



STRATEGIC PLAN TO IMPROVE REPRESENTATION OF VETERANS AND MILITARY SPOUSES IN STEM CAREERS

A Report by the
INTERAGENCY WORKING GROUP ON VETERANS
AND MILITARY SPOUSES IN STEM
FEDERAL COORDINATION IN STEM EDUCATION SUBCOMMITTEE
COMMITTEE ON STEM EDUCATION
of the
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

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About this Document

In February 2020, the *Supporting Veterans in STEM Careers Act* was signed, which seeks to promote veteran and military spouse involvement in STEM education, computer science, and scientific research. In this Act, Congress directed the White House Office of Science and Technology Policy to establish an Interagency Working Group and develop and facilitate the implementation of this strategic plan to support Veterans, service members, and military spouses in STEM education and careers.

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Abbreviations and Acronyms

AJC	American Job Center
CIP	classification of instructional program
DoD	Department of Defense
DOE	Department of Energy
DOL	Department of Labor
ED	Department of Education
IWG	Interagency Working Group
MOC	military occupation classification
MOS	military occupational specialty
MOU	memorandum of understanding
NSF	National Science Foundation
NSTC	National Science and Technology Council
OMB	Office of Management and Budget
OPM	Office of Personnel Management
OSTP	Office of Science and Technology Policy
OVP	Office of the Vice President
R&D	research and development
S&E	science and engineering
SBA	Small Business Administration
STEM	Science, Technology, Engineering, and Mathematics
STW	skilled technical workforce
TAP	Transition Assistance Program
U.S.	United States
VA	Department of Veterans Affairs

Introduction

Science, Technology, Engineering, and Mathematics (STEM) provide the foundation for innovation, research and development, and technological achievements that have helped the United States remain global leaders and develop the world's most competitive economy. As the Federal government issues executive actions and enacts legislation, in combination with coordinated public and private actions, STEM innovation and the STEM workforce drive the transition into an economy designed for the 21st century. As new skillsets and paradigms emerge, steps are necessary to ensure STEM education maps to and supports expanded entry into STEM careers today and those of the future.

In February 2020, the Supporting Veterans in STEM Careers Act¹ was signed, seeking to improve representation and equity of Veterans and military spouses in STEM fields. The Act directed the White House Office of Science and Technology Policy (OSTP) to develop and facilitate the implementation of a strategic plan to support Veterans, service members, and military spouses in STEM education and careers by establishing an Interagency Working Group (IWG) to coordinate efforts across the Federal government. This resulting strategic plan addresses points of intersection between STEM education and barriers to growing the domestic STEM workforce, as well as changing conditions that could positively influence the employment of Veterans and military spouses. This strategy identifies overarching goals and specific actions the Federal government can take to help address barriers that Veterans, transitioning service members, and military spouses experience pursuing STEM education and careers, and proposes workforce investments that fuel expansion of science and engineering to maintain global leadership in research and development (R&D).

Background

STEM

The number of degrees awarded in science, engineering, and related fields has increased steadily during the last two decades² and is one of the most common pathways to pursuing a STEM career. The majority of workers in science and engineering occupations (~75 percent) hold a bachelor's or advanced degree, compared to 31 percent of workers in all other occupations.³ The demand for a U.S. STEM workforce is projected to increase by 8 percent between 2019 and 2029, compared to a projected increase in employment in non-STEM occupations of 3.7 percent.⁴

Beyond four-year degrees, there is also a need for competency-based STEM pathways, skills-based training, apprenticeships, work-based learning, certification programs, cooperative education experiences, or on-the-job training programs that meet current and future careers. According to the U.S. Bureau of Labor Statistics, 5 of the top 10 occupations that are projected to grow the fastest from 2019-2029 require some level of postsecondary education or training,⁵ and six of the top ten are in the healthcare sector.⁶ The skilled technical workforce (STW), which consists of individuals who use science and engineering skills in their occupations but do not have a bachelor's degree, is a vital complement⁷

¹ [H.R.4323 - 115th Congress \(2017-2018\): Supporting Veterans in STEM Careers Act | Congress.gov | Library of Congress](#)

² <https://www.nsf.gov/statistics/2018/nsb20181/report/>

³ <https://www.nsf.gov/statistics/2018/nsb20181/report/>

⁴ <https://www.bls.gov/emp/tables/stem-employment.htm>

BLS includes "computer and mathematical, architecture and engineering, and life and physical science occupations, as well as managerial and postsecondary teaching occupations related to these functional areas and sales occupations requiring scientific or technical knowledge at the postsecondary level" in its definition of STEM. <https://www.bls.gov/oes/topics.htm#stem>

⁵ <https://www.bls.gov/news.release/pdf/ecopro.pdf>

⁶ https://www.bls.gov/emp/images/growing_occupations.png

⁷ <https://www.nationalacademies.org/our-work/the-supply-chain-for-middle-skill-jobs-education-training-and-certification-pathways>

to the development of a more diverse and inclusive U.S. STEM workforce.⁸ These occupations are a key part of the nation's workforce, and maintaining the proper mix of skills is essential for a competitive economy.⁹ A National Academies of Sciences, Engineering, and Medicine report estimated a shortfall of 3.4 million skilled technical workers by 2022.¹⁰

The strategy provided here acknowledges a multi-faceted definition of STEM occupations enabling identification of opportunity for Veterans and military spouses with a range of backgrounds and prior experience in science and technology to participate in the STEM education and workforce programs.

For the purposes of this plan, *STEM Degree Fields* are defined as degree fields including the life and physical sciences, engineering, computer science and mathematics, information technology and cybersecurity, the social sciences, health and medicine, innovation and entrepreneurship, and other areas of study requiring scientific or technical knowledge.¹¹ *STEM Occupations* are defined as occupations that include a broad set of occupations that are an aggregation of the National Science Foundation's Science & Engineering (S&E) occupations, S&E-related occupations, and occupations in the Skilled Technical Workforce (STW).¹² Most S&E and S&E-related occupations require higher education degrees for entry. S&E occupations include life and physical scientists, computer and mathematical scientists, engineers, social and related scientists, and science and engineering postsecondary teachers. S&E-related occupations include science and engineering managers, science and engineering technologists, health-related occupations and science and engineering precollege teachers, among others. The STW includes occupations that require science and engineering skills, but that do not require a bachelor's degree. The STW includes occupations in construction, extraction, production, installation, maintenance, repair, and many others that are not included in the definitions of S&E or S&E-related occupations.

