

SMARTSAT NEWS

ISSUE 15 - June 2021



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Front image: Conceptual imagery - Spacelink satellite data relay (Electro Optic Systems)

Message from the CEO



Prof Andy Koronios
Chief Executive Officer

Dear Colleagues

Welcome to the June edition of the SmartSat newsletter. During the past few months, we have been fortunate to resume some face-to-face industry events including the launch of the NSW Node and the 11th Australian Space Forum. It has been wonderful to visit more of our partners around Australia and have the opportunity to increase our engagement and discuss strategic opportunities.

Development of the state nodes is progressing well. We have recently received approval of funding from the Queensland as well as the Victorian governments to establish nodes in Qld and in Victoria. We are delighted to be helping the states build their space ecosystems by supporting their start-up and space SMEs.

Now under the guidance of our new Chief Research Officer, Dr Carl Seubert, the Research Leadership Team is working to increase research activity to ensure that we have a sustainable project pipeline in place. The Board has now approved three capability demonstrators: AquaWatch Australia, the Indo-Pacific Connector and I-In-the-Sky Disaster Resilient Technologies. Given the current interest in minimising the risks of natural disasters, water management and defence and national security, we are confident these demonstrators can play a critical role for Australia.

Finally in this edition you will find preliminary information regarding the first Annual SmartSat Conference. I am looking forward to meeting with all of our partners and getting to know some of our researchers and students. I would like to thank you all for your continued support and look forward to seeing what we can achieve throughout the rest of the year.

Andy

“The Board has now approved three capability demonstrators: AquaWatch Australia, the Indo-Pacific Connector and I-In-the-Sky Disaster Resilient Technologies. Given the current interest in minimising the risks of natural disasters, water management and defence and national security, we are confident these demonstrators can play a critical role for Australia.”

Communications & Outreach



Adj Prof Nicola Sasanelli

Director, Communication and Outreach

Dear Colleagues

The list of SmartSat outreach activities already undertaken grows as we approach mid-year, however I am even more excited for what lies ahead in the second half 2021. I have been lucky to meet with many of our SmartSat colleagues around Australia now travel is possible, and I hope to see more of you before the year ends.

At the 11th Australian Space Forum in March, we were pleased to have many visitors to the SmartSat and Aurora exhibition booths, which gave us the opportunity to inform the community about our cornerstone projects under SmartSat's three capability demonstrators: AquaWatch Australia, the Indo-Pacific Connector and I-In-the-Sky Disaster Resilient Technologies. We published a series of factsheets outlining high impact projects and our [Strategic Plan 2021-25](#) as part of our outreach strategy and these are now available on our website for anyone who was not able to collect one in person at the Forum.

Our most recent Distinguished Speaker lecture featured Dr Alice Bunn, International Director at the UK Space Agency. In addition to this lecture, SmartSat's Industry Director Peter Nikoloff participated in a Virtual Trade Mission to Australia with Maryland's Department of Commerce. See the Past Events section of this newsletter for more details. These outreach activities with our international colleagues are an important avenue in raising awareness of Australia's space expertise, particularly within SmartSat, and building relationships around the globe.

SmartSat is coordinating a naming competition for the SASAT1 SA Space Services Mission, as announced by South Australian Premier Steven Marshall. This competition is open to all South Australian school students and aims to build their awareness of satellite and space technologies. We are also participating in the SA Premier's Reading Challenge as in 2020. We are currently discussing ways to engage in STEM activities in other states, such as events and student challenges, and hope to have more news on this in our next newsletter.

A number of key external national and international events fall in the second half of 2021, including National Science Week, World Space Week, the International Aeronautical Conference, Avalon 2021/Airshow 2021, and the 12th Australia Space Forum. In addition, SmartSat will be hosting our inaugural Annual Participants Conference. Stay tuned!

Nicola

“These outreach activities with our international colleagues are an important avenue in raising awareness of Australia’s space expertise, particularly within SmartSat, and building relationships around the globe.”

Meet the new CRO



Dr Carl Seubert
Chief Research Officer

I have lift off! I have commenced my role with SmartSat, from California for now, but my family and I will soon be returning to home soil. I have received a warm virtual welcome and am thrilled to be joining this amazing team.

I have spent nearly a decade at NASA JPL, developing skills and gaining experience which I believe will be highly applicable to SmartSat. This includes managing the spacecraft formation control testbed and leading research and technology development tasks on autonomous proximity operations for comet sampling, formations for Earth observation and terrain relative navigation for future planetary landers. I'll proudly tick a life accomplishment when the Europa Clipper Mission launches, with my attitude control algorithms onboard!

