Space technology
civil and commercial
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Welcome to Adelaide

Adelaide, the capital city of South Australia, leads the nation for cutting edge technology development in areas including cyber, surveillance and simulation, driven by major defence and research programs. It is home to some of the world’s most sophisticated projects, including the A$50 billion Future Submarines Project, one of the world’s single biggest military contracts.

Now, our state is leading the way in the development of a space economy for our nation.

With a culture of innovation and entrepreneurship, world class universities, vibrant incubators and co-working hubs, and fast growing venture capital support and interest, South Australia is the place for space.

Adelaide, South Australia’s capital city, is the first city in Australia to:

- Join the United States’ Ignite Gig City network (and the only city outside the US)
- Pass legislation to test autonomous vehicles on public roads
- Be selected as a Cisco “Lighthouse City”, joining cities such as Barcelona, Chicago, Hamburg and Dubai
- Deliver a state of the art innovation district, Tonsley, that also houses the national simulation and modelling peak body, Simulation Australasia
- Set targets for becoming world’s first carbon-neutral city
- Be home to Techstars first Asia-Pacific accelerator.

The Government of South Australia is leading the charge for the establishment of an Australian Space Agency and has signed a Memorandum of Understanding with the ACT Government in support of a Canberra-based agency with a prominent presence in Adelaide to take advantage of our state’s leadership in numerous high-tech industries.

South Australia is a progressive and ambitious Australian state and Adelaide is a modern and innovative city that is both vibrant and relaxed. Britain’s Sunday Times named it one of the best places in the world to live, and The Economist ranked it the world’s fifth most liveable city.
New space technologies are critical to the operation and ongoing productivity of a wide range of industries, and to the broader fabric of Australian society. Space-related technology is so integrated in our daily lives now that we hardly notice it. Google maps, global roaming, real time transport updates, better weather forecasts and improved emergency services are what we now expect.

South Australia is developing a vibrant, entrepreneurial space ecosystem. We are home to significant capabilities across a range of space related activities, including ground infrastructure and the processing of spatial information. South Australia is the first state in Australia to launch a Space Innovation and Growth Action Plan and develop a Space Capability Directory. Developed by Defence SA, these resources outline how the South Australian Government will help to grow the space industry, and map out the skills and experience in our local ecosystem. These resources are available at: www.defencesa.com/capabilities/space.

A critical part of the local ecosystem is a number of amazing start-up companies that are attracting global attention and venture capital investment. This cohort is anticipating future growth in Adelaide with plans to recruit additional roles such as mechatronics engineers, hardware and software engineers, telecommunications engineers, aerospace engineers, electrical engineers, mechanical engineers and mechanical fabrication technicians, plus a range of broader business roles.

Our growing ecosystem is backed by a new A$50 million Venture Capital Fund and an Early Commercialisation Fund, the latter providing eligible companies a maximum of A$500,000 per approved project. Administered by the state government, these funds are focused on helping businesses secure investment, test and commercialise products.

South Australia’s reputation as the Nation’s Defence State continues, with many of the biggest defence companies in the world located here and with approximately A$90 billion worth of defence projects in progress, including the A$50 billion Future Submarine build.

Outside of defence, but connected through already established expertise and skills, our reputation is growing as a pioneer in new industries. The spectrum of possible civil applications of space-related innovations is larger than ever. It ranges from agriculture to energy, communications to telemedicine, and distance learning to national security. Within the growing space economy, commercial activity now far surpasses that of government projects. Technology is becoming more affordable, with the global capability of small satellites increasing and the associated costs falling.
South Australia recognises the enormous opportunity the small satellite market represents – a market expected to earn US$7.18 billion by 2022, with a compound annual growth rate of 19.8% during the forecast period 2016 - 2022.

The Small Satellite Market Growth and Industry Forecast 2014-2022 published by Allied Market Research (May 2017) highlights continued and growing interest in inexpensive, very small satellites and their use for academic, government, and, increasingly, commercial purposes across numerous industries including:

- Earth observation
- Defence and Security
- Agriculture
- Engineering
- Oil and gas
- Energy
- Health
- Communication
- Scientific research
- Technology demonstration

Our world class universities are significantly contributing to the growing industry in South Australia. The University of Adelaide offers a degree in Strategic Space Law and has partnered with McGill University in Montreal, Canada to develop a ‘Manual on International Law Applicable to Military Uses in Outer Space’. The University of South Australia offers a Southern Hemisphere Space Studies Program, in partnership with the International Space University. The Program gives students a multi-disciplinary experience of the space industry, including study in space exploration, space systems engineering and technology, space business and law, and space policy and economics. Flinders University offer an outstanding range of space applications and research infrastructure.

The Space Industry Association of Australia (SIAA) is a key industry body headquartered in Adelaide, and works with government to broker opportunities for industry and research. The SIAA offers proximity to expertise and can connect you to Federal Government knowledge, incubators and grants, including the research and development tax incentive.

One thing is clear – South Australia is well positioned to drive the Australian sector successfully into the future. As the industry matures, opportunities like software, launch systems, space tourism, antennas and sensors, and architecture for satellites will increase in importance. Our state has the research capability, fertile ecosystem and competitive business environment to tackle this head on.

