

## Australia in Space: A strategic plan for space science

### Workforce capability and capacity

Led by the National Committee for Space and Radio Science, the decadal plan for space science (2020-2030) will identify key scientific challenges, changes and trends, and associated applications, which provide new opportunities in space science research and can support the development of Australia's scientific capability and contribute to national priorities.

The plan should:

- identify existing **space science workforce capability and capacity**
- provide a vision for the future
- set priorities and develop strategies on how that vision may be achieved.

**Vision statement:** It is 2030 and the Australian workforce has the capacity and capability to sustain and grow opportunity, discovery and applications in space science. This drives a vibrant space ecosystem, enhancing economic, social and national security. The space science workforce is enabled by access to education, training, and exciting, future-proof career paths which engage innovative young minds and others transitioning to the sector. Space science workplaces are respectful and inclusive, free of harassment and discrimination, value diversity and are structured to attract and retain diverse and professional employees.

### Context: Jobs in the space sector

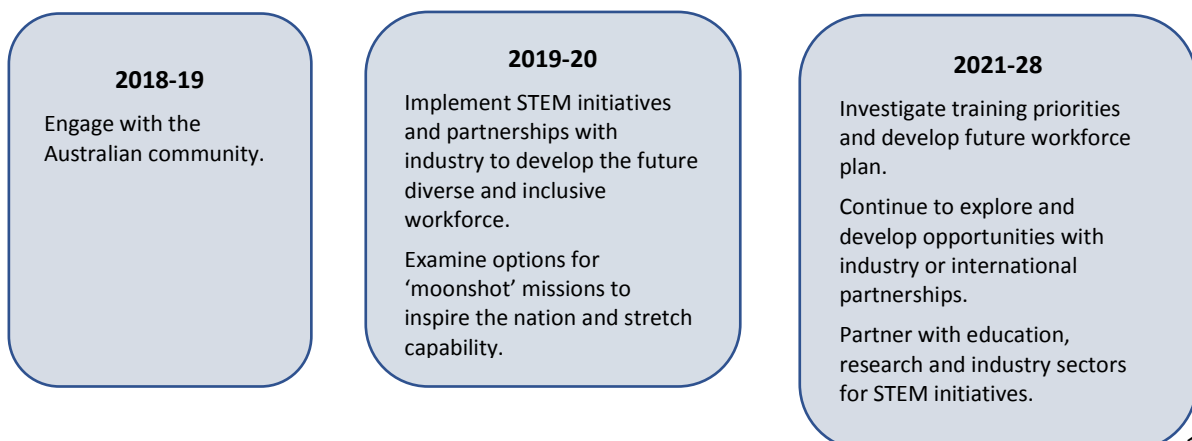
Australia's [space sector](#) has high ambitions and great potential.

The [Australian Civil Space Strategy 2019-2028](#) (the Strategy) outlines Australian Government investment of around \$600 million over next five years, and together with the establishment of the [Australian Space Agency](#), provides a focus on growing Australia's space ecosystem. The space sector is considered key to diversifying the economy, connecting internationally, developing national capability in areas of competitive advantage, ensuring the safety and security of sovereign space infrastructure and activities, and inspiring and improving the lives of all Australians through high-value jobs. These investments seek to build on existing Australian skills and industries, exploit our geographical advantages, and harness historical support of and endeavour in space science.

Included as measures of success in the Strategy is achieving year-on-year growth of direct and indirect jobs that would meet a target of [20,000 additional jobs by 2030](#).

Other aims of the strategy include encouraging investment and growth in the space sector, and increasing public awareness of space activities. However, specific and targeted action is required to ensure the necessary workforce capacity and capability, that there are enough suitably qualified and skilled personnel available to meet the sector's requirements.

The Strategy commits to the following implementation activities to 'Inspire' and Build Future Workforce, although metrics for evaluating success and details of the specific strategies are unclear.