In its early tenure, SmartSat has developed a fantastic array of diverse space research pursuits. As I learn of the intricate details of these projects, I am continuously impressed by the depth and expertise of our partners. It is an incredible list of organisations from across Australia, engaging the academic, government and industry sectors. This is an indication of the commitment to space innovation and the potential that lays ahead for the nation.

I am already diving into our research paths for our Aquawatch and Defence projects and working with our partners involved in those programs. I look forward to building on these foundations and those across our portfolio. There is a good set of new research in the pipeline and future activities on the horizon and I look forward to contributing to these further.

I have had some early engagement with the Australian Space Agency and their roadmap developments and see a synergistic and collaborative relationship there. I am also working to grow our existing interactions with international partners with the intent to benefit Australia through showcasing our partners' space research prominence and explore opportunities for technical exchanges and learning.

There is great momentum in Australia for creating a lasting space capability and SmartSat is forging an impactful space research and technology development campaign to enable it. I am excited to be in the hot seat and returning to Australia to contribute.

Carl

Industry



Peter Nikoloff
Director, Industry Advisory Board

South Australian Space Mission

The SA Space Services Mission (SASAT1) is progressing well with the Integrated Product Team (IPT) selecting the Hyperscout-1 sensor for the spacecraft which also includes the Myriota IOT payload. Inovor and Myriota are working at a feverish pace on the spacecraft design. At the same time SmartSat's Research Program Managers Andrew Barton and Craig Williams are developing the Research Strategy which will support outputs for the SA Government and SmartSat's AI and EO research.



2030 Space and Spatial Road Map

SmartSat is one of the key stakeholders of the 2030 Space and Spatial Road Map. The steering group organisations' aim is to drive industry growth to benefit Australia through better utilisation of space and spatial technologies and capabilities. We will be kicking off an extensive consultation program by the end of June with an initial web-based survey that will be very flexible and easy to use allowing you to provide quick high-level input and in-depth contribution. You can follow the progress of the Road Map [here](#).



New Projects



Prof Allison Keally
Research Program
Director

The May Board meeting approved three new research projects:

AquaWatch Pathfinders: Earth Observation Sensor Design Testbed (End to End Simulator)

This project is led by SatDek and involves Curtin University, Australia National University, CSIRO, and the University of Queensland. It is the first in a three-stage process to establish a simulation and optimisation capability to support the design of new satellite sensors and associated ground sensor networks. Stage 1 will involve initial prototyping and demonstration sensing



applications for aquatic and marine targets.

Development of novel methods to utilise space-based SAR measurements to create and maintain a state-wide surface deformation model

This project is led by Curtin University and includes MDA Corporation, FrontierSI, Victorian Department of Land Water and Planning, and Geoscience Australia. This project will develop and test methods based on satellite interferometric synthetic aperture radar (InSAR) that can be used to create a broad-scale land deformation model that can detect land motion at magnitudes as small as ~1 mm/yr.

Compact Hybrid Optical-RF User Segment (CHORUS) Phase 2

This project will continue to be led by DST Group and involves EOS Space Systems, EM Solutions, ANU, UniSA, Shoal Group, and Lyrebird. Phase 1 of Project CHORUS was established as a high-risk, high-payoff research activity to develop concepts for a highly integrated, tactical satellite communications terminal that combines

radio frequency and optical frequency capabilities into a single compact terminal. This Phase 2 project will develop an engineering model of CHORUS capable of demonstrating core technologies that can be used to advance other areas of interest across the CRC including cognitive communications, optical communications, and satellite-based laser terminals as a minimum set.

Under our Tactical Research Fund, the SmartSat Executive has also approved the following projects in the last quarter:

- Next Generation Testbed Design for Earth Observation (P3-11) FrontierSI will be the project lead and engage with SmartSat CRC participants and stakeholders throughout the project for user survey, innovation IP and prototype testbed development and testing.
- Indigenous Earth Observation – iEO (P4-15) this project involves Winyama Digital Solutions, NGIS Australia and FrontierSI. It aims to establish a network of indigenous organisations interested in deploying EO solutions in their workplace along with a strategy for building training courses aimed at EO skills and capability.
- Distributed Flatsat Phase 1 (P2-23) this project is led by the University New South Wales and includes Sydney University and representation from our Aurora Cluster. This project's primary innovation will be to remotely interface different spacecraft avionics components and will take an agile approach by rapidly iterating between user needs identification, design concept and scoping of works to arrive at a final 'flat sat' design.
- GNSS-Reflectometry for Maritime Surveillance PHASE 1 (P2-24). The project team comprises UNSW, Seaskip and BAE Systems and aims to establish the theoretical feasibility of GNSS reflectometry in detecting objects of interest at sea and defining performance characteristics associated with this technology.
- AI Architectures for On-board Processing (P2-25) with QUT, UQ and Swinburne.

