




Australian Government
Department of Defence

MOVING TOWARDS A HIGH-TECH FUTURE FOR DEFENCE

Workforce Strategic Vision underpinned by
Science, Technology, Engineering and Mathematics
2019–2030



STEM
key workforce
objectives

shape

Shape National
STEM Agenda

partner

Partner to develop
a cohesive STEM
approach

inspire

Inspire students
to seek STEM
careers

promote

Promote
Employment
Pathways into
Defence

retain

Retain STEM
professionals
in Defence

Foreword

This Science, Technology, Engineering and Mathematics Workforce Strategic Vision outlines our shared aspirations for Defence to ensure we are capable of meeting the challenges of the future.

Australia's strategic environment is changing. The Australian Government is also investing \$200 billion in Australia's Defence capability over the next decade.

To ensure the Defence of Australia keeps pace with these changes, we need to continue building a technology enabled Australian Defence Force, Australian Public Service and Defence industry workforce.

As the demand for a technologically skilled workforce increases across the globe, there is a need for Defence to take a stronger role in partnering and collaborating across Government, industry and academia to secure a strong and diverse talent pool.

We must take a One Defence approach to harness, coordinate and leverage our current activities and look for opportunities to partner with and learn from others to grow our talent pipeline and inspire future generations of Australians into Defence careers.

We need to keep our sights focused on accessing a broad talent pool which represents the diversity of the Australian community, specifically highlighting the career pathways for women and indigenous Australians into STEM careers.

This vision is supported by a set of key objectives that will allow Defence to take a leading role in shaping the science, technology, engineering and mathematics

eco-system. Much has already been achieved and this vision looks to build on these efforts by clearly articulating what we need to do going forward to 2030.

We have formed the Defence STEM Council with Senior Executives from the Defence Groups and Services and key stakeholders from the Department of Industry, Innovation and Science and the Department of Education and Training to ensure both a One Defence and broader whole of government approach.

We would like to thank all the representatives who have helped to shape this Defence STEM Workforce Strategic Vision and look forward to the continued work to achieve our vision for 2030.



Greg Moriarty
Secretary



General Angus Campbell AO, DSC
Chief of the Defence Force

Introduction

A STEM workforce is critical for Defence and Australia's ability to achieve the Government's current and future challenges. Defence needs to continue to build a world-leading STEM-capable workforce of Australian Defence Force and Australian Public Service personnel.

The global and regional context for Australia's Defence will undergo significant change in coming years. Key challenges facing Australia include further blurring of state and non-state threats, military modernisation in the Asia-Pacific region, global access to commercial off-the-shelf technology and the rapid progression of cyber capabilities and other disruptive technologies.

The Australian Government is investing \$200 billion in Australia's Defence capability over the next decade. The Australian Defence Force (ADF) employs technology that is state-of-the-art, and in some cases world-leading. However, technological advancements are occurring rapidly and technical disruption has increased for Defence. Meeting these challenges requires a specialised ADF, Australian Public Service (APS), and defence industry STEM workforce as well as greater STEM understanding in our non-STEM specialist workforce.

Australia 2030: Prosperity through Innovation Report by Innovation and Science Australia has highlighted that GDP growth will be achieved primarily through multifactor productivity growth. A STEM workforce is key.

Consistent with this research, industry surveys show that STEM literacy is increasingly becoming part of the core capabilities that Australian employers need.

Demand for STEM skills in Australia is high, and unless there is collective action over the coming decade these needs

will not be met (*Women in STEM Decadal Plan*). It has been estimated that 75% of the fastest growing occupations require STEM skills and knowledge, but students are not acquiring the STEM skills we need for our future prosperity (*Australian Industry Group (2013) Lifting our Science, Technology, Engineering and Maths (STEM) Skills*).

Australia is facing a challenge in ensuring that current and future generations take up STEM subjects. A key issue is the decline in Australian school system performance over the last decade, particularly in core STEM subjects of science and mathematics, and the need to increase the ambition and motivation of students in STEM subjects. There is also a need to make the vocational education and training sector more responsive to our future priorities.

