

Victorian Space Industries Snapshot



The global space industry is forecast to be worth more than \$1 trillion by 2040. This offers significant opportunities for Victorian businesses in areas such as advanced manufacturing, earth observation, position, navigation and timing (PNT), telecommunications, robotics and data analytics.

It also offers global businesses the chance to develop and deepen beneficial partnerships in Victoria.

Victoria is coordinating national and international collaboration on space industries and attracting global investment. In fact, we already have 250 space-related science and technology companies based here, supported by world-class research and development expertise.

With existing strategic relationships and renowned capability in areas such as advanced manufacturing and digital industries, Victoria is in a prime position to contribute to the Australia-wide and global space economy. Did you know that digital gaming uses space to service 2.3 billion people across the globe and Victoria's expertise plays an important part in this rapidly growing market? It is world-class know-how like this that puts Victorian businesses in a leading position to contribute to space industries.

Victoria is open for business and seeking to grow the space economy. We are well-placed to boost our broad capability and develop policy to support agile space industries.

So, if you are a:

- **Global company**, consider setting up your operations in Victoria and engaging with local experts in advanced manufacturing and across the space supply chain.
- **Victorian SME**, think about your place in the supply chain; how could your expertise add value? Think about partnering with a large prime bidder to be part of large federally-funded projects, such as the Defence project: JP9102 – Australian Defence Satcom System.
- **Victorian startup**, explore the potential of Victoria's startup ecosystem to accelerate and incubate your big idea.

Engage with the Victorian Department of Jobs, Precincts and Regions to assist you with your space ambitions.

What does the space economy mean for Australia?

The space economy is a diverse sector with complex interactions and interdependencies, in a constantly evolving policy and regulatory environment. It generates significant revenue and employment multipliers, and social, environmental and strategic impacts, with considerable reach into other industrial sectors.

Australia aims to significantly grow its space industry market segment from around 10,000 jobs and a market size of \$3.9 billion to up to another 20,000 jobs and \$12 billion by 2030, with further jobs and economy growth from spillover effects.

Australian Space Agency (2019), Advancing Space: Australian Civil Space Strategy 2019-2028, Canberra: Commonwealth of Australia, April; available at: space.gov.au

The Australian Space Agency

The Australian Space Agency has set out National Civil Space Priority Areas in which Victoria can compete and respond quickly to supply skilled people and infrastructure, and help build the size, scope, capability and commercial sustainability of the space sector.

Australia's space capability touches virtually every sector of the economy and includes sending satellites and spacecraft into space as well as using space to help us communicate, locate, and see the Earth in new ways.

The Australian Government has invested in space, including through Geoscience Australia to improve satellite positioning to enable the precise navigation we rely on at the touch of a button, from smartphones to tracking devices and autonomous vehicles.

The Agency's \$150 million Moon to Mars initiative will fuel the growth of Australian businesses so they can thrive in international supply chains and support these businesses and Australian researchers to join NASA on its campaign to return to the Moon and travel to Mars.

What does Victoria have to offer?

The state of Victoria has one of the nation's largest economies, with infrastructure, research, integrated support services, and, a strong technology ecosystem including innovative local companies and global firms in cybersecurity, artificial intelligence, quantum computing and data augmented and virtual reality. With its global orientation and a skilled workforce, Victoria is well-placed to deliver on Australia's space industry goals.

Victoria offers high-tech manufacturing, earth observation, robotics and automation, aerospace systems, digital games, data science, local microgravity experiment capability and communications technologies.

Experience and expertise

Around 2,300 Victorians are currently employed in 250 space-related businesses, including some of the biggest names in space, such as Lockheed Martin, Thales, Boeing and BAE Systems, and businesses that have developed locally.

Victorians already doing business in the space sector with products and services critical in high-performance space and terrestrial applications include:

Advanced Composite Structures Australia

designs and manufactures engineered structures using advanced composite materials, which are optimised for strength, stiffness, weight, durability, repair and cost.

Applied Fasteners and Tooling is Australia's specialist provider of the latest fastening technologies, assembly tooling and consumables for application on spacecraft. This includes design support, prototyping, manufacturing and training.

Marand designs and manufactures precision-engineered structures, tools, equipment and automation, and supports industry partners in engineering projects.

Cablex manufactures custom cables and harness assemblies and complete 'end-to-end' solutions for products from development to after-market services. It is also pre-qualified for the Airbus global supply chain.

ESSWeathertech designs, manufactures, installs and supports weather satellite groundstations, radar systems, tidal monitoring systems, weather balloons, forecaster display systems and more.