Project Calls

As part of our commitment to undertake industry driven research and provide opportunities to our research partners for participation and introduction to new industry relationships, SmartSat releases targeted project calls.

For current opportunities, visit our [Project Opportunities webpage](#). Note, passwords for project calls are announced to our partner network via email.

If you would like to be added to this project call distribution list, please contact research.projects@smartsatcrc.com.

Current calls are for:

- Skills Gap Analysis Stage #2 (applications close 16 July 2021)
- A Success Factor-based Framework for undertaking small satellite missions: SASAT-1 (applications close 14 July 2021)

Project Updates

Coherent Free-Space Optical Communications Phase 2

Thales & Goonhilly Earth Station collaborate on research into laser beams as data pipes

Thales Australia has signed a major research extension with the SmartSat Cooperative Research Centre (CRC) for the development of Advanced Optical Communications technologies for transmission through Earth's Turbulent Atmosphere.

The research extension builds upon initial feasibility work conducted over the past 12 months, and provides a three-year commitment from SmartSat to fund the next phase of this new communications technology that uses laser beams to carry high data rate communications through space.

The project will develop an advanced optical communications system that has been shown to support optical fibre-like data transfer rates over atmospheric free-space communication links, using active optics technology and a free-space coherent phase-stabilisation system. The project will focus on deploying this technology to demonstrate feasibility over vertical free-space communications links through Earth's turbulent atmosphere, starting with low-altitude targets, progressing to light aircraft and stratospheric vehicles. Preliminary work has already demonstrated successful communication over 2.4 km and 10 km horizontal free-space links.

Led by Thales Australia and Dr. Sascha Schediwy from the University of Western Australia, in collaboration with Goonhilly Earth Station, the University of Western Australia (UWA), the University of South Australia (UniSA), and Defence Science & Technology (DST), the project supports the commitments made by Thales Australia's Strategic Statement of Intent signed with the Australian Space Agency in December 2019, and is indicative of opportunities for new space projects that will flow from the SmartSat CRC initiative.

MIMO and Cooperative Communications for New Space – Phase 1: Feasibility Study

Smart small satellite constellations in Low Earth Orbit (LEO) enable a whole new class of opportunities for Defence in the "New Space" paradigm. Underpinned by DST's Resilient Multi-Mission Space STaR Shot, these opportunities are envisioned to be transitioned into fit-for-purpose operational capabilities across surveillance, space situational awareness, position navigation and timing (PNT), geospatial intelligence (GEOINT) and resilient global communications. To support such a mission with an increasing level of autonomy, flexible interconnected communication architectures and protocols are paramount.

The aim of this project is to investigate novel communications technologies towards achieving a resilient communications architecture between satellites flying in formation, the ground network and users. Multiple Input Multiple Output (MIMO) and cooperative communications have facilitated some great developments in terrestrial communication systems, including the application of massive MIMO as a core-enabling technology in 5G mobile communications. The parallels from these technologies will be explored for small satellite missions; to securely task space missions for near real-time operations, to enable an efficient network of active space sensors to facilitate distributed/centralised data processing and dissemination of processed/raw payload data back to ground network and directly to warfighters.

This scoping study phase strongly aligns to DST Group's Resilient Multi-Mission Space STaR Shot. The project will deliver a feasibility study report, with identified technologies, channel models and delivery of a simulation framework with advanced signal processing algorithms and architectures. These will have strong alignment to Defence applications and with a vision to transitioning for further proof of concept prototype demonstrations in subsequent project phases.

For more information on our projects visit the [Projects pages](#) on our website.



Education & Training College



Dr Ady James

Education and Training Director – Industry Training

SmartSat has released the Space Industry Skills Gap Analysis report which identifies three hundred and nineteen space-related skills needed to support future needs of the sector. This study was supported by the Australian Space Agency as an initial step to understanding the skills needs of the national space workforce.