Veterans and Military Spouses in STEM

Veterans and military spouses offer one way to increase the technical capabilities of the U.S. workforce by leveraging the investment our Nation has already made in training its military members for technical occupations and by supporting STEM-trained military spouses' retention in the workforce.

Many Veterans have knowledge, skills, and abilities relevant to STEM occupations and careers resulting from their STEM-intensive military training and experience. Approximately 200,000 service members transition from military to civilian life each year, resulting in more than 8 million Veterans currently in the labor force.¹³ A recent analysis from the Institute for Veterans and Military Families found about 8 percent of the Veteran workforce were employed in STEM occupations compared to 6 percent of the non-Veteran workforce.¹⁴ The National Center for Science and Engineering Statistics (NCSES) found that while an equal percentage (approximately 43%) of Veterans and non-Veterans pursue science and engineering related majors, Veterans more frequently seek computer science, information technology, or engineering degrees than non-Veterans.

⁸ <https://www.nsf.gov/nsb/publications/2019/nsb201923.pdf>

⁹ <https://www.nsf.gov/nsb/publications/2019/nsb201923.pdf>

¹⁰ <https://www.nap.edu/catalog/23472/building-americas-skilled-technical-workforce>

¹¹ <https://www.ice.gov/sites/default/files/documents/Document/2016/stem-list.pdf>

¹² <https://nces.nsf.gov/pubs/nsb20198/>

¹³ <https://www.census.gov/content/dam/Census/library/publications/2020/demo/acs-43.pdf>

<https://benefits.va.gov/TRANSITION/docs/mct-report-2018.pdf>

¹⁴ <https://ivmf.syracuse.edu/article/enhancing-veterans-access-to-stem-education-and-careers/>

In the analysis completed by the Institute for Veterans and Military Families, STEM occupations are defined to include professional and technical support occupations in science, technology, engineering, mathematics, and life and physical sciences.

There are currently more than 600,000 active duty military spouses.¹⁵ Nearly 40 percent of military spouses have a college degree (two-year, four-degree, or advanced degree) compared to 30 percent of the U.S. working age population, and approximately 15 percent of military spouses have an advanced degree.¹⁶ Though advanced degrees are required for many high-skill STEM jobs, higher degree attainment is correlated with higher unemployment and underemployment among military spouses.¹⁷ In 2019, the unemployment rate among all military spouses was 22 percent¹⁸ compared with the national average of 3.6 percent,¹⁹ and approximately two-thirds of military spouses faced underemployment.²⁰ The majority of military spouses experience at least three moves during the military careers of their spouses, and they are ten times more likely to relocate across state lines than their civilian counterparts.²¹ Increasing opportunities for military spouse employment could also improve military readiness, retention, and recruitment, as the stress that unemployment creates in military families impacts a family's decision to leave or remain in the military.²²

Problem Statement

STEM fields are increasingly important to the Nation's future economic, scientific, and national security posture and the U.S. workforce faces shortages of qualified personnel. Veterans and military spouses offer one means to expand the STEM workforce. However, supporting their increased participation in the STEM workforce requires related but distinct solutions addressing challenges and leveraging opportunities.

Legislative Charge

The *Supporting Veterans in STEM Careers Act*²³ was signed into law in February 2020. It seeks to improve Veteran and military spouse representation and access in STEM fields. In this Act, Congress directed OSTP to establish an IWG to develop and facilitate the implementation of a strategic plan to support Veterans, service members, and military spouses in pursuing STEM education and careers.

The *Supporting Veterans in STEM Careers Act* specifies that this strategic plan should:

- Identify barriers Veterans face in reentering the workforce;
- Identify barriers military spouses face in establishing careers in STEM fields;
- Specify short- and long-term objectives;
- Describe the approaches that each participating agency will take;
- Specify common metrics that will be used by Federal agencies to measure progress toward objectives; and
- Identify barriers requiring Federal or State legislative or regulatory changes.

¹⁵ <https://www.militaryonesource.mil/data-research-and-statistics/military-community-demographics/2018-demographics-profile>

¹⁶ <https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/05/Military-Spouses-in-the-Labor-Market.pdf>

¹⁷ <https://www.uschamberfoundation.org/reports/military-spouses-workplace>

¹⁸ <https://www.uschamberfoundation.org/reports/military-spouses-workplace>

¹⁸ <https://download.militaryonesource.mil/12038/MOS/Infographic/OPA-Military-Families-Spouse-Employment-and-Education-2019-Survey-of-Active-Duty-Spouses.pdf>

¹⁹ <https://www.bls.gov/opub/ted/2019/unemployment-rate-unchanged-at-3-point-6-percent-in-may-2019.htm>

²⁰ <https://www.uschamberfoundation.org/reports/military-spouses-workplace>

²¹ [https://ivmf.syracuse.edu/wp-](https://ivmf.syracuse.edu/wp-content/uploads/2019/10/ForceBehindtheForce.BusinessCaseforLeveragingMilitarySpouseTalentACC_02.21.18.pdf)

[content/uploads/2019/10/ForceBehindtheForce.BusinessCaseforLeveragingMilitarySpouseTalentACC_02.21.18.pdf](https://ivmf.syracuse.edu/wp-content/uploads/2019/10/ForceBehindtheForce.BusinessCaseforLeveragingMilitarySpouseTalentACC_02.21.18.pdf)

²² <https://www.uschamberfoundation.org/reports/military-spouses-workplace>

²³ <https://www.congress.gov/116/plaws/publ115/PLAW-116publ115.pdf>

Strategic Vision

Vision

A U.S. ecosystem that enables military spouses and Veterans to be fully engaged in a mobile, highly technical, and malleable STEM workforce designed to advance our Nation's global leadership and economic development.

Mission

Increase the representation and equity of Veterans and military spouses in STEM occupations and careers through targeted government programs that support access to and affordability of STEM educational pathways and the development of skillsets portable across geographic regions.

