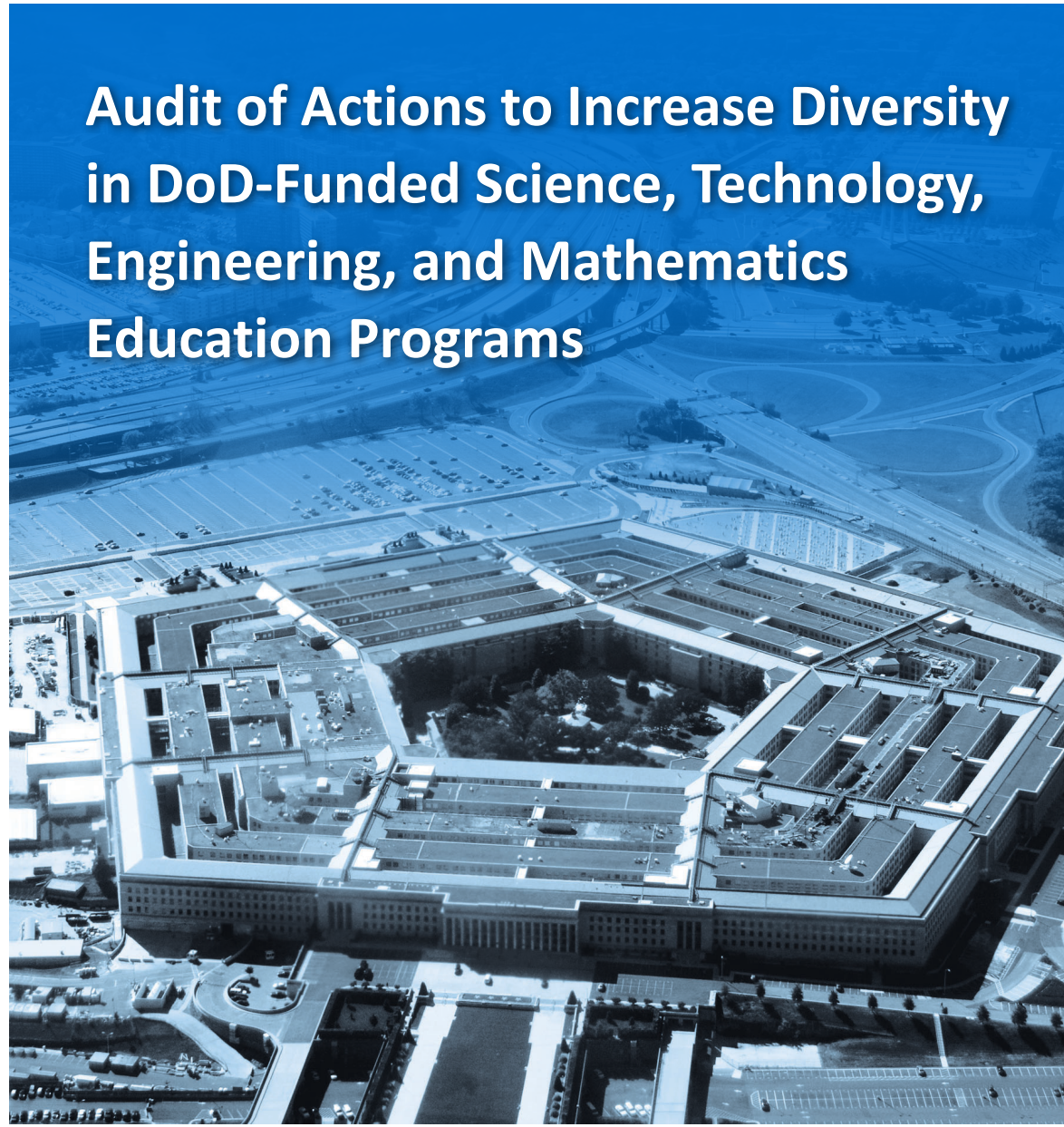




INSPECTOR GENERAL

U.S. Department of Defense

NOVEMBER 21, 2024



Audit of Actions to Increase Diversity in DoD-Funded Science, Technology, Engineering, and Mathematics Education Programs

INDEPENDENCE ★ INTEGRITY ★ EXCELLENCE ★ TRANSPARENCY





Results in Brief

Audit of Actions to Increase Diversity in DoD-Funded Science, Technology, Engineering, and Mathematics Education Programs

November 21, 2024

Objective

The objective of this audit was to determine whether the DoD Components implemented actions designed to increase the diversity of the postsecondary, DoD-funded science, technology, engineering, and mathematics (STEM) education programs and the DoD's applicant pool for STEM positions and whether the DoD tracked and measured the performance of these actions.

Background

In July 2021, the DoD published the DoD STEM Strategic Plan with the mission to “inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future DoD workforce poised to tackle evolving defense technological challenges.” In alignment with the Federal STEM Education Strategic Plan, one of the goals of the DoD STEM Strategic Plan is to increase participation of underserved and underrepresented groups in education and workforce development programs, activities, and outreach.

Findings

The DoD Components implemented 18 actions to increase the diversity of the STEM Program applicant pool of the six DoD STEM education programs included in our review. However, the DoD Components could not determine the effectiveness of these actions. Specifically,

Findings (cont'd)

we determined that DoD STEM program managers did not consistently establish:

- measurable goals to assess the effectiveness of these programs, or
- processes to determine program effectiveness.

The Office of the Under Secretary of Defense for Research and Engineering did not provide the DoD Components with guidance on determining the effectiveness of the actions to increase the diversity of the DoD STEM applicant pool.

Consequently, we concluded that the DoD Components may have missed opportunities to increase diversity in STEM education programs and activities by:

- expanding or duplicating programs that were producing the intended results, and
- reducing, stopping, or adjusting programs that were not producing the intended results.

Recommendations

To address the findings in this report, we made four recommendations. We recommend that the Under Secretary of Defense for Research and Engineering:

- update the DoD Instruction on STEM education programs and activities to include developing a framework for establishing measurable diversity goals specific to each STEM program and requiring DoD-funded programs to annually report on the representation of underserved and underrepresented groups in the job applicant pool; and
- conduct an in-depth review of their recruiting efforts for postsecondary STEM education programs that includes identifying best practices and collecting relevant data for DoD STEM recruiting efforts. In addition, develop a system to collect, track, and report program and job applicant data.



Results in Brief

Audit of Actions to Increase Diversity in DoD-Funded Science, Technology, Engineering, and Mathematics Education Programs

Management Comments and Our Response

The Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary of Defense for Research and Engineering, agreed with two recommendations related to establishing measurable goals for STEM education programs, and partially agreed with two recommendations regarding tracking education programs' impacts on applicant pools. Therefore, two recommendations are resolved and two are unresolved and all four remain open. We request additional comments on the unresolved recommendations within 30 days. Please see the Recommendations Table on the next page for the status of recommendations.

Recommendations Table

Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Under Secretary of Defense for Research and Engineering	B.1 and B.2	A.1 and A.2	None

Please provide Management Comments by December 23, 2024.

Note: The following categories are used to describe agency management’s comments to individual recommendations.

- **Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **Closed** – The DoD OIG verified that the agreed upon corrective actions were implemented.





OFFICE OF INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500

November 21, 2024

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING
AUDITOR GENERAL, DEPARTMENT OF THE ARMY
AUDITOR GENERAL, DEPARTMENT OF THE NAVY
AUDITOR GENERAL, DEPARTMENT OF THE AIR FORCE

SUBJECT: Audit of Actions to Increase Diversity in DoD-Funded Science, Technology,
Engineering, and Mathematics Education Programs
(Report No. DODIG-2025-043)

This final report provides the results of the DoD Office of Inspector General's audit. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

The Under Secretary of Defense for Research and Engineering agreed to address two of the recommendations presented in the report; therefore, we consider the recommendations resolved and open. We will close the recommendations when you provide us documentation showing that all agreed-upon actions to implement the recommendations are completed. Therefore, within 90 days please provide us your response concerning specific actions in process or completed on the recommendations. Send your response to either followup@dodig.mil if unclassified or rfunet@dodig.smil.mil if classified SECRET.

This report also contains two recommendations that are considered unresolved because the Under Secretary of Defense for Research and Engineering did not fully address the recommendations presented in the report. Therefore, the recommendations remain open. We will track these recommendations until management has agreed to take actions that we determine to be sufficient to meet the intent of the recommendations and management officials submit adequate documentation showing that all agreed-upon actions are completed.

DoD Instruction 7650.03 requires that recommendations be resolved promptly. Therefore, please provide us within 30 days your response concerning specific actions in process or alternative corrective actions proposed on the recommendations. Send your response to audrgo@dodig.mil.

If you have any questions, please contact me at (703) 604-8938, (DSN 664-8938).

FOR THE INSPECTOR GENERAL:

A handwritten signature in blue ink, reading "Richard B. Vasquez", is positioned above the typed name.

Richard B. Vasquez
Assistant Inspector General for Audit
Readiness and Global Operations

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Introduction

Objective

The objective of this audit was to determine whether the DoD Components implemented actions designed to increase the diversity of the postsecondary, DoD-funded science, technology, engineering, and mathematics (STEM) education programs and the DoD's applicant pool for STEM positions and whether the DoD tracked and measured the performance of these actions. As of May 2024, the Office of the Under Secretary of Defense for Research and Engineering (OUSDR&E) had not issued any additional guidance to DoD Components on determining the effectiveness of the actions to increase the diversity of the DoD STEM programs and applicant pool.

Background

The DoD STEM program is the DoD's comprehensive approach to developing STEM talent through education and opportunities for participants in primary, secondary, and postsecondary schools and across the DoD workforce. Specifically, DoD STEM education programs and activities are designed to provide authentic learning experiences through a variety of education and outreach initiatives in the form of scholarships, internships, enrichment activities, competitions, and mentorships by leveraging partners from industry, academia, and other Government organizations with a shared STEM mission. The Basic Research Office within the OUSDR&E executes the DoD STEM program.

Federal STEM Education Strategic Plan

In December 2018, the Committee on STEM Education (CoSTEM) of the National Science and Technology Council issued a report that established a Federal strategy for the next 5 years “based on a vision for a future where all Americans will have lifelong access to high-quality STEM education and the United States is the global leader in STEM literacy, innovation, and employment.” According to the report, the United States intends to achieve this vision by:

- building strong foundations for STEM literacy;
- increasing diversity, equity, and inclusion in STEM; and
- preparing the STEM workforce for the future.¹

¹ CoSTEM of the National Science and Technology Council, “Charting a Course for Success: America’s Strategy for STEM Education,” December 2018.

DoD STEM Strategic Plan

In July 2021, the DoD published the DoD STEM Strategic Plan that provides an overarching framework for achieving the DoD STEM mission and vision. The DoD STEM program’s mission is to “inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future DoD workforce poised to tackle evolving defense technological challenges.”² In addition, the DoD STEM Strategic Plan explains that the DoD STEM program’s vision is to develop “a diverse and sustainable STEM talent pool ready to serve our Nation and extend the DoD’s competitive edge.” In alignment with the Federal STEM Education Strategic Plan’s goals, one of the goals of the DoD STEM Strategic Plan is to increase participation of underserved and underrepresented groups in STEM education and workforce development programs, activities, and outreach.

The DoD STEM Strategic Plan further defines underserved and underrepresented populations in STEM as comprising:

- military-connected individuals (dependents of members of the active duty Armed Forces, the National Guard, and Reserves);
- individuals with low income;
- racial and ethnic minorities who are historically underrepresented in STEM, such as Alaskan Natives, Native Americans, Black or African Americans, Latino/Latina/Hispanic Americans, and Native Hawaiians and other Pacific Islanders;
- individuals with disabilities, as defined by the Americans with Disabilities Act;
- individuals with English as a second language or English language learners;
- first-generation college students;
- students in rural, frontier, or other federally targeted schools; and
- females in STEM fields where they remain underrepresented, such as physical science, computer science, mathematics, and engineering.

In May 2022, the OUSD(R&E) issued an internal to DoD implementation plan in alignment with the DoD STEM Strategic Plan. The purpose of the implementation plan was to document the intent of the DoD STEM Strategic Plan, highlight exemplary programs, and compile data on the DoD’s efforts

² DoD STEM Program Office, “The Department of Defense STEM Strategic Plan: FY 2021 – FY 2025”.

as of May 2022 toward achieving the DoD STEM Strategic Plan. In addition, the implementation plan highlighted specific areas for improvement to achieve the broad goals and objectives of the 5-year DoD STEM Strategic Plan.³

Federal and DoD Policy for DoD STEM Programs

Federal criteria for STEM education include sections in title 10 of the United States Code (U.S.C.) and the “America COMPETES [Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science] Reauthorization Act of 2010.”⁴ In addition to the DoD STEM Strategic Plan, the DoD issued DoD Instruction (DoDI) 1025.11, “DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” to provide guidance for DoD STEM education programs and activities.⁵ For STEM programs and activities, the U.S.C. and DoDI collectively require the DoD to:

- periodically report on the programs and activities;
- measure and track data on their effectiveness, including achieving diversity goals and objectives;
- stimulate interest in underserved and underrepresented groups; and
- collect data on underserved and underrepresented groups’ participation in the programs and activities.