The Space Industry Skills Gap Analysis is a detailed and in-depth examination and assessment of Australian space-related skills, developed by a team engaged by SmartSat from Western Sydney University (WSU) and Asia Pacific Aerospace Consultants (APAC).

The team used information from NASA and the European Space Agency projects combined with the Australian Space Agency definition of space activities, to develop an Australian Space Skills Taxonomy. Importantly, the study finds while Australia's space industry workforce currently encompasses nearly every skill type, there is both a need for specific training to address existing and future needs, and also a shortage of suitably qualified training providers.

Notably, eighty-six 'high intensity' skills were identified, of which forty-eight skills are at risk of critical current and/or future shortages, whilst sixty-two skills are at risk due to shortages of training providers. These 'high intensity' skills include highly specific technologies, such as spacecraft mechanisms and launch technology, space exploration and ground systems, as well as software, programming and computing.

The full report can be found [here](#).



Prof Wei Xiang

Director HDR Program

PhD Welcome Webinar

The SmartSat PHD cohort were welcomed to the SmartSat community at a Webinar on Thursday 27 May. This event provided the PhD students an opportunity to hear from SmartSat's senior management team on the research portfolio and SmartSat's strategic direction. In addition, the session included presentations from Joseph O'Leary from EOS, about his career pathway since completing his PhD and the scholarships on offer to PhD students from EOS through the Andy Thomas Space Foundation; as well as Sintelix on their analytic platform which can support the PhD students with their research. Future events to bring SmartSat's PhD together are being planned.

For more information on our PhD students and their research projects, please visit the [PhD webpage](#).

Curtin University

I was recently invited to present a SmartSat CRC PhD Scholarship Briefing Session to researchers and GRS research managers at Curtin University on Thursday 3 June. In this presentation, I firstly gave an overview about SmartSat's three programs and two cross-cutting themes, and the priority areas within these research programs/themes. Following this, I discussed the Education & Training College, in particular SmartSat CRC's PhD program and current PhD scholarship projects. This included an introduction to the PhD application process and some advice as to how to link a scholarship application with one or more priority areas of SmartSat. It was very clear from the presentation and following questions there is very strong interest from Curtin University researchers to tap into the SmartSat's PhD scholarship program.

Aurora Startup Cluster



Dr Tim Parsons
Chair, Aurora Space Cluster
NSW Node Coordinator

Aurora Financial Membership to commence from 1 July 2021

After a successful stand event at the last Space Forum in Adelaide, Aurora has launched a new [website](#) with an online membership application form for startup companies. All companies who have previously signed membership agreements will be contacted shortly with details on how to become a financial member.



An example satellite bus built by UNSW ACSEr that would be connected to the new Distributed FlatSat system.

New Project: The Aurora Distributed FlatSat

With the support of board member and now SmartSat staff member Dr Andrew Barton, SmartSat has approved initial funding for Aurora's first collaborative project on Distributed FlatSats. Aiming to lower barriers and provide hands-on experience for new payload developers to integrate with satellite bus systems, the project envisages a satellite bus fielding connections via a secure internet connection to remotely simulate the payload-bus interface. The project, led by UNSW Sydney's ACSEr team, kicks off with an EOI for Aurora members to participate, which we will be announcing shortly.

ACT, Adelaide, NSW & Perth Aurora Meetups

- Aurora is now planning events in several capital cities over the next few months, starting with a joint meetup with the NSW Node community, followed by the ACT, Adelaide, and Perth. Stay tuned for event invitations from SmartSat and Aurora as dates, hosts, speakers, and venues are locked in.

Host an Aurora Meetup in Your State!

- If your company or organisation would like to host an Aurora meetup, showcase your work and also facilitate networking within the membership group – food + drink to be subsidised by Aurora – please let Aurora Chair Tim Parsons know via tim.parsons@smartsatcrc.com. We're looking for venues where Aurora member visitors can have a learning experience, hear a speaker, and discuss what they're doing socially.

NSW Node

Having launched in March, the new NSW Node has been busy connecting industry and research partners, including running a demonstrator Co-Design workshop with academics and industry with SmartSat CRC partner UNSW Sydney, and a site visit to NH Micro (formerly Nicholas Hacko Watchmaker) where we deep-dived into the world of micron-scale tool- and movement-making.