This is an exciting opportunity to immerse your operations within a cutting-edge space innovation ecosystem with a ready supply of employees and graduates, creating pathways to collaboration and future product development.
Open innovation and collaboration

South Australia is building a reputation as one of the best regions for entrepreneurs in Australia. We are home to more co-working spaces per capita than anywhere else in Australia and offer numerous incubators and accelerators to assist companies to grow and succeed. Our incubators include TechinSA, run by the South Australian Government, which recently supported local company Myriota (see page 8), through the Early Commercialisation Fund, with A$300,000 for an Internet of Things enabled transceiver for use by businesses in remote areas or those that transport goods over long distances. Our accelerators include Techstars, which recently opened their first Asia-Pacific office in Adelaide. Techstars has graduated over 900 start-ups in the US with a combined market cap of US$7.5 billion.

In addition to numerous Australian Federal Government incentives, the South Australian government offers eligible companies support via the South Australian Early Commercialisation Fund, and the Venture Capital Fund (detailed on page 18-19).

Advanced Manufacturing

Manufacturing has long been a key foundation of South Australia’s economy. With a deep, technical skills base developed from the automotive and defence sectors, South Australia is developing and producing goods as diverse as water recycling equipment, premium food and wine, naval ships and submarines, agricultural equipment and health and medical devices.

For manufacturing companies, South Australia provides access to a local research and development sector with strengths in emerging technologies such as photonics, nanotechnology, additive manufacturing, advanced materials and robotics.

Importantly to the space sector, South Australia has a critical mass of aerospace companies with strengths in engineering, test and evaluation, systems integration and through-life-support.

South Australia also has a strong capability in precision engineering and manufacturing with companies such as Toolcraft, working on the manufacture of the components for the DST Group Hyperersonic HiFIRE projects and the Scramspace rocket for The Queensland University, and Axiom, selected to manufacture components for world class telescopes and high precision fuel cell manufacturing components supplied to the Space Prime (Orbital ATK) that fuelled the space shuttle launches to the International Space Station.

Research, training and education advantages

South Australia prides itself on being the nation’s ‘Knowledge State’.

Alongside three world-class public universities (The University of Adelaide, University of South Australia and Flinders University) and campuses of the international Torrens University Australia and Carnegie Mellon, are many private specialist training institutions providing industry with a highly-skilled workforce.

All of Adelaide’s leading institutions collaborate with industry on research and skills programs, as well as the development and commercialisation of technologies.

Education is South Australia’s largest service export, and sixth largest export overall. More than 30,000 international students from 125 countries study in South Australia every year, creating a pool of expertise that makes Adelaide an ideal base for Asia Pacific growth.

Adelaide’s advantages for Space technology

Adelaide is home to more co-working spaces per capita than anywhere else in Australia and offers numerous incubators and accelerators to assist companies to grow and succeed.
Information and communications technology

South Australia’s information and communications technology (ICT) capabilities are well-established and respected.

Hewlett Packard Enterprise recognised this expertise when it decided to establish its new headquarters in South Australia in partnership with the University of South Australia. This includes an Innovation and Collaboration Centre, which provides a unique environment connecting technology, knowledge and commercialisation.

New Zealand-based IT services company, Datacom, is investing A$22 million to build an ICT hub in South Australia, a project which will create hundreds of new jobs and training opportunities.

Global technology company NEC is investing A$4.38 million to establish a Global Security Intelligence Centre in Adelaide to meet growing global demand for cyber security.

Modelling and simulation

South Australia has developed a reputation as an Australian leader in simulation. The national peak body for the simulation community, Simulation Australasia, is headquartered in Adelaide and provides an international connection point for industry, research and government stakeholders.

There are more than 80 firms with modelling and simulation capabilities operating in the State, ranging from large primes to innovative micro businesses. Defence is the largest customer base for these services, followed by resources and mining, and healthcare, with Sydac leading the world in transportation simulation.

Adelaide’s universities also offer broad and deep simulation research capabilities and facilities, as well as educational pathways into simulation-related professions.

Home of Australia’s biggest defence investments

South Australia has been announced as the location of the A$50 billion Future Submarines Project - Australia’s biggest ever defence investment and one of the world’s single biggest military contracts. This project alone will drive vast activity across defence and associated industries, particularly technology and innovation sectors.

South Australia will also host the nation’s A$230 million Centre for Defence Industry Capability, making it the heart of Australia’s defence innovation – with the State now benefiting from a majority share of the total Australian defence industry spending.

In September 2016, Adelaide was confirmed as the location for a new A$500 million Australian Defence electronic war-gaming laboratory, including dedicated new facilities and simulation and testing equipment.
Fleet is a next generation connectivity company that will launch a constellation of nanosatellites to connect the world’s 75 billion devices for free. Once live, this network will create a digital nervous system that covers the planet, creating a world more connected than ever before.