DoD STEM Education and Outreach Data Call

In 2017, the OUSD(R&E) established the DoD STEM Evaluation and Assessment Capability group, which now operates within the Basic Research Office, to assess the effectiveness and impact of DoD investments in STEM. This group conducts data calls to collect information about DoD STEM education and outreach programs performed by DoD Components, including:

- program information, such as description, objective, and intended outcomes;
- year of inception;
- funding sources and budget amounts;
- location;
- platform (in-person, virtual, or hybrid) and duration;
- number and type of participants;

³ DoD STEM Program Office, “Department of Defense STEM Implementation Plan,” FY 2022.

⁴ Public Law 111-358, “America COMPETES Reauthorization Act of 2010,” January 4, 2011.

⁵ DoDI 1025.11, “DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” August 21, 2020.

- schools or DoD labs, facilities, or installations involved; and
- evaluation and performance metrics.

The DoD STEM Evaluation and Assessment Capability group designed the data call to allow the DoD to align with the requirements of the “America COMPETES Reauthorization Act of 2010”; follow transparency and accountability efforts of the Federal STEM Education Strategic Plan; and monitor progress toward goals of the DoD STEM Strategic Plan.⁶

According to the DoD STEM Education and Outreach Data Call for FY 2020, DoD STEM included 219 STEM education and outreach programs executed by the Military Services and Defense agencies.⁷ The 219 STEM education and outreach programs reached more than 944,000 students. The budget enacted for each program varied, but the total budget for all 219 programs was more than \$300 million.

What We Reviewed

We examined the results of the FY 2020 STEM Data Call and chose to focus on STEM programs that targeted postsecondary learners, such as undergraduate, graduate, or technical programs.⁸ We identified 17 postsecondary STEM education programs that met our criteria and selected six programs to review. We selected the postsecondary STEM education programs with the highest budget received for review.⁹ Table 1 shows the six programs selected for review. See Appendix B for additional information on each program.

⁶ Public Law 111-358, “America COMPETES Reauthorization Act of 2010,” section 101, “Coordination of Federal STEM Education.”

⁷ Components began submitting data for the FY 2021 Data Call in May 2022, and the OUSD(R&E) began the data validation process in January 2023 and completed it in December 2023. However, as of April 2024, the results for the FY 2021 data call have not been publicly released. Because these efforts were ongoing when this audit was initiated, we used 2020 data as the basis for our review.

⁸ The FY 2020 DoD STEM Education and Outreach Data Call classified postsecondary learners as undergraduate, graduate, community college, or technical trainee students.

⁹ Due to the difference in National Geospatial-Intelligence Agency and U.S. Navy program objectives, we selected the second highest budgeted programs for review.

Table 1. Postsecondary STEM Programs Selected to Review

DoD Component	Postsecondary STEM Education Program	Reported Program Budget Received for FY 2020 (in Millions)	Program Description
OUUSD(R&E)	Science, Mathematics, and Research for Transformation (SMART) Scholarship-for-Service Program	\$71.0	Academic funding for a STEM degree in exchange for a period of full-time civilian employment
National Geospatial-Intelligence Agency (NGA)	Visiting Scientist Program (VSP)	0.8 ²	Geospatial intelligence research and development opportunities for students, postdoctoral researchers, and university faculty
National Security Agency (NSA)	National Centers of Academic Excellence in Cybersecurity (NCAE-C) ¹	25.0	Established curriculum standards for academic institutions, with the objective of producing students with cybersecurity knowledge and skills
U.S. Army	Army Educational Outreach Program (AEOP) Apprenticeships	2.6 ²	Opportunities for high school and undergraduate students to conduct real-world research alongside Army scientists and engineers
U.S. Navy	Naval Research Enterprise Internship Program (NREIP)	2.1 ²	Summer internship for college students pursuing science and engineering careers to participate in research at a Department of Navy laboratory
U.S. Air Force	Leadership Experience Growing Apprenticeships Committed to Youth (LEGACY)	1.5	Summer camps and paid summer internships and apprenticeships to build youth interest in STEM

¹ We reviewed the Centers of Academic Excellence in Cyber Operations (CAE-CO) Summer Program, an internship program within the NCAE-C.

² The budget received does not equal actual amount due to rounding.

Source: The OUUSD(R&E) and the DoD OIG.

For these six programs, we focused on three specific populations—racial and ethnic minorities who are historically underrepresented in STEM, females, and individuals with disabilities. To determine effectiveness of the programs, we focused on STEM program applicants pool post-program employment data for underserved and underrepresented program participants. Specifically, we focused on whether those program participants applied for STEM jobs and ultimately joined the DoD STEM workforce.

Finding A

DoD Components Did Not Effectively Monitor the Actions Implemented to Increase the Diversity of STEM Program Applicant Pools

The DoD Components implemented 18 actions to increase the diversity of the STEM Program applicant pool of the six DoD STEM education programs we reviewed.¹⁰ However, the DoD Components could not determine the effectiveness of these actions. Specifically, we determined that the DoD STEM program managers did not consistently establish:

- measurable goals to assess the effectiveness of these programs, or
- processes to determine program effectiveness.

This occurred because the OUSD(R&E) did not provide the DoD Components with guidance on determining the effectiveness of the actions to increase the diversity of the DoD STEM program applicant pool. Specifically, the OUSD(R&E) did not:

- provide the DoD Components with a framework for establishing measurable goals by identifying and integrating measurable diversity goals into DoD STEM guidance, or
- document and distribute best practices for DoD STEM recruiting efforts, including the collection of demographic data and analytical methods to determine the effectiveness of the actions taken to increase the diversity of the DoD STEM program applicant pool.

Consequently, the DoD Components may have missed opportunities to expand or duplicate programs that were producing the intended results or, conversely, reduce, stop, or adjust programs that were not producing the intended results. For example, we found that the OUSD(R&E), NGA, NSA, Army, Navy, and Air Force program officials implemented actions that increased the number, or proportion, of individuals with disabilities in the STEM program applicant pools. However, the DoD Component programs did not have a consistent method to measure this progress.

¹⁰ We define “STEM program applicant pool” as a group of students who applied for a postsecondary STEM education program, regardless of whether they were selected to participate in the program.

DoD Components Implemented Actions to Increase the Diversity of STEM Program Applicant Pools

The DoD Components implemented 18 actions to increase the diversity of the STEM program applicant pools for the six postsecondary, DoD-funded STEM education programs we reviewed. One of the goals of the DoD STEM Strategic Plan is to increase participation of underserved and underrepresented groups in STEM education and workforce development programs, activities, and outreach. To achieve this goal, the DoD STEM Strategic Plan includes an objective to expand the outreach of DoD STEM education and activities to underserved and underrepresented communities through consideration of the barriers faced by these populations. In addition, the DoD STEM Strategic Plan states that the DoD will report participation rates and assess the participation of underserved and underrepresented groups in DoD STEM education programs.

To address the DoD STEM Strategic Plan objective to increase participation of underserved and underrepresented groups in STEM education and workforce development programs, activities, and outreach, officials from the OUSD(R&E), NGA, NSA, Army, Navy, and Air Force developed:

- plans to increase diversity and reach underserved and underrepresented groups;
- practices to specifically target underserved and underrepresented groups; and
- mechanisms to collect, track, and report demographic data of participants in their STEM programs.

Table 2 summarizes the 18 actions officials from the OUSD(R&E), NGA, NSA, Army, Navy, and Air Force took to increase the diversity of the STEM program applicant pools for their specific programs.

Table 2. Program Actions to Increase Applicant Pool Diversity

DoD Component	Postsecondary STEM Education Program	Actions Taken to:		
		Develop a Plan to Increase Diversity	Target Underserved and Underrepresented Groups	Collect, Track, and Report Demographic Data
OUSD(R&E)	Science, Mathematics, and Research for Transformation (SMART) Scholarship-for-Service Program	Developed a diversity initiative in response to sections 242 and 250 of the FY 2021 National Defense Authorization Act ¹¹	<p>Prioritized university engagement with historically underserved institutions</p> <p>Conducted targeted advertising to underrepresented groups</p>	<p>Collected and tracked data in the information management system from application to program completion</p> <p>Reported data in external evaluations and the Congressional report</p>
NGA	Visiting Scientist Program (VSP)	Developed a Diversity, Equity, Inclusion, and Accessibility Maturity Framework and diversity and inclusion plan	<p>Developed an annual marketing and recruiting plan to target underserved and underrepresented students</p> <p>Created a monthly email list for faculty from minority-serving institutions and historically Black colleges and universities</p>	Collected and tracked data during application process

¹¹ Public Law 116-283, “National Defense Authorization Act for Fiscal Year 2021,” section 242, “Modification of Science, Mathematics, and Research for Transformation (SMART) Defense Education Program,” states that the SMART Defense Education Program may establish arrangements so that participants may participate in a paid internship for an appropriate period with an industry sponsor. Section 242 of the FY 2021 National Defense Authorization Act also states that the Secretary of Defense must seek to enter partnerships with minority institutions of higher education and appropriate public and private sector organizations to diversify the participants in the program. Public Law 116-283, “National Defense Authorization Act for Fiscal Year 2021,” section 250, “National security workforce and educational diversity activities,” states that the Secretary of Defense shall seek to diversify participation in the SMART Defense Education Program. The Secretary must also submit a report, no later than September 30, 2024, to the congressional defense committees that evaluates the success of activities conducted by the Secretary in increasing diversity in appropriate DoD programs and hiring and retaining diverse individuals in the science, mathematics, and research workforce of the public sector.

Table 2. Program Actions to Increase Applicant Pool Diversity (cont'd)

DoD Component	Postsecondary STEM Education Program	Actions Taken to:		
		Develop a Plan to Increase Diversity	Target Underserved and Underrepresented Groups	Collect, Track, and Report Demographic Data
NSA	Centers of Academic Excellence in Cyber Operations (CAE-CO) Summer Program	Developed diversity objectives with percentage targets	Recruited at historically Black colleges and universities and minority-serving institutions	Collected and tracked data during application, hiring, and orientation process
Army	Army Educational Outreach Program (AEOP) Apprenticeships	Developed diversity-related priorities and objectives	Developed metrics and programs to target underserved students	Collected and tracked data through a contractor
Navy	Naval Research Enterprise Internship Program (NREIP)	Developed diversity-related STEM program outreach goals	Participated in diverse outreach events to target underserved students	Collected and tracked data through a contractor
Air Force	Leadership Experience Growing Apprenticeships Committed to Youth (LEGACY)	Developed diversity-related program goals and objectives	Utilized National Center for Education statistics to target Title I and rural schools	Collected data during the application process and tracked data using internal spreadsheets

*See Appendix B for the requirements in the FY 2021 National Defense Authorization Act.

Source: The DoD OIG.

DoD Components Could Not Determine the Impact of Their Efforts to Increase Diversity of STEM Program Applicant Pools

The DoD Components could not determine the effectiveness of their actions to increase the diversity of the STEM program applicant pool of the six DoD STEM education programs we reviewed because the program managers did not consistently establish:

- measurable goals to assess the effectiveness of these programs, or
- processes to determine the effectiveness of these programs.

DoD Components Did Not Consistently Establish Measurable Goals to Assess Effectiveness of STEM Programs

DoD STEM program managers did not consistently establish measurable goals to assess the effectiveness of DoD STEM education programs we reviewed. According to DoDI 1025.11, the OUSD(R&E), in conjunction with the DoD Components, should determine the appropriate type of assessment for program performance by clarifying the program’s goals and strategy.¹² However, according to the DoD STEM Director, the OUSD(R&E) relies on DoD Components to establish measurable goals for programs. Because the OUSD(R&E) does not define how program operations and results are assessed, some DoD Components established measurable goals for their individual programs. Having disparate goals for each Component makes it difficult to measure STEM program success across the DoD. Additionally, because the OUSD(R&E) defers to the Components on goals, there are some STEM programs included in our sample that do not have any. Table 3 summarizes the measurable goals established by program officials for the diversity of their programs.

Table 3. Summary of Programs’ Measurable Goals to Increase STEM Program Applicant Pool Diversity

DoD Component	Postsecondary STEM Education Program	Measurable Goals to Increase Diversity of STEM Program Applicant Pool
OUSD(R&E)	Science, Mathematics, and Research for Transformation (SMART) Scholarship-for-Service Program	Recruiting goals to have at least: (1) 45 percent of applicants identified as a minority race or ethnicity; ^{1,2} (2) 25 percent of applicants attend a historically underserved institution; and (3) 15 percent of applicants attend an historically Black colleges and universities or minority institution
NGA	Visiting Scientist Program (VSP)	None established
NSA	Centers of Academic Excellence in Cyber Operations (CAE-CO) Summer Program	Objectives to increase the percentage of diverse students participating in NSA Student Programs for: (1) minority students to 35 percent; ¹ (2) female students to 41 percent; ¹ and (3) students with disabilities to 12 percent ¹
Army	Army Educational Outreach Program (AEOP) Apprenticeships	None established
Navy	Naval Research Enterprise Internship Program (NREIP)	None established

¹² DoDI 1025.11, “DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” August 21, 2020.