Changing Conditions

- In the last couple of years, innovative technical solutions, along with flexible workplace rules, have significantly enabled remote work for many Americans. This shift has the potential to reduce many of the traditional barriers experienced by Veterans and military spouses pursuing STEM careers.
- Labor needs in certain industries require the country to prioritize STEM positions such as technologists, software coders, and analysts.
- International competition with China and supply-chain challenges highlighted during the COVID-19 pandemic response are driving the need for highly technical workforces to support reclaiming the manufacturing footprint in the U.S.
- In addition to traditional STEM pathways that yield four-year or advanced degrees, and in order to meet evolving workforce and industry needs, the employment opportunities offered must align with the experiential training opportunities, short-term credentialing, and two-year degree options available for Veterans and military spouses.

Barrier Analysis for Target Populations

Stakeholder analysis was completed by conducting 27 listening sessions with various Federal program representatives and six listening sessions with individuals engaged in this area. These listening sessions provided themes on common barriers faced by Veterans and military spouses when entering or returning to the STEM workforce, as well as actions that can be taken to address them. Themes from the stakeholder analysis are available in [Appendix 2](#). Themes from the listening sessions are listed below.

Target Population: Veterans

Veterans experience vastly different transitions from the military to civilian life based on their location, training, education level, timeframe for transition, and personal situations. To understand barriers and optimize solutions, the population of Veterans should be further stratified into multiple subgroups including: officer/enlisted, with and without a bachelor's degree, immediate or delayed entry into additional schooling, geographical proximity to STEM jobs, etc. For example, officers are required to have four-year degrees (often science or engineering in nature) and many have advanced degrees prior to achieving their rank. Therefore, they may not face as many barriers entering post-secondary STEM career paths following their service. For enlisted Veterans, many have experience relevant to STEM occupations and careers resulting from their STEM-intensive military training, applied experiences, and formal (but uncertified) education. Military experience, when it does translate formally with industry established standards, often results in lower-level certifications, such as in the case of the combat medic's level of practice being dramatically limited in the civilian sector to that of an Emergency

Medical Technician-B. There are some programs that crosswalk skills from military occupations to civilian job types. Those systems, knowledge of them, and access to them by end users vary. Many home-grown lists of resources are used at bases and Veteran-affiliated groups, but the onus remains largely on the Veteran to navigate and ask for the right resources, disproportionately affecting enlisted Veterans or those outside of college programs. Geographic mobility remains a hindrance for the number and types of jobs available, as well as the ability to relocate in support of personal and family circumstances.

Figure 1: STEM Career and STEM Education Barriers for Veterans

Barriers to STEM Careers (Veterans)	Barriers to STEM Education (Veterans)
<ol style="list-style-type: none"> 1. Geographic constraints may limit accessibility of some careers 2. Employers may not possess an understanding of the value Veterans bring to the workplace or not know how to effectively recruit them 3. How to map from a military occupational specialty to a civilian career path is unclear 4. Multifaceted challenges with re-licensure when relocating to a new location 5. Altered social and psychological support networks compared to military duty stations 	<ol style="list-style-type: none"> 1. Multifaceted challenges with financing higher education 2. Lack of awareness of pathways to STEM education and careers and how to navigate them 3. Challenges translating education and skills gained during military service into STEM education or careers 4. Few STEM-specific programs for Veterans 5. Existing programs for Veterans may not emphasize STEM careers or communicate how to enter STEM 6. Existing transition support programs for service members & Veterans may not emphasize STEM education or careers

Target Population: Military Spouses

Military spouses in STEM may have advanced degrees or specialized training for occupations with limited employment opportunities near military installations, which are often located in rural or geographically remote areas. Many military spouses experience barriers to employment due in large part to frequent relocation during their spouse’s military service, particularly when the active duty member attends short-term military training (e.g., basic schools, or career courses). Military families relocate every two to three years on average with limited choice of location, often intensified as active duty spouses specialize in their mid to late career. Those moves are at times across State lines—or overseas, and may not have proximity to STEM jobs in their career field. Other STEM occupations, including those in health care, require licensure or certifications on a State-by-State basis. Additionally, the prospect of relocation can hinder the likelihood that companies will offer employment to military spouses. While there are services and programs to help military spouses overcome these broader problems, few address the specific challenges to gaining and maintaining STEM employment.

Figure 2: STEM Career and STEM Education Barriers for Military Spouses

Barriers to STEM Careers (Military Spouses)	Barriers to STEM Education (Military Spouses)
<ol style="list-style-type: none"> 1. Challenges maintaining employment through frequent relocations, especially if overseas 2. Geographic constraints may limit accessibility to some careers 3. Lack of flexible work schedules 4. Lack of remote work opportunities 5. Lack of broadband infrastructure in more remote areas can impact/hinder existing remote/portable work opportunities 6. Challenges with re-licensure following relocation across State lines, which is required for some STEM fields 	<ol style="list-style-type: none"> 1. Lack of understanding of how to navigate STEM education and career pathways as a military spouse 2. Lack of STEM specific programs to support military spouses in STEM education and careers 3. Infrastructure may impact ability to work in STEM fields in some geographic locations 4. Lack of remote work opportunities

Overview of the Goals to Address Barriers

The Interagency Working Group on Veterans and Military Spouses in STEM identified four high-level goals that can be used to focus progress in overcoming the barriers, with specific actions necessary to achieving these goals. The identified goals in this strategic plan are focused around efforts to facilitate entry into, or advancement of, STEM careers, with the idea that knowledge and skills gained via competency-based and education-based pathways may be stackable and help promote career advancement. Efforts to develop STEM career pathways with flexibility and portability are key to overcoming barriers Veterans and military spouses face in pursuing STEM opportunities. The Actions listed below are identified as applying to either Veterans, military spouses, or both. Appendix 3 expands on these actions to include: 1) short and long-term objectives, 2) metrics, and 3) applicable agencies.

Goal 1. Align STEM Education and Employment Resources with Industry Needs

Building the STEM workforce of the future requires a disproportionate increase in select positions such as artificial intelligence/machine learning, coders, data scientists, etc., when compared to traditional STEM fields of focus. In addition, many STEM jobs are also optimally suited for translation between military occupational specialty and civilian industry positions and leverage modernized credentialing to rapidly gain national certifications. Combined, the shifts driven by this goal offer both security and industrial resilience, particularly in the COVID-19-era, where mobility is newly available within these in career paths. Lastly, this goal centers on what the government can do to leverage existing data on current skillsets and degrees, in order to identify STEM needs and enhance movement of Veterans and military spouses into select STEM fields best aligned to be a part of the STEM workforce.