Fleet was founded in 2015 by aerospace engineers Flavia Tata Nardini (European Space Agency, TNO), Dr Matthew Tetlow (Space Systems Institute, Tigerfish Aviation) and entrepreneur Matt Pearson. Fleet’s goal is to enable the Internet of Things revolution by building the infrastructure to connect billions of sensors and low-bandwidth devices to the internet via nanosatellites.

The company is headquartered in Adelaide, South Australia, which CEO Flavia Tata Nardini describes as “an emerging breeding ground of Australian-led space innovation with ambitious minds, geographical advantages, and a buzzing start-up community.”

“A number of Australian aerospace organisations are located here, providing Fleet with a network of connections, manufacturing capabilities, and a pool of potential partners, all on its doorstep.

“We also received strong support from the South Australian Government during start-up stage.”

Fleet is targeting the transport, oil and gas, mining and agriculture sectors – industries that often involve working in remote locations where connectivity is limited.

“We plan to launch at least 100 nanosatellites between 2018 and late 2020, forming a constellation that will provide free low-bandwidth internet connectivity for devices, not people, in remote areas across the globe. While our network will leave no corner untouched, we see our technology making the biggest impact in Africa, parts of Asia, South America, Australia, and other unconnected regions,” says Flavia.

In early 2017, Fleet closed a A$5 million capital raise from investors including Blackbird, Atlassian co-founder Mike Cannon-Brookes, Earth Space Robotics, and Silicon Valley’s Horizon Partners.

Fleet plans to launch its first nanosatellites in 2018 with pilot partners already signed up in in Australia, South America, Europe and the US. These pilot projects span industries such as production, logistics, agriculture, and environmental sustainability.

Flavia added, “finding pilot partners has been quite easy. These industries know they must improve their efficiency and to do that they have deployed [internet-connected] sensors, but they still need to connect them, particularly in remote areas. That’s where we come in.

Our goal is for our technology to make real, tangible efficiency improvements to the ways businesses operate and address the issues of tomorrow; be it measuring the rate of tree regeneration in the Amazon, or tracking important cargo like aid as it journeys across the Indian Ocean.”

In addition to fine-tuning its technology, Fleet has opened three offices in 2017, including new premises in hometown Adelaide, and two international offices in Los Angeles and Delft (The Netherlands).

Fleet is always looking for partners that are driven to solve the world’s biggest challenges, from space.

“By 2025, the global population is expected to reach over eight billion,” says Flavia. “Earth will face new and increasing challenges such as resource depletion, food and water security, and environmental stresses, as well as incredible technological advancements. Fleet hopes to help improve life on Earth, and is looking to partner with companies with a similar focus.”

www.fleet.space
Global Defence and Security company, BAE Systems, design and deliver solutions for civil and commercial space agencies for use on Earth, near space and deep space. With expertise in radio frequency systems, antenna design, synthetic aperture radar processing, radiation hardened electronics, and mapping software, BAE Systems enables customers to command, control and communicate with space craft, and ensure electronics survive the radiation and temperature extremes of deep space.

In Australia, BAE Systems are headquartered at Edinburgh in northern Adelaide with around 1,000 employees.

“In South Australia one of our focus areas is around advanced manufacturing, particularly for high end, low volume products” Andrew Sysouphat, Senior Aerospace Systems Engineer says. “We specialise in development and manufacture of high end sensors and systems.”

BAE System’s capabilities include additive manufacturing, diamond point turning, optics lab, machining, PCB and electronics assembly halls and environmental testing.

“We are working to de-risk the development of Australian space technologies and capability for the Australian Defence Force (ADF) applications through self-funded R&D, collaboration with local SMEs and academia.” says Andrew.

“This is enhancing the capability of Australian industry.

BAE Systems Australia has a unique and sophisticated technology capability employing some of the most highly regarded engineers across Australia, and the skillset of our people consistently enables us to deliver the most cutting edge technologies.

In response to the high technology push of the recent ADF White Paper, we are undertaking internally funded R&D in a number of areas including additive manufacturing and miniaturised and ruggedized sensor technologies, including the MantleTM Radio Frequency sensor product.

We are always looking for opportunities to partner with local space industry, SME’s and start-ups to deliver next generation space based capability,” says Andrew.

“We believe everyone – including large businesses, governments and the communities in which employees and business owners live – benefit when we have a viable and productive small business supplier base.

The innovation and agility small businesses/start-ups are able to contribute, and the niche technologies that provide a capability edge when integrated as an element of a larger system, make for a compelling and productive relationship.”

www.baesystems.com/en-aus/
Adelaide-based Internet of Things (IoT) company Myriota, is bringing affordable remote IoT to industries whose needs are not being met by traditional communications technologies.

"Many farmers, resource companies, environmental agencies, governments, defence agencies and industries with remote operations have a strong demand for remote machine-to-machine and IoT connectivity however the cost of deploying and maintaining ground based infrastructure like towers, gateways or backhaul hubs is prohibitive," CEO and co-founder Alex Grant says.

"These are applications where you currently collect data manually, install expensive broadband satellite solutions, or don’t collect the data at all due to the high cost.