Table 3. Summary of Programs' Measurable Goals to Increase STEM Program Applicant Pool Diversity (cont'd)

DoD Component	Postsecondary STEM Education Program	Measurable Goals to Increase Diversity of STEM Program Applicant Pool
Air Force	Leadership Experience Growing Apprenticeships Committed to Youth (LEGACY)	Objective to have at least 50 percent of students from the following DoD-identified underserved and underrepresented groups: (1) Title I and rural schools; (2) females; ¹ (3) minorities; ¹ (4) first-generation college students; and (5) military dependents

¹ These are the measurable goals that we reviewed from the OUSD(R&E), NSA, and Air Force.

² The DoD STEM Strategic Plan for FY 2021 through FY 2025 determined that the racial and ethnic minority population comprises Alaskan Natives, Native Americans, Black or African Americans, Latinx/Hispanic Americans, and Native Hawaiians and other Pacific Islanders. For the purposes of this audit, we used the same criteria to determine the minority race or ethnicity populations.

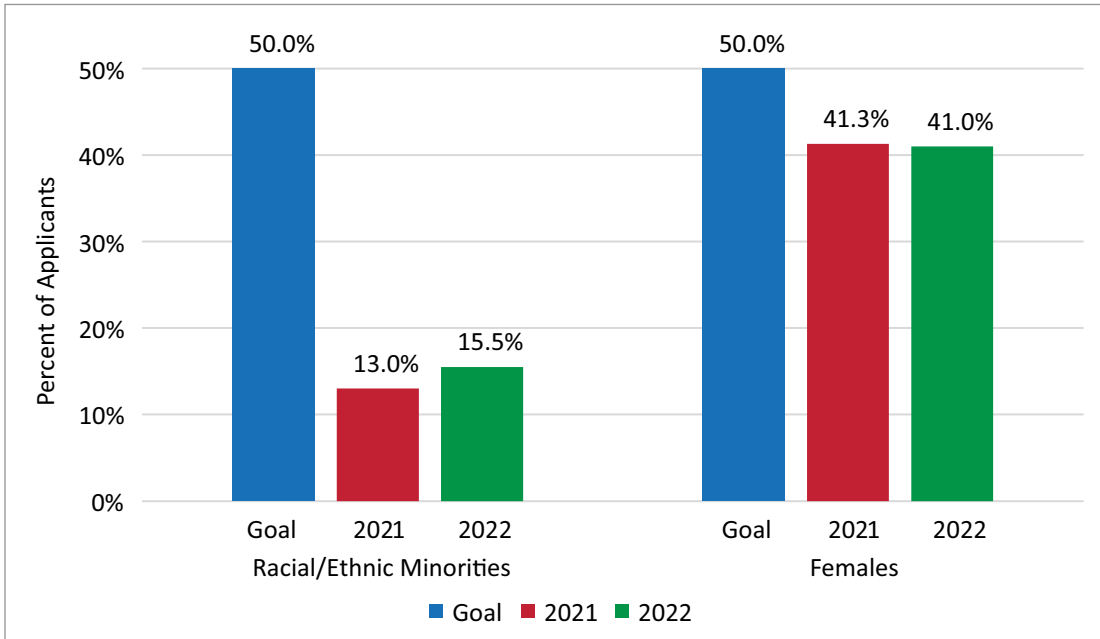
Source: The DoD OIG.

Of the six DoD Components we reviewed, program officials at the OUSD(R&E), NSA, and Air Force established measurable goals to assess the results of their efforts to increase the diversity of the STEM program applicant pools for their specific programs from FY 2021 to FY 2022. From the three programs that established measurable goals to increase the diversity of STEM program applicant pools, the Air Force program met its goals that were within our scope, but the OUSD(R&E) and NSA STEM programs did not meet their individual program goals.¹³

Figure 1 compares the Air Force LEGACY Program outcomes for FYs 2021 and 2022 to its goals. Figure 2 compares the OUSD(R&E) SMART Program outcomes for FYs 2021 and 2022 to its goals. Figure 3 compares the NSA CAE-CO Summer Program outcomes for FYs 2021 and 2022 to its goals.

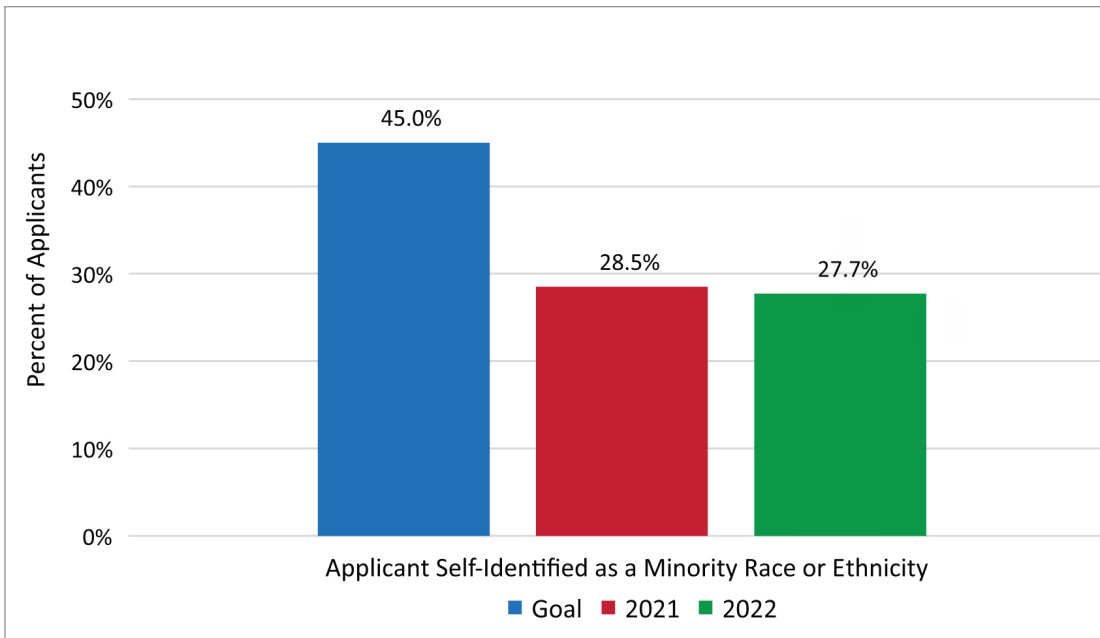
¹³ DoD STEM programs asked applicants to voluntarily identify demographic data (race, ethnicity, gender, and disability). Some applicants may not have selected any of the demographic data options provided, while others may have selected more than one. Therefore, applicants could have been counted more than once. We focused on any applicant who self-reported their demographic data because we did not have enough information to determine each applicant's minority status.

Figure 1. Bar Graph of Air Force LEGACY Program Diversity Goals and Outcomes for FYs 2021 and 2022 Applicants



Source: The DoD OIG based on FYs 2021 and 2022 Air Force LEGACY program data.

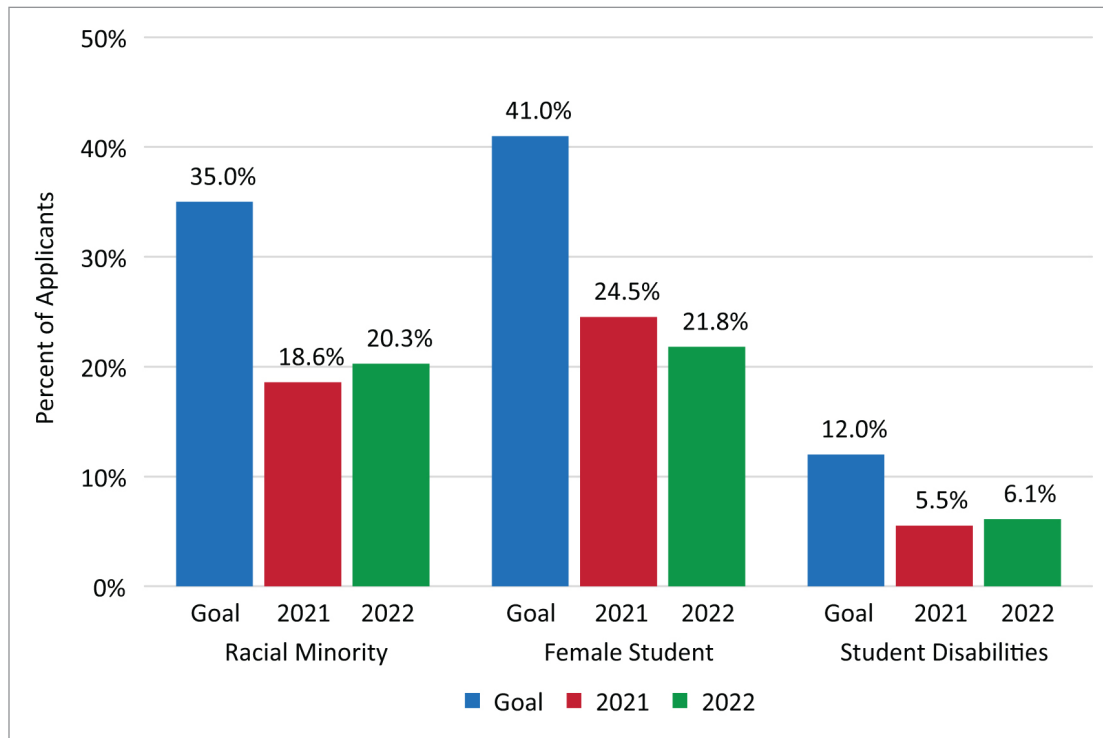
Figure 2. Bar Graph of OUSD(R&E) SMART Program Diversity Goals and Outcomes for FYs 2021 and 2022 Applicants



Source: The DoD OIG based on FYs 2021 and 2022 OUSD(R&E) program data.

As shown in Figure 2, OUSD(R&E) officials for the SMART Program established a goal to have a least 45 percent of STEM program applicants identify as a minority race or ethnicity.¹⁴ However, in FY 2021, minority race and ethnic STEM program applicants made up 28.5 percent of the STEM program applicant pool, while in FY 2022, minority race and ethnic STEM program applicants made up 27.7 percent of the STEM program applicant pool. Similarly, the OUSD(R&E) did not meet its goals in the other two areas.

Figure 3. Bar Graph of NSA CAE-CO Summer Program Diversity Goals and Outcomes for FYs 2021 and 2022 Applicants



Source: The DoD OIG based on FYs 2021 and 2022 NSA CAE-CO Summer program data.

As shown in Figure 3, NSA officials for the CAE-CO Summer Program established an objective to increase the percentage of female students participating in NSA Student Programs to 41 percent. However, in FY 2021, female STEM program applicants accounted for 24.5 percent of the CAE-CO Summer STEM program applicant pool, while in FY 2022, female STEM program applicants accounted for 21.8 percent of the CAE-CO Summer STEM Program applicant pool. Similarly, the NSA did not meet its goals in the other two areas.

¹⁴ The DoD STEM Strategic Plan for FY 2021 through FY 2025 does not include the Asian population as a minority race or ethnicity. We used the DoD STEM Strategic Plan criteria to determine the minority race or ethnicity populations for this audit. Therefore, for the purposes of this audit, applicants identifying as Asian were removed from the sample.

In contrast, the NGA, Army, and Navy STEM programs did not establish any measurable goals. See Appendix C for a detailed summary of the proportional rates of applicants from three underserved and underrepresented groups (racial or ethnic minority, females, and individuals with a disability) for each program from FY 2021 to FY 2022.

DoD Components Did Not Consistently Have Processes to Determine the Effectiveness of Their STEM Programs

For the six DoD STEM education programs we reviewed, the DoD Components did not consistently design processes to enable them to measure the effectiveness of the actions to increase the diversity of the STEM program applicant pool. According to DoDI 1025.11, program evaluations will answer specific questions about program performance and focus on assessing program operations and results. In addition, program evaluation results may be used to assess a program's effectiveness, identify how to improve performance, or guide resource allocation.¹⁵ The six DoD Components we reviewed implemented actions to collect, track, and report demographic data; however, the DoD Components did not consistently use the data to determine the number of underserved and underrepresented STEM program participants they had in their programs. Of the six DoD Components we reviewed, the:

- Air Force did not assess its program's effectiveness;
- NSA had not assessed its program's effectiveness since 2015;
- NGA assessed its program's effectiveness, but the NGA did not determine the effectiveness of its actions to increase the diversity of its STEM program applicant pool; and
- OUSD(R&E), Navy, and Army assessed the effectiveness of their actions to increase the diversity of their STEM programs' applicant pool.

The OUSD(R&E) Did Not Establish Guidance Related to Increasing the Diversity of the DoD STEM Program Applicant Pool

The OUSD(R&E) did not provide DoD Components with guidance on determining the effectiveness of the actions to increase the diversity of the DoD STEM program applicant pool. The OUSD(R&E) is responsible for establishing policy for STEM education programs and activities, including publishing DoDI 1025.11, and coordinating STEM education programs and activities with DoD Components.

