

BROAD AGENCY ANNOUNCEMENT
USAFA-BAA-2015
Research Interests of the United States Air Force Academy (USAFA)

TWO-STEP CALL ANNOUNCEMENT (CALL) 0007

FEDERAL AGENCY NAME: The United States Air Force Academy (USAFA), Center for Aircraft Structural Life Extension (CAStLE)

BROAD AGENCY ANNOUNCEMENT TITLE: Research Interests of the United States Air Force Academy

BROAD AGENCY ANNOUNCEMENT NUMBER: USAFA-BAA-2015

BROAD AGENCY ANNOUNCEMENT TYPE: This is the initial announcement.

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: 12.800

CALL ANNOUNCEMENT TITLE: Research of Technologies Advancing Corrosion Prevention and Control

CALL ANNOUNCEMENT (CALL) NUMBER: 0007

TECHNICAL POINT OF CONTACT: The technical point of contact for this CALL as outlined in the baseline BAA, Section I - Funding Opportunity Description (a)(8), Engineering Mechanics (Center for Aircraft Structural Life Extension) Research Center is:

Dr. Gregory A. Shoales, P.E., Director,
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Center for Aircraft Structural Life Extension (CAStLE)
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CONTRACTING POINTS OF CONTACT: The contracting points of contact for this CALL are:

Grants/Agreements Specialist:

Mr. Christian Cornell, 10 CONS/PKC
United States Air Force Academy, CO
Phone: 719-333-8042

Grants/Agreements Officer:

Ms. Chelsea A. Huff, 10 CONS/PKC
United States Air Force Academy, CO
Phone: 719-333-4899

BAA Email: 10MSG.LGCC@us.af.mil

BACKGROUND: The USAFA is seeking unclassified research white papers and proposals that do not contain proprietary information. If proprietary information is submitted it is the offerors' responsibility to mark the relevant portions of their proposal as specified in USAFA-BAA-2015. CASTLE performs a range of structural integrity research tasks in support of multiple Government, academic and commercial sponsors. Among these pursuits, CASTLE engages in a wide range of corrosion engineering and material science research efforts, with more emphasis on applied research, and that part of development not related to a specific system or hardware procurement.

Current CASTLE research strengths include: high temperature materials development; advanced barrier coatings; static strength, static stability design, corrosion modeling, prevention and control; validation testing, analysis and methods development; computational structural and fracture mechanics; failure analysis, flight data acquisition system development, installation, maintenance and data analysis; structural risk analysis, and support of the USAF Aircraft Structural Integrity Program (ASIP). The interaction between corrosion and cracking damage mechanisms and their effect on the structural integrity has been a long-standing interest of CASTLE. There is Department of Defense (DoD) level interest in material degradation in structures—to include corrosion, cracking and other service-related damage mechanisms. The DoD level material degradation interest is the subject of this CALL, while also serving a dual public purpose.

This CALL is focused on fundamental research that can lead to the future development of capabilities to prevent and control corrosion and degradation of materials and the structures of systems and facilities. The ultimate goal of these capabilities is reducing costs, improving availability of systems and increasing the safety of military assets, which serve a dual interest in public structures and facilities. Projects must be new research efforts. Proposals for the continuation of existing research projects funded under previous grant or cooperative agreement awards are not desired. Collaboration among proposing institutions is strongly encouraged.

Specific research areas of interest include the following *Corrosion Investment Categories* along with their associated problem statements and focus:

Corrosion Investment Categories:

Performance Prediction

- Problem Statement: Inability to accurately predict corrosion performance drives maintenance costs and disrupts schedules. This is complicated by implementation of new materials and processes (e.g. non-chrome coatings, additively-manufactured components). Focus is to accurately predict corrosion in DoD systems via validated methods; these predictions and solutions will be mirrored in applicability to the public sector.

Real-Time Condition Assessment

- Problem Statement: Methodologies and techniques for assessment of corrosion related systems health are not sufficient to integrate with maintenance and repair strategies, especially based on conditioned and reliability centered approaches. Focus is to assess corrosion health of systems and infrastructure to integrate with maintenance strategies.