Industry needs low cost connectivity to harvest the benefits of the IoT revolution, such as cost and risk reduction, productivity improvements and emergence of new business models. Remote industries shouldn’t be excluded from these benefits due to a lack of affordable communications infrastructure."

The number of IoT connected devices is estimated to hit over 70 billion in the next few years.

Myriota offers a highly scalable global service for this new category of customer.

"Unlike other satellite technology, we have developed a direct-to-orbit IoT solution which significantly lowers the total cost of communications in remote areas.

Our technology transmits very large numbers of low power messages over tiny slivers of radio bandwidth. These messages are then sent to a constellation of low-earth-orbit satellites, which relay the messages back to earth to be processed using patented cloud-based software.

We are exploiting advancements in computing and nanosatellite technology to provide a system with very low infrastructure costs," Alex says.

Myriota was formed in late 2015 with seed funding of over A$2.5 million to commercialise technology developed during a A$12 million research program conducted at the University of South Australia’s Institute of Telecommunications Research. Myriota aims to raise further funds during 2017 to launch its product globally.

Myriota, currently employing 11 staff, has attracted strong interest from the agriculture, oil and gas, defence and marine sectors, as well as for asset tracking, environmental sensing, utilities and water monitoring. There are several deployments in the field including the Australian Institute of Marine Science using Myriota technology to connect scientific drifters for research by its oceanographers.

www.myriota.com
Myriota has joined with University of New England and the Australia and New Zealand Cooperative Research Centre for Spatial Information (CRCSI) in a project to conduct trials of low-cost livestock water tank level monitoring.

The project falls under the CRCSI Australian Livestock Spatial Innovation Program (ALSIP).

Myriota has deployed its technology at a number of remote sites throughout Australia.

Graziers are able to monitor water points regardless of location using satellite connected pressure sensors. The trial is demonstrating the benefits of this cost effective remote monitoring system to the Australian red meat sector.

Myriota’s Tom Rayner says that the company has “deployed about 30 Myriota transmitters connected to sensors that measure livestock water tank levels around Australia. Sensors collect tank level data and Myriota’s transmitters send that data direct to low-earth-orbit satellites. From there the messages are transmitted to the cloud where the data will be interpreted and sent to the grazer. The tank levels will be updated at least twice a day.”

The project will run over a six-month period and conclude later in 2017.

Professor David Lamb from the University of New England Precision Agriculture Research Group said the technology could prove to be a game changer in remote connectivity.

“The purpose of the trial is to demonstrate Myriota’s remote IoT (Internet of Things) platform,” David says.

“There is a huge number of agricultural applications that will benefit from this technology and we are pleased to be working with Myriota to develop the product through to commercialisation.”
ARC, a San Diego-based start-up, is currently in Adelaide as part of the first ever Australian Techstars cohort.

Founded in 2015 by Chief Executive Officer Andy Kieatiwong and Chief Technology Officer Kyle Adriany, ARC has developed innovative technology which can create 3D-printed metal rocket engines in a tenth of the time and at half the cost of traditional methods.

By combining advanced design capabilities with state-of-the-art additive manufacturing technologies, ARC is able to provide reliable and affordable propulsion solutions for the space industry.

“Techstars reached out to ARC in early 2017 and encouraged us to consider the accelerator, which was opening a defence-focused program in Adelaide and we are honoured to be a part of the first cohort,” Andy says.

“This specific emphasis on shaping start-ups within the sector was appealing to us. On top of finding out what Adelaide had to offer for the space industry, this was a chance for us to make new connections and gain additional knowledge and expertise needed to further our company.”

The Techstars team works hard to provide the support and resources necessary to strengthen the start-up community. They do a great job leveraging their network; if there is something you need, they can connect you with the right people from all over the world.”

With their emphasis on mentorship-driven growth, Techstars understands the value of providing entrepreneurs with a variety of perspectives to help guide them in making the best possible business decisions, during and after the program.

“We’ve had the opportunity to meet with experts from companies within the space industry including Boeing, Codan, Saab, and Thales,” Andy says.

“Adelaide is a forward-thinking city, committed to building a start-up infrastructure, and there is lot of potential for success for companies within new and emerging industries.

For those in the space and defence sector, this is the perfect time to get into the market. Innovation and connectivity is brewing in Adelaide, positioning the city as a major player in the global economy.

By implementing cutting edge new technologies such as the GigCity Network, Adelaide has set itself apart from other areas of world that are still trying to catch up.”

Andy says that South Australia’s strong backing for start-up growth is also essential element.

“We’re seeing an incredible amount of support provided by the South Australian Government, who recognize the positive economic impact of taking risks on innovative companies like ours,” Andy says.

“There are also world-class universities, like The University of Adelaide, that foster important partnerships with the start-up community.

Also, the city boasts an enviable lifestyle that is a key factor in entrepreneurs’ decisions to relocate or expand. Overall, I’m confident start-ups can thrive in the business climate that Adelaide has to offer.”

Case Study: Additive Rocket Corporation (ARC)
A small satellite built by The University of Adelaide – one of the first Australian-built satellites in 15 years – was launched into space by NASA from Cape Canaveral in Florida on the Atlas V rocket, in April 2017. It is now deployed from the International Space Station.