Action	Goal 1. Align STEM Education and Employment Resources with Industry Needs
1.1	Assess availability of data on Veterans and military spouses [Both]
1.2	Identify best practices for including STEM content in Veterans and military spouses programs [Both]
1.3	Assess and update STEM education programs to reflect industry needs [Both]
1.4	Enable crossover from existing STEM careers to emerging and in-demand STEM careers [Both]
1.5	Enhance competency-based programs (STW) [Both]

Goal 2. Enable Mobility and Resilience within STEM Pathways

Veterans and military spouses are an inherently mobile workforce. Enhancing their engagement in STEM requires prioritization of topical and geographical malleability among STEM workers. This goal enables that capability by prioritizing interoperable learning records, short-term credentials, and credit transfers among higher education institutions to help eliminate lost training resulting from mobility. This goal also focuses on empowering those with STEM careers to transfer certifications to new locations, while simultaneously developing systems solutions to limit career gaps linked to the logistics of geographical moves. Among other actions, this goal includes efforts to promote industry engagement on developing transferable certifications across similar technical jobs within the STEM workforce.

Action	Goal 2. Enable Mobility and Resilience within STEM Pathways
2.1	Evaluate data to inform policy making [Both]
2.2	Support transfer of licenses and credentials [Both]
2.3	Evaluate and optimize all STEM programs around mobility [Both]
2.4	Build capability of universal recognition of skills and credentials [Both]

Goal 3. Streamline Connections with Existing Federal Government STEM Programs

Many Federal departments and agencies provide programs to support service members, Veterans, and military spouses as they pursue STEM employment. A subset of these programs has STEM components that specifically help Veterans or military spouses pursue STEM education or occupations. The wide-ranging nature of these existing programs and partnerships helps address the diversity of needs; however, it also presents challenges in maintaining awareness and coordinating efforts across this space. Coordination across these disparate programs and associated data sources is required to track progress in addressing barriers for Veterans and military spouses and to inform areas to focus improvement efforts.

Action	Goal 3. Streamline Connections with Existing Federal Government STEM Programs
3.1	Assess for alignment of data on programs; create/localize programs to a Federal inventory [Both]
3.2	Align existing Veterans programs [Veterans]
3.3	Promote and expand existing military spouse programs [Military Spouses]
3.4	Visualize/centralize data in one place [Both]

Goal 4. Enhance Non-governmental STEM Partnerships

The work of supporting Veterans and military spouses relies heavily on a strong network of partnerships between the Federal government and private industry, non-profit organizations, and educational institutions, among others. Efforts to leverage local partnerships, particularly those near military installations, can help create pipelines from military training to STEM careers that utilize job-connected competency-based training opportunities or higher education. Partnerships with industry are essential to removing the barriers military spouses and Veterans face in joining, remaining within, and becoming fully contributory members of the STEM workforce. By coordinating across Federal departments and agencies, and sharing partnership-related best practices, the government can help identify areas to establish new partnerships or expand existing ones. It can also tailor government and industry partnerships, in alignment with Goal 1, to advance the U.S. research and development capabilities in addition to supporting individual Veterans and military families.

Action	Goal 4. Enhance Non-governmental STEM Partnerships
4.1	Create and leverage partnerships [Both]
4.2	Leverage existing initiatives (such as Joining Forces) for additional ways to convene and partner with organizations. [Both]
4.3	Organize unified outreach plans [Both]

Implementation

Following the release of this Strategic Plan, the Interagency Working Group (IWG) on Veterans and Military Spouses in STEM plans to develop an implementation plan. Development of the implementation plan will also include review and update of the actions listed in Appendix 3. All actions, short-term and long-term objectives, and metrics may be updated during implementation plan development and at iterative review to ensure the effort utilizes the best resources and tools available.

Updates on the progress of implementing this Plan will be reported as part of the annual CoSTEM Progress Report.

Conclusion

The United States faces a critical need to maintain and strengthen the STEM capabilities of the U.S. workforce. By leveraging prior Federal investment in the training of military service members and reducing the barriers for Veterans and military spouses to pursue STEM careers, shortages in the STEM workforce can be filled, and military families who have served our Nation will be able to obtain high quality employment consistent with their chosen career path. This strategic plan outlines four main goals as well specific actions that will be used to support Veterans and military spouses in their pursuit of STEM careers. Achieving the goals of this strategic plan will require continued collaboration across the Federal government, as well as engagement with non-Federal stakeholders, such as employers, educational institutions, and non-profits.

Appendix 1. Glossary of Key Terms

The following descriptions offer additional detail and explanation for key terms used throughout this strategic plan. The context that these descriptions provide are indicative of the scope of this plan and contribute to shared guiding principles for Federal agencies to use as they implement this plan.

Action – For the purposes of this strategic plan, an action is a step that Federal agencies can take in support of achieving one or more goals of the strategic plan.

Career – For the purposes of this plan, a career refers to a trajectory of occupations or jobs that includes opportunities for growth and development over time.

Education and Career Counselors – For the purposes of this plan, education and career counselors refer to individuals who advise and support service members, Veterans, and military spouses in pursuing STEM education or careers.

Goal – A desired result of the strategic plan that is enabled by actions. There are four central goals of this strategic plan.

Military Spouse – A spouse of current and veteran members of the Armed Forces, including the Army, Navy, Marine Corps, Air Force, Space Force, Coast Guard, National Guard, and Reserves.

Occupation – A job, profession, or type of work.

Pathway – For the purposes of this plan, a pathway refers to a possible route that an individual can take or complete in pursuit of a STEM occupation or career. This plan acknowledges that there are a multitude of possible pathways that one can use to pursue a STEM occupation or career, but focuses on two types of pathways – competency-based pathways and higher education-based pathways.

Competency-Based Pathways – Routes to STEM occupations and careers that involve skills-based learning, apprenticeships, on-the-job training, and/or similar opportunities. Individuals who pursue these competency-based pathways do not necessarily need to acquire bachelor's degrees for meaningful employment.