- The node's first EOI has now closed, with five demonstrator project EOIs received from industry and research partners. Of note is that all industry partners are also Aurora members, good validation for the Aurora initiative and how it can complement node achievement. The EOIs will now be assessed via an accelerated process, with the next EOI due out shortly to maintain the node's promised rapid turnaround cadence.

- More node funding programs are set to be announced soon, comprising Mobility - to enable exchange of talent between sectors - and Infrastructure - to enable industry to get free access to R&D infrastructure to help them accelerate their space technology development work. Enquiries are already coming in about these from industry, which bodes well for the impact the node is hoping to have on the NSW Space ecosystem.

SmartSat Victoria Node launched at RMIT



New Space Industry Hub launches at RMIT University

A new Space Industry Hub has launched at RMIT University in Melbourne to connect local business and research capabilities with global opportunities in space technology. The Hub will also host the Victorian node of the SmartSat CRC.

The \$1 million just announced for the Hub in the Victorian Higher Education State Investment Fund is being matched by \$1 million from SmartSat CRC, significant technical and training support from Amazon Web Services (AWS), and industry engagement backing from FrontierSI.

Initial funding will establish several flagship research projects aimed at connecting local capability with booming space industry markets both here and abroad, especially in the United States and Europe.



RMIT Deputy Vice-Chancellor for STEM and Vice President Digital Innovation, Professor Aleksandar Subic, said the Hub's primary focus was to help local companies – from agriculture and transport to logistics and manufacturing – develop new technologies, skills

and capabilities using satellite data.

“The RMIT Space Industry Hub will be a launch pad and an industrial solutions incubator to support collaboration and innovation for Victoria’s space industry growth,” Subic said.

“At the core of this growth are digital technologies and leveraging the state’s strong capabilities in advanced manufacturing.”

Significantly, the Hub will provide affordable access to real-time satellite data for industry collaborators through AWS Ground Station. This service allows users to control their satellite communications, process data, and scale their operations without having to worry about building or managing ground station infrastructures.

AWS Country Director for Public Sector in Australia and New Zealand, Iain Rouse, said this improved access to satellite data would help drive innovation and provide new market opportunities for Australian businesses.

“When space is made accessible and cost-effective, there is no limit to what can be accomplished. AWS is excited to help the Space Industry Hub accelerate their research, innovation, and capability development in space,” Rouse said.

CEO of SmartSat CRC, Andy Koronios, said this major step for Victoria was part of a national effort to become leaders in the space economy.

“We are delighted that the Victorian Government has made this investment, which with SmartSat co-investment will help spark innovation and develop technologies to leverage the huge opportunities the space economy offers,” he said.

CEO of FrontierSI, Dr Graeme Kernich, said collaborative sector roadmaps were being developed to guide researchers and local industries in how to capitalise on space industry opportunities.

“The Space Industry Hub provides the opportunity to connect Victoria’s world-leading research and solution providers with the challenges and opportunities of the global space sector,” Kernich said.

“We are delighted that this strategic collaboration intends to leverage innovative space technologies into impactful solutions used by industry.”

The Hub will make the most of RMIT’s existing facilities, services and research centres, as well as its innovation networks through RMIT Europe and the university’s entrepreneurship and innovation unit, RMIT Activator.

“With our strong research capabilities in data science, space engineering and geospatial science, our strategic industry partnerships and our global reach, RMIT is well placed to host this Hub and help grow the Victorian space industry,” Subic said.

For more information contact:

spaceindustryhub@rmit.edu.au



Diversity & Inclusion Committee Update



Emily White
Executive Officer

On behalf of the Chair, I would like to welcome two new members to the SmartSat D&I Committee - Tim Roberts (Assistant Manager, Engagement & Industry Growth, Australian Space Agency) and Melanie Plumb (Chief Operating Officer, FrontierSI). We look forward to working with Tim and Melanie and learning from their experiences in this area.

Over the past few months, we have completed several significant D&I activities. The first annual staff survey was administered in April. The data obtained from the survey has given us a more detailed picture of our demographic profile as well as our performance across 12 key areas of inclusion. This information will help us to benchmark and measure improvement over the years to come. The recommendations from the survey report have been incorporated into the 2021-22 D&I Action Plan which has been approved by the D&I Committee and is now available on the SmartSat website alongside a summary of the survey results.

A Townhall meeting was conducted to review and communicate the results of the survey and inform staff of our D&I activities and goals. Staff were also encouraged to provide feedback on the D&I program as well as other operational areas.