The four-year project was led by Inovor Technologies CEO Dr. Matthew Tetlow, and approximately 50 university students and a dozen staff have worked on the project.

It is one of three nanosatellites developed in Australia as part of a research project involving Australian universities under the European-funded project, QB50 — an international network of 50 CubeSats. They will play a key role in investigating the thermosphere, (a layer of atmosphere from about 95 kilometres to 500 kilometres from the Earth’s surface) with the aim of increasing understanding of climate and weather modelling.

The South Australian State Government granted A$300,000 towards the development of the University of Adelaide satellite through the Premier’s Research and Industry Fund. Other contributors included the Sir Ross and Sir Keith Smith Fund, Inovor Technologies, The University of Adelaide and the University of South Australia, and in-kind support from BAE Systems Australia, Vitech and ITP Engines UK.

“It is incredibly exciting to see our spacecraft launched to the International Space Station and know that it will play an important part in this research,” says Matthew.

“It’s a fantastic milestone and a testament to the team. The whole project has been an invaluable and unique experience for the many students who have worked on it. It’s not everyday student engineers get to help build a satellite to be launched by NASA.

The CubeSat represents a major design and construction challenge, but it also shows what our incredibly talented students can do.

Dr Tetlow says nanosatellites are the way of the future for space research. “With the miniaturisation of electronics, it’s now possible to put the same amount of research equipment of a full-sized satellite into something that’s about the size of a loaf of bread. The CubeSat can do the same work that a large satellite does at a much-reduced cost.”

www.adelaide.edu.au
Inovor Technologies established in Adelaide in 2012, with a focus on research and development of space systems and small satellite technologies.

“In the contract R&D area, we will continue to build modelling and simulation expertise to provide broad support to a number of sectors, mainly within defence,” says CEO Dr. Matthew Tetlow.

“In small satellite technologies we are a turn-key service provider – having recently designed, built, tested and delivered a small satellite – and we want to grow and capture business in satellite platforms and satellite missions.

We design and integrate small satellites, from identifying customer needs to requirements definition, through design, build, integrate and test.”

In addition to providing nanosatellite services, Inovor Technologies has partnered with The University of Adelaide and a local defence prime to develop a nanosatellite based space object detection system to detect and track space objects.

Inovor Technologies has also developed a second-generation satellite bus, providing precision pointing and an advanced power management system.

“We are developing a number of different future missions, with our initial focus being on imaging spacecraft, both for Space Situational Awareness (SSA) – looking away from Earth, and Earth imaging missions,” says Matthew.

Of locating in South Australia, Matthew says it’s a no-brainer.

“Adelaide has a large space start-up community and as such has some of the best space technologists in Australia. South Australia is the only Australian state to have built satellite subsystems in the past 15 years and we also have UniSA ITR here which is the premier satellite ground station research organisation in Australia, having descended from the CRC for Satellite Systems.

On top of that there is a strong space legal expertise in Adelaide, so we have the best technical and legal expertise in Australia. The State Government is very supportive and Defence SA is doing an exceptional job facilitating and driving the space agenda.”

Inovor Technologies key projects to date have included:

> SUSat (the QB50 spacecraft) – the company designed and built the satellite including the following indigenous subsystems: attitude determination and control system (points the spacecraft); the deployable antenna systems; the mechanical structure, including primary structure and secondary internal and external brackets to hold sensors, as well as the flight and ground software.

> SSA – the company developed image processing algorithms to detect objects in orbit around Earth as part of the Linkage project with The University of Adelaide, supported by the Defence Science and Technology Group.

Matthew believes expanding Australia’s space industry, particularly the space segment, will create a sustainable industry suited to Australia’s skilled workforce with the potential for spin-off technologies and applications in other sectors in the economy, including agriculture, defence, communications and emergency services.

www.inovor.com.au
Neumann Space is a space startup that relocated from New South Wales to South Australia in late 2016 to take advantage of Adelaide’s competitive economic environment for new businesses. They now have six employees and the business is growing.

“Our patented solar-electric ion drive is more efficient than anything else on the market. We are uniquely suited to delivering affordable, efficient drives that can greatly prolong the lifespan of satellites, as well as lowering the fuel and mass costs for long missions, such as space exploration and mining. We’ve built a brand new kind of ion engine (that’s a kind of rocket), that has just broken the world record for specific impulse previously held by NASA’s HIPEP thruster,” says Dr Patrick Neumann.

“This level of fuel efficiency is so good that one of these engines could send a probe to Mars and back on a single fuel rod. But it could also be great for keeping satellites in their proper position in orbit, or cheaply sending all the heavy equipment ahead of a manned mission somewhere.”

At the 2016 International Astronautical Congress in Guadalajara, Mexico, Neumann Space signed an agreement for European company Airbus Defence & Space to transport their drive to the International Space Station (ISS) in 2019 for a 12-month test program. Tests will take place on the Bartolomeo platform, a commercial research platform attached to the European Columbus module of the ISS. The aim is to demonstrate how the drive performs in a real out-of-world environment for an extended period.