Another key issue is accessing the best talent from all parts of a diverse Australian community to build the workforce. Currently women represent only 16% of Australia's STEM skilled workforce (*Women in STEM Decadal Plan*). Significantly more indigenous students are now enrolling in STEM courses, representing an 8.34 percent annual increase: however, Indigenous Australians are still underrepresented in STEM courses. An inclusive lens on STEM engagement is needed to increase the representation of women and Indigenous Australians in STEM, leading to a stronger and more diverse STEM workforce. As Defence is a major employer of STEM skills there is a need for us to take a

leading role in shaping the national STEM agenda and communicating our workforce needs for the future.

There are a large number of STEM engagement initiatives occurring across Defence, industry and academia and more broadly; however, we must ensure that these initiatives have an impact on students, parents, teachers and communities to develop a strong diverse talent pool.

To continue to inspire students to study STEM and promote Defence careers, we will need to continue to showcase our work and the variety of STEM career opportunities available. We will only achieve this through strong partnerships across Defence, Government, industry and academia.

In order to secure our capability for the future, Defence commits to a single vision that is collaborative, integrated and focussed across Defence and broader Government. It will only happen through regular interaction, relationship building and implementation of shared objectives. The STEM approach will address the total workforce needed to deliver Defence capability.



Professor Tanya Monro
Chair, STEM Council

Strategic context

A key action is to reinforce and harmonise the objectives and goals from both the Defence strategic vision and broader strategies and plans.

The Defence STEM Workforce Strategic Vision, developed by the Defence STEM Council, provides a cohesive framework to guide the Groups and Services in

attracting and maintaining a strong STEM workforce to deliver leading-edge short and long-term capability outcomes for Defence. The Defence vision harnesses

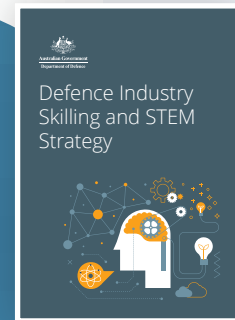
the goals from the *National STEM School Education Strategy 2016–2026*, *Women in STEM Decadal Plan*, and the *Defence Industry Skilling and STEM Strategy*.



2016 Defence White Paper



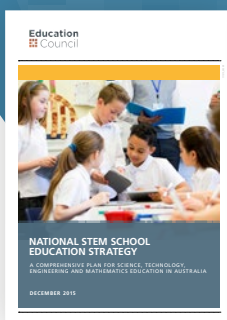
2016 Defence Industry Policy Statement



Defence Industry Skilling and STEM Strategy

Defence STEM Workforce Strategic Vision

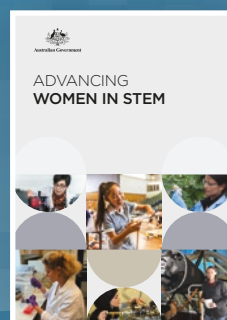
National STEM School Education Strategy 2016–2026



Women in STEM Decadal Plan



Advancing Women in STEM Strategy



Australia 2030 Prosperity through Innovation



Defining our STEM workforce

STEM, or Science, Technology, Engineering and Mathematics, refers collectively to a broad field of distinct and complementary approaches to knowledge.

In the *Optimising STEM Industry-School Partnerships: Inspiring Australia's Next Generation* report, Australia's Chief Scientist refers to STEM education as a "term used to refer collectively to the teaching of the disciplines within its umbrella – science, technology, engineering and mathematics – and also to a cross-disciplinary approach to teaching that increases student interest in STEM related fields and improves students' problem solving and critical analysis skills". Defence has adopted this description of STEM to clearly articulate the scope of this vision. Defence requires a technology-enabled workforce with the roles broadly defined as Professionals, Allied and Enabled.

STEM Professional

STEM Professional jobs where there is the requirement for a university qualification in a STEM field (Bachelor degree, graduate diploma and graduate certificate, masters degree and doctoral degree) in order to apply the competencies, skills or experience to Defence capability.

STEM Allied

STEM Allied jobs where vocational education and training (Advanced diploma and diploma and certificate III and IV) is required to apply the competencies, skills or experience to Defence capability.

STEM Enabled

STEM Enabled jobs where formal qualifications are not necessary; however, a level of STEM literacy or numeracy is necessary for the operation of Defence equipment.

As at 1 February 2019, 34.5% of the Defence APS and 50.6% of the permanent ADF workforce were in STEM roles.



Military and Defence civilian staff at a wargaming session.



