

Department of Defense

DoD STEM

Science • Technology • Engineering • Mathematics



Defense Science, Technology, Engineering, and Mathematics (STEM) Education Consortium (DSEC) Opportunity Day

Dr. Jagadeesh Pamulapati, Director, Laboratories Office

Office of the Under Secretary of Defense for Research & Engineering

Agenda

0900-0910: Opening Remarks and Introductions

0910-0950: DoD STEM Overview

0950-1030: Cooperative Agreement Overview

1030-1100: Break

1100-1200: Q&A Panel

Points of Contact

- **Office of the Under Secretary of Defense (Research and Engineering) (USD(R&E))**
 - **Dr. Jagadeesh Pamulapati, Director, Laboratories Office & STEM Development Office**
 - **Dr. Syed Shah, Deputy Director, Laboratories Office & STEM Development Office**

- **Army Contracting Command – Research Triangle Park (ACC-RTP)**
 - **Mr. Tylar Temple, Cooperative Agreement Manager (CAM)**
 - **Mr. Camilo Asuncion, DoD Grants Specialist**

OVERVIEW OF DOD STEM

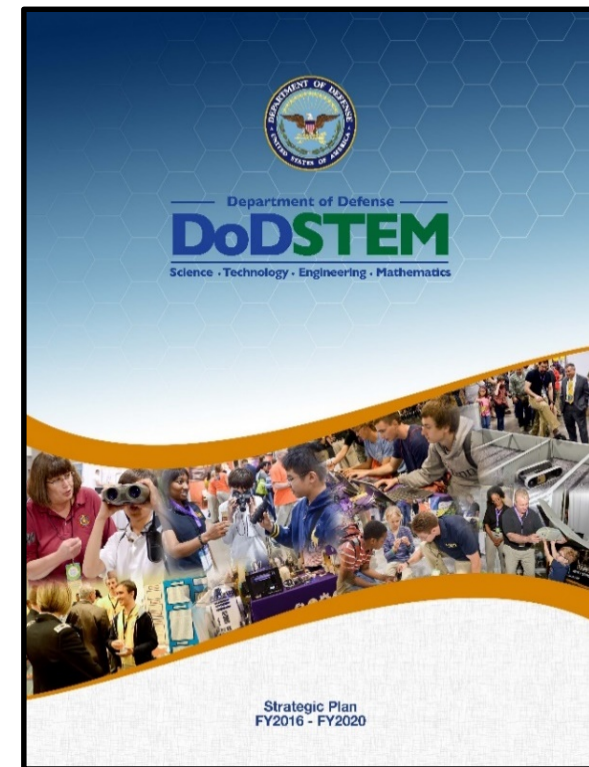
DoD STEM Strategic Plan

In alignment with the Federal plan, the Department's STEM Strategic Plan collectively addresses critical STEM challenges as a national priority through communication, talent inspiration and cultivation, and diversity emphasis using evidence-based approaches.

This Department-wide strategic plan is an overarching framework that is driven by the Federal priorities with a focus on developing education and outreach initiatives that are unique to DoD's mission, needs, and resources and required to build the Force of the Future needed to serve and defend our Nation.

GOALS:

- **COMMUNICATE** the value and purpose of the DoD STEM Strategy and the need for engagement.
- **INSPIRE** youth and community engagement in STEM education and outreach in the K-12 domain by supporting and enhancing student and educator participation in DoD-sponsored STEM events.
- **CULTIVATE** the future STEM talent pool through supporting and enhancing undergraduate and graduate students served by DoD-sponsored STEM programs.
- **PROMOTE** increased participation of underserved groups in STEM activities and education programs.
- **ENHANCE** the efficiency and effectiveness of STEM initiatives by gathering evidence using a systematic approach.