Neumann Space has also come to an agreement with Airbus Defence and Space to on-sell excess capacity on the Bartolomeo platform to other research projects through the FAST (Facility for Assisted Space Tests) program.

In an Australian-first, The South Australian Department for Education and Child Development has recently signed a Memorandum of Understanding with Neumann Space and the ISS will host three STEM experiments created by South Australian public school students. The ‘South Australian Schools Space Mission’ will use high-tech sensors and receptors to stream data back to South Australian schools for recording and analysis over a twelve-month period.

Industry customers can also take advantage of the FAST program to test hardware.

“After a successful test in space, the hardware is much more attractive to customers, which means that these small start-ups can grow their businesses and the broader ecosystem,” says Patrick.

Neumann Space is keen to see the Australian civil space industry develop and aspires to manufacture components for spacecraft in Australia for global customers.

“There are a lot of Australians working on cutting-edge research in satellite dynamics and ground-based observations, mostly working overseas with NASA, the European Space Agency or private companies like Airbus, Boeing or Lockheed,” says CEO Ian Whitchurch.

Neumann Space decided to headquarter in Adelaide encouraged by the state’s cutting-edge advanced manufacturing capabilities, along with its military aerospace and defence strengths and rapidly growing space innovation ecosystem. Investment Attraction South Australia has worked closely with Neumann Space to facilitate introductions and partnerships with key local stakeholders. “Adelaide is consistently ranked among the top 10 most liveable cities worldwide by the Economist Intelligence Unit, with lower costs of housing and transport compared to most other Australian capital cities” says Ian.

Being Adelaide based means that Neumann Space and its employees can spend less on the fixed costs of renting their business and residential premises. Adelaide’s transport infrastructure is also highly competitive offering an international airport with frequent flights to major international hubs, and a large, efficient port.

It is also the manufacturing site for much of Australia’s high tech and defence manufacturing, and has a dense network of companies and services that help a high-tech business to thrive.

Neumann Space are accessing several of these companies via the Defence Teaming Centre, and expect to be announcing several collaborations with companies in the aerospace and specialty manufacturing sectors.”

www.neumanspace.com
The University of South Australia (UniSA) runs a sophisticated summer space Master program in partnership with the International Space University (ISU) headquartered in Strasbourg, France.

Currently the program is headed by NASA Chief Innovation Officer Dr Omar Hatamleh, who oversees all of ISU’s Master programs. The program held annually at UniSA is co-directed and supported by UniSA staff. Co-Director for the 2017 program was Associate Professor Graziella Caprarelli, and Co-Director for 2018 is Dr Ady James of University College London, currently on secondment with UniSA.

The Southern Hemisphere Space Studies Program is an intensive, five week, live-in experience built around the international, intercultural, and interdisciplinary (3 ‘I’s) educational philosophy for which the ISU is renowned.

The program provides a multidisciplinary understanding of the activities and areas of knowledge required by today’s space professions, including:

- Space science and exploration
- Space applications and services
- Human spaceflight and life sciences
- Space systems engineering and technologies
- Space policy and economics
- Space business and project management and
- Space law and regulatory issues

The program also regularly includes special events with international astronauts and space research, communications, and policy leaders from around the world.

In 2017 the program had a significant focus on small satellite technology. With more than 3000 satellites operating in Earth’s orbit today and an increasing capacity to build smaller and cheaper satellites to carry sophisticated payloads, one of the great prospects for the space industry globally is the development of more accessible and affordable satellite-mediated technologies. For the 39 participants from 12 countries who joined the UniSA program in 2017, the implications of the satellite revolution – for technology, business, industry, law, and indeed for space itself – were the central focus of their capstone team project.

According to the 2017 Program Co-Director, UniSA’s Associate Professor Graziella Caprarelli, one of the great things about the satellite revolution is that countries that have been excluded from the significant benefits and services of a space economy, because of the high sector costs, will increasingly be able to develop their own payloads and support their own satellites.

“Small satellite technology is becoming increasingly more sophisticated and operational, and what were once seen as merely test projects, can operate as fully functional carriers of complex payloads.

This is making space accessible to virtually all countries. But with the positives also come challenges and we will see management issues arise in the constellation of small satellites soon to be orbiting Earth.”

The South Australian Government has partnered with UniSA to offer five full scholarships for South Australians to undertake study in 2018.

www.unisa.edu.au/spaceprogram

The Institute for Telecommunications Research (ITR) at UniSA is an internationally recognised research organisation, specialising in research, education, and technology development for wireless communications with fixed, mobile, satellite and terrestrial applications. ITR conducts its research in areas including satellite communications, high speed data communications and flexible radios.

Project highlights include new space-based techniques for next-generation satellite communications and new coding methods for mobile wireless systems to improve bandwidth and power efficiency.

ITR research aims to increase the reliability, spectral efficiency and flexibility of satellite communications with a focus on multiuser systems. These technical innovations deliver entirely new categories of economic delivery of services to remote users.