Advanced Materials and Processing

- Problem Statement: Materials selection/materials substitution decisions are difficult due to the desire to optimize competing trade factors (cost, availability, safety, performance, etc.); widely-varying and sometimes unanticipated operational environments; and regulations restricting use of

hazardous materials and processes. Focus is to investigate new materials that can handle diverse environments while meeting environmental/health regulations.

Product Support

- Problem Statement: DoD's \$20+B/year cost of corrosion is largely seen in product support. Improved, training, logistics/supply and transition of technology and tools for inventory storage & handling and maintenance are necessary to avoid these high recurring costs. Focus is to reduce corrosion as a maintenance cost and availability driver. Those tactics and efforts that are valuable to the DoD will also serve as valuable to industry, as degradation of public systems is increasingly prevalent.

REQUIREMENT DESCRIPTION: The United States Air Force Academy is soliciting white papers for research under **Section I - Funding Opportunity Description (a) (8), Engineering Mechanics (Center for Aircraft Structural Life Extension) of the Broad Agency Announcement USAFA-BAA-2015 updated on 31 October 2018** specifically for Research of Technologies Advancing Corrosion Prevention and Control.

THIS WILL BE A TWO-STEP CALL ANNOUNCEMENT.

ELIGIBILITY INFORMATION: In accordance with USAFA-BAA-2015 through Amendment 0004, all responsible, potential applicants from academia and industry are eligible to submit white papers. USAFA particularly encourages white papers 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.

Responses from Federal Agencies, including subcontracting/sub-recipient 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 the internal Government procedures.

FIRST STEP: WHITE PAPERS

WHITE PAPER SUBMISSION FORMAT REQUIREMENTS:

1. White papers submitted in response to this CALL shall conform to the requirements found in USAFA-BAA-2015, Section IV(c)(1).
2. White papers submitted for consideration under this CALL shall conform to a 5 page limit which includes the *White Paper Submission Abstract Summary*.
3. Letters of endorsement and/or statements of support from organizations not directly involved in the proposal may be included with the *White Paper* submittal. If included these endorsement letters/support statements are not included in the *White Paper* 5-page limit.
4. All white papers **shall** begin with the *White Paper Submission Abstract Summary* as defined below, which states the project title, the corrosion investment category addressed, the potential customer, planned collaborations, student involvement, period of performance and budget.

IMPORTANT: White papers which do not begin with the required abstract summary as specified below or exceed the 5 page limit **shall** be removed from consideration for the Second Step.

Required White Paper Submission Abstract Summary template:

1. **Project Title:** *Succinct descriptive title of proposed research.*

2. **Corrosion Investment Category addressed:** *Specify which Corrosion Investment Category, as defined in this CALL document, is addressed by the proposed project.*
3. **Potential Impact/Benefit:** *What capability (technology, process or other research products) will successful execution of this project bring to DoD? To the general public?*
4. **Potential Customer:** *What DoD agency(ies) or DoD system(s) is(are) expected to benefit from the products of the proposed project? How can this transfer to a public purpose?*
5. **Collaborations:** *Specify planned collaborations with other universities, DoD organizations or corporations if applicable. Specify current existing DoD collaborations, if applicable.*
6. **Student Involvement:** *If applicable, briefly summarize the number of students impacted by the proposed research project and the level of impact. (For example; research project for 2 PhD students, capstone projects for team of 3-4 undergraduate students, and 1 summer co-op opportunity.)*
7. **Period of Performance and Budget:** *Time to execute from award and total project cost. Project may not include funding for DoD or other Government organizations which may be related to the proposed project.*

WHITE PAPER DUE DATE AND TIME: The due date for white papers submitted in response to this CALL is no later than 1630 MST on 19 February 2019. White papers received after the due date and time shall be governed by the provisions of FAR 52.215-1(c)(3). ****Please note: It is the responsibility of the submitting organization to ensure white papers have been received by the USAF Academy. If you do not receive a confirmation email within 48 hours of submitting your white paper, it is your responsibility to contact the contracting office to ensure receipt. Failure to do so may result in a late white paper. White papers not received on time will NOT be processed.***

WHITE PAPERS ARE TO BE E-MAILED TO:

10 CONS/PKC

Attn: Christian Cornell

8110 Industrial Drive, Ste #200

United States Air Force Academy, CO 80840

Email: 10MSG.LGCC@us.af.mil

WHITE PAPERS SHOULD ADDRESS ANY OR ALL OF THE OBJECTIVES FOUND IN THIS CALL.