¹⁵ DoDI 1025.11, "DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities," August 21, 2020.

While the DoD Component STEM education programs do not report directly to the OUSD(R&E), the OUSD(R&E) establishes policies and procedures applicable to those programs. Although some DoD Components saw an increase in underserved and underrepresented STEM program applicants, the OUSD(R&E) did not:

- provide DoD Components with a framework for establishing measurable goals, including identifying and integrating measurable diversity goals into DoD STEM guidance; or
- document and distribute best practices on DoD STEM recruiting efforts, including the collection of demographic data and analytical methods to determine the effectiveness of the actions taken to increase the diversity of the DoD STEM program applicant pool.

The OUSD(R&E) Did Not Establish Measurable Goals for DoD Component STEM Programs

The OUSD(R&E) did not provide the DoD Components with a framework for establishing measurable goals, including identifying and integrating measurable diversity goals into the DoD STEM guidance. Specifically, the OUSD(R&E) STEM Strategic Plan states that the DoD will operate with transparency and accountability to use common metrics to measure progress and encourage growth of STEM education and workforce development programs, activities, and outreach. In addition, one of the goals of the DoD STEM Strategic Plan is to increase participation of underserved and underrepresented groups in STEM education and workforce development programs, activities, and outreach. In support of this goal, one of the Strategic Plan's objectives is to measure the effectiveness of current DoD STEM education programs for underserved and underrepresented groups. However, the plan does not provide guidance to the DoD Components on how to establish and measure goals. According to DoDI 1025.11, the OUSD(R&E), in conjunction with the DoD Components, should determine the program's goals and strategy.

The OUSD(R&E) has taken steps to address the framework. According to an OUSD(R&E) official, the OUSD(R&E) hosts quarterly meetings of the STEM Advisory Council Working Group and the Evaluation and Assessment Capability Working Group. Representatives from across the Components provide recommendations and guidance, and they assist in coordinating STEM initiatives and activities through the DoD STEM Advisory Council.¹⁶ According to OUSD(R&E) officials, these quarterly meetings enable the OUSD(R&E) to conduct discussion and distribution of best practices, including the collection of demographic data and analytical methods, across the Components.

¹⁶ DoD STEM Program Office, "Department of Defense STEM Implementation Plan," FY 2022.

According to an official from the Basic Research Office, the OUSD(R&E) relied on the DoD Components to identify their own program diversity goals; however, the OUSD(R&E) did not require all the DoD Components to establish diversity goals for their DoD STEM education programs. The OUSD(R&E) acknowledges and has taken steps to address the inconsistencies in measuring progress. For example, the OUSD(R&E) hosted a pair of Common Metrics Workshops in 2022 and 2023 which brought together representatives from across the Components to address specific challenges and best practices in DoD STEM program evaluation. The 2022 workshop focused on how programs communicate their impact using metrics to assess the participant's acquisition of technical knowledge and skills. The 2023 workshop focused on how to measure progress toward program goals that also address the DoD's STEM Strategic Goals.

The current process allows DoD Components to determine their own program diversity goals. According to an OUSD(R&E) official, the DoD's STEM programs are funded and managed directly by individual DoD Components. Although we understand the OUSD(R&E)'s budget limitations and authority to direct individual Components, the OUSD(R&E) does have the authority to update guidance to create the desired framework for establishing measurable goals, including identifying and integrating measurable diversity goals in DoD STEM programs. Therefore, we recommend that the Under Secretary of Defense for Research and Engineering update DoDI 1025.11, "DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities," August 21, 2020, to provide DoD Components with a framework for establishing measurable diversity goals specific to each of their STEM education programs, as defined in the DoD STEM Strategic Plan, to assess the effectiveness of these programs.

The OUSD(R&E) Did Not Establish Best Practices for DoD STEM Recruiting Efforts

The OUSD(R&E) did not document or distribute best practices for DoD STEM recruiting efforts, including the collection of demographic data and analytical methods to determine the effectiveness of the actions taken to increase diversity of the DoD STEM program applicant pool. According to the America COMPETES Reauthorization Act of 2010, CoSTEM is required once every 5 years to develop, implement, and update a 5-year STEM education strategic plan that describes the approaches that will be taken by each participating agency to assess the effectiveness of its STEM education programs and activities. The OUSD(R&E) is responsible for establishing and implementing DoD STEM policy and prescribing procedures for DoD STEM education programs and activities. In addition, the OUSD(R&E) is responsible for coordinating and collecting data on STEM education

programs in accordance with Public Law 111-358.¹⁷ However, according to the FY 2022 DoD STEM Implementation Plan at the time of publication, many DoD STEM programs do not have robust mechanisms for directly measuring the number of underserved or underrepresented students participating in programs. Furthermore, the DoD STEM Implementation Plan states that, for FY 2019, not all programs collected participant data, such as racial and ethnic demographics or gender.¹⁸

According to OUSD(R&E) officials, the DoD STEM Strategic Plan is a guiding document for DoD STEM programs and efforts that are distributed in nature across the Components. Therefore, DoD Components have the autonomy to implement analytical methods to determine the effectiveness of the actions taken to increase diversity of the DoD STEM program applicant pool that best align to the DoD's strategic goals, while meeting unique programmatic goals and objectives. In addition, OUSD(R&E) officials stated that they have challenges with relying on DoD Components to collect and provide STEM program demographic data related to the diversity of the DoD STEM programs. As a result, DoD Components lacked the capability to determine whether their performance assessment for current and future diversity goals met the DoD's STEM expectations in accordance with DoDI 1025.11. Therefore, we recommend that the Under Secretary of Defense for Research and Engineering conduct an in-depth review of their recruiting efforts for postsecondary STEM education programs. The review should document and distribute best practices for DoD STEM recruiting efforts, including the collection of demographic data and methods to assess the effectiveness of actions to increase the diversity of the DoD STEM program applicant pool, as defined in the DoD STEM Strategic Plan.

DoD Components Missed Opportunities to Expand STEM Program Applicant Pools

The DoD Components may have missed opportunities to expand or duplicate DoD STEM programs that were producing the intended results or, conversely, to reduce, stop, or adjust programs that were not producing the intended results. DoDI 1025.11 requires DoD Component heads to continue current and establish new programs and activities to stimulate and support interest in STEM fields and DoD STEM careers to meet defense and national security needs. In addition, DoDI 1025.11 required DoD Component heads to collect data and report the results to the Director of Defense Research and Engineering for Research and Technology

¹⁷ Public Law 111-358, "America COMPETES Reauthorization Act of 2010," January 4, 2011.

¹⁸ DoD STEM Program Office, "Department of Defense STEM Implementation Plan," FY 2022.

about efforts supporting STEM education programs and activities.¹⁹ We found that OUSD(R&E), NGA, NSA, Army, Navy, and Air Force program officials implemented actions that increased the number, or proportion, of individuals with disabilities in the STEM program applicant pools. However, DoD Component programs did not have a consistent method to measure this progress. Therefore, we concluded that DoD Components did not duplicate these actions to increase the diversity of DoD STEM program applicant pools in programs that were not producing the intended results. See Appendix C for a detailed summary of the proportional rates of applicants from three underserved and underrepresented groups (racial or ethnic minority, females, and individuals with a disability) for each program from FY 2021 to FY 2022.

Management Comments on the Finding and Our Response

Although not required, the Under Secretary of Defense for Research and Engineering provided editorial comments on the draft report. We reviewed the suggested editorial changes and incorporated changes, when appropriate. For the full text of the management editorial comments, see the Management Comments section in the report.

Under Secretary of Defense for Research and Engineering Comments

In addition to editorial comments, the Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary, acknowledged that we removed the Asian demographic numbers from the reported SMART FY 2021 and FY 2022 applicant data. However, the Deputy Under Secretary stated that the 45-percent goal cited by the SMART program was inclusive of Asian demographics, as the program's stated goal is "at least 45 percent of STEM program applicants identify as a minority race or ethnicity," not "racial and ethnic minorities who are historically underrepresented in STEM."

Our Response

We appreciate the comments from the Deputy Under Secretary and have included them in our report. However, we did not make all suggested editorial changes. In response to the Deputy Under Secretary's comments on the use of Asian demographics, we added a table note to Table 3, created Footnote 14, and revised "Work Performed" in Appendix A to explain that for the purposes of this report,

¹⁹ DoDI 1025.11, "DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities," August 21, 2020.

we followed the DoD STEM Strategic Plan for FY 2021 through FY 2025 and its definition for racial and ethnic minority. The DoD STEM Strategic Plan states that the racial and ethnic minority population comprises Alaskan Natives, Native Americans, Black or African Americans, Latinx/Hispanic Americans, and Native Hawaiians and other Pacific Islanders. We acknowledge that the 45-percent goal cited by the SMART program was inclusive of Asian demographics. However, according to the Deputy Under Secretary's comments, including the Asian population in minority race and ethnic STEM program applicants made up only 38 percent of the STEM program applicant pool in fiscal year 2021 and 40 percent of the applicant pool in fiscal year 2022. Even with the inclusion of the Asian population, the SMART program still did not meet its goal.

Recommendations, Management Comments, and Our Response

Recommendation A.1

We recommend that the Under Secretary of Defense for Research and Engineering update DoD Instruction 1025.11, "DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities," August 21, 2020, to provide the DoD Components with a framework for establishing measurable diversity goals specific to each of their science, technology, engineering, and mathematics education programs, as defined in the DoD Science, Technology, Engineering, and Mathematics Strategic Plan, to assess the effectiveness of these programs.

Under Secretary of Defense for Research and Engineering Comments

The Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary, agreed, stating that the Under Secretary of Defense for Research and Engineering is currently working with the DoD Components to update DoDI 1025.11 and will incorporate a framework for establishing measurable diversity goals for DoD STEM programs in the updated Instruction.

Our Response

Comments from the Deputy Under Secretary addressed the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation when we receive a copy of the updated DoDI 1025.11, "DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities," and ensure that guidance provides a framework for the DoD Components to establish measurable goals.

Recommendation A.2

We recommend that the Under Secretary of Defense for Research and Engineering conduct an in-depth review of their recruiting efforts for postsecondary science, technology, engineering, and mathematics education programs. The review should document and distribute best practices for DoD science, technology, engineering, and mathematics recruiting efforts, including the collection of demographic data and methods to assess the effectiveness of actions to increase the diversity of the DoD science, technology, engineering, and mathematics education program applicant pool, as defined in the DoD Science, Technology, Engineering, and Mathematics Strategic Plan.

Under Secretary of Defense for Research and Engineering Comments

The Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary, agreed, stating that the Under Secretary of Defense for Research and Engineering will conduct an in-depth review of recruiting efforts for postsecondary DoD STEM education programs to identify and document challenges and lessons learned in recruiting efforts for such programs. This review will identify, share, and document best practices in DoD STEM recruiting efforts for postsecondary programs, including capturing participation rates.

Our Response

Comments from the Deputy Under Secretary addressed the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation when the Under Secretary of Defense for Research and Engineering provides support that documents an in-depth review of recruiting efforts for postsecondary DoD STEM education programs was conducted and distributed.

Finding B

DoD Components Did Not Have Performance Measures to Assess the Impact of STEM Education Programs on the STEM Job Applicant Pool

Program officials at the OUSD(R&E), NGA, NSA, Army, Navy, and Air Force did not have performance measures to assess the impact of STEM education programs on underserved and underrepresented groups within the STEM job applicant pool. This occurred because DoD Components were not required to collect demographic information and report common performance measures for assessing the impact of underserved and underrepresented groups in STEM education programs on the STEM job applicant pool.²⁰ Specifically, the:

- STEM Data Call did not collect data on program participants who entered the STEM job applicant pool; and
- DoD Components were not required to track post-program employment plans of program participants.

As a result of OUSD(R&E) officials not establishing common performance measures for DoD Components, DoD Components will continue to have incomplete and inconsistent information for assessing program impact on relevant candidate pools. Requiring common performance measures for the potential impact of STEM education programs on the STEM job applicant pool would provide comprehensive data on STEM education program performance and help measure whether the DoD has a diverse and sustainable STEM job applicant pool to meet long-term national defense needs.

DoD Components Did Not Develop Performance Measures to Assess Program Impact

OUSD(R&E), NGA, NSA, Army, Navy, and Air Force officials did not develop performance measures to assess the impact of STEM education programs on underserved and underrepresented groups in the STEM job applicant pool. Specifically, the officials collected data regarding participants' post-program

²⁰ According to the Government Accountability Office, performance measurement is the ongoing monitoring and reporting of program accomplishments, particularly progress toward pre-established goals. Performance measures may address the type or level of program activities conducted (process), the direct products and services delivered by a program (outputs), or the results of those products and services (outcomes).

employment plans and status; however, none of the six DoD Components collected data to assess STEM program impact to underserved and underrepresented groups in the STEM job applicant pool.