Education-Based Pathways - Routes to STEM occupations and careers that involve the pursuit and completion of an associate's, bachelor's, or advanced degree.

Program – For the purposes of this plan, a program refers to an education or training activity that is STEM-related and/or that supports service members, Veterans, and/or military spouses. Programs can count towards a degree, certificate, or license, and can include skills-based training. Programs of interest for this strategic plan involve those which have or could have a STEM component and those that are or could be available to Veterans, service members, and/or military spouses.

Science, Technology, Engineering, and Mathematics (STEM) – STEM is an acronym referring to science, technology, engineering, and mathematics. This plan uses STEM to refer broadly to a range of technical degree fields and occupations such that it will be inclusive of the different definitions for STEM that Federal agencies in differing contexts.

Service Members – Currently serving members of the Armed Forces, including the Army, Navy, Marine Corps, Air Force, Space Force, Coast Guard, National Guard, and Reserves.

Skilled Technical Workforce (STW) – Occupations that require STEM skills but are largely made up of individuals who do not have bachelor's degrees.

Stakeholders – For the purposes of this plan, stakeholders include Veterans, service members, military spouses, Federal agencies, and non-Federal entities including non-profits, educational institutions, employers, and state and local governments.

Transition – For the purposes of this plan, transition is generally used to refer to the transition from military service to civilian careers. In the context of the plan, this includes preparation for post-service education or employment that may begin as early as the start of military service.

Veterans – Honorably discharged members of the Armed Forces, including the Army, Navy, Marine Corps, Air Force, Space Force, Coast Guard, National Guard, and Reserves.

Appendix 2. Themes from Stakeholder Analysis

<p>Common themes heard from listening sessions pertaining to Veterans include:</p> <ul style="list-style-type: none"> • In the midst of transition, Veterans experience a plethora of changes causing them to not be able to take advantage of opportunities while balancing a location change, required transition courses, and family needs. This can be overwhelming and prevent Veterans from taking full advantage of benefits. • Receiving credit for military skills and education would help Veterans more efficiently pursue STEM careers. • Pursuing STEM degrees often takes longer than non-STEM degrees and Veterans experience a lack of resources to complete them. • Public-private partnerships are critical to the success of these programs and improvement is needed in helping industry recognize the STEM skills Veterans have to offer. • Existing courses focused on transition could include or expand existing STEM content. • There is strong interest in the expansion of stackable STEM credentials. • Veterans do not often recognize how their military-trained skills translate into STEM careers, and internships can help them better understand how their skills are used in the civilian workforce.
<p>Common themes heard from listening sessions pertaining to military spouses include:</p> <ul style="list-style-type: none"> • Military spouses face a perception in the workforce that they will not be in the same location for a long period of time causing them to be underemployed or unemployed. • Military spouses commonly work in health care and carrying health care licensures across state lines is often an issue for military spouses due to the lack of reciprocity. The pandemic has provided more opportunities for remote work. • Promoting careers that are portable, remote or Federal jobs would be beneficial for military spouses. • Gaining direct feedback from military spouses is essential to further develop and improve Federal STEM programs to become accessible. • Military spouses receive a significant amount of content about careers and programs that can make it feel overwhelming.
<p>Common themes heard from listening sessions pertaining to both Veterans and military spouses:</p> <ul style="list-style-type: none"> • Existing programs for Veterans and military spouses can include or expand STEM content. • Some existing programs can expand eligibility, e.g. include military spouses, allow pursuit of advanced STEM degrees, etc. • Veterans and military spouses have access to much information to help them make decisions about civilian life following service, but it is not located in one place making it difficult to find.

Appendix 3. Integrated Solutions

The barriers identified in this strategic plan are focused on elements that are preventing the ideal future state where military spouses and Veterans have easy entry into STEM and the ability maintain a STEM career regardless of permanent change of station of geographical location. Each goal has actions that Federal departments and agencies may take. This table also indicates which Federal agencies could address each barrier of the plan, which population the action applies to [Veterans, Military Spouses, Both], along with metrics to measure progress toward achieving the actions. All actions, short- and long-term objectives—annotated as [S] or [L], and metrics may be updated to ensure the effort utilizes the best resources and tools available at all points in time.

<p>Actions for Goal 1. Align STEM Education and Employment Resources with Industry Needs</p> <p>Agencies [DHS, DoD, DOE, DOL, NSF, OPM, SBA, VA]</p>	
<p>1.1 <u>Assess Availability of Data on Veterans and Military Spouses</u> [Both]</p> <p>Federal agencies should work to identify current data sources with information on the number of Veterans and military spouses in the STEM workforce, as well as those who earn STEM degrees. Information those records contain could include but is not limited to demographics, military service records, degree field and type, and occupation or industry of employment. Upon assessing data availability, Federal agencies may gather available data and identify gaps in current data on service members, Veterans, and military spouses in STEM education and careers. Collection of new data may require regulatory or legislative action (see Appendix 4).</p>	<p>[S] Assess current STEM data availability</p> <p>[S] Identify additional STEM data</p> <p>[L] Rate utility of data for task</p> <p>[L] Initial analysis of newly generated data for additional insights</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of data sources identified ▪ Data inventory generated ▪ Initial analysis produced
<p>1.2 <u>Identify Best Practices for including STEM Content in Veterans and Military Spouses Programs</u> [Both]</p> <p>Federal departments and agencies should identify best practices regarding the inclusion of STEM content in considering how to most effectively expand programs that support</p>	<p>[S] Identify best practices regarding the inclusion of STEM content in existing programs</p>