FrontierSI provides expertise in high-precision spatial mapping, infrastructures, positioning, geodesy, analytics and standards, across multiple sectors.

Through businesses like these, Victoria generates \$400 million per year in space-related revenue.

Research, development and infrastructure

Victoria is ready to support R&D, services and applications, particularly in:

- **Advanced manufacturing** – developing and applying leading manufacturing technologies, techniques and data, as a key enabler of other sectors (e.g. agriculture, medicine, defence), and as a sector in its own right
- **Earth observation** – gathering and analysing data about the earth
- **Robotics and automation** – remote building and operation of equipment
- **Digital games** – developing and producing new mobile games, and tackling non-entertainment challenges through gamification
- **PNT** – developing services and applications to capitalise on open access to national precise positioning capability
- **Data science** – expanding our understanding of the world through analysis of position, navigation and timing, effective and secure communications, handling big data, connecting the internet of things, and building smart cities
- **Artificial Intelligence** – developing specialist knowledge to design, develop, and operate AI-based products and intelligent systems for the advancement of everything from healthcare, agriculture and education to manufacturing, law and financial services.



Victoria is home to some of the most significant national agencies for data science: CSIRO's Data61, the Australian Data Research Commons, the Australian Urban Research Infrastructure Network, AuScope, Astronomy Australia and the Bureau of Meteorology. Victoria is also home to one of the world's largest data-science meetup groups involving around 12,000 data scientists. These connections in Victoria are enabling unprecedented opportunities to monitor the built and natural environment. This will improve planning and project delivery, monitoring and evaluation, modelling and scenario planning.

Established relationships

Many Victorian commercial and research and development organisations have established relationships with international space agencies such as NASA, the UK Space Agency, the Japanese Space Agency (JAXA) and the German Aerospace Centre (DLR). La Trobe University, for example, partnered with DLR on the engineering design of a critical component of a world-leading earth sensing instrument now installed on the International Space Station. Victorian businesses also make key contributions to the space-supply-chain in areas including design and manufacture of hardware and systems ranging from electronic components to full telecommunications relay platforms, scientific satellites and spacecraft for human spaceflight.

Modernising spatial data to support planning, infrastructure, construction, roads, transport, agriculture and emergency services

Vicmap is Victoria's most popular dataset of spatial data – information about a specific location on the Earth's surface.

Originally created from digitising old maps and plans, Vicmap's accuracy is now being updated. The \$45 million Digital Cadastre Modernisation project is converting title dimensions and survey measurements for all 3.3 million land parcels in Victoria to a new digital format.

This will create a data-driven, spatially accurate, measurement-based, digital register of property to accelerate Victoria's ability to grow our digital economy through smart cities, digital innovation, digital engineering and improved emergency management and response. This highly accurate base data, readies Victoria to make best use of changes that will be realised through the precise positioning that the Space Based Augmentation System will bring.



Victoria is ready with some of Australia's key space-related infrastructure and capability. This includes laboratory facilities such as CSIRO's Lab 22 and Monash University's Centre for Additive Manufacturing, the Australian Synchrotron, the Bureau of Meteorology's supercomputer, the University of Melbourne's access to IBM's quantum computers, Deakin University's Institute for Intelligent Systems Research and Innovation, suite of robotic base sensorised motion platforms, and RMIT's Satellite Positioning for Atmosphere, Climate and Environment (SPACE) Centre. The Victorian Government supports precincts as a way of enabling communities centred around R&D activities. Several of these precincts are ready or have the potential to further develop space capability.

The Victorian Government is active in space

The Victorian Government, led by the Department of Environment, Land, Water and Planning, is a user of space technologies and systems, which are already helping us to monitor transport, plan, build infrastructure, monitor environment, predict trends, refine agriculture and predict, plan for and respond to bushfires, floods and other natural disasters.

The Victorian Government manages the ongoing operation, maintenance and enhancement of an integrated network of Global Navigation Satellite Systems (GNSS) ground stations to enable precise positioning services. A wide range of industries benefit from these services including precision agriculture, construction, transport, mining, asset and resource management, surveying and mapping. For example, the Positioning Australia program collects data from the Victorian network that has been made freely available to encourage innovation, expand the user base and increase productivity. The reported economic benefits have the potential to exceed \$73 billion in value to Australia by 2030.

High-performance computing in Victoria

A range of supercomputing or high-performance computing facilities are available in Victorian universities.

Monash University is a partner institution for MASSIVE, with hardware designed for processing, analysis and visualisation of large volumes of data.