The university is one of a lucky few in the Southern Hemisphere to have a Satellite Ground Station in operation. These facilities are available for research and commercial purposes, UniSA can push the boundaries of what’s possible in telecommunications.

X-Band Satellite Reception Facility

This tracking facility has continued to be used to acquire images downloaded from the Spot 4 and Spot 5 satellites. 2011 saw upgrades to the station reception equipment to the ITR-developed ERSDEM-3 capable of multiple channel reception.

L-Band and S-Band Reception Facility

ITR provided tracking services for multiple Autonomous Transfer Vehicle launches to the International Space Station. ITR’s role is essential as part of the global network of tracking stations providing critical real-time data for these missions.

VHF and UHF Transmission and Reception Facility

ITR operates steerable Yagi antennas in the VHF and UHF band for bi-directional communication with low earth orbit satellites.

As activity in outer space increases, there is wide consensus that the rule of law in outer space must be strengthened.

To address this challenge, The University of Adelaide and the McGill University Institute of Air and Space Law, Montreal have partnered up to offer a ground-breaking course in Strategic Space Law. The university has attracted global thought leaders in the field such as Professor Jack Beard from the Nebraska College of Law, to present their expansive experience in space, cyber and international law to the program.

Contemporary topics covered as part of the program are:

- Law of armed conflict in space
- Civil and commercial regulatory framework of space activities
- Protection of space based data
- Military use of satellites
- Surveillance in space
- State responsibility and liability
- Space situational awareness

As a contributor to several multi-jurisdictional projects, The University of Adelaide is at the forefront of global best practice:

- The University of Adelaide Law School’s Research Unit on Military Law and Ethics and McGill University’s Centre for Research in Air and Space Law, Montreal, are founding institutions on a project to develop a Manual on International Law Applicable to Military Uses of Outer Space. The manual aims to articulate and clarify existing international law applicable to military activities in outer space, including what limitations international law places on the threat or use of force and conduct of hostilities in outer space.

The university is also focused on the civil space arena - conducting research into the growth and enablement of non-military space testing facilities in South Australia. The research, development and testing of space technology is a crucial aspect of the civil and commercial space industry and South Australia as an innovation hub provides a fertile ecosystem for this work to expand.

The Adelaide Law School recently hosted the Asia-Pacific Finals of the 2017 Manfred Lachs Space Law Moot in April 2017. There were 37 university entries from the Asia Pacific region, representing Australia, China, Hong Kong, India, Indonesia, Iran and South Korea.

www.adelaide.edu.au

Flinders University, which aspires to be in the top 1% of universities worldwide, has space-applicable capabilities in materials science, nanotechnology, robotics, mechatronics, earth observation, science education and policy, geospatial sciences, space heritage and archaeology, and medicine.

Flinders is a member of the International Astronautical Federation and the Space Industry Association of Australia and welcomes research-industry collaborations.

Flinders has an outstanding range of space applications and research infrastructure. At the Flinders Tonsley campus, facilities include a Faraday cage, underwater and autonomous vehicle development and testing capacity, a large hexapod robot for biomechanical testing, and a new generation of industrial robots including Baxter, Sawyer and URS, in addition to a wide array of digital manufacturing and rapid prototyping facilities.

The Flinders Centre for NanoScale Science and Technology can manufacture and test coatings and new materials in-house. Another Flinders research group is studying the interaction between bacteria and mineral surfaces for applications in biominning.

Flinders’ Centre for Science Education in the 21st Century supports STEM education in secondary schools through student and teacher-focused projects. The Centre runs a new degree program in Science Communication and Policy.

The university also collaborates with Airborne Research Australia (ARA), Australia’s only national research facility operating aircraft for environmental and atmospheric research.

Most projects are based on collaborations, both national and international.

Flinders University is at the forefront of the emerging field of space archaeology, in which Dr Alice Gorman is a globally recognised leader. Dr Gorman has expertise in space heritage, social and ethical aspects of orbital debris mitigation and off-Earth mining, and space environmental management frameworks.

www.flinders.edu.au
A supportive environment for innovators and entrepreneurs

South Australian Government

South Australian Early Commercialisation Fund
TechInSA’s South Australian Early Commercialisation Fund has been established to assist South Australia’s entrepreneurs and innovative organisations looking to commercialise novel products and services. The fund will provide eligible companies and organisations with a maximum of A$500,000 + GST per project with matched funding required in most cases.


Industry Development Grant
TechInSA established the Industry Development Grant program to assist South Australian technology organisations to develop their business. Repayable grants from A$50,000 up to A$250,000 can be used for a range of activities.


South Australian Venture Capital Fund
A State Government A$50 million Venture Capital Fund has recently opened and is managed by the venture arm of ASX-listed Blue Sky Alternative Investments to invest in high-growth companies from South Australia, or those willing to relocate to the state, and alongside other private investors.


Innovation Voucher Program
The Innovation Voucher Program provides vouchers of between A$10,000 and A$50,000. The program is designed to help small and medium-sized enterprises collaborate with universities and private research companies in the development of new manufacturing processes and products to drive productivity and business profitability.