National Defense Education Program



VISION AND MISSION Create a STEM talent pool with minds for innovation, diversity of thought, and the technical agility to sustain the Department's competitive edge. Attract, inspire, and develop exceptional STEM talent across the education continuum to enrich our current and future DoD workforce to meet defense technological challenges

PROGRAM GOALS

- Build a highly-qualified STEM workforce in mission critical areas: SMART
- Enhance the preparation of dependents of our Armed Forces for careers in STEM: Military Child Pilot Program
- Provide education and outreach programs and activities that build the pipeline
- Promote increased participation of underserved and underrepresented groups
- Communicate the value of STEM investments as a critical enabler to the DoD mission

PROGRAM PARTNERS

- DoD Components: Services and 4th Estate
- Federal agencies: NSF, ED, Smithsonian & others
- Federally-Funded Research & Development Centers
- Industry, Non-profits and State/Local Education Activities



OSD PROGRAM Requires coordination, policy, and oversight of Defense-wide STEM education, outreach, workforce development programs and initiatives as well as execution of joint Service and Agency activities

Shaping our Future Force to Ensure Technological Superiority

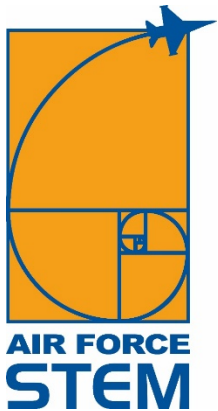
DoD STEM Components



- **AEOP:** A diverse, agile, highly competent STEM talent pool, representative of our nation's demographics to supply the Army, DoD, and the Nation's workforce.



- **Naval STEM:** The Department of the Navy (DoN) aims to foster and cultivate a diverse, world class STEM workforce in order to maintain the U.S. Navy and Marine Corps' technological superiority.



- **Air Force:** Increase the local STEM talent pool by exposing as many students and influencers as possible, including those underrepresented in STEM, to Air Force STEM expertise, technical facilities/equipment and STEM concepts through various local STEM outreach activities. Leverage research work assignments, fellowships, and university grants.

DoD STEM OSD Program Efforts

Program	Overview
	<p>Service-DoDEA school partnership that reaches students of all backgrounds, specifically military dependents, in after-school robotics programs. The DoD program was established in 2009 with 49 teams, but NDEP sponsored sites, teams, DoD volunteers and students has increased.</p>
	<p>Programs for U.S. middle-school students of all ability levels to build confidence and improve attitudes towards math and problem solving.</p>
	<p>CEE/RSI sponsors high achieving US high school seniors at a one-of-a-kind STEM research experience at MIT. DoD “Rickover” Internship places alumni of RSI and USA Biology Olympiad majoring in STEM at top tier US colleges or universities in DoD Labs for summer internships.</p>
	<p>DoD’s partnership with NMSI includes a significant focus on developing and providing further access to advanced placement (AP) programs Through its College Readiness Program, NMSI reaches inside high schools in locations with military-connected students to increase the number of students taking and earning qualifying scores on AP math, science, and English exams. This includes teacher support, student support, school support, and awards.</p>
	<p>USA Science and Engineering Festival is America’s largest K-12 STEM Education & Workforce Development Festival. Over 1,000 science and engineering organizations participate, providing 3,000+ hands-on activities and 50+ stage shows.</p>

COOPERATIVE AGREEMENT OVERVIEW

Difference Between a Contract, Grant, and Cooperative Agreement

Contract: legal instrument reflecting a relationship between the United States Government and a State, a local government, or other recipient when— **(1)** the principal purpose of the instrument is to acquire (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government; or **(2)** the agency decides in a specific instance that the use of a procurement contract is appropriate.

Grant: legal instrument reflecting a relationship between the United States Government and a State, a local government, or other recipient when— **(1)** the principal purpose of the relationship is to transfer a thing of value to the State or local government or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government; and **(2)** substantial involvement is not expected between the executive agency and the State, local government, or other recipient when carrying out the activity contemplated in the agreement.

Cooperative Agreement: legal instrument reflecting a relationship between the United States Government and a State, a local government, or other recipient when— **(1)** the principal purpose of the relationship is to transfer a thing of value to the State, local government, or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government; and **(2)** substantial involvement is expected between the executive agency and the State, local government, or other recipient when carrying out the activity contemplated in the agreement.