White papers may be submitted for one or more topics or for a specific portion of one topic. A proposer may submit separate white papers on different topics or different proposals on the same topic. The U.S. Government does not guarantee an award in each topic area. Further be advised, as funds are limited, otherwise meritorious white papers may not be funded. Therefore, it is important that white papers show strength in as many of the evaluation areas as practicable for maximum appeal.

WHITE PAPERS EVALUATED AND SELECTED: Full proposals will be requested from those white papers receiving the highest evaluations, in accordance with USAFA-BAA-2015. This process starts with a panel review of white papers. After the review, each paper will be placed in one of three categories. Category I papers will be funded as funds are available, Category II papers would only be funded following those in Category I and papers considered to be Category III will not receive funding. Offerors whose white papers are not of interest to the Government will be notified via letter.

These factors, while not indicators of the Applicant's merit, e.g., technical excellence, cost, applicant's ability, etc., may be essential to the process of selecting the application(s) that, individually or collectively, will best achieve the program objectives. Such factors are often beyond the control of the applicant. Applicants should recognize that some very good applications may not receive an award because they do not fit within a mix of projects which maximizes the probability of achieving the USAFA's overall research and development objectives. Therefore, the following Program Policy Factors may be used by the Evaluation Team to assist in determining which of the ranked application(s) shall receive USAFA funding support. The selection official may consider the following Program Policy Factors in the selection process:

1. It may be desirable to select research projects for award that represent a diversity of research technology concepts and applications, crossing all of the Areas of Interest specified in this CALL.
2. It may be desirable to select research projects for award of less technical merit than other projects, if such a selection will optimize use of available funds by allowing more projects to be supported while not being detrimental to the overall objectives of the program.
3. It may be desirable to select research projects for award that have greater technical merit than all proposals in a specified Corrosion Investment Category. There is no commitment to fund all Corrosion Investment Categories indicated.
4. It may be desirable to select research projects for award that display collaboration with other potential recipients such as for-profit, non-profit, and universities with research supported through this CALL or previous awards which support the Technical Corrosion Consortium (TCC). Attachment 1 summarizes current TCC projects, and includes applicable research award recipient, Principal Investigators and/or point of contact, and current end of award/project date.
5. It may be desirable to select research projects for award that support and collaborate with US Military service, as demonstrated by supporting documentation such as a 1-page letter of support and expected collaboration from a representative of a US Military service or US Military laboratory. The 1-page letter of support may be attached to the white paper and will not count against the 5-page limit.

SECOND STEP: PROPOSALS

INTENT TO PROPOSE: Should potential offers receive a formal request for proposal, they are requested to advise the Grants Officer point of contact (by e-mail) if they intend to submit a proposal. Such notification is merely a courtesy and is not a commitment by the offeror to submit a proposal.

PROPOSAL INSTRUCTIONS: Offerors are requested to follow the instructions within the baseline BAA, USAFA-BAA-2015 on how to submit a proposal. All proposals must be submitted through Grants.Gov, <https://www.grants.gov> and must include all the required forms specified within the baseline BAA.

REGISTRATION REQUIREMENTS: Prospective Awardees shall be registered in the System for Award Management (SAM) database prior to award, during performance, and through final payment of any award resulting from this announcement. Offerors may obtain information on registration and annual confirmation requirements via the Internet at www.sam.gov or by calling 1-866-606-8220.