A review of all SmartSat policies and procedures was conducted and documents have been updated to reflect our commitment to D&I where appropriate. D&I guidance for researchers has also been developed and is available on the SmartSat website to assist partners in developing the D&I section of their research project proposals.

Several elements of the SmartSat Health & Wellbeing Program have been implemented including staff flu vaccines, an office recycling program, and the introduction of an Employee Assist Program to support our staff.

Over the coming months we will continue to progress our Action Plan and the collaborative project with the Inclusive Institute. Please feel free to contact us if you have any suggestions to enhance our D&I program or if you wish to collaborate on D&I related activities

Visit [the SmartSat D&I webpage](#) for more information.

Past Events

Distinguished Speaker Series

Dr Alice Bunn, UK Space Agency
25 May 2021



Dr Alice Bunn is International Director at the UK Space Agency, responsible for increasing the UK's global influence in science, security and trade through space. She leads teams responsible for ensuring international competitiveness

through developing world class skills in the UK space sector; international engagement through multilateral and bilateral frameworks for science, security and trade; and delivering the security and resilience of the UK's infrastructure and space applications.

Dr Bunn discussed the UK Space Agency's strategic ambition of capturing 10% of the global market by 2030; international partnerships with ESA and other bilateral/multilateral agreements; and the innovative collaboration opportunities arising from the UK-Australia Space Bridge.

Demonstrator Webinar series

Space Environmental Challenge Part 1
3 June 2021

In support of the Australian Space Agency Moon to Mars: Demonstrator Feasibility Grant, SmartSat has developed a series of webinars focusing on the challenges and requirements to put a payload in space. The first of two sessions addressing the harsh space environmental challenges which must be addressed by spacecraft design engineers was held on June 3rd. In order to de-risk missions, it is common for mission owners to insist on a minimum set of product assurance activities ensuring that materials, mechanical parts, electrical components and materials used to create the spacecraft are qualified to operate in space. This two-part webinar explores these space environmental challenges, why it is necessary to qualify components and spacecraft, and how/when/where to test. The second webinar will be held shortly.

Maryland Department of Commerce Australia Round Table: 'Earth Observation'

3 June 2021

Part of a Virtual Trade Mission to Australia with Maryland's Department of Commerce, this event discussed how issues within three key areas (fire, water and Earth) are affecting both Australia and Maryland, and how challenges related to them can be better addressed in the future through earth observation technologies. It included SmartSat's Industry Director Peter Nikoloff, as well as speakers from:

- NASA Goodard
- Howard University
- Emergent Space Technologies
- Australian Space Agency
- Myriota

Awards

Prof Allison Kealy

SmartSat Research Program Director

*National SSSI Professional Eminence Award;
Fellowship of the Royal Institute of Navigation*

Congratulations to Professor Allison Kealy who has won the *National SSSI Professional Eminence Award*. The award was made last week at APSEA, the Asia Pacific Spatial Excellence Awards, held both online and face-to-face for the first time. The APSEA awards are the surveying and spatial industries' night of nights. This richly deserved award recognises Allison's many years of outstanding leadership and service to the spatial and surveying community, both within Australia and internationally.

In further acknowledgement of her professional contributions, Professor Kealy has been awarded a *Fellowship of the Royal Institute of Navigation*. This Fellowship was awarded in recognition of advancing the art and science of navigation, and promoting and expanding the use of PNT for personal use and intelligent transport systems.



Dr Sarah Cannard

SmartSat Deputy Industry Director

FINALIST - 2021 Women in Defence Awards

Sarah Cannard, SmartSat's Deputy Industry Director has been named a finalist in the Engineering category for the 2021 Women in Defence Awards. These awards celebrate talented, determined, successful women who make a positive impact in the defence business arena, as members of Defence industry, Australian Public Service (APS) or in uniform. The Engineering category is awarded to the defence community's most outstanding female individual working within the defence community's most outstanding female individual working within the engineering field. The Award ceremony will be announced at National Arboretum Canberra on 30 July 2021.

Australian Space Awards 2021

SmartSat would like to congratulate the winners of the Australian Space Awards 2021, especially those who are associated with SmartSat either as a participant or are involved in SmartSat's research portfolio, listed below.