Cooperative Agreement Funding

- The projected scope of the cooperative agreement is approximately \$75 million over the course of five (5) years.

Years	Amount
Base Year	Up to \$15,000,000
Option Year 1	Up to \$15,000,000
Option Year 2	Up to \$15,000,000
Option Year 3	Up to \$15,000,000
Option Year 4	Up to \$15,000,000
Estimated Total	Up to \$75,000,000

5 Fundamental Elements

- 1) Consortium Management**
- 2) Program Evaluations: Data Collection, Analysis and Reports**
- 3) Outreach/Communications**
- 4) STEM Alumni Management**
- 5) Strategic Outreach Initiatives**

Fundamental Element 1

Consortium Management:

- **The Recipient will lead the Consortium to ensure fundamental elements are focused on planning and executing programs in alignment with STEM priorities and goals as outlined in the DoD STEM Strategic Plan.**
 - Foster an open, collaborative environment to achieve the Government's priorities and objectives.
- **The Recipient will be responsible for planning Consortium Management Committee (CMC) Meetings, submitting consolidated Consortium-wide deliverables, conducting program evaluation and overall outreach and communications efforts.**
 - Will distribute funding to all Consortium members.
 - Can only administer / manage Fundamental Element 1.
- **The organizational framework of the Consortium should be efficient and flexible with defined areas of responsibility among the Consortium Members.**
 - Applicants should identify management tools and mechanisms in their application, but also justify and demonstrate the benefit and cost effectiveness of these management activities.

Fundamental Element 1

Consortium Management Cont'd:

- The Applicant is to assemble a qualified team of organizations that have expertise and a proven track record in the areas required to successfully manage and implement fundamental DoD STEM elements described in this announcement. **These members each must be an “eligible entity” as defined at 10 USC §2192(b)(3) which includes a State, a political subdivision of a State, an individual, and a not-for-profit or organization in the private sector.**
 - o The following requirements must be addressed:

Cooperative Agreement Manager (CAM)	Annual Program Review (APR)
Consortium Chair (CC)	Quarterly Reviews
Individual Program Administrator (IPA)	Insurance
Local Program Coordinator (LPC)	Compliance
Cooperative Management Committee (CMC)	Program Promotion
Articles of Collaboration	Metrics
Annual Program Plan (APP)	

Fundamental Element 2

Program Evaluations: Data Collection, Analysis, and Reports:

- **Aligned with the Federal Strategic Plan and the DoD STEM Strategic Plan, the Government requires the evaluation of all DoD STEM programs based on specific metrics and evidence-based approaches to:**
 - Achieve key objectives of DoD outreach;
 - Increased efficiency and coherence;
 - Ability to share and leverage best practices; and
 - focus on DoD STEM priorities and core objectives.
- **The Government requires the incorporation of mid to long-term impacts of STEM alumni that previously participated in STEM programs.**
 - Periodic program effectiveness through an external third party evaluator may be appropriate.
- **The Recipient is responsible for ensuring a cohesive and coordinated evaluation strategy across all elements of the STEM programs. A centralized evaluation is required to satisfy key Federal guidelines for rigorous evaluation, in that it:**
 - Is conducted by capable professionals who are external to program administrators and their institutions, to assure confidence in the objectivity of the evaluation.
 - Strives to (1) assess whether programs are making satisfactory progress toward STEM program objectives; (2) recommend reasonable, evidence-based adjustments to programming; and (3) provide indications of potential program effects.
 - Employs study- designed methods that are appropriate, aligned to the evaluation objectives and data assessment tools, and account for the varying developmental stages of STEM programs and objectives.