DoDI 1025.11 requires DoD Components to carry out, or support procedures, regarding program evaluations (assessments). According to DoDI 1025.11, assessments answer specific questions about program performance and focus on program operations and results. In addition, Components may use the assessments to determine a program's effectiveness, identify how to improve program performance, or guide resource allocation.

To determine whether the postsecondary STEM education programs collected common performance measures regarding underserved and underrepresented groups in STEM education programs on the STEM job applicant pool, we interviewed DoD officials responsible for managing and overseeing their respective programs and reviewed demographics, surveys, third-party evaluations, program reports, and internal procedures. Since the STEM education programs at the six Components did not have mechanisms to assess the impact of underserved and underrepresented groups within STEM education programs on the STEM job applicant pool, we determined that the STEM education programs at the six Components did not have performance measures.

DoD Components Were Not Required to Collect Performance Data to Assess STEM Job Applicant Pool Impact

OUSD(R&E), NGA, NSA, Army, Navy, and Air Force officials did not have performance measures to assess the impact of underserved and underrepresented groups within their programs on the STEM job applicant pool upon completion of their programs because the DoD did not require DoD Components to collect the data. Specifically, the STEM Data Call asks DoD Components to voluntarily report demographic data (race, ethnicity, and gender) of program participants, rather than requiring them to collect and report demographic data. In addition, the STEM Data Call did not require DoD Components to collect and report performance data that DoD Components can use to assess the impact of STEM education programs on the STEM job applicant pool. While the STEM Data Call asked DoD Components to report the type of performance measures each program used (surveys, third-party evaluations, focus groups, or no measures at all), the STEM Data Call did not require the reporting of a common performance measure on the impact of underserved and underrepresented groups in STEM education programs on the STEM job applicant pool. According to the DoD STEM Evaluation and

Assessment Capability group, who administers the STEM Data Call, responding is voluntary. In addition, the group stated that it deferred to each DoD Component's discretion on the data they chose to share.

Although officials at six of the DoD Components we visited—the OUSD[R&E], NGA, NSA, Army, Navy, and Air Force—used surveys or other internal procedures to collect different information on participant employment plans and status, challenges existed to track whether participants continued to a full-time STEM position in the DoD after completing their programs. For example, program officials may lose communication with participants after they leave their programs. In addition, some DoD Components did not have a formal mechanism when reviewing applications for hiring initiatives to determine whether an applicant participated in a STEM program. Furthermore, while some program officials were able to track their program participants, the process was limited to job placement within the same DoD Component.

According to Basic Research Office officials, DoD Components could track their participants after program completion; however, this process may require participants to agree to have their career progression tracked, rather than voluntarily reporting their post-program employment plans. Basic Research Office officials understand the need to determine how the DoD can capture a return on investment on its STEM education programs. Specifically, if DoD Components cannot assess the impact of underserved and underrepresented groups within their programs on the STEM job applicant pool, they will not be able to determine whether STEM programs are contributing to the DoD goals of diversifying the STEM workforce.

According to Basic Research Office officials, DoD Components work collaboratively to implement the DoD STEM Strategic Plan. The OUSD(R&E), through the Basic Research Office, serves in a coordinating capacity that includes collecting program data, generating reports, and facilitating periodic updates to the DoDI 1025.11 and DoD STEM Strategic Plan. DoDI 1025.11 states that program evaluations will answer specific questions about program performance and focus on assessing program operations and results. However, DoD-funded programs did not measure performance or assess the impact of underserved and underrepresented groups in their STEM education programs on the STEM job applicant pool.

DoDI 1025.11 authorizes the OUSD(R&E) to establish and implement policy for STEM education programs and activities, provide guidance, make recommendations, and represent the DoD on STEM matters involving interagency partners. According to OUSD(R&E) officials, DoD Component, and STEM program participants, providing data is voluntary. While the DoD Components do not report to the OUSD(R&E), the OUSD(R&E) has the authority to establish policies and procedures that include requirements for the DoD Components to provide

information and analysis. Therefore, we recommend that the Under Secretary of Defense for Research and Engineering update DoDI 1025.11, “DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” August 21, 2020, to require DoD-funded, postsecondary STEM education programs to report on an annual cycle to the DoD Science, Technology, Engineering, and Mathematics Evaluation and Assessment Capability group. The guidance update should include requirements to establish and implement performance measures to track the impact of STEM postsecondary education programs on the representation of underserved and underrepresented groups in the job applicant pool.

We recommend that, after completion of Recommendation B.1, the Under Secretary of Defense for Research and Engineering complete the following actions.

- Develop a way to track STEM program applicant pool participants that move through the STEM Education Programs after they leave the program.
- Create a system in which to collect the data.
- Establish and implement a requirement to run a periodic report based on the data in the system.
- Establish and implement a requirement to review the periodic report to make data-informed decisions about actions that the DoD can take to improve the STEM education program-to-job applicant pipeline.

Lack of Requirements Can Affect Assessments of STEM Education Program Diversity and Effectiveness

Assessing the impact of STEM education programs on the STEM job applicant pool is a performance measure that is crucial in determining the effectiveness of STEM education programs. Collecting demographic information and requiring DoD Components to report common performance measures to assess the impact of underserved and underrepresented groups in STEM education programs on the STEM job applicant pool would further efforts of the DoD Components to meet the DoD STEM Strategic Plan goal to increase the participation of underserved and underrepresented groups in STEM education programs. By not establishing and requiring common performance measures on the impact of STEM job applicant pool, DoD Components will continue to have incomplete information to assess the impact of their STEM education programs on the STEM job applicant pool and overall effectiveness of their STEM education program. Requiring common performance measures for potential impact of STEM education programs on the STEM job applicant pool would provide comprehensive data on STEM education program performance and help measure whether the DoD has a diverse and sustainable STEM job applicant pool to meet long-term national defense needs.

Recommendations, Management Comments, and Our Response

Recommendation B.1

We recommend that the Under Secretary of Defense for Research and Engineering update DoD Instruction 1025.11, “DoD Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” August 21, 2020, to require DoD-funded, postsecondary science, technology, engineering, and mathematics education programs to report on an annual cycle to the DoD Science, Technology, Engineering, and Mathematics Evaluation and Assessment Capability group. The guidance update should include requirements to establish and implement performance measures to track the impact of science, technology, engineering, and mathematics education postsecondary education programs on the representation of underserved and underrepresented groups in the job applicant pool.

Under Secretary of Defense for Research and Engineering Comments

The Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary, partially agreed, stating that the Under Secretary of Defense for Research and Engineering will update DoDI 1025.11 to require DoD Components to annually report on participation rates of underserved and underrepresented groups in the DoD Components’ postsecondary STEM programs. Additionally, the Under Secretary of Defense for Research and Engineering agreed to explore the possibility of including requirements to establish and implement performance measures to track the impact of DoD STEM education programs on the representation of underserved and underrepresented groups in the job applicant pool.

The Deputy Under Secretary stated that the capacity to directly track DoD STEM program participants into the job applicant pool is limited due to several factors, including child protection laws and related challenges to conducting such data collections; the voluntary nature of data collection; and the fact that DoD STEM programming includes elementary and middle school participants, who may not enter the STEM workforce for more than a decade after participating in STEM programs. Moreover, DoD STEM job applicant data is collected and captured at the individual installation level, which presents significant limitations in capturing this data.

Our Response

Comments from the Deputy Under Secretary partially addressed the recommendation; therefore, the recommendation is unresolved. Their comments focused on concerns related to collecting data on underage participants such as elementary and middle school children. However, our audit focused only on the postsecondary STEM education programs and not early childhood education programs. We revised the recommendation to focus on postsecondary STEM education programs.

DoDI 1025.11 states that program evaluations will answer specific questions about program performance and focus on assessing program operations and results. In response to Recommendation B.2, the Deputy Under Secretary acknowledged that some existing STEM Education Programs already have a system in place that captures how their program participants move through STEM educational programs. We request that, within 30 days of the final report, the Under Secretary of Defense for Research and Engineering provide comments that address the updates to DoDI 1025.11 to include requirements to establish and implement performance measures to track the impact of DoD STEM postsecondary education programs on the representation of underserved and underrepresented groups in the job applicant pool.

Recommendation B.2

We recommend that, after completion of Recommendation B.1, the Under Secretary of Defense for Research and Engineering:

- a. Develop a way to track science, technology, engineering, and mathematics education program applicant pool participants that move through the science, technology, engineering, and mathematics education programs after they leave the program.**
- b. Create a system in which to collect the data.**
- c. Establish and implement a requirement to run a periodic report based on the data in the system.**
- d. Establish and implement a requirement to review the periodic report to make data-informed decisions about actions that the DoD can take to improve the science, technology, engineering, and mathematics education program-to-job applicant pipeline.**

Under Secretary of Defense for Research and Engineering Comments

The Deputy Under Secretary of Defense for Research and Engineering, responding for the Under Secretary, partially agreed, stating that if the Under Secretary of Defense for Research and Engineering determines that it is possible to establish and implement performance measures to track the impact of DoD STEM education

programs on the representation of underserved and underrepresented groups in the job applicant pool in Recommendation B.1, the Under Secretary of Defense for Research and Engineering will then explore the possibility of developing a system to track STEM program participants into the job application pool.

The Deputy Under Secretary also stated that some existing STEM programs currently capture how their program participants move through other STEM educational programs, and the Under Secretary of Defense for Research and Engineering will incorporate the opportunity to provide this data into the existing annual data collection through evaluation and assessment capability efforts. The Deputy Under Secretary further stated that the Under Secretary of Defense for Research and Engineering leverages a variety of methods and systems to collect aggregate data from the DoD Components or STEM programs.

Our Response

Comments from the Deputy Under Secretary partially addressed the recommendation; therefore, the recommendation is unresolved. Their comments acknowledged that some existing STEM Education Programs already have a system in place that captures how their program participants move through STEM educational programs. In addition, our audit focused only on the postsecondary STEM education programs and not early childhood education programs. Therefore, implementing Recommendation B.1 with the Under Secretary of Defense for Research and Engineering to incorporate STEM programs participants' data that move through the postsecondary STEM education programs as part of the existing annual data collection process could ensure that the DoD increases the diversity of STEM education program-to-job applicant pool. These evaluation and assessment capability efforts will meet the intent of our recommendation. By implementing the evaluation and assessment capabilities as part of the annual data collection review process, the DoD will be better able to make informed decisions by assessing DoD STEM results annually. We request that, within 30 days of the final report, the Deputy clarify how the Under Secretary of Defense for Research and Engineering intends to incorporate the existing program into the annual data collection process.

Appendix A

Scope and Methodology

We conducted this performance audit from September 2022 through August 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Audit Universe and Sample

We obtained a list of 219 DoD STEM education programs reported by DoD Components in the FY 2020 STEM Data Call. We reviewed this list to identify the universe of DoD STEM education programs within our scope of review. In addition, we followed up with six DoD Components to confirm each Component's reported programs in the FY 2020 data call. Specifically, we identified 43 of 219 reported DoD STEM education programs that targeted postsecondary learners. Table 4 identifies the total number of DoD STEM education programs and postsecondary STEM education programs reported by DoD Components in FY 2020.

Table 4. Total Reported Number of DoD and Postsecondary STEM Education Programs in FY 2020

DoD Component	Total Programs	Postsecondary Programs
OUSD(R&E)	57	17
Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs)	1	0
DoD Education Activity	4	0
Defense Threat Reduction Agency	1	0
Missile Defense Agency (MDA)	9	3
National Geospatial-Intelligence Agency (NGA)	8	8
National Security Agency (NSA)	2	2
Army	6	1
Navy	6	5
Air Force	124	7
TriServices*	1	0
Total	219	43

*The Army, Navy, and Air Force co-sponsored the TriServices program.

Source: The OUSD(R&E).

From the list of 43 postsecondary DoD STEM education programs, we identified 18 programs after applying following criteria.

- Programs included a financial (scholarship or fellowship) or instructional (internship or apprenticeship) aid element.
- Programs established before 2019.

Table 5 shows the seven selected DoD Components that had 43 total postsecondary DoD STEM education programs, with 18 of the 43 programs meeting the outlined criteria.

Table 5. Total Postsecondary STEM Programs, Programs Including an Aid Element, and Programs with an Aid Element Established Before 2019

DoD Component	Total Postsecondary Programs	Postsecondary Programs with an Aid Element	Postsecondary Programs with an Aid Element Established Before 2019
OUSD(R&E)	17	13	2
MDA	3	1	1
NGA	8	4	4
NSA	2	1	1
Army	1	1	1
Navy	5	3	3
Air Force	7	5	5
Total	43	28	17

Source: The OUSD(R&E) and the DoD OIG.

From this universe of 17 postsecondary programs, we selected a nonstatistical sample based on the program with the highest budget enacted or received per DoD Component.²¹ Table 6 shows the six programs selected for review.

²¹ Due to the difference in eligibility requirements for STEM program applicants at the Missile Defense Agency (MDA), we removed the MDA from our scope of review. The MDA’s Military Academy Internship program relied on the military academies to provide program participants for its Military Academy Internship program. The other DoD Components relied on civilian participation.