- Academic of the Year & Excellence Award - Sascha Schediwy, University of Western Australia
- Female Leader of the Year - Professor Anna Moore, Australian National University Institute for Space
- Researcher Of The Year - Saeid Nahavandi, Deakin University
- Business Of The Year (Large) - Electro Optic Systems
- Business Of The Year (SME) - Shoal Group

SmartSat also extends congratulations to all of this year's finalists, many of who we enjoy an association with. We particularly congratulate:

- Joseph O'Leary, Electro Optic Systems - Rising Star of the Year
- Prof Tat-Jun Chin, Australian Institute for Machine Learning - Academic of the Year
- Patrick Neumann, Neumann Space - Researcher of the Year/Innovator of the Year

And the finalists for Female Leader of the Year, who work with our SmartSat participants:

- Elisha Buckley, Southern Launch
- Rowena Christiansen, the ad astra vita project
- Alice Gorman, Flinders University
- Flavia Tata Nardini, Fleet Space Technologies

A full list of award finalists and winner can be viewed [here](#).



Updates from the Australian Space Agency

The Australian Space Agency's purpose is to grow and transform a globally respected Australian space industry that lifts the broader economy and improves the lives of Australians. The Australian Civil Space Strategy identifies 7 National Civil Space Priority Areas. These Priority Areas will deliver the greatest opportunity for the Australian space sector. The development of roadmaps under each of these Priority Areas will:

- describe a pathway to uplift capability
- coordinate activities with industry, researchers and government agencies
- guide and inform industry, research, and government
- map out the future workforce
- align the space sector
- advance the Australian space industry over the next decade
- encourage organisations to invest resources and efforts where they want to pursue the opportunities identified in the roadmaps

The first roadmap, Communications Technologies and Services (published late 2020) provides strategic direction to support the growth of the industry. This will assist other areas of the economy including agriculture, remote medicine and resources. It will contribute to securing the future of Australia's space sector over the next 10 years.

The Communications Technologies and Services Roadmap, prioritises six focus segments. These include:

- Low Earth Orbit (LEO) satellite services
- optical ground stations
- hybrid RF-optical
- reconfigurable networks, radios, modems and waveforms
- satellite communication network management tools
- quantum-enabled communications

Industry, researchers and Australian government agencies have contributed to the development of this roadmap. Peer space agencies and stakeholder organisations supported validation of Australia's state-of-the-art capabilities, technologies and opportunities.

The development of the remaining 6 roadmaps will take place throughout 2021, with the Earth Observation from Space Technology roadmap due to be published end of Q2 2021.



Grants and Tenders

Moon to Mars Supply Chain Capability Improvement Grant Recipients - Round 2

Crystalaid Manufacture and Fleet Space Technologies have been announced as recipients for Round Two of the Moon to Mars Supply Chain Capability Improvement grants. These grants form part of the \$150 million Moon to Mars initiative.

Crystalaid Manufacture will use the grant to replace and modernise their vacuum oven technology. This will enhance their ability to supply electronic components to the international space industry. Fleet Space Technologies, through their partnership with SA Power Networks and OZ Minerals, will improve their ability to monitor remote critical infrastructure and environmental factors. Read more [here](#).

The Supply Chain Capability Improvement grants will strengthen Australia's national space capability and enhance Australia's ability to compete in the international space economy.

Moon to Mars Supply Chain Facilitation

ASA is holding an industry briefing to outline the details of the first Moon to Mars Supply Chain Facilitation tender opportunity.

The Moon to Mars initiative consists of three integrated elements over a five year period. The initiative's Supply Chain Facilitation component is a procurement program. This is the first of a series of planned procurements under the program. This tender aims to identify service providers who have the ability to assist Australian organisations to enter space supply chains.

[View here](#) for more information and to register for the briefing.

Moon to Mars Feasibility Grants

The recipients of the Moon to Mars Feasibility Grants have been announced, providing a \$4 million funding boost to Australian space researchers and businesses to help them develop new technologies for use in future NASA missions to the Moon and beyond.

The Moon to Mars Demonstrator Feasibility grants will see 20 organisations receive up to \$200,000 each to conduct feasibility testing and to transform their concepts into the next generation of space products and services.

The 20 successful projects have demonstrated clear potential to support future Moon to Mars activities, including in the areas of advanced communications, remote sensing, autonomous systems and propulsion systems.

Under the \$150 million Moon to Mars initiative, the Demonstrator Feasibility grants are the first component of the Demonstrator program. The second component of the Demonstrator program is the Demonstrator Mission grants which will support projects launching Australian products and services to space. These grant guidelines are expected to open later this year.