Fundamental Element 2

Program Evaluations: Data Collection, Analysis, and Reports:

- **Program Evaluations: The Consortium will be responsible for developing and managing the program evaluations to include design and instrumentation, data collection and analysis, and the generation of annual evaluation reports.**
 - The DoD website, and proposed application and survey tools will be used as the primary method to collect data from STEM program participants.
 - The Consortium is responsible for assuring that complete and accurate participant data are reflected in the data collection and program evaluations.
 - The Consortium should include in their application the types of quantitative and qualitative data from students, teachers, mentors, and other participants in their individual program(s) it plans to collect.
 - The Recipient is responsible for guiding evaluation efforts, including collection, synthesis, interpretation, reporting of data, and overall development of the evaluation strategy.

Fundamental Element 2

Program Evaluations: Data Collection, Analysis, and Reports:

- The application should address the following near, mid, and long term outcomes and impacts:

Near Term Outcomes	Mid and Long-term Impact
<ul style="list-style-type: none">• Increased student interest and engagement in STEM (formal and informal)• Increased participant STEM competencies (STEM skills, knowledge, abilities, and confidence)• Increased participant awareness of, and interest in, DSEC opportunities• Increased participant awareness of, and interest in, STEM research and careers• Increased participant awareness of, and interest in, DoD STEM research and careers• S&E Mentors' impact on DSEC participants• Changes in teacher approaches to teaching about STEM concepts, practices, and careers in their classrooms• Implementation of evidence-based recommendations to improve programs	<ul style="list-style-type: none">• Sustained student appreciation of STEM and DoD STEM• Increased student pursuit of DSEC opportunities and DoD workforce development programs• Increased student pursuit of STEM coursework in secondary and post-secondary schooling• Increased student pursuit and achievement of STEM degrees• Increased student pursuit and achievement of STEM careers• Increased student pursuit and achievement of DoD STEM careers• Continuous improvement and sustainability of the DSEC

Fundamental Element 3

Outreach / Communications:

- **Primary Objective:** To promote DoD STEM as a coordinated and cohesive effort offering students and teachers a pipeline of STEM educational opportunities, sparking an early interest in STEM subjects by providing hands-on learning, and maintaining that interest through STEM competitions, summer enrichment activities, and competitive apprenticeships.
- **Should be designed to influence:** K-College students, educators and other key stakeholders
- **The application should consist of the following:**
 - Sufficient number of personnel with appropriated skills
 - How applicant intends to synchronize and coordinate with IPAs to ensure successful communication efforts amongst Consortium.
 - Maintenance plan for DoD STEM website (dodstem.us)
 - Plan on communicating DSEC milestones and successes
 - Media relations and outreach campaign
 - Management of DoD STEM blog
 - DoD STEM Social media campaign
 - Implementation of DoD STEM calendar of events

Fundamental Element 3

Outreach / Communications:

- **The Recipient will coordinate with the CAM to:**
 - Develop, manage, and execute the annual strategic communications plan and vision (in coordination with the DoD and IPAs that aligns with DoD STEM objectives and priorities);
 - Develop, manage, and execute an annual communications schedule/editorial calendar (in coordination with DoD and IPAs; based on program year);
 - Plan, manage, and execute an integrated Social Media Strategy; and
 - Establish a communication infrastructure that is efficient and scalable to strengthen DoD STEM's engagement with target audiences across multiple platforms integrating the website, traditional and social media channels.

- **Applicant should detail the process in which the purchase and contracting of services, items, and collateral required to support the outreach and communications plan, including:**
 - Graphic Design Services
 - Web Design Services
 - Print/Press Production
 - Promotional Materials/Informational Items
 - Outreach Suite/Memberships
 - Video Production Services
 - Web Domain Fee and Maintenance

Fundamental Element 4

STEM Alumni Management:

- **DSEC programs and partnerships will generate a large pool of talented, highly-skilled STEM alumni.**
 - STEM alumni management efforts will capitalize on the outcomes and successes of its programs, which can most effectively be accessed and shared through its alumni network.
 - These management efforts will provide the Government a way to access, connect, exchange, and share information that is relevant to current and future DoD STEM generations.
- **STEM Alumni Management:** The Recipient will work with the Government to develop a strategy and tactics that will establish and grow the STEMs alumni database.
 - Develop innovative approaches to developing alumni network.
- **STEM Alumni Study:** The Applicant should include a proposed study with alumni to ascertain the current status, achievement, attitudes, and future aspirations of STEM alumni, and assess the extent to which alumni perceive their participation in a STEM program as contributing to these factors.
 - Evaluate success in achieving longer term objectives through assessing mid- and long-term outcomes.
 - Infrastructure should include longitudinal tracking and study of these same alumni over the next 5-7 years.