ANTICIPATED FUNDING: The total anticipated funding for the total cumulative amount of all awards made as a result of this CALL is \$0-\$2M. All funding is subject to change at the Government's discretion and availability as well as technical needs.

ANTICIPATED NUMBER AND TYPE OF CONTRACTS/INSTRUMENTS: The Government anticipates awarding 0-4 Cooperative Agreements as a result of this CALL but reserves the right to award the instrument best suited to the nature of research proposed including a Grant, Cooperative Agreement, or Procurement Contract. Potential offerors are reminded that in accordance with 32 CFR Part 22.205, a fee or profit may not be paid to the recipient of a Cooperative Agreement or Grant.

PERIOD OF PERFORMANCE: The anticipated period of performance for awards resulting from this CALL is up to 4 years per award, depending on the proposed effort.

PROPOSAL DUE DATE AND TIME: The due date for proposals will be 30 days after a formal request for proposal has been sent to the submitter of the selected white paper(s). Proposals for any other technology area identified in the baseline BAA will not be accepted under this CALL. **Proposals received after the due date and time shall be governed by the provisions of FAR 52.215-1(c)(3).**

ANTICIPATED AWARD DATE: September 2019

CALL AMENDMENTS: Offerors should monitor **Grants.gov** <http://www.grants.gov> and **Federal Business Opportunities** <https://www.fbo.gov/> for any additional notices to this CALL that may permit extensions to the white paper submission date or otherwise modify this announcement.

APPLICABILITY OF BASELINE BAA: All requirements of USAFA-BAA-2015 apply unless specifically amended and addressed in this CALL. For complete information regarding USAFA-BAA-2015, refer to the initial opened-ended BAA as amended. It contains information applicable to all CALLS issued under the BAA and provides information on the overall program, proposal preparation and submission requirements, proposal review and evaluation criteria, award administration, agency contacts, etc. Direct questions may be addressed to the points of contact identified above.

ATTACHMENT 1: Current TCC Projects/Active Cooperative Agreements

Performing Entity	Research Topic	Principal Investigator/POC	Current End Date
University of Southern Mississippi	Establish, Quantify, and Understand the Origins and Pathways for Performance Attainment, Retention, and Loss in Polymer-Based Corrosion Control Coatings	James Rawlins	August 2019
University of Virginia	Role of the Organic Topcoat in Mitigating Elemental Mg Conversion/Depletion in MgRp During Exposure and Residual Scratch Protection Mechanisms Afforded by Oxidized Mg Compounds	John Scully	September 2019
University of Virginia	Accelerated Evaluation Methods for Galvanically-Induced Intergranular Corrosion Susceptibility of Sensitized Marine Al Alloys Under Atmospheric Conditions	Robert G Kelly, William Golumbskie	September 2019
University of Virginia	Predicting and Controlling Cracking Interaction Effects on Structural Integrity	James Burns	September 2019
University of Akron, NCERCAMP	Inert Atmospheric Plasma Polymerization (IAP) for Improved Corrosion Protection	Ali Dhinojwala, Mark Foster	September 2019
University of Akron, NCERCAMP/USMA	Mathematical Modeling of Pitting in Aluminum	Gerald Young	September 2019
Pennsylvania State University	Low-cost, conformal applique for evaluating paint degradation and substrate corrosion in hard-to-access spaces	Barbara Shaw	February 2021
University of Hawaii	Modeling, Validation, and Application of Finite Element Models for the Galvanic Corrosion of Aluminum Coupled to Non-Passivating and Passivating Alloys	Lloyd Hirara	January 2022
University of Alabama	Assessing and Enhancing Corrosion Performance of Additive Repairs Produced by Cold Gas Dynamic Spray Deposition	Luke Brewer	January 2022
Ohio State University	Quantification and Prediction of Environment Assisted Cracking Failure in Atmospheric Corrosion Environments	Jennifer Locke	May 2022
University of Virginia	Metal Rich Primers to Mitigate Multiple Forms of Corrosion Including Environmental Cracking for High Performance Alloys	John Scully	May 2022