Defence engineering staff hosting the stand at the Adelaide Careers and Employment Expo.

Our opportunity

As a significant employer of STEM skills, Defence plays a critical role in shaping the future STEM policy and conversation at a national level – but only if there is a national level approach.

Defence has traditionally focussed on the STEM pipeline with the aim of recruiting and retaining personnel. The opportunity now is to influence the national policy agenda, engage the increasingly mobile STEM workforce and partner with the best STEM employers.

By engaging with others in the STEM ecosystem on STEM policy and practices, our Defence STEM initiatives will complement whole of Government strategies.

Although Defence has been steadily increasing the participation rates of women and Indigenous Australians in

Defence STEM occupations through participation in programs such as *Male Champions for Change* and *Science Australia Gender Equity*, we need a systematic approach to increasing the depth and diversity of the talent pool. There is an opportunity for a greater One Defence approach to increasing diversity and inclusion in the STEM pipeline and in Defence careers.

Defence has the opportunity to become a pre-eminent organisation for attracting a world-class STEM workforce and accessing a broad talent pool. We need to ensure that the culture of our

organisation attracts and retains a talented STEM workforce by promoting the work that we do in the national interest. We'll achieve this through:

- Our leading-edge capability which offers fantastic opportunities both within the ADF and the APS
- Our culture of life-long learning and development of STEM and enterprise skills
- Our lead role in a vibrant STEM eco-system which supports multiple career paths.

Defence commits to take a cohesive One Defence approach to STEM through the implementation of the strategic vision. If we continue to carry on with the same path, we will not achieve the step-up that is required, external stakeholders will continue to find it difficult to engage with Defence, and Defence will not attract the talented workforce required to achieve the Government outcomes for the nation.

Our objectives

Our key objectives provide a framework which help to inform, guide and assist delivery of the Workforce Strategic Vision.

shape the national STEM agenda

Collaborate with Defence industry and academia to provide advice to Government on STEM policy

Collaborate with Department of Education to influence the STEM school curriculum to meet Defence future needs

Collaborate with Department of Industry, Innovation and Science to influence national STEM programs

Ensure Defence is represented on key professional bodies or associations that have a national presence

Engage with the National Infrastructure Roadmap

partner to develop cohesive approach

Adopt best practice models for leveraging STEM outcomes through hubs and sharing of infrastructure

Create cross-sector mobility options to advance STEM career development

Ensure the STEM programs that are supported in Defence are linked and leveraged

Establish a framework to monitor impact, performance and outcomes of Defence STEM programs

Partner with Department of Education to implement strategy to develop STEM teachers through the provision of course materials, real world case studies, teacher sabbaticals, and student work experience

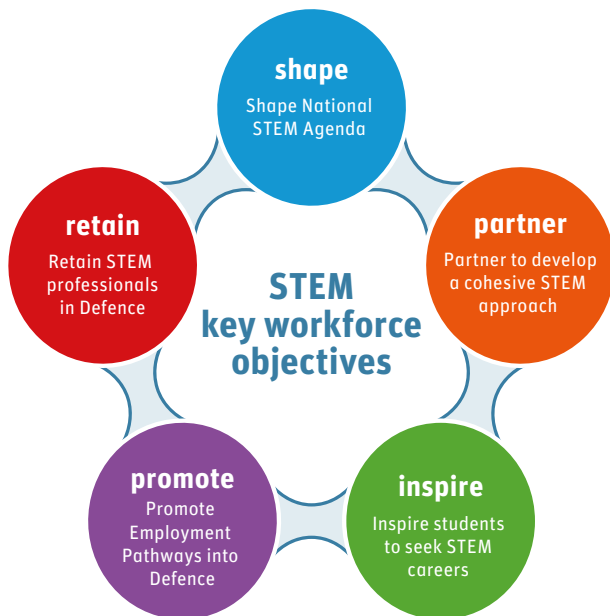
inspire students to seek careers in STEM

Promote the variety of STEM careers in Defence by sharing stories of success via media platforms, awards and internal and external role models

Sponsor high profile competitions and influential STEM educators to raise the awareness of a STEM career in Defence throughout schools, students and parents

Create products for use in the education sector to raise awareness of careers in Defence