Table 6. Postsecondary STEM Education Programs Reviewed

DoD Component	Postsecondary STEM Education Program
OUSD(R&E)	SMART Scholarship-for-Service Program
NGA	VSP
NSA	CAE-CO Summer Program
Army	AEOP Apprenticeships
Navy	NREIP
Air Force	LEGACY

Source: The DoD OIG.

Work Performed

We identified and reviewed the following Federal and DoD criteria regarding STEM education.

- Section 2192, title 10, United States Code
- Section 2193, title 10, United States Code
- Public Law 111-358, “America COMPETES Reauthorization Act of 2010,” January 4, 2011
- CoSTEM of the National Science and Technology Council, “Charting a Course for Success: America’s Strategy for STEM Education,” December 2018
- DoDI 1025.11, “DoD STEM Education Programs and Activities,” August 21, 2020
- The Department of Defense STEM Strategic Plan: FY 2021 – FY 2025

We interviewed program officials at each of the six DoD Components selected for review to understand actions taken to increase the diversity of their postsecondary DoD STEM education programs. We reviewed documentation, such as recruiting plans and metrics, to determine whether program officials were specifically taking action to provide underserved and underrepresented students STEM education and career opportunities. In addition, we interviewed program officials to understand processes and procedures to collect and track demographic and workforce placement data within each program. We reviewed documentation, such as assessments, reports, and participant surveys, to determine how program officials monitored their program’s performance, as well as assessed their impact on the STEM job applicant pool.

To determine whether program officials’ actions increased the diversity of their respective programs, we analyzed the demographic data for all individuals who applied to each program in 2021 and 2022. We focused on the 2-year

period of 2021 and 2022 because we based our program sample on the FY 2020 STEM Data Call and the issuance of the DoD STEM Strategic Plan in July 2021. The DoD STEM Strategic Plan for FY 2021 through FY 2025 does not include the Asian population as a minority race or ethnicity. We used the DoD STEM Strategic Plan criteria to determine the minority race or ethnicity populations for this audit. Therefore, for the purposes of this audit, applicants identifying as Asian were removed from the sample. In addition, we focused on three underserved and underrepresented populations defined in the DoD STEM Strategic Plan: (1) racial and ethnic minorities who are historically underrepresented in STEM; (2) females; and (3) individuals with disabilities.

Organizations Interviewed and Sites Visited

We conducted interviews and obtained supporting documentation from 13 DoD Component organizations responsible for overseeing and executing DoD STEM education programs. In addition, we interviewed Defense Civilian Personnel Advisory Service personnel to discuss DoD STEM civilian workforce data. See Table 7 for the summary of DoD Component organizations that we interviewed and sites that we visited.

Table 7. Summary of DoD Components and Organizations Interviewed and Sites Visited to Answer the Audit Objective

DoD Component	Organizations Contacted	Site Visit Location
Office of the Under Secretary of Defense for Personnel and Readiness	Defense Civilian Personnel Advisory Service	Virtual
OUSD(R&E)	DoD STEM, Basic Research Office	Virtual
	DoD SMART Scholarship Program	Virtual
MDA	STEM Outreach Program Office	Redstone Arsenal, Alabama
NGA	Human Development Directorate	Springfield, Virginia
	Research Directorate	Springfield, Virginia
NSA	Office of Student Program Services	Fort Meade, Maryland
Army	Office of the Deputy Assistant Secretary of the Army Research and Technology	Virtual
	U.S. Army Combat Capabilities Development Command	Virtual

Table 7. Summary of DoD Components and Organizations Interviewed and Sites Visited to Answer the Audit Objective (cont'd)

DoD Component	Organizations Contacted	Site Visit Location
Navy	Naval STEM Coordination Office, Office of Naval Research	Virtual
	Naval Surface Warfare Center, Philadelphia Division	Philadelphia, Pennsylvania
Air Force	Office of the Deputy Assistant Secretary of the Air Force for Science, Technology and Engineering	Virtual
	Wright-Patterson Air Force Base Educational Outreach Office	Virtual

Source: The DoD OIG.

Internal Control Assessment and Compliance

We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed the control components and underlying principles related to DoD-funded STEM education programs in accordance with Federal and DoD policies. Specifically, we assessed the control environment and control activities, including the actions established by management through policies and procedures to achieve objectives and respond to risks. In addition, we assessed whether the Components' postsecondary DoD-funded STEM education programs had performance measures to provide underserved and underrepresented students STEM education and career opportunities and assessed their impact on the STEM vacancy and program candidate pool.

During the audit, we found that the actions of the OUSD(R&E) did not increase the diversity of the STEM program applicant pools for DoD Component STEM programs. Specifically, we found that OUSD(R&E) officials did not provide a framework for establishing measurable goals by identifying and integrating measurable diversity goals into DoD STEM guidance. The OUSD(R&E) not establishing metrics caused inconsistent outcomes and participation rates for underserved and underrepresented groups. However, because our review was limited to these internal control components and underlying principles, it may not have disclosed all internal control deficiencies that may have existed at the time of this audit.

Use of Computer-Processed Data

We used computer-processed data from the FY 2020 STEM Data Call to obtain a universe of DoD STEM education programs and select a nonstatistical sample of programs to review. To test the reliability of the data, we confirmed with each

DoD Component within the audit scope the completeness and accuracy of their list of programs reported in the data call. While we determined that the data was sufficiently reliable for the purposes of this audit in selecting programs to review, we found discrepancies regarding the completeness and accuracy of the data call results. See Appendix D for a detailed discussion on the issues we found with the data call.

We obtained computer-processed data from the systems used by each DoD Component to maintain and store the demographic data of STEM program applicants. We did not test the reliability of the computer-processed data from these systems because the focus of our audit was on whether DoD Components implemented actions to increase the diversity of the STEM program applicant pools for their postsecondary DoD-funded STEM education programs. Specifically, we used the data to determine whether there had been a change in the number of applicants from underserved and underrepresented groups and reported those numbers as provided by the DoD Components. Therefore, we determined that the reliability of the computer-processed data did not affect the findings in this report.

We obtained computer-processed data from the DoD Functional Community Dashboard on the DoD Advana platform regarding the demographic makeup of the DoD STEM civilian workforce. We interviewed Defense Civilian Personnel Advisory Service officials involved in developing the Dashboard to obtain an understanding of how the data was sourced, entered, and safeguarded. However, we did not test the reliability of the Dashboard because we used the data for informational purposes only. Therefore, we determined that the reliability of the computer-processed data did not affect the findings in this report.

Use of Technical Assistance

We coordinated with the DoD OIG Quantitative Methods Division to develop a methodology for selecting a nonstatistical sample of postsecondary DoD STEM education programs to review.

Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) issued two reports discussing Federal STEM education programs and women's participation in STEM careers. Unrestricted GAO reports can be accessed at <http://www.gao.gov>.

GAO

Report No. GAO-21-490, "Financial Services Industry: Factors Affecting Careers for Women with STEM Degrees," June 2021

The GAO found that several factors affect women's participation in STEM degree programs and subsequent careers in the financial services industry, including early exposure to STEM topics, access to resources, and a sense of belonging in STEM degree programs. The GAO also found that selected financial services firms encouraged girls and women to pursue STEM by providing funding and other support to nonprofit organizations that focus on increasing girls' participation in STEM, as well as sponsoring conferences and offering scholarships for women in STEM. Furthermore, the GAO found that selected financial services firms recruit women with STEM degrees by collaborating with organizations that work with women STEM majors and sponsoring conferences for women in technology.

Report No. GAO-18-290, "STEM Education: Actions Needed to Better Assess the Federal Investment," March 2018

The GAO found that Federal investment in STEM education remained stable from FY 2010 to FY 2016. In addition, the GAO found that the interagency CoSTEM Education had not reviewed programs' performance assessments or documented those assessments in its inventory. Furthermore, CoSTEM did not report the participation rates of underrepresented groups in Federal STEM education programs. The GAO made three recommendations to CoSTEM to review performance assessments of STEM education programs, document those assessments, and report programs' participation rates of underrepresented groups.

Appendix B

Postsecondary STEM Education Programs Selected for Review

We reviewed the following DoD STEM programs.

Science, Mathematics, and Research for Transformation Scholarship-for-Service Program – OUSD(R&E)

In 2006, the DoD established the SMART Scholarship-for-Service Program in accordance with 10 U.S.C. § 4093 to provide academic funding in exchange for completing a period of full-time civilian employment with the DoD. For every year of degree funding, a scholar commits to working with the DoD as a civilian employee for 1 year upon graduation, with the opportunity to remain employed upon completion of their SMART commitment. For FY 2020, the OUSD(R&E) reported that the SMART Program received a budget of \$71 million, with funding provided by the National Defense Education Program.²²

The FY 2021 National Defense Authorization Act required the Secretary of Defense to diversify participation in the SMART Program by carrying out the following activities.

- Set aside funds for financial assistance, scholarships, and fellowships for students at academic institutions, such as historically Black colleges and universities and minority institutions.
- Partner with institutions of higher education and other public and private sector organizations.
- Establish individual and organizational incentives.
- Increase awareness of opportunities to participate in the program.
- Evaluate the potential for new programs, fellowships, and other activities at historically Black colleges and universities and minority institutions to increase diversity in educational and workforce development programs.
- Identify potential changes to the program that would improve diversity of program participants.
- Establish metrics to evaluate the success of these activities.

²² According to OUSD(R&E) officials, budget amounts reported may not match congressionally allocated amounts, as some money could also be fundraised or granted. In addition, the STEM Data Call provides an opportunity for DoD Components to report a comprehensive list of all funding or sponsor sources for each program.

Visiting Scientist Program – NGA

In 2006, the NGA established the VSP, which provides geospatial intelligence research and development as well as fellowship and learning opportunities for graduate students, postdoctoral researchers, and university faculty. Mentors at the NGA work with Visiting Scientists to define research assignments and goals that mutually support the NGA mission and the educational pursuits of the Visiting Scientists. For FY 2020, the NGA reported that the VSP received a \$788,000 budget, with funding provided by the NGA.

The Centers of Academic Excellence in Cyber Operations Summer Program – NSA

In 1998, the NSA established the National Centers of Academic Excellence in Cybersecurity (NCAE-C) program to create and manage a collaborative cybersecurity educational program with colleges and universities that establishes standards for cybersecurity curriculum and academic excellence. As part of the NCAE-C program, academic institutions can choose from three designations to meet the characteristics of a Center of Academic Excellence institution—Cyber Defense, Cyber Operations, and Cyber Research. For FY 2020, the NSA reported that the NCAE-C received a \$25 million budget, with funding provided by the NSA.

The NSA invites students enrolled in the Cyber Operations specialization at NSA-designated universities to participate in the Centers of Academic Excellence in Cyber Operations Summer Program to gain knowledge of cyber-related topics and work on a broad range of problems involving applications of computer science and engineering.

Army Educational Outreach Program: Apprenticeships – Army

In 2004, the Army established the AEOP, a portfolio of Army-sponsored STEM programs that aims to engage, inspire, and attract the next generation of STEM talent with kindergarten through college programs and expose participants to DoD STEM careers. The AEOP portfolio includes five apprenticeship programs, including three programs that target undergraduate students—Research and Engineering Apprenticeship Program, College Qualified Leaders, and Undergraduate Research Apprenticeship Program. Research and Engineering Apprenticeship Program participation is limited to underserved students. The remaining four apprenticeship programs are open to all student applicants.

The AEOP Undergraduate Apprenticeship programs provide opportunities for students to gain firsthand exposure to research conducted in university labs and in U.S. Army Research Laboratories and Centers across the country, while also working under the mentorship of a professional scientist or engineer. For FY 2020, the Army reported that AEOP apprenticeships received a budget of \$2.6 million, with the funding provided by the Headquarters of the Department of Army.

Naval Research Enterprise Internship Program – Navy

In 2001, the Navy established the NREIP to provide an opportunity for college students to participate in research at a Department of Navy laboratory for 10 weeks during the summer. The goals of the NREIP are to encourage participating college students to pursue science and engineering careers, further their education through mentoring by laboratory personnel and participation in research, and raise their awareness of Department of Navy research and technology efforts that could lead to employment with the Department of Navy. For FY 2020, the Navy reported that the NREIP received a budget of \$2.1 million, with funding provided by the Department of Navy.