Over the 5 years to 2018-19 [the number of people employed in the Australian space sector grew by around 2,000](#) to 15,000 at an average annual rate of 11%. By extrapolation this is broadly in line with the [Review](#) of Australia's Space Industry Capability which found in March 2018 that between 10,000 and 20,000 jobs could be created by 2030. The Australian Space Agency's jobs mission could therefore be achievable if the annual compounding growth rate is maintained for the next decade. However, there are three important caveats.

First, growth predictions extrapolated over long timeframes are risky at best in the very uncertain post-COVID world. Second, it is more important to develop a space ecosystem which fosters new opportunities and initiatives and provides sustainable growth leading eventually to a sovereign space capability not reliant on government support packages. Third, around 60% of current industry revenue in the space sector comes from satellite communications and broadcasting services (e.g. Telstra and Foxtel), while space technology and manufacturing accounts for only around 15%. This is inadequate for stimulating a shift to innovation-driven growth in new cutting edge industries. Other stimuli are needed, for example through exploiting Australia's scientific, technical and geographic advantages with a sustainable national world-class space program.

To inform development of the next strategic plan for space science, the National Committee for Space and Radio Science undertook a survey of current and future space science research capacity. The survey was conducted in June 2020 and targeted heads of space science research groups in universities, government divisions, and SMEs. Thirty detailed responses were received, representing over 600 employees and around 120 higher degree students. Of these responses, 30% described one of their main barriers to research being the ability to find suitable staff. This demonstrates that workforce capacity is already a concern for Australia's nascent space sector. University groups also find difficulty in attracting suitable students to space science research projects.

A separate survey over January-March 2020 targeted space science researchers and attracted 210 responses spanning all age and seniority levels. Fifty-six percent of responses were from the university sector, but only 19% of all respondents were female. The view of job prospects in the space industry was generally strong; for example 60% of PhD students citing their job prospects as good to excellent. However, many expressed concerns regarding ongoing employment, including "lack of funding" (38%), "instability of employment" (22%), and "poor career prospects" (13%). Only 15% reported no such impediments and were in high-level government or university positions, students, or retired. The negativity concerning employment related specifically to Australia, with many references to better prospects overseas. These results are also worrying when considering future workforce capacity.

Nationally, despite the rise of automation, ageing of the workforce may exacerbate a [shortage](#) of skilled workers. The COVID-19 pandemic may also have significant impacts on the availability of workers, with likely declines in skilled migration, higher education and research activity, career prospects, and possible redirection of investment from the space sector to other economic and social priorities.

However, because the space R&D sector focuses on new ideas and technologies and encourages STEM engagement, it presents an important post-COVID growth opportunity. Furthermore, apart from simply providing direct employment, the space sector is vital to Australia's social, economic and strategic security: think for example of Earth observation for resource and hazard monitoring; weather and climate prediction and forecasting; precise positioning and precision navigation; effective intelligence, surveillance and analytics for national security, and so on.

To harness these opportunities a national long-term workforce strategy will be required that:

- actively seeks to attract, retain and progress the space workforce;

- specifically supports diversity, inclusion and equity;
- engages all Australians in space science; and
- develops strategic partnerships with relevant domestic industries and businesses while leveraging international linkages.

This strategy must be appropriately supported at all levels of government, and be sufficiently adaptable to meet community expectations and changing circumstances.

The Australian defence sector faces similar challenges in attracting and retaining a skilled STEM workforce. Lessons can be learnt from the [strategies](#) being developed to address its workforce capacity and capability requirements.

The benefits of diverse research workforces and the risks of homogenous ones are [well known](#), as are the economic and social benefits of including women and minority groups in current and future workplaces. The Australian government is committed [to improving female workforce participation](#) as a key to boosting productivity and innovation. National strategies have already been developed to ensure greater participation of women and girls in STEM, including the [Women in STEM Decadal Plan](#) and the [2020 Action Plan](#), together with equity action frameworks being established in STEM workplaces, including [Science in Gender Equity](#). These all offer important learnings, solutions and opportunities for the space sector.