Participate in programs that strive to encourage and increase diversity in STEM



promote Defence employment pipeline

Promote STEM careers in Defence to grow the pipeline of people who would consider this career path

Ensure talent pipeline programs are in place to transition STEM students into Defence careers

Recruit STEM professionals, allied and enabled workforces into Defence

Ensure there is a sustainable model for forecasting future Defence workforce demand

Define the talent pipeline continuum for the STEM workforce

retain the STEM workforce in Defence

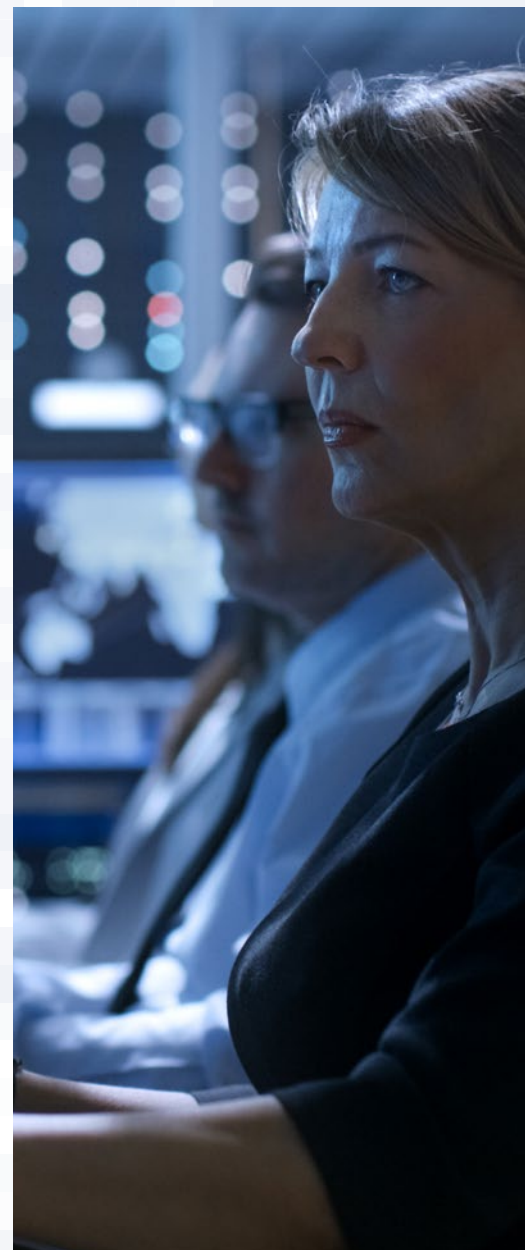
Conduct focus groups across the STEM ADF and APS personnel in Defence to identify retention strategies

Undertake a longitudinal study of ADF and APS STEM personnel to identify key attributes of a career in Defence

Analyse and report on exit data provided by separating STEM ADF enlistments and APS personnel

Create tailored, clear career pathways for the STEM workforce

Develop a STEM value proposition which is in line with community expectations



Looking ahead to 2030

This STEM Workforce Strategic Vision outlines our shared aspirations for Defence and articulates the objectives that underpin a One Defence approach.

It's 2030. The STEM Workforce Strategic Vision has been realised and Defence has continually invested in our future capability. Scientific and technological advances are continuing to take Australia forward, and Defence is meeting the challenges of the nation, powered by a world-class technology-enabled workforce.

Significantly more primary school students have identified STEM for their future career paths, large numbers of indigenous students are now enrolling in STEM courses, high school students have moved into STEM careers and university students are now working in the STEM sector. Defence has played a key role on the national stage, working with the Department of Education to ensure that STEM subjects studied at school are creating students who have the skills of a future STEM workforce. Students have been inspired to follow STEM career pathways through consistent involvement across their high school years, with Defence-supported STEM programs and competitions, sponsorships and engaged mentors from across the existing STEM workforce. Teachers have also helped promote these career opportunities as they are resourced with

curriculum relevant STEM materials, showcasing theoretical science in real world applications across Defence and more broadly.

Defence is now the provider of expert STEM advice to Government and industry and is seen as a central point in STEM policy for the nation. The ADF and Defence Groups have established best practice models, sharing infrastructure and knowledge to ensure that Australia's Defence capability is supported by cutting edge science and technology.