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<p>Veterans and military spouses. This may involve mapping STEM career opportunities that align with military knowledge and occupation codes, exploring incentives to advance participation in STEM-relevant credentialing courses and training programs, and efforts to encourage participation of additional STEM employers in existing training and apprenticeship programs. (Elements of this action also map to Goal 2.)</p>	<p>[L] Create a best practices toolkit, focusing on mechanisms for including more STEM content in existing programs</p> <p>[L] Propose new programs or alignment where gaps exist</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Best practices identified ▪ Toolkit produced ▪ Gap analysis produced
<p><u>1.3 Assess and Update STEM Education Programs to Reflect Industry Needs</u></p> <p>Federal departments and agencies, in coordination with OSTP, should support actions to identify and prioritize jobs aligned to industry needs. Follow-on actions may center around mapping industry needs, particularly those with mobility for workers, to Veteran and Military Spouse Programs. Incorporate additional measures related to the above data points into STEM education.</p>	<p>[S] Identify STEM emerging and in-demand industries and associated subcategories</p> <p>[S] Stratify resulting list into jobs that support industry needs and allow for mobility of the workforce</p> <p>[S] Identify STEM education programs in need of updated focus or curriculum</p> <p>[L] Update STEM education programs to incorporate and prioritize training</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Stratified Inventory of job classes produced ▪ STEM education programs or investments inventory produced ▪ Updated curriculum incorporated prioritized list

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<p>1.4 <u>Enable Crossover of STEM Careers to emerging or in-demand STEM careers</u></p> <p>Federal departments and agencies should collaborate as a sector to develop career pathways where the training required to transition from one field to an emerging or in-demand field has associated credentials integrated to facilitate opportunities for veterans and military spouses. These opportunities should maximize use of short-term credentialing and remote learning options.</p>	<p>[S] Build inventory of crossover options including training platforms, short-term credentialing options, and distance learning facilitator capabilities</p> <p>[L] Build on STEM inventories from Action 1.3 to generate crossover training packages</p> <p>[L] Develop or modify programs to ensure the range of communications, and to alert students, agencies, and industry of opportunities for crossover</p> <p><u>Metrics</u></p> <ul style="list-style-type: none"> ■ Stratified inventory of crossover options produced ■ Crossover training packages produced by agencies ■ Monitor and report on status of existing programs modifications to meet goal 1.4
<p>1.5 <u>Enhance Competency-Based Programs [Both]</u></p> <p>Federal departments and agencies may collaborate as a sector to develop career pathways where the training required to obtain needed credentials is integrated into secondary and post-secondary coursework; support cutting-edge curriculum development; and provide apprenticeships, mentorships, internships, and other work-based learning opportunities for veterans and military spouses.</p>	<p>[S] Identify best practices regarding the inclusion of STEM content in existing Federal programs</p> <p>[S] Survey federal landscape for current use of competency-based programs</p> <p>[L] Increase public-private sector collaboration and partnerships</p> <p><u>Metrics</u></p> <ul style="list-style-type: none"> ■ Best practices document produced

	<ul style="list-style-type: none"> ▪ Quantification of increased collaborations between industry and federal government ▪ Demonstrated increase in the number of military spouses and veterans using competency-based programs
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<p>Actions for Goal 2. Enable Mobility and Resilience Within STEM Pathways</p> <p>Agencies [DHS, DoD, DOE, DOL, ED, NSF, OPM, SBA, VA]</p>	
<p>2.1 <u>Evaluate Data to Inform Policy Making</u> [Both]</p> <p>Following completion of the short-term components of Actions 1 and 2, Federal agencies may coordinate to synthesize the information gathered to provide further insights. This evidence may indicate programs that are underutilized, and programs that have demonstrated positive impact may be used to inform future decision and policy making; these efforts may be supported by the Foundations for Evidence-Based Policymaking Act of 2018.²⁴</p> <p>Policy making could be leveraged to develop new or expand existing programs that support Veterans, service members, and military spouses in STEM education and careers.</p>	<p>[S] Use data collected to inform immediate solutions</p> <p>[L] Analyze data collected to inform future policy making</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Identification of underutilized programs ▪ Identification of programs with positive impact ▪ Identification of gaps & areas of opportunity ▪ Develop policy that incorporates data from reporting described in Action 2.1
<p>2.2 <u>Support Transfer of Licenses and Credentials</u> [Both]</p> <p>This action builds upon existing efforts led by DoD, OPM, and DOL to support military spouses in obtaining or maintaining occupational licenses and certifications after relocations across State lines. These efforts include offering reimbursement to military</p>	<p>[S] Identify and support existing efforts that enable the transfer of licenses and in obtaining occupational credentials after relocation</p>

²⁴ <https://www.congress.gov/bill/115th-congress/house-bill/4174>

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<p>spouses after re-licensure and re-certification, as well as reciprocity agreements that establish interstate license recognition. In line with this action, Federal agencies should also consider how to support Veterans in obtaining occupational licenses and certifications as well as maintaining these credentials after relocations across State lines. This action is also aligned with the 2020 Executive Order on Increasing Economic and Geographic Mobility, which offers additional opportunities for coordination and could support relevant partnerships. Interstate certification and licensing may also facilitate stacking of credentials and educational opportunities to grow an occupation into a career. In some cases, increased support for these efforts may require pursuit of legislative or policy changes (see Appendix 4).</p>	<p>[L] Produce a gap analysis to determine if legislative/regulatory changes are needed</p> <p>[L] Inventory current utilization of transfer of licenses and credentials</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of agreements to create transferrable licenses/certifications or transfer existing licenses/certifications across state lines supported ▪ Gap analysis produced ▪ Increase in utilization of license/certification transfer
<p>2.3 <u>Evaluate and optimize all STEM Programs around Mobility</u></p> <p>This action centers around landscape analyses to identify current mobility-focused enhancements within STEM programs, identification of best practices, and modifications to those programs to increase mobility-based elements.</p>	<p>[S] Conduct a Federal inventory of mobility related elements with STEM programs (particularly related to COVID-19 induced modifications) and metrics to measure future changes</p> <p>[S] Generate landscape analysis and an interim best practices document for mobility across education, transfer of field, mobility of workforce, and asynchronous work.</p> <p>[L] Adjust programs and policies at agencies or sponsored by agencies to incorporate best practices and produce inventory of updated policies.</p> <p>[L] Analysis of movement in metrics from inventory noted above through iterative data calls.</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Inventory of mobility-related elements produced