Broader diversity and inclusion initiatives across space science workplaces, such as Reconciliation Action Plans and support for people living with disability, should continue to be supported to engage a broader range of people to create diverse research workforces.

Women in STEM professions face specific [impacts](#) from the COVID-19 pandemic, including disproportionate job insecurity, increased caring responsibilities and disruptions and their capacity to carry out paid work. Hard-won gains by women in STEM are at risk. This risk will be even greater if STEM employers do not closely monitor and mitigate the gender impact of their decisions.

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
<p>To meet the workforce needs of the space sector, we need to understand what <b>skills, training and knowledge</b> are required to meet current and growing demand within the sector, which will need to be developed at all levels of the education system.</p>	<p><a href="#">Jobs</a> in the space sector include science, technology, engineering, and mathematics (STEM), and diverse areas such as digital apprenticeships and skilled trades, medicine, law, entrepreneurship, and finance.</p> <p>More STEM and other graduates in other fields will be needed to meet this demand. There is specifically a <a href="#">shortage</a> of flight-tested, mid-career engineers, and a depleted set of skills for making investment in the field.</p> <p>The Australian space sector has <a href="#">strong</a> experience in downstream services, such as satellite communication services, global positioning, and the use of satellite imagery. However, there is relatively <a href="#">limited</a> experience in spaceflight services, such as manufacturing hardware and software for mission control, and on-orbit operations of space objects.</p> <p>Similarly, <a href="#">the commercial and customer knowledge</a> required by the changing and dynamic space market may be limited amongst pure space sector trained employees.</p> <p><a href="#">The types of jobs available, the skills needed to do them, and the length of employment is changing.</a> Over 90% of future jobs will need digital skills, and more jobs will demand interpersonal skills, entrepreneurialism and hypothesis-based problem solving.</p> <p>This is particularly relevant in the Australian space market where <a href="#">start-up companies comprise 87 per cent</a> of it. These businesses will require specific skills in finance and entrepreneurship but are unlikely to have capacity to invest in their skills needs over the long term.</p> <p><a href="#">People will also change jobs more frequently.</a> An Australian student leaving school today is likely to have five careers and 17 jobs over their working life.</p>	<p>A joined up national innovation and education strategy is critical to meet the skills demand of the space science sector.</p> <ul style="list-style-type: none"> <li>• A national agency should be responsible for completing a skills and training gap assessment and ensuring that the relevant Government department policies and strategies address these in an appropriate timeframe. <ul style="list-style-type: none"> <li>• This skills map must be fluid and responsive to changing skills needs in the sector, while providing guidance on the long-term innovation and education investments. The Agency’s strategy for education should focus on long-term growth and sustainability.</li> <li>• The <a href="#">provision of spaceflight job opportunities</a> for university graduates has also been highlighted as important – other specific opportunities are likely to emerge in the skills map. There is likely to be growing demand in data analytics, AI and related areas.</li> </ul> </li> <li>• Consideration should be given to equipping the burgeoning start-up sector with the skills they need to grow in the Australian space market, including tax incentives or other investments. A need for greater <a href="#">investment in R&amp;D</a> for this sector has also been identified by some business groups.</li> <li>• The space sector also needs to consider its own workplaces and workplace development activities that reflect the <a href="#">changing world of work</a> with the rise of <a href="#">automation</a> in the post-COVID world and the demand for not only STEM-specific skills but <a href="#">interpersonal</a> and other skills. The provision of graduate training that includes transferable skills will provide highly skilled graduates for roles across science research.</li> </ul>	<p>Skills needs and gaps in space science are firmly understood by policy makers and education providers and addressed through targeted strategies, while Australian students and those working in space science R&amp;D are equipped with key skills, knowledge and training to drive and thrive in Australia’s space industries.</p>