The Applicant will consider a strategic implementation plan with timelines and processes, proposed work with target outcomes for the program year, and 3-year outlook with initial year as baseline.

Fundamental Element 5

Strategic Outreach Initiatives:

- **DoD STEM aims to grow its strategic outreach initiatives in an effort to expand its reach of its programs, to increase program awareness and impact as well as participation from diverse populations.**
 - The Government is looking to explore and adapt innovative ways to form mutually beneficial relationships with likeminded organizations that have similar STEM goals.
 - Would like to reach underserved and underrepresented populations and military dependents.
 - Intends to promote its portfolio of opportunities to better meet objectives, maximize impact, and provide more enriching STEM opportunities for students.
- **DSEC Programs and Partnerships:** Applicant should consider Consortium to be composed of like-minded organizations that align with the DoD K-16 STEM education and outreach goals and strategies. Goals include:
 - Collaborate with STEM partners and leverage strong STEM networks (internships/hands on research experiences at colleges or universities, partnerships with local/regional/national science and engineering expos or festivals, etc.).
 - Promote and integrate portfolio of STEM opportunities within the framework of partners' existing STEM programming.
 - Enhance the educational experiences of underrepresented and military- dependent K-12 students, their parents, and teachers. These programs may include teacher professional development and student-focused programs in the formal (curriculum-based) and informal (after-school and summer enrichment) domains.
 - Coordinate with the Government to leverage existing and new partnerships to execute STEM activities. These competitions and challenges should include areas of, but are not limited to, robotics, mathematics, artificial intelligence, etc.

Fundamental Element 5

Strategic Outreach Initiatives:

- **Expositions/Symposia/Events:** The Applicant should explain how it proposes to encourage STEM program participants to engage in scientific meetings/technical symposia to showcase their STEM achievements and receive recognition.

- **Participation could be accomplished in the following ways, however the applicant is also expected to propose other technique(s) to accomplish this as well:**
 - Partner with technical associations and organizations that are willing to support STEM program participants and offer them a platform to present their research.
 - Develop a fair and equitable process that identifies STEM students who are invited to attend technical symposia to present their research accomplishments.
 - Ensure that STEM students who benefit from this opportunity provide an executive summary of their experience.
 - Highlight STEM student presenters through internal and external communications efforts.

Fundamental Element 5

Strategic Outreach Initiatives:

- **Military Dependent Children and Families:** In close collaboration with the Government, develop a strategy and tactics to engage and increase participation of military dependents in STEM programs through the following means:
 - In collaboration with CAM, establish a line of communication with DoDEA to specifically target DoD military-dependent students and their teachers, and to make them aware of DoD STEM opportunities and careers.
 - Target Child, Youth and School services at military installations to promote STEM programs and increase participation of military-dependent students in these programs.
 - Partner with military-focused organizations and associations to create awareness of and engage military families in STEM opportunities.

Develop a plan with established objectives and recommend measurable impacts in support of engaging and retaining interest of students from underserved and underrepresented populations.

At least 80% of funding allocation should fund Fundamental Element 5, the Strategic Outreach Initiatives. The budget should clearly show this allocation.

Expectations

- **Close collaboration with the CAM and Government on all fundamental elements of the cooperative agreement**
- **Firm understanding of a cooperative agreement**
- **Firm understanding of the operational structure within the Consortium, with an emphasis of creating an open, collaborative environment**
- **Firm understanding of the DoD STEM mission and the DoD STEM Strategic Plan**
- **Development of innovative solutions to achieve FOA objectives**