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	<ul style="list-style-type: none"> ▪ Landscape analysis and interim best practices produced ▪ Inventory of updated policies produced ▪ Increase in mobility metrics (identified above) over time through iterative data calls
<p>2.4 <u>Build Capability of Universal Recognition of Skills and Credentials</u></p> <p>This task focuses on ensuring all stakeholders and users understand the shift in STEM education and workforce context. It is largely centered around communications within Federal departments, programs, and users.</p>	<p>[S] Conduct a landscape and gap analysis to identify existing resources that explain and/or promote evolution of skills and credential modernization.</p> <p>[L] Build out appropriate communications and/or modify policy to address gaps noted above.</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Landscape and gap analysis produced ▪ Supplemental communications produced ▪ Policy updated as appropriate

<p>Actions for Goal 3. Streamline Connections with existing Federal Government STEM Programs</p> <p>Agencies [DHS, DoD, DOE, DOL, ED, NSF, OPM, SBA, VA]</p>	
<p>3.1 <u>Assess Availability and Alignment of Data on Programs; Create/localize programs to a Federal Inventory</u> [Both]</p> <p>Federal agencies may work to identify current data sources with information on participation and outcomes metrics pertaining to service members, Veterans, and military spouses in relevant Federal programs. Federal agencies and non-Federal partners may coordinate to collect new data and conduct evaluations of the effectiveness of programs in helping all service members, Veterans, and military spouses successfully access programs and pursue careers aligned with their interests in STEM.</p>	<p>[S] Assess current metrics data availability</p> <p>[S] Identify and compile STEM content in existing programs that support STEM education</p> <p>[L] Identify additional metrics data</p> <p>[L] Aggregate educational resources on one central database to promote existing programs that support STEM education</p>

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<p>In conjunction with identifying programs for the inventory, this action directs agencies to identify existing Federal programs that support STEM higher education as well as competency-based programs such as apprenticeships, skills-based training programs, and other credentialing programs, and specifically to flag and promote content relevant to STEM education and career pathways. These efforts would increase the awareness of STEM programs and programs with STEM content, and would help service members, Veterans, and military spouses more easily identify education-based STEM pathways that they might want to pursue.</p> <p>Counselors, whether virtual, on military installations, from the Department of Veterans Affairs, at institutions of higher education, or at American Job Centers (AJCs), already provide extensive support to service members, Veterans and military spouses pursuing their education and employment goals. Because this action requires a high level of coordination, the IWG may lead collaboration to support this effort to help equip counselors with education on STEM skills, career pathways, and programs.</p>	<p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of data sources identified ▪ Data inventory generated ▪ Evaluations complete and best practices generated ▪ Number of programs ▪ Database established ▪ Number of programs promoted ▪ Number of stakeholders accessing program information
<p><u>3.2 Align Existing Veterans Programs [Veterans]</u></p> <p>After Federal departments and agencies identify existing STEM offerings for the Federal inventory (Action 1.1, 3.1) and best practices (Action 1.2, 1.5), they may consider ways to support the expansion of STEM options within these programs and other programs that could be modified to include STEM components. In addition, Federal departments and agencies may explore options to expand eligibility requirements, increase geographical access, and provide social and financial supports to increase utilization of successful, in-demand programs that support Veterans in pursuing STEM education and careers. Efforts to expand access can leverage existing programs and initiatives to increase diversity, equity, and inclusion, extending those activities to STEM education and the STEM workforce. In some cases, increased access to programs may require legislative or policy changes (see Appendix 4). Federal agencies can also consider ways to support and encourage colleges and universities to increase recruitment and retention of service members and Veterans, and military spouses in STEM degree programs.</p>	<p>[S] Expand STEM within and access to existing programs</p> <p>[S] Identify opportunities to engage veterans and military spouses in developing STEM programs</p> <p>[L] Incorporate feedback into existing and future STEM programs for veterans and military spouses</p> <p>[L] Identify legislative or regulatory changes that would increase access</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of education or workforce programs with STEM content available to service members or veterans

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<p>This action also directs departments and agencies to consider feedback from Veterans in STEM careers as programs relevant to veterans who would like to enter STEM are promoted, expanded, and enhanced. This can be achieved by engaging with non-Federal entities, such as professional societies, non-profits, and industry organizations. Departments and agencies should consider mechanisms to provide feedback to existing and future STEM programs for Veterans should be considered to target and develop programs and increase program utilization more effectively.</p>	<ul style="list-style-type: none"> ▪ Number of existing programs with newly added STEM components ▪ Number of education or workforce programs for service members or veterans with potential to incorporate STEM content ▪ Number and types of opportunities to solicit feedback from veterans on programs improvements
<p>3.3. <u>Promote and Expand Existing Military Spouse Programs</u> [Military Spouses]</p> <p>In conjunction with identifying programs for the Federal inventory (Action 1.1, 3.1), this action directs departments and agencies to highlight existing Federal programs with a STEM component in which military spouses can participate. Once STEM-relevant programs within departments and agencies have been identified, materials to increase awareness of the programs can be developed, with the overall aim of increasing utilization of the programs by military spouses. In addition, Federal departments and agencies may explore options to expand eligibility requirements, increase geographical access, and provide social and financial supports to increase utilization of successful, in-demand programs that support military spouses pursuing STEM education and careers. Efforts to expand access can leverage existing programs and may be informed by the best practices identified and initiatives to increase diversity, equity, and inclusion, extending those activities to STEM education and the STEM workforce. In some cases, increased access to programs may require legislative or policy changes (see Appendix 4).</p> <p>This action also directs departments and agencies to consider feedback from existing military spouses in STEM careers as programs relevant to military spouses who would like to enter STEM are promoted, expanded, and enhanced. This can be achieved by engaging with non-Federal entities, such as professional societies, non-profits, and industry organizations. Mechanisms to provide feedback to existing and future STEM</p>	<p>[S] Identify STEM content in existing programs for military spouses</p> <p>[S] Identify opportunities to engage veterans and military spouses in developing STEM programs</p> <p>[L] Incorporate feedback into existing and future STEM programs for Veterans and military spouses</p> <p>[L] Identify legislative or regulatory changes that would increase access</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of education or career programs with STEM content available to military spouses ▪ Number of existing programs with newly added STEM components ▪ Number of education or career programs for military spouses with potential to incorporate STEM content