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
		<ul style="list-style-type: none"> <li>The space industry must be willing to respond to this reality by acknowledging the transferability of skills and engage with an increasingly mobile workforce, as well adopting a culture of lifelong learning.</li> <li>The space sector should also consider, and be supported, to diversify its talent pool from activities such as exchanges with other industries and internships where traditional STEM skills can be complemented with customer and commercial know-how.</li> <li>National policies on education (in the early years, school, vocational and higher education) must consider the opportunities in the space sector and how it can equip students with the capabilities they need to thrive in the 2030 workforce. The next <a href="#">review of the Australian Curriculum</a> is due this year. A <a href="#">Roadmap for VET reform</a> is scheduled for endorsement in mid-2020. The <a href="#">HER sector</a> is facing an uncertain future. <ul style="list-style-type: none"> <li>Engagement of space scientists in teacher training and curriculum development should be part of this strategy. The <a href="#">Astronomy Decadal Plan 2016-2025</a> makes a similar recommendation, and anecdotally there has been an increased awareness of astronomy in schools, buoyed by public education and awareness campaigns.</li> </ul> </li> </ul>	
<p>Space education and career paths need to be better understood in the community to attract people to the sector.</p>	<p>Students and teachers lack the understanding of <a href="#">career paths</a> in STEM. As identified by the Australian Space Agency, there is much more to a career in space than being an astronaut. Seeing what space science offers through public platforms will inspire younger generations.</p> <p>As highlighted by Engineers Australia in 2018, <a href="#">we lack a national approach to STEM</a> careers: ‘increasing the</p>	<ul style="list-style-type: none"> <li>A national and multi-faceted approach to STEM careers should include a focus on the range of opportunities space science offers.</li> <li>A specific career strategy for space science would be warranted given the level of investment and potential growth – this would be linked to the ‘<a href="#">Inspire</a>’ strategy, being led by the Space Agency.</li> </ul>	<p><a href="#">Australian kids</a> are inspired to be innovators and entrepreneurs and to tackle global challenges, spurred on by a national space program that entrenches a strong culture of ambition and innovation.</p>

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
	<p>awareness of STEM related careers, as well as other career opportunities that can be unlocked by those with STEM skills, will assist in overcoming the negative stereotypes of lab coats and hard hats that the term ‘STEM career’ evokes. Students can then consider which careers would contribute to solving real world problems, and the skills and knowledge they need, so they can make subject choices that will equip them with relevant skills for a changing work environment.’</p> <p><a href="#">Twenty Australian universities</a> provide world-leading space-specific education, generating a pipeline of highly skilled workers for the sector, who have, until now, often sought work abroad.</p> <p>The <a href="#">Canadian space sector</a> has visibly grown to be increasingly prevalent in the everyday lives of Canadians, from ensuring their personal safety to improving their quality of life or being a source of inspiration. A ‘hearts and minds’ strategy could work here and encourage more people into space science careers.</p>	<ul style="list-style-type: none"> <li>• The responsible agency, logically the <a href="#">Australian Space Agency</a>, has a focus on increasing understanding of career paths in space, including creating connections with ‘real life’ space scientists and professionals – this could be expanded, including working with enablers such as the <a href="#">Women in STEM Ambassador</a>, <a href="#">STEM Australia</a>, <a href="#">Science &amp; Technology Australia</a> (also developed the <a href="#">Superstars</a> program) and the <a href="#">Australian Academy of Science</a> communication and education programs.</li> <li>• A ‘Superstars of Space’ initiative could be developed which, like the STA Superstars program, would equip space scientists with communication skills and provide opportunities to share their knowledge and experiences.</li> <li>• Partnerships between universities and industry are critical to address the ‘brain drain’ in space science and harness existing and emerging opportunities.</li> </ul>	<p>Australian space science graduates are supported to advance their careers in Australia with higher retention rates.</p>
<p>Those already working in space science may not be able to access, or do not understand, the opportunities for career progression and retention.</p>	<p>While a number of space industry projects have been initiated in Australia in recent years (both government and commercially driven), they are <a href="#">often short-term and disconnected</a>. This makes it challenging for companies to win capital funding, recruit skilled workforces and maintain scale, requiring them to either diversify income or scale down to be sustainable.</p> <p>While there have been substantial increases in government funding to the sector, it’s small by comparison to other OECD nations. This means <a href="#">funding will need to be complemented by innovative partnerships</a> with local industry and foreign investment to achieve the Agency’s growth ambitions.</p>	<ul style="list-style-type: none"> <li>• Defining a long-term investment plan for space science, as has occurred in defence science. This would increase space organisations’ ability to make longer term decisions that benefit employees and investment.</li> <li>• This would be further enhanced by strategies to retain employees who may leave the sector between major projects and contracts. Partnerships within industry and HER could assist.</li> <li>• While there is a <a href="#">peak group</a> for the space industry, there is no professional body or similar for space scientists. Such a professional body should focus on the development of professional standards in space science, accreditation and training and membership</li> </ul>	<p>People working in space science have clear pathways to stay and advance their careers.</p>

