STEM PIPELINE



WHAT IS THE STEM PIPELINE?

The Science, Technology, Engineering, and Mathematics (STEM) pipeline describes the process of capturing the imagination and preparing individuals – of all ages – 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 (S&T) literate population, and ultimately a properly skilled workforce. These workers form the A&D industrial base backbone that the United States and its international partners count on to provide sustained innovation, economic growth, global competitiveness, and national security. However, there is a concern that a skills gap within the A&D sector will threaten the U.S. 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 S&T challenges in this new decade, including attracting talent from competing business sectors, and sustaining operations and S&T through the COVID-19 pandemic.

CURRENT TRENDS

- ➤ The A&D industry added approximately 110,000 jobs in 2019, a 4.8% increase to nearly 2.2 million strong.¹ For 2020, the impact due to the COVID-19 pandemic is still being quantified.
- **>** 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 significant concern that has been exacerbated by the global pandemic. 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 minorities to pursue careers in the A&D industry.
 - Many members of the A&D industry report interest by third grade so investing resources in the K-12 educational environment is vital.
 - Continue to focus on STEM exposure for students of all populations at an early age, regardless of gender, race, or socioeconomic status.
 - 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 requires new technical skills in the workforce and courses for upskilling and learning.
 - Strong partnerships between industry and educational institutions—such as internships, apprenticeships, and cooperative education—nurture interest, expose students to the A&D industry, and create access to educational and career opportunities.
 - Trade school programs should have enough qualified instructors and modern infrastructure to prepare highly skilled workers for the A&D industry.
 - Adoption and alignment of online educational and training resources that were required as a result of the COVID-19 pandemic.
- > Encourage and support K-12 educational environments to use readily available online STEM curriculum repositories that include aerospace-relevant topics.
 - Provide a mechanism to overcome the challenges of incorporating "aerospace" topics within K-12 educational curriculums, including more science- and engineering-type training.
 - Aerospace can come to the classroom through affordable spacecraft hardware (e.g., CubeSats) and STEM educational material, but challenges remain in tailoring the content for educators and established curriculums.

 $1\ https://www.aia-aerospace.org/wp-content/uploads/2020/09/2020-Facts-and-Figures-U.S.-Aerospace-and-Defense.pdf$



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