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<p>programs for military spouses should be considered to target and develop programs and increase program utilization more effectively.</p>	<ul style="list-style-type: none"> ▪ Number and types of opportunities to solicit feedback from military spouses on programs improvements
<p>3.4 <u>Visualize/centralize Data in One Place</u> [both]</p> <p>Federal agencies may create an inventory of existing programs for transitioning service members, Veterans, or military spouses that include STEM components, or existing federally operated STEM programs that can be adapted to focus on service members, Veterans, or military spouses. In developing this inventory, the IWG may also consider sustainable mechanisms for continued information sharing across the Federal agencies that oversee the programs as well as dissemination to the broader public. This centralized source of information can also be used by service members, Veterans, military spouses, education and career counselors, and others to increase their awareness of STEM pathways and support their transition into the civilian STEM workforce. This resource could include Federal job opportunities where the applicants can use their hiring preference eligibility.</p>	<p>[S] Create Federal inventory of existing educational and training support programs with STEM components; publish information</p> <p>[L] Create a mechanism to share this information among agencies; regularly update published information</p> <p><u>Metrics</u></p> <ul style="list-style-type: none"> ▪ Program inventory generated ▪ Mechanism to share inventory information created ▪ Process to update published information established

<p>Actions for Goal 4. Enhance Non-governmental STEM Partnerships</p> <p>Agencies [DHS, DoD, DOE, DOL, ED, NSF, OPM, SBA, VA]</p>	
<p>4.1 Create and Leverage Partnerships [Both]</p> <p>Federal agencies may leverage their partnerships with non-Federal stakeholders, including industry, educational institutions, and non-profits, to engage Veterans, service members, and military spouses in STEM education and careers. Partnerships play a host of critical roles from communicating the value of hiring Veterans and military spouses to directly providing education and career training to delivering financial or social supports that enable Veterans and military spouses to pursue STEM careers, among other roles.</p> <p>Leveraging current partnerships and identifying where new partnerships could be formed would increase awareness and utilization of STEM education and career programs by Veterans and military spouses and can help them pursue STEM employment.</p>	<p>[S] Leverage current partnerships with non-Federal stakeholders</p> <p>[S] Conduct analysis of existing program evaluations to determine best fit for expansion</p> <p>[L] Expand partnerships including industry, non-profits, and educational institutions</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number and type of partnership activities that provide STEM education or career support to service members, Veterans or military spouses ▪ Number and type of Federal communication and outreach efforts aimed at non-Federal stakeholders
<p>4.2 Leverage Existing Initiatives (such as Joining Forces) for Additional Ways to Partner with Organizations. [Both]</p> <p>Some existing partnerships, especially those that are co-located with military installations, are critical to connecting service members, Veterans, and military spouses to local employment opportunities. Efforts to strengthen the representation of STEM opportunities in these areas may increase utilization of resources that are currently available, including those in local job centers and at military support services centers. Further connecting American Job Centers near installations with those across the country may also help expand the reach of these resources. Improving outreach</p>	<p>[S] Leverage partnerships with co-located military installations</p> <p>[S] Explore possibilities of virtualization to supplement locations without co-located partnerships</p> <p>[S] In coordination with Joining Forces, conduct a landscape analysis of STEM related policies and programs that align with the initiative’s priorities</p>

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<p>and awareness at these locations may likely also serve as a mechanism to help expand local partnerships by connecting with more local employers who anticipate having STEM-related job openings.</p> <p>This action also centers around mapping core focal areas of the Joining Forces initiative to this interagency effort.</p>	<p>[L] Expand partnerships with co-located military installations</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number and type of partnership activities with organizations co-located with military installations to support veterans and military spouses in STEM
<p>4.3 <u>Organize Outreach Plans</u> [Both]</p> <p>Federal agencies may conduct outreach campaign to engage with Federal and non-Federal partners, including Federal agencies, private companies, and educational institutions, to increase their awareness of the value that Veterans and military spouses bring to their organizations. This activity may occur in conjunction with partnership-related actions to help cultivate new relationships with non-Federal partners and online web portals captured in Goal 3. This action can help educational institutions understand how Veterans’ military training courses translate to higher education credits. Additionally, this action can help companies better understand how Veterans’ military skills and credentials can translate to industry skills, licensures, and credentials.</p> <p>The inventory of STEM programs generated in Action 1.1., 3.1 may help provide a more holistic view of all of the STEM content that is available to service members, Veterans, and military spouses. Using this information, departments and agencies can work to develop outreach and communication plans to raise awareness of STEM education and careers opportunities, including Federal employment, and the availability of STEM programs and training that could lead to STEM jobs tailored to each of these audiences.</p>	<p>[S] Conduct an outreach campaign</p> <p>[L] Compile outreach campaign analytics</p> <p>Metrics</p> <ul style="list-style-type: none"> ▪ Number of outreach or communications campaigns developed ▪ Number of programs promoted ▪ Number of stakeholders reached ▪ Number of partnership leads generated

Appendix 4. Actions Requiring Legislative or Regulatory Change

The *Supporting Veterans in STEM Careers Act* required this strategic plan include the Federal or State legislative or regulatory changes required to address barriers and achieve plan goals. This appendix describes the high level legislative or regulatory changes that might be necessary to implement some actions in the plan, grouped by approach.

Summary of Actions in the Strategic Plan that may require Legislative or Regulatory Action

Goals	Actions	Types of Legislative or Regulatory Changes Required
Improve Data and Tracking	Action 1.1. Assess Availability of Data on Veterans and Military Spouses	Authorizing interagency sharing of data on service members, Veterans, and military spouses may require legislative or regulatory changes.
	Action 1.2. Identify best practices for including STEM content in veterans and military spouses programs	The addition of new survey questions for obtaining data may also be subject to the Paper Reduction Act and require authorization.
Leverage Existing Programs	Action 2.1 Expand Existing Veterans Programs	As an example, expanding the VA Edith Nourse Rogers STEM Scholarship to include coverage of graduate degrees would require legislative action, or continuing the VA VET TEC program, which is a pilot, would require congressional authorization and appropriation to continue.
	Action 2.2. Support Transfer of Licenses and Credentials	Reciprocity agreements across State lines may involve legislative, regulatory, or enabling policy changes. Federal action could support legislative or regulatory changes at the State level.
	Action 3.3. Promote and Expand Existing Military Spouse Programs	Allowing military spouses to access programs currently open only to service members or Veterans would likely require legislative action and additional appropriations.