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
	<p>This creates a situation where space sector employees may leave the industry between projects and contracts, losing critical skills and knowledge from space projects and locations.</p> <p>In the post-COVID-19 world, companies who prioritise employee needs over shareholder needs could become <a href="#">talent destinations</a>.</p>	<p>with benefits such as mentoring, learning, and professional development support and networks. Ongoing membership of the professional body would support those who have career breaks to maintain connections with the sector.</p> <ul style="list-style-type: none"> <li>• Acknowledgement of key advances in space science through awards and prizes. These may be industry sponsored.</li> <li>• Targeted retention policies that offer lifelong learning and flexible work arrangements. Policies that address the needs of carers, parents, women and other groups are detailed below as part of diversity and inclusion strategies.</li> </ul>	
<p>Increased awareness and efforts are needed to close the gender (and other) participation gaps in space science as a shared goal of the sector.</p>	<p>The lack of gender equity in STEM in Australia is well known, with women comprising <a href="#">16 per cent</a> of the STEM skilled workforce, <a href="#">20 per cent of researchers in the physical sciences</a>, and 24% in a recent survey of space science researchers. Only 12% of academics at the professorial level are women.</p> <p>In March 2020 the Australian Government released the <a href="#">STEM Equity monitor</a>, a national data report on girls' and women's participation in STEM.</p> <p>The gender balance in space science is worrying if we are to meet the future workforce needs of the space sector and to ensure all Australians can participate in the opportunities available in this sector. Many studies have shown that corporations demonstrate better performance when there is <a href="#">diversity in decision making positions</a>.</p> <p>We know less about the participation of other groups in STEM and space science, including Indigenous, culturally and linguistic diverse (CALD) Australians, people with</p>	<ul style="list-style-type: none"> <li>• A better understanding of the gender and other gaps in space science is needed.</li> <li>• Significant national efforts are underway that should underpin, inform and support the space science sector on its diversity and inclusion journey: <ul style="list-style-type: none"> <li>- The <a href="#">Women in STEM Decadal Plan</a> was launched in April 2019, authored by the Academies of Science and Engineering and Technology at the request of the Australian Government. It seeks to address barriers to STEM participation for women at every point of the STEM pipeline. The Australian Academy of Science continues to support the implementation of the Plan and all STEM organisations are encouraged to become <a href="#">Women in STEM Decadal Plan champions</a> to align their gender equity journey with the Plan and to share gender equity actions. In 2019 <a href="#">ASTRO 3D</a> became a champion and is a great example of how gender equity activities can be aligned with the Plan and publicly stated.</li> <li>- The <a href="#">Science in Gender Equity</a> (SAGE) initiative seeks to improve gender equity in STEM</li> </ul> </li> </ul>	<p>More women and girls participate in a diverse and inclusive space science sector.</p> <p>The space sector has in place measures embedding a respectful culture, free of discrimination, harassment, where merit is recognised and rewarded.</p> <p>The space sector adopts an equity target, based on deeper analysis of the current context, noting that the Astronomy Decadal Plan has a goal of 33% female participation in the workforce by 2025 (currently 20%)</p>