Federal Government

The following programs are delivered by AusIndustry. For more information visit: www.business.gov.au/about/ausindustry-programme-summary

Accelerating Commercialisation
This program provides expert guidance, connections and financial support to assist small businesses, entrepreneurs and researchers find the right commercialisation solutions for their novel products, process or services. Funding is through competitive matched grants of up to A$1 million over two years for commercialisation activities and is open to entrepreneurs, start-ups and small to medium businesses that meet the eligibility criteria.

Incubator Support
This program provides funding to new and existing incubators delivering services aimed at improving the prospects of Australian start-ups achieving commercial success in international markets. The program supports organisations that foster innovative start-ups, focussed on international trade, through the provision of services such as seed funding, co-locations, mentoring, professional services and access to networks.
**Innovation Connections**

This program encourages and assists small and medium sized businesses to access knowledge and engage with researchers to foster innovation. The service provides specialist support which may include assistance to identify critical and strategic research needs, help find expertise, technology and advice within the research sector. Matched funding of up to A$50,000 is available for research projects.

**R&D Tax Incentive**

The R&D Tax Incentive is the Australian Government’s principal measure to encourage industry investment in research and development (R&D) which it does by providing tax offsets to eligible entities that undertake eligible R&D activities. It is a self-assessment program open to all industry sectors.

It has two core components, a refundable tax offset of 45 percent for certain eligible entities whose aggregated turnover is less than A$20 million, and a 40 percent non-refundable tax offset for all other eligible entities.

**Cooperative Research Centres Programme**

This competitive, merit-based grant program supports industry-led and outcome-focussed collaborative research partnerships. The program aims to improve the competitiveness, productivity and sustainability of Australian industries; foster high quality research to solve industry-identified problems; facilitate SME participation in collaborative research; and increase skills and capabilities in industry and research organisations (including graduates with hands-on industry experience).

The program has two funding streams:

- **Cooperative Research Centres (CRCs)** - supports medium to long term industry-led collaborations for varying periods of up to 10 years. There is no limit set on funding for CRCs.
- **Cooperative Research Centre-Projects (CRC-Ps)** - supports short term, industry-led collaborative research up to a maximum of three years. CRC-P grants are capped at a maximum of A$3 million.

**Global Innovation Linkages**

This program provides funding to assist Australian businesses and researchers to collaborate with global partners on projects with a strategic focus and leading-edge research and development. It supports projects focussed on developing high quality products, services or processes that will respond to industry challenges. Eligible participants will be able to apply for grants of up to A$1 million over a grant period of up to four years.

**Business Research and Innovation Initiative**

This pilot program aims to help drive innovation within Australian SMES whilst addressing Australian Government policy and service delivery challenges. Eligible businesses can apply for a competitive grant to undertake a feasibility study on their proposed solution to a challenge. Successful applicants will receive grants of up to A$100,000 to develop their idea and test feasibility over three months. The most successful ideas may then be eligible for a further grant of up to A$1 million to develop a prototype or proof of concept over the following 18 months which may be purchased by government.

**Significant and Premium Investor Visa Programmes**

High net worth migrant investors can apply for permanent residence if they make a minimum investment of A$5 million across mandated investments. The new complying investment framework for the Significant Investor Visa (SIV) and introduction of the Premium Investor Visa (PIV) are aimed at attracting applicants with business and entrepreneurial skills and capital to invest into innovative Australian businesses and the commercialisation of Australian ideas, research and development.

**Industry Skills Fund**

The Industry Skills Fund targets micro, small and medium businesses in priority industries and helps businesses take advantage of new growth opportunities and adapt to rapid technological or structural change within their business.

To help businesses achieve growth, the fund offers one or both of the following:

- **Skills advice** - a service to help businesses identify skills needs and maximise training outcomes, and/or
- **Training grant** - to help businesses with the cost of training.
How we can work with you

Investment Attraction South Australia is the peak agency for supporting investment into South Australia.

We are the people to speak to if you are:

> establishing a presence in South Australia
> seeking joint venture opportunities
> growing an existing business in South Australia
> investing in South Australian businesses, or
> looking to raise capital by listing on the Australian Stock Exchange.

We are looking for small, medium and large businesses, but importantly we are looking for smart, creative businesses that live firmly in the future.

That’s why innovation, entrepreneurship and start-ups are part of our focus!

Together with our agency partners, we will work with you by offering:

> access to key decision-makers in both the public and private sectors
> a project and case management service to streamline establishment and approvals processes for foreign direct investment
> an ambitious red tape reduction program to make doing business as easy as possible
> a range of State Government grant and loan packages, including the Economic Investment Fund, for eligible investors.

Put simply, we can connect you with decision-makers, identify funding and support options, help you choose new premises and then continue to provide assistance as you settle into South Australia.
South Australia has led the way in governmental initiatives to develop the space sector in this country. Building on the State’s space-related research and educational achievements, a vibrant ecosystem of start-up companies is attracting investment and creating exciting jobs. The future is very bright for South Australia in space.

Michael Davis
Chair, Space Industry Association of Australia
September 2017

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This document is subject to change by Investment Attraction South Australia.

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Let’s talk

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