Leadership Experience Growing Apprenticeships Committed to Youth – Air Force

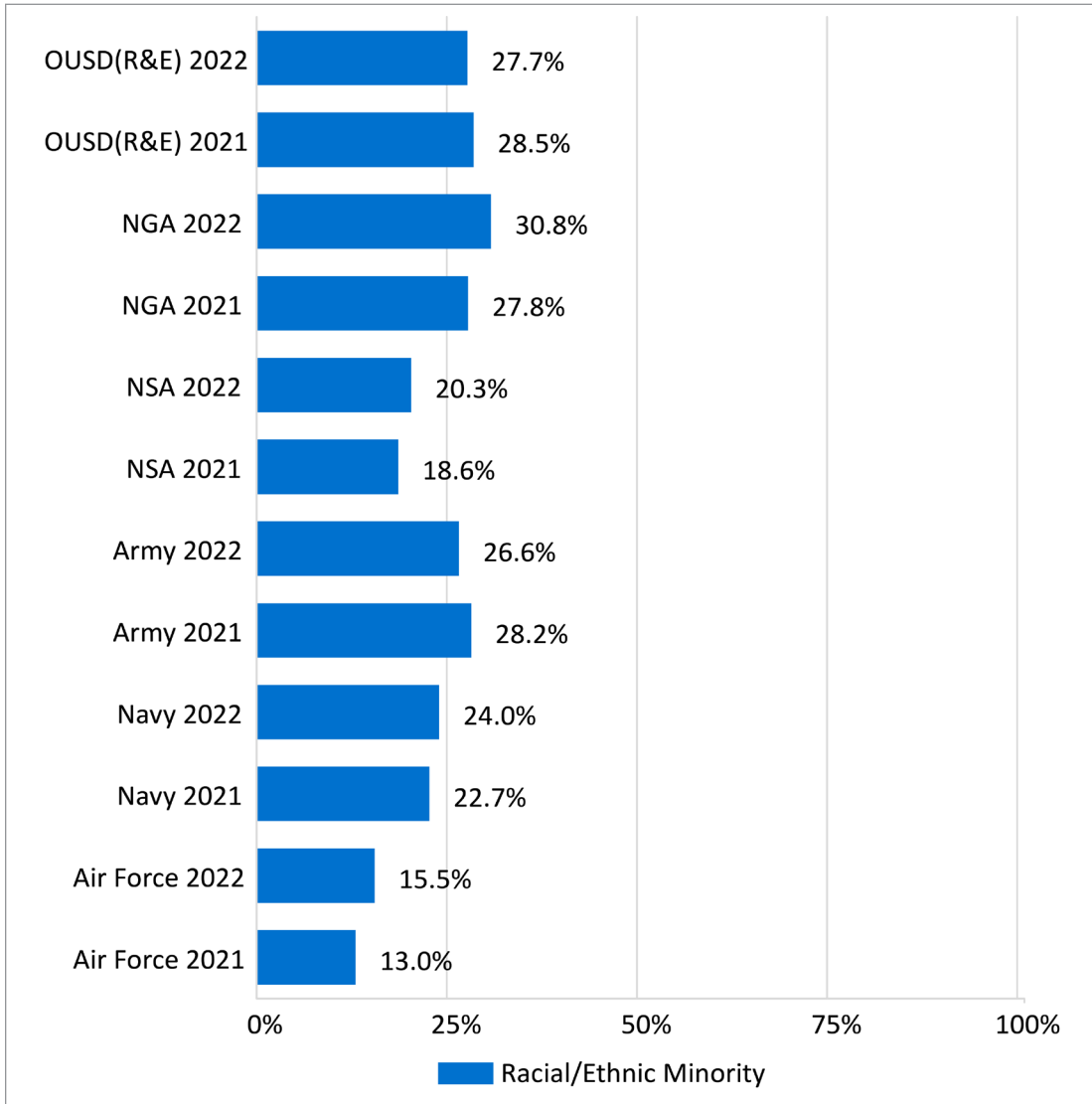
In 2017, the Air Force established the LEGACY program, designed to propel a middle school student into an Air Force STEM career after college education. The LEGACY program consists of three phases—Craftsman (ages 11 through 15), Junior Apprentice (ages 16 and older), and Apprentice (in college). Apprentice students continue to build on their Junior Apprentice experience and work with a mentor to prepare for transition to the workforce. In addition, Apprentice students work on focus areas, such as real-world research, technical writing, and presentation and briefing skills. For FY 2020, the Air Force reported that the LEGACY program received a budget of \$1.5 million, with funding provided by the Air Force Research Laboratory.

Appendix C

Comparison of the Proportional Rates of Applicants for Components Organized by Racial or Ethnic Minority, Female, Disability, and the Rest of the Population for FYs 2021 and 2022

In Finding A, we focused our audit on three categories of underserved and underrepresented applicants. In this Appendix, we show the specific data related to those underserved and underrepresented personnel; however, without DoD-wide or Component-specific measurable goals in each of these categories, there is no way to determine whether this representation met the DoD's goals or represented the overall population. Figure 4 summarizes the change in the percentage of applicants from FY 2021 to FY 2022 in the underserved and underrepresented racial or ethnic minority group. Figure 5 summarizes the change in the percentage of applicants from FY 2021 to FY 2022 in the underserved and underrepresented female group. Figure 6 summarizes the change in the percentage of applicants from FY 2021 to FY 2022 in the underserved and underrepresented individuals with a disability group.

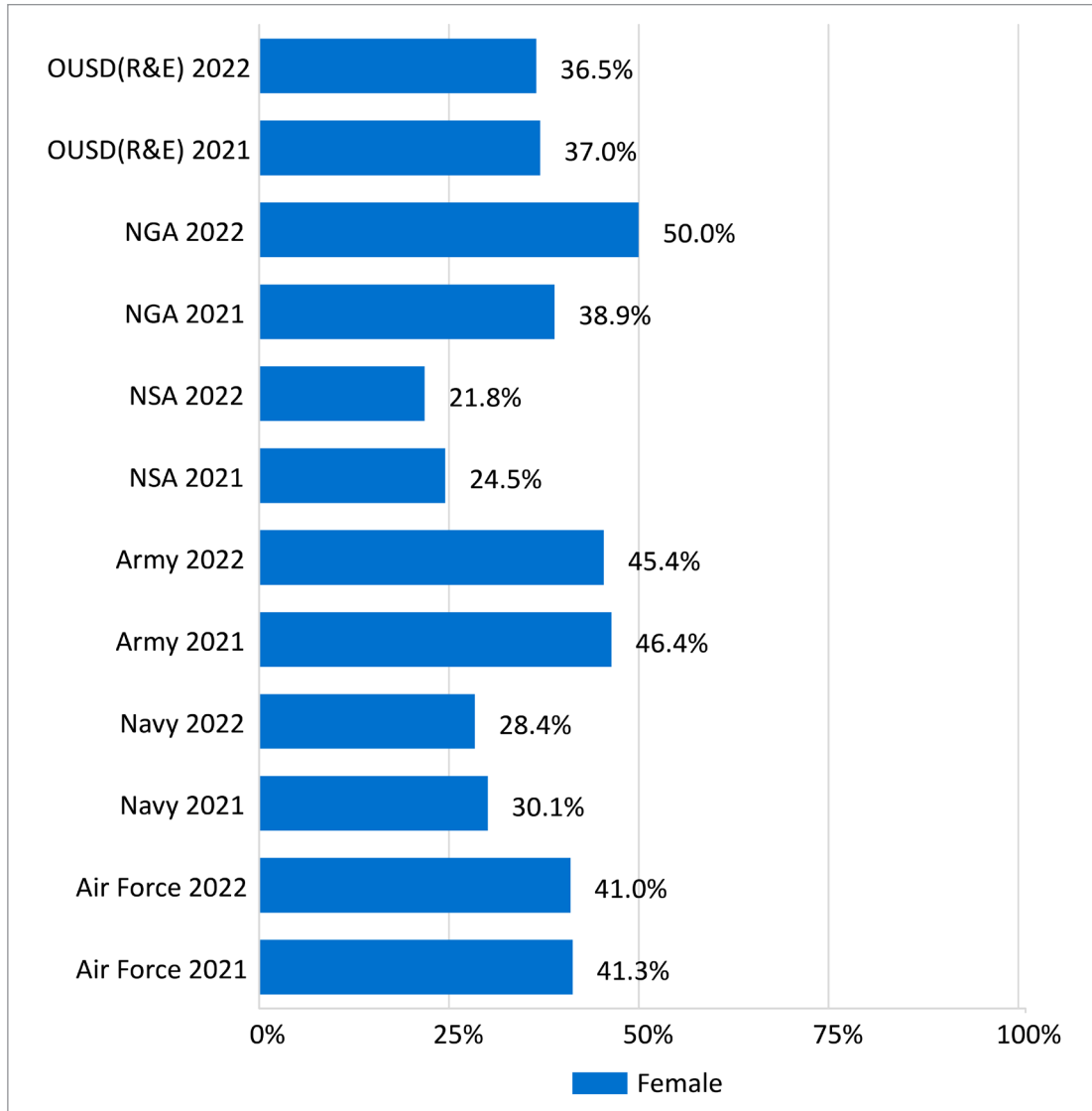
Figure 4. Percentage of STEM Program Applicants Who Identified as a Racial or Ethnic Minority for FYs 2021 and 2022



Note: An applicant could be part of a racial minority, ethnic minority, or both. The percentages are out of 100 percent of each STEM program’s applicant pool.

Source: The DoD OIG based on FYs 2021 and 2022 DoD Component program data.

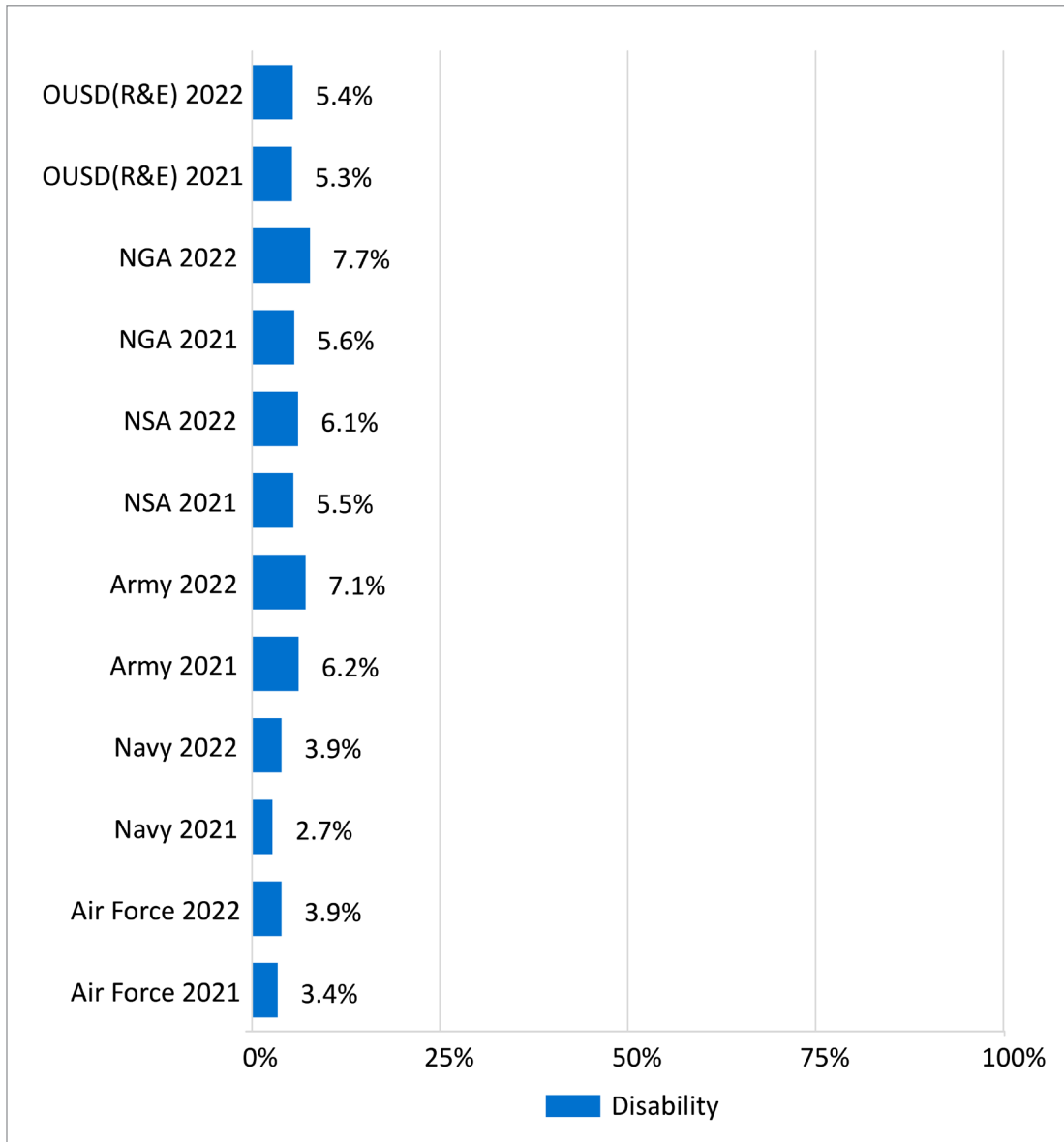
Figure 5. Percentage of STEM Program Applicants Who Identified as Female for FYs 2021 and 2022



Note: The percentages are out of 100 percent of each STEM program’s applicant pool.

Source: The DoD OIG based on FYs 2021 and 2022 DoD Component program data.

Figure 6. Percentage of STEM Program Applicants Who Identified as Having a Disability for FYs 2021 and 2022



Note: The percentages are out of 100 percent of each STEM program’s applicant pool.