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
	<p>disability, LGBTQIA+ Australians, but they are typically underrepresented in STEM fields.</p> <p>As canvassed in the Women in STEM Decadal Plan, the STEM career pipeline for women is ‘leaky’ at every point from primary school through to senior levels – with specific barriers identified in each stage. Fewer <a href="#">women and girls choose STEM careers</a>.</p> <p>The Women in STEM Decadal Plan launched in April 2019 sets out six opportunity areas in leadership, evaluation, workplace culture, visibility, education and industry action, with key recommendations and actions to achieve gender equity across the STEM sector.</p> <p>There are <a href="#">specific challenges impacting women’s participation in STEM in view of the pandemic</a> recently identified in a Rapid Response Information brief. Given the compounding effect of career breaks and gender-based discrimination on career progression, it is reasonable to assume the pandemic is likely to have more long-term negative implications for women in STEM than men.</p> <p>The Decadal Plan for Astronomy has set a goal of achieving 33% of its workforce as female by 2025 (currently 20%).</p>	<p>(Science, Technology, Engineering, Mathematics, and Medicine) in the Australian HER sector by building a sustainable and adaptable Athena SWAN model for Australia.</p> <ul style="list-style-type: none"> <li>- All women in STEM can join <a href="#">STEM Women</a>, a tool to access a range of career and other opportunities (launched by the Academy of Science in August 2019 and now host to over 2.5k profiles). This platform is continually updated.</li> <li>- Specific challenges pertaining to early and mid-career researchers are being addressed through the advocacy and support network of the <a href="#">EMCR Forum</a> – support and new members are always welcome. The Forum is supported by the Australian Academy of Science secretariat.</li> <li>- <a href="#">Reconciliation Action Plans</a> are an effective way to initiate and grow reconciliation journeys and should also be supported within institutions. Reconciliation actions can underpin greater participation by Indigenous people in STEM. This is also a very useful network for the promotion and use of <a href="#">Aboriginal Astronomy</a>, now part of the curriculum.</li> <li>- In 2019, with the support of the Theo Murphy Initiative administered by the Academy of Science, <a href="#">QueersInScience</a> was launched. This aims to build community and improve support for LGBTQIA+ people working in STEMM in Australia.</li> <li>- Organisations can consider becoming members of <a href="#">Diversity Council of Australia</a>, an independent not-for-profit peak body leading diversity and inclusion in the workplace, providing unique research, inspiring events and programs, curated resources and expert advice across all diversity</li> </ul>	



Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
		<p>dimensions to a community of member organisations.</p> <ul style="list-style-type: none"> <li>All organisations can explore and assess how they are ensuring people with disability can participate - including an increased focus on virtual connectedness, flexible work, and accessibility.</li> <li>The Astronomy Society of Australia has created <a href="#">the Pleiades awards</a> to recognise organisations in Australian astronomy that take active steps to advance the careers of women and strive for sustained improvement in providing opportunities for women to achieve positions of seniority, influence and recognition. A similar initiative could be explored for broader space science.</li> </ul>	
<p>What role can the space sector play in economic recovery, economic transition, and structural adjustment, post COVID-19.</p>	<p>While Australia's economy has recently retracted and entering recession due to the necessary COVID-19 restrictions, sluggish growth and persistent unemployment is typically location-based. A vibrant space sector offers growth and employment potential.</p> <p>The <a href="#">development of Australia's space industry</a> by establishment of the Australian Space Agency and through targeted space investment programs should create new opportunities for business and job growth across the economy, including the manufacturing, agriculture, communications, mining, and oil and gas industries.</p> <p>However, the government programs, including the Space Agency itself, do not offer ongoing programmatic support measures. There is a danger that the sector will prove unsustainable if and when these measures cease.</p> <p>By far the most significant investment in the space sector is from Defence requirements. For example, the ADF is seeking to acquire a next generation satellite</p>	<ul style="list-style-type: none"> <li>The <a href="#">creation of physical and virtual precincts</a> in locations experiencing economic transition have led to economic growth and renewal, often in high-value industries. The space sector must consider what partnerships, including through the Defence Innovation Hub, it can develop further to capitalise on these opportunities.</li> <li>Ensuring that the roles of the space R&amp;D sector, industry and government agencies including defence, are considered in national and regional economic transition and recovery packages. A key aim should be strategic planning of civilian and strategic space programs to develop domestic capability and capacity able to secure sovereign capability in space over a realistic timeframe.</li> </ul>	<p>The economic opportunity of the space science R&amp;D sector is understood by policymakers and investors and actively contributes to social, economic and national security.</p>