Working with the Department of Industry, Innovation and Science, Defence influences innovative program development to create exciting opportunities for young Australians and attractive opportunities for innovators to be a part of a thriving STEM community.

In 2030, there is a growing pool of STEM talent across Defence, who have joined through a range of targeted employment pathways. These pathways have been designed to engage professionals at all stages of the career pipeline, creating a workforce that is diverse in experience and expertise.

Defence is seen as an employer of choice for STEM graduates. They are motivated by the career paths that are showcased as part of the STEM-skilled ADF, APS workforce and Defence industries and see Defence as a place that can challenge them and help them grow. Recruitment of future talent is coordinated across Defence, informed by an in-depth understanding of Defence's future workforce demand.

STEM professionals at all stages of their careers see a clear pathway for their future in Defence and more broadly in the STEM eco-system. They are empowered to build and tailor their career, and their mobility across the industry is not only supported but encouraged. Systematic efforts have been made to understand and address issues, ensuring our teams and workplaces retain and value the highly regarded STEM workforce.

Leaders across the organisation, through the Defence STEM Council, have driven the implementation of this strategic vision and will continue to create a world-leading STEM workforce.

It's 2030. The STEM Workforce Strategic Vision has been realised and Defence has continually invested in our future capability. Scientific and technological advances are continuing to take Australia forward, and Defence is meeting the challenges of the nation, powered by a world-class technology-enabled workforce.

Summary

The Workforce Strategic Vision identifies the need for Defence to attract and maintain a world-class STEM workforce into the future, and highlights the opportunities available from taking a One Defence approach.

The vision highlights the opportunity to take a One Defence approach to leverage our knowledge and programs across Defence, and build strong connections and alignments with the broader STEM eco-system.

Our purpose is to deliver a resilient ADF and APS workforce to effectively deliver Australia's Defence outcomes by building a strong diverse pipeline, showcasing the range of careers in Defence and valuing the contribution of our STEM people.

These aims will be delivered through leadership. We will foster better cooperation and more effective partnerships, both within Defence and externally.

Further information

For more information on Defence's STEM Workforce Strategic Vision, please contact:

STEM.Council@defence.gov.au



Students viewing RAAF's STEM animation video focused on a character called Jasper.

STEM Council

The Defence STEM Council was established in 2018 and brings together senior executives across Defence and other Government agencies, to take a collective approach in progressing Defence's future STEM workforce capability needs.

The Council members are committed to achieving this outcome by shaping the National STEM Agenda, enhanced collaboration and strategic partnering, building a strong STEM talent pipeline and inspiring future generations into Defence careers.

Chair

Professor Tanya Monro Chief Defence Scientist DSTG

Deputy Chair

Ms Justine Greig Deputy Secretary Defence People DPG

Members

Mr Tony Fraser	Deputy Secretary Capability Acquisition and Sustainment	CASG
Mr Peter Tesch	Deputy Secretary Strategic Policy and Intelligence	SP&IG
RADM Chris Smith	Deputy Chief of Navy	Navy
MAJGEN Anthony Rawlins	Deputy Chief of Army	Army
AVM Catherine Roberts	Head Air Force Capability	Air Force
Mr Stephen Pearson	Chief Information Officer	CIOG
MAJGEN Michael Ryan	Commander Australian Defence College	ADC
RADM Jaimie Hatcher	Deputy Chief Joint Operations	JOC
Dr Peter Sawczak	First Assistant Secretary Defence Industry Policy	SP&IG
Mr Andrew Byrne	First Assistant Secretary National Naval Shipbuilding	NNSO*
Ms Jane Quodling	First Assistant Director General – People and Portfolio Management	ASD
Mr Adrian Hudson	First Assistant Secretary Infrastructure Division	E&IG
Dr Sheridan Kearnan	First Assistant Secretary Intelligence Assessments	DIG

Ex-officio

MAJGEN Natasha Fox	Head People Capability	DPG
Dr David Kershaw	Chief Science Engagement and Impact Division	DSTG
BRIG Duncan Hayward	Director General Defence Force Recruiting	DPG
Ms Maria Jolly	First Assistant Secretary, Improving Student Outcomes	Dept. of Education and Training
Ms Janean Richards	Head of Division, Science and Commercialisation	Dept. of Industry, Science, Energy and Resources

*National Naval Shipbuilding Office









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