyzed simultaneously during the evaluation process. The AF reserves the right to select for award any, all, part or none of the proposal received.

VI. Award Administration Information

a. Award Notices – Should your proposal be selected for award, the Contracting/Grants Officer will receive correspondence from the Department/Center/Institute/Director stating this information. At that point, your business office will be contacted by the Grants/Contracting Officer to negotiate the terms of your award.

b. Reporting Requirements – The awards written against this BAA typically require quarterly and/or annual and final technical reports, financial reports, prototype deliverables, annual patent reports and closeout activities/documents. Additional deliverables may be required based on the research being conducted, as well as the nature and source of funding. Failure to comply with terms and conditions of any federal awards, to include delinquent reports and close out information may deem an offeror ineligible for current and future awards.

c. Ombudsman –

1. 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 Program Officer or Contracting Officer. The ombudsman may refer the party to another official who can resolve the concern.
2. Before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the Grants or Contracting Officer for resolution. Consulting an ombudsman does not alter or postpone the timelines for any other processes.
3. If resolution cannot be made by the Grants/Contracting Officer, concerned parties may contact the USAFA Ombudsman: Mr. James Anderson, Director (HQ USAFA/PK). Telephone: (719) 333-3829. Email: James.Anderson.72@us.af.mil. Concerns, issues, disagreements and recommendations that cannot be resolved at the USAFA level may be brought by the concerned party for further consideration to the U.S. Air Force Pentagon, Washington DC 20330-1060, phone number (703) 588-7004.
4. The ombudsman has no authority to render a decision that binds the agency.
5. Do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the Grants/Contracting Officer.

d. Reporting Subawards and Executive Compensation – Any assistance award resulting from this announcement may contain the award term set forth in 2 CFR Part 25 and 2 CFR Part 170.

e. Additional Subcontract /Subaward Reporting Requirements – The Federal Funding and Transparency Act and 27 Aug 2010 OMB memo, "Federal Spending Transparency and Subaward and Compensation Data Reporting" require that as of 1 Oct 10 awardees of contracts and NFEs of grants have been required to report Executive Compensation and First-Tier Subcontract/Sub-NFE Awards for any contract valued at $30,000 or grant valued at $25,000 or more excluding classified contracts or contracts/grants with individuals.

f. Payment Process – The USAFA does not set up automatic payments for NFEs. Therefore, all NFEs must access Wide Area Workflow (WAWF) and complete WAWF's Standard Form (SF) 270, Request for Advance or Reimbursement, for payment. Each NFE must register with WAWF at https://wawf.eb.mil.

g. Post-Award Surveillance- When applicable, post-award delegated offices out of DCMA or ONR will perform routine surveillance in partnership with USAFA GO to ensure proper performance measures are being met under the award. This includes technical reports, invoice audits, reviews of financial management systems and reporting accuracy. More detailed information will be provided in the negotiation stage of award, when risk determinations are made.

*** End of BAA Announcement ***