Insights (Problem we hope to address)	Evidence (What we know now)	Strategies (Actions)	Outcomes (Metrics)
	<p>communications system (JP 9102) at \$2-3 billion, while the Australian Geospatial-Intelligence Organisation plans sovereign satellite imagery capability (DEF-799 Phase 2) costing around \$3-4 billion.</p> <p>Some recent changes in consumer demand such as in-home entertainment, work-from-home arrangements, online education and training offerings and increased internet usage may offer new opportunities for the space sector.</p>		

## Recommendations

### 1. An integrated national space science innovation and education strategy

In order to grow a sustainable space sector workforce it is necessary to first understand the gaps and needs then develop appropriate responses. A national agency should be responsible for completing a skills and training gap assessment and engaging with national education agencies spanning primary, secondary, tertiary and the VET sectors to consider how to space can be used a vector to engage and equip students and retraining workers with the capabilities they need to thrive in the 2030 workforce and beyond. A focus on increasing understanding of career paths in the space sector and embedding strategies encouraging engagement of underrepresented and disadvantaged groups, is essential. The strategy needs to form partnerships between the university, VET and industry sectors to harness existing and emerging opportunities. The Australian Space Agency has identified development of a future workforce plan in Phase 3 of its Strategic Plan but a suitably funded coordinated, multi-sector approach is required.

### 2. Articulate a national commitment to a sustainable space program

Australia's aspirations to develop its space economy rely on stimulating growth of a new innovation sector in a very difficult and competitive economic and international environment. To support such growth major organisations and the research and industry sectors need to be able to make longer term decisions, including around forming partnerships and recruiting, training and retaining their workforce. A clear commitment to an ongoing national engagement with civilian space is required. Defence science has already recognised that a long term commitment and investment plan is needed to ensure it is able to meet its workforce needs. This necessarily includes core commitments to equity and diversity. A long term national goal should be development of capability and capacity able to secure sustainable growth of the sector and sovereign capability in space over a realistic timeframe.

### 3. Stimulating economic growth via the space sector

The space R&D sector is at the forefront of new technologies and opportunities which are necessary not only because our economy and well-being are increasingly reliant on space-based products and services, but also to support structural transition to an innovation-led high tech future. Therefore space-based activities in universities, industry and government agencies including defence should be considered in national and regional economic transition and recovery packages. This could include the creation of physical and virtual precincts in locations experiencing economic transition. The space sector must consider what partnerships, including through the Defence Innovation Hub, it can develop further to capitalise on such opportunities. Presently various state governments are competing to establish space innovation and industry hubs, which risks duplication of effort and unhelpful competition for resources.

#### 4. A professional peak body representing space science

While there is an effective peak group representing the space industry, there is no professional body or similar for space science. Such a professional body should focus on the development of professional standards in space science including the promotion of equity, diversity and inclusion; accreditation and training; promotion of career pathways; and supporting the growth of space science research and development through forming partnerships across government, university and industry sectors. These activities would support the goals and activities of the Australian Space Agency and other organisations including the SIAA.