Source: The DoD OIG based on FYs 2021 and 2022 DoD Component program data.

Appendix D

Other Matters of Interest – STEM Data Call Discrepancies

Basic Research Office officials provided the FY 2020 DoD STEM Education and Outreach Data Call, which we used to select our nonstatistical sample of postsecondary STEM education programs to review. However, we determined that the FY 2020 STEM Data Call was incomplete and inaccurate. Specifically, NSA and Air Force officials indicated that we did not have a complete list of their STEM education programs. During their respective entrance conferences, both NSA and Air Force officials identified STEM education programs that were not included in the FY 2020 STEM Data Call.

Due to inconsistencies found in the FY 2020 STEM Data Call, we performed additional work to validate the data and obtain any missing STEM education programs that the DoD Components did not report. We followed up with the six DoD Components we selected to confirm the completeness and accuracy of each Component's list of programs reported in the FY 2020 STEM Data Call. As a result, we found that:

- Air Force officials identified 11 previously reported postsecondary programs that did not actually target postsecondary learners and 7 additional postsecondary programs that were not included in the data call;
- NSA officials identified 3 additional postsecondary programs that were not included in the data call; and
- OUSD(R&E) officials identified 2 previously reported postsecondary programs that did not actually target postsecondary learners.

We determined that there was a lack of consistent reporting methods across the DoD Components. Basic Research Office officials stated that DoD Components differed in the way they provided data. For example, Basic Research Office officials stated that the Air Force took a decentralized approach to distribute the data call to each program site lead at multiple locations, while the Army and Navy took a centralized approach. In addition, we determined that there was a misunderstanding on what programs could be reported in the data call. For example, NSA officials stated that their understanding was that only programs that met a certain funding threshold could be reported, but Basic Research Office officials clarified to us that such a threshold did not exist.

According to Basic Research Office officials, the results of the FY 2020 STEM Data Call were only as reliable as the information the DoD Components reported. Basic Research Office officials stated that they had a process in place to look for discrepancies in the data reported and would follow up with the DoD Components, but they reiterated that they deferred to the DoD Components on their decision on what to report. During the audit, we notified the DoD Components about the inconsistencies that we found in the FY 2020 STEM Data Call. However, this matter was outside the scope of our audit. Therefore, we did not include a recommendation to the DoD Components for corrective action related to data call reporting.

Management Comments

Office of the Under Secretary of Defense for Research and Engineering



RESEARCH
AND ENGINEERING

DEPUTY UNDER SECRETARY OF DEFENSE
3030 DEFENSE PENTAGON
WASHINGTON, DC 20301-3030

September 16, 2024

[REDACTED]

Readiness and Global Operations
4800 Mark Center Drive
Alexandria, VA 22350-1500

Dear [REDACTED]:

I am responding on behalf of the Under Secretary of Defense for Research and Engineering (USD(R&E)) regarding the draft Department of Defense Office of the Inspector General report "Audit of Actions to Increase Diversity in DoD-Funded Science, Technology, Engineering, and Mathematics Education Programs," Project Number D2022-D000RK-0179.000, dated August 1, 2024. Please find the USD(R&E) response enclosed.

Sincerely,

HONEY,D [REDACTED]
AVID.A [REDACTED]

David A. Honey, PhD

Enclosure:
As stated

Office of the Under Secretary of Defense for Research and Engineering (cont'd)

Department of Defense Office of Inspector General, “Audit of Diversity Actions for the Department of Defense-Funded Science, Technology, Engineering, and Mathematics Education Programs,” Project Number D2022 - D000RK-0179.000

Under Secretary of Defense for Research and Engineering (USD(R&E)) Response to Report Recommendations:

Recommendation A.1: The Department of Defense (DoD) Office of Inspector General (OIG) recommends that the USD(R&E) update the DoD Instruction 1025.11, “Department of Defense Science, Technology, Engineering, and Mathematics (STEM) Education Programs and Activities,” August 21, 2020, to provide the DoD Components with a framework for establishing measurable diversity goals specific to each of their science, technology, engineering, and mathematics education programs, as defined in the DoD Science, Technology, Engineering, and Mathematics Strategic Plan, to assess the effectiveness of these programs.

USD(R&E) Response: The USD(R&E) concurs with Recommendation A.1.

The USD(R&E) is currently working with the DoD Components to update DoD Instruction 1025.11 and will incorporate a framework for establishing measurable diversity goals for DoD STEM programs in the updated Instruction.

Recommendation A.2: The DoD OIG recommends that the USD(R&E) conduct an in-depth review of their recruiting efforts for postsecondary science, technology, engineering, and mathematics education programs. The review should document and distribute best practices for DoD science, technology, engineering, and mathematics recruiting efforts, including the collection of demographic data and methods to assess the effectiveness of actions to increase the diversity of the DoD STEM program applicant pool, as defined in DoD Science, Technology, Engineering, and Mathematics Strategic Plan.

USD(R&E) Response: The USD(R&E) concurs with Recommendation A.2.

The USD(R&E) will conduct an in-depth review of recruiting efforts for postsecondary DoD STEM education programs to identify and document challenges and lessons learned in recruiting efforts for such programs. This review will identify, share, and document best practices in DoD STEM recruiting efforts for postsecondary programs, including capturing participation rates.

Recommendation B.1: The DoD OIG recommends that the USD(R&E) update DoD Instruction 1025.11, “Department of Defense Science, Technology, Engineering, and Mathematics Education Programs and Activities,” August 21, 2020, to require DoD-funded programs to provide annual reports to the DoD Science, Technology, Engineering, and Mathematics Evaluation and Assessment Capability group. The guidance update should include requirements to establish and implement performance measures to track the impact of STEM education programs on the representation of underserved and underrepresented groups in the job applicant pool.

Office of the Under Secretary of Defense for Research and Engineering (cont'd)

USD(R&E) Response: USD(R&E) partially concurs with Recommendation B.1.

The USD(R&E) will work with DoD Components to update DoD Instruction 1025.11 to require DoD Components to annually report on participation rates of underserved and underrepresented groups in the DoD Components' postsecondary STEM programs. The USD(R&E) will explore the feasibility and advisability of including requirements to establish and implement performance measures to track the impact of DoD STEM education programs on the representation of underserved and underrepresented groups in the job applicant pool.

The capacity to directly track DoD STEM program participants into the job applicant pool is limited due to several factors, including child protection laws and related challenges to conducting such data collections; the voluntary nature of data collection; and the fact that DoD STEM programming includes elementary and middle school participants, who may not enter the STEM workforce for more than a decade after participating in STEM programs. Moreover, DoD STEM job applicant data is collected and captured at the individual installation level, which presents significant limitations in capturing this data.

Recommendation B.2: The DoD OIG recommends that, after completion of Recommendation B.1, the USD(R&E):

- Develop a way to track STEM program applicant pool participants that move through the STEM Education Programs after they leave the program.
- Create a system in which to collect the data.
- Run a periodic report based on the data in the system.
- Review the periodic report to make data-informed decisions about actions that the DoD can take to improve the STEM education program-to-job applicant pipeline.

USD(R&E) Response: The USD(R&E) partially concurs with Recommendation B.2.

If the USD(R&E) determines that it is feasible and advisable to establish and implement performance measures to track the impact of DoD STEM education programs on the representation of underserved and underrepresented groups in the job applicant pool in Recommendation B.1, the USD(R&E) will then explore the feasibility and advisability of developing a system to track STEM program participants into the job application pool.

A subset of existing STEM programs currently captures how their program participants move through other STEM educational programs, and the USD(R&E) will incorporate the opportunity to provide this data into the existing annual of data collection through evaluation and assessment capability efforts. However, that the USD(R&E) collects aggregate data from the DoD Components or STEM programs, which leverage a variety of methods and systems to collect such data.

Office of the Under Secretary of Defense for Research and Engineering (cont'd)

**Final
Report Reference**

USD(R&E) Requested Corrections (noted in **bold red):**

- **Report Page 2:** In May 2022, the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) issued an **internal to DoD** implementation plan in alignment with the DoD STEM Strategic Plan. The purpose of the implementation plan was to document the intent of DoD STEM Strategic Plan, highlight exemplary programs, and compile data on DoD's efforts to date toward achieving the DoD STEM Strategic Plan. In addition, the implementation plan highlighted specific areas for improvement to achieve the broad goals and objectives of the five-year DoD STEM Strategic Plan.
 - Justification: The proposed report on DoDIG Project D2022-D000RK-0179.000 will be publicly released and the DoD STEM implementation plan is not approved for public release.

- **Report Page 9:** "Prioritized university engagement with **institutions with** historically underserved **groups institutions**"
 - Justification: The term "historically underserved institutions" was used in the original report from where the DoDIG pulled Science, Mathematics, and Research for Transformation (SMART) data. However, in the final report, this term was updated to be institutions with "historically underserved groups," which is more representative of the targeted institutions of interest.

- **Report Page 11:** "However, according to the Director of **DoD STEM the Basic Research Office**, the OUSD(R&E) relies on DoD Components to establish measurable goals for programs."
 - Justification: This comment is currently attributed to the incorrect DoD representative.

- **Report Page 14:** "However, in Fiscal Year (FY) FY 2021, minority race and ethnic STEM program applicants made up **38 percent 28.5** percent of the STEM program applicant pool, while in FY 2022, minority race and ethnic STEM program applicants made up **40 percent 27.7** percent of the STEM program applicant pool."
 - Justification: The FY 2021 and FY 2022 minority applicant data currently included in this report from the SMART program were adjusted from their original source by the DoDIG officials. The DoDIG officials removed the Asian demographic numbers from the reported SMART FY 2021 and FY 2022 applicant data for this report to align with the DoD STEM Strategic Plan definition of underserved and underrepresented populations in STEM. However, the 45 percent goal cited by the SMART program was inclusive of Asian demographics, as the program's stated goal is "at least 45 percent of STEM program applicants identify as a minority race or ethnicity," not "racial and ethnic minorities who are historically underrepresented in STEM." Accordingly, it is inaccurate to capture the goal and revised FY 2021 and FY 2022 numbers and report both as

**Report Page 2:
Added suggested
editorial change**

**Report Page 9:
No Action Taken
to suggested
editorial change**

**Report Page 11:
Added suggested
editorial change**

**Report Page 14:
Revised suggested
editorial change**

**Report Page 14:
Revised suggested
editorial change**

Office of the Under Secretary of Defense for Research and Engineering (cont'd)

Final Report Reference

- “Applicants Self-Identified as a Minority Race or Ethnicity” as listed in Figure 2 and in the descriptive text cited above.
- Should the DoDIG officials elect to move forward with the revised numbers in the report, the values should instead be described as “applicants self-identified as a minority race underrepresented in STEM” and the overall SMART program goal should be adjusted to reflect a corresponding removal of Asian demographics, which would be less than 40 percent. We also request that the DoDIG officials note in the report that this adjustment was made by the DoDIG officials, as it does not accurately reflect SMART program goals.
 - Report Page 17: “The OUSD(R&E) has taken steps to address the framework. According to an OUSD(R&E) official, the OUSD(R&E) hosts quarterly meetings of the STEM Advisory Council Working Group and the Evaluation and Assessment Capability Working Group. ~~The DoD STEM Implementation Plan states the Evaluation and Assessment Working Group will meet on a quarterly basis.~~”
 - Justification: This statement is redundant from the previous one, and the future tense in the removed sentence is inaccurate, as the Evaluation and Assessment Capability Working Group has met quarterly since 2019.

Report Page 16: Deleted suggested editorial change

Office of the Under Secretary of Defense for Research and Engineering (cont'd)

Consolidated Coordination Sheet

URE000661-24

Draft Report for the Department of Defense Office of Inspector General, "Audit of Diversity Actions for the Department of Defense-Funded Science, Technology, Engineering, and Mathematics Education Programs,"
Project Number D2022 – D000RK-0179.000

Coordinating Office	Coordinator's Name and Duty Title	Date	Comments
OASD(S&T)	[REDACTED]	9/10/2024	concur
GC	[REDACTED]	September 10, 2024	Concur as revised.
DASD S&T FOU	[REDACTED]	10 SEP 2024	Concur
ST-FUT-BRO	[REDACTED]	8/26/24	Concur as written

Other versions of this consolidated coordination sheet are obsolete

July 24, 2024

Acronyms and Abbreviations

AEOP	Army Educational Outreach Program
CAE-CO	The Centers of Academic Excellence in Cyber Operations
COMPETES	Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science
CoSTEM	Committee on STEM Education
LEGACY	Leadership Experience Growing Apprenticeships Committed to Youth
MDA	Missile Defense Agency
NCAE-C	National Centers of Academic Excellence in Cybersecurity
NGA	National Geospatial-Intelligence Agency
NREIP	Naval Research Enterprise Internship Program
NSA	National Security Agency
OUSDR&E	Office of the Under Secretary of Defense for Research and Engineering
SMART	Science, Mathematics, and Research for Transformation
STEM	Science, Technology, Engineering, and Mathematics
U.S.C.	United States Code
VSP	Visiting Scientist Program



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