WHAT IS THE STEM PIPELINE?

The Science, Technology, Engineering, and Mathematics (STEM) pipeline describes the process of capturing the imagination and preparing individuals for engaging and contributing to the aerospace community through the sciences, engineering, and advanced technology disciplines. It begins in grade school, advances in middle and high school, becomes specialized in college and graduate school, and extends to trade schools, certificate programs, and military training.

The future of the aerospace and defense (A&D) sector depends on a diverse, science- and technology-literate population, and ultimately a properly skilled workforce. These workers form the backbone of an A&D industrial base that the United States and its allies count on to provide sustained innovation, economic growth, global competitiveness, and national security. However, there is mounting widespread concern that the A&D sector faces a skills gap that will threaten the American industry’s ability to perform and remain competitive worldwide, potentially leading to a national workforce crisis.

The A&D sector needs a robust STEM pipeline to maintain the industrial skillset—ensuring that the workforce is available to meet the science and technology challenges in this new decade, while compensating for ongoing retirements and competing business sectors such as finance and commercial services.

CURRENT TRENDS

› A&D companies increased hiring >70% from 2017 to 2018 and planned to hire more than 55,000 new employees in 2019—significant growth in the industry.

› The workforce is predominately Caucasian (60%) and male (76%).

› Underrepresented minorities, such as African Americans (6% of A&D workforce) or Latinos/Hispanics (7% of A&D workforce), report becoming interested in STEM much later than those from other populations.

› The percentages of women and ethnic minorities working in A&D have not changed significantly for almost five decades, despite outreach and policy support and dedicated efforts focusing on diversity and inclusion.

CONTINUING CHALLENGES

Building and maintaining the nation’s 21st-century skilled A&D workforce continues to be a concern. Challenges remain for employers in federal, state, and local governments; industry; and academic institutions to:

› Increase diversity and foster inclusion by encouraging women and underrepresented minority group members to pursue careers in the A&D industry.

• Many members of the A&D industry report interest by third grade so maintaining resources and encouragement in the K-12 educational environment is important.

• Continue to focus on STEM exposure for students of all populations, regardless of gender, race, or socioeconomic status at an early age.

• Current outreach to recruit new hires with previous active duty military service has not translated into an increase in the percentage of these veterans entering the A&D workforce.

› Ensure that current education and training programs evolve so they stay aligned with a modern and ever-changing workplace.

• Rapidly evolving technology in A&D calls for new technical skills in the workforce and courses for upskilling and learning. Some companies have introduced advanced tools and tuition reimbursement programs for their employees, while at other companies increased funding is not available and participation has fallen slightly.

• Fostering strong partnerships between industry and educational institutions—such as internships, apprenticeships, and cooperative education—continues to nurture interest, expose students to the A&D industry, and create access to educational and career opportunities.

• Ensuring that trade school programs have enough qualified instructors and modern infrastructure to prepare the highly skilled workers needed for the A&D industry.

› Encourage and support K-12 educational environments to include more aerospace-relevant topics.

• Current K-12 education is slowly evolving to include more science- and engineering-type training; however, many challenges continue to exist regarding incorporating “aerospace” topics within these curriculums.

• Falling costs of spacecraft hardware (e.g., CubeSats) and a wealth of publicly available educational material (from NASA and on the Internet) can enable teachers to bring aerospace into classrooms, but challenges still exist in connecting established curriculums with A&D-specific STEM opportunities.

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