The Moon to Mars initiative is part of more than \$700 million being invested by the Australian Government in the Australian civil space sector since the establishment of the Australian Space Agency in 2018.

Several SmartSat participants received grants including:

- Australian National University
- Curtin University
- Queensland University Of Technology
- Thales Australia Limited
- The University Of Adelaide
- University Of New South Wales
- University Of Sydney
- University Of Western Australia

In addition, three Aurora members also received grants:

- Phosenergy Limited
- Sperospace Pty Ltd
- Valiant Space Pty Ltd

The full list of Demonstrator Feasibility grant recipients is available [here](#).



News from our partners

Spacelink Incorporates Optical Links To Drive Fast Secure Access To Data

Australia's largest commercial satellite program, SpaceLink, recently announced that it plans to incorporate optical terminals into its satellite relay network. Using laser communications for its intersatellite links helps drive SpaceLink's mission to speed massive amounts of data to users no matter where they are located on Earth, commencing services in 2024.

SpaceLink is building an information superhighway for the space economy with a high-capacity data relay network that will meet pent-up demand for continuous, fast, and secure access to the growing amount of data available from space. For satellite operators who can only download data when they are in view of an Earth station, SpaceLink provides Always in Sight™ continuous access with near real time transmission of user data via the Internet, private cloud, or other secure delivery method.

The SpaceLink satellite relay constellation operates in Medium Earth Orbit (MEO) from where it has visibility of all spacecraft in Low Earth Orbit (LEO). It is designed for secure, resilient, low latency connectivity using both radio frequency (RF) and optical technology to connect to client satellites, and its own dedicated network of gateway Earth stations.

In May, SpaceLink announced an agreement with Mynaric, a pioneer in space-based laser communications, to accelerate the deployment of optical intersatellite links for the SpaceLink constellation. Mynaric's product portfolio meets SpaceLink's programmatic requirements, provides high performance, and is fully compliant with the Optical Intersatellite Link (OISL) standard driven by the U.S. Space Development Agency (SDA).

"Our work with Mynaric to implement advanced OISL capability into the SpaceLink constellation will ensure performance and interoperability," said Glen Tindall, CEO of Communications Systems at EOS. "Mynaric has exceptional expertise to advance a new generation of OISLs



Guide Star Laser technology

that address our customer's requirements and supports our mission. This will enable SpaceLink's customers to take a quantum leap in delivering data that saves lives and advances humanity to a new age of space commerce, exploration, environmental awareness, and security."

The U.S. SDA considers laser intersatellite links to be a critical technology for its next-generation space architecture and is driving standards to reduce the cost of optical terminals and enable mass production. Optical links provide much higher data transmission rates than traditional RF and they are more secure. The agency adopted the 1550 nanometers standard with the goal of compatibility with the most widely used waveform used by the fibre optics industry.



Gilmour Space to launch Fleet satellites in 2023

Two of Australia's New Space pioneers, both SmartSat participants – Queensland rocket manufacturer Gilmour Space Technologies, and South Australian nanosatellite manufacturer for the Internet of Things (IoT), Fleet Space Technologies – are joining forces to launch small satellites to orbit.

"We have signed a contract to launch six Fleet Space Centauri nanosatellites on our Eris rockets in 2023," said Adam Gilmour, CEO of Gilmour Space, which is tracking to launch its first commercial payloads to orbit next year. "It is a great example of how homegrown space companies are scaling and partnering to meet the world's growing demand for innovative small satellite applications and affordable launch," he added.

"This launch is going to involve an Australian-built payload in an Australian-built satellite, on an Australian-built rocket," said Flavia Tata Nardini, CEO of Fleet Space.

"(This) announcement is the beginning of an ongoing launch service relationship as we work towards our planned constellation of 140 satellites," she added. "We are building a strong portfolio of launch service partners, and we are very excited to have Gilmour Space as one of them."

Gilmour and Fleet were the first New Space start-ups to raise venture capital funding in Australia, well before the formation of the Australian Space Agency. They were seeded by Sydney-based venture capital firm Blackbird Ventures, which has since invested in subsequent rounds.

News from our partners

Inovor Technologies To Build Small Satellites In Australia

Inovor Technologies, a supporting partner of SmartSat, has announced its entry into the small satellite market.

Development of Inovor Technologies' new class of small satellite (up to 250 kilograms), named 'Australis', is underway at Lot Fourteen in Adelaide.