OzSTAR at Swinburne University supports the astronomy community in gravitational wave and theoretical astrophysics research.

University of Melbourne houses high-performance, large scale computing facilities, operates a cloud computing resource and access to national supercomputing and high-performance computing services.

Entrepreneurs and startups

There is a vibrant entrepreneurial and startup community in Victoria. The diversity is rich and broad across advanced manufacturing, robotics, spatial applications, artificial intelligence, medical technologies and many other areas. One example in the advanced manufacturing sector is NextAero. This company is using the latest 3D printing technology to manufacture aerospike engines, which is a novel propulsion system designed to launch “small satellites”. This is a market that is projected to be worth US\$15 billion by 2026. Another example is Cape Bionics, which has taken its technology developed for astronauts, in collaboration with NASA, MIT, European Space Agency, to revolutionise biocompression garments for medical applications and elite athletes.

Support for investment and business development

The Victorian Government has several initiatives designed to stimulate commercial enterprise and partnerships.

Invest Victoria is the State of Victoria’s investment attraction agency. It works directly and proactively to bridge the gap between investor and the Victorian market through a range of services, including facilitating connections with potential industry and research partners. Victoria has Australian offices of international space-enabled companies in space-defence (BAE, Lockheed Martin, Thales), aerospace (Boeing), communications (e.g. ViaSat), medical technologies and pharmaceuticals (GSK) and the digital sector (Alibaba).

Support is available for developing and operating space-related businesses. For companies based in Victoria or across Australia, the Victorian Government Business Offices, Regional Development Victoria and the Defence Capture Team are staffed with specialists in business development who are knowledgeable about the operating environment and can provide advice in navigating government services, programs and regulations. Victoria is home to many dynamic space-enabled SMEs and is seeking to grow these enterprises.

For companies based outside Australia seeking to begin operations in Victoria, Global Victoria operates 22 Victorian Government Trade and Investment offices around the world, from the United States to Germany, India to Chile and elsewhere.

A skilled workforce

Victoria has a unique place in the world” with seven in world with seven universities located in the Melbourne CBD that are directly engaged in space activities. These universities have world-leading academics in disciplines such as robotics, artificial intelligence, industry 4.0 or smart manufacturing, earth observations, additive manufacturing, quantum technologies, applied and theoretical physics, precision agriculture, and medtech and pharma.

These universities have international partnerships and collaborations with other academic institutions, such as Caltech and the W.M. Keck Observatory, and international space agencies. Student-led organisations at these universities are also engaged in outcome-driven space-related activities, such as the Melbourne Space Program, launching the next generation of technology pioneers, and Nova Rover, a team that designs, fabricates and tests the next generation of Mars rovers.

At a tertiary level, 30 per cent of Australia’s engineering graduates are produced at these seven Victorian universities. Specialist space education is also provided by RMIT University and Swinburne University. Most Victorian universities provide degrees and postgraduate training in space-enabling disciplines covering science, technology, engineering, mathematics (STEM), business and commerce, policy and law, and built environment and design.

Schools in Victoria have access to the Victorian Space Science Education Centre, one of six Science and Mathematics Specialist Centres. Specialist schools also offer space industry related programs and ten Tech Schools provide opportunities to secondary students to enable discovery-learning in STEM.

Premier international industry events

AVALON 2023

Every two years, Victoria hosts the **Australian International Airshow and Aerospace & Defence Exposition** at Avalon Airport. The Airshow is the largest in the Southern Hemisphere and a global business event, attracting senior civil aviation, air transport, aerospace and defence industry, military and government decision-makers from around the world.

AVALON 2019, with 698 participating companies and 161 official industry and government delegations, had attendances at industry-only trade sessions exceeding 39,000. Along with the public day attendances, the entire event attracted more than 170,000 people.

AVALON 2023 is scheduled to run from 28 February to 5 March 2023.

What can the Victorian government do for you?

The Victorian Government can connect you with important stakeholders, including multinational companies, international space agencies, world-class research capability and market leaders across the space supply chain.

The Government is serious about Victoria's involvement in space industries and will rigorously promote activities and partnerships to maximise the opportunities for Victorian businesses to play a significant role.

So, engage early and keep connected with the Office of the Lead Scientist, the Defence Capture Team and local metropolitan networks.

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djpr.vic.gov.au/victorias-lead-scientist

Telephone:

(03) 9651 9038

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Follow on Twitter:

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Space supports
autonomous
technologies





Space supports
the global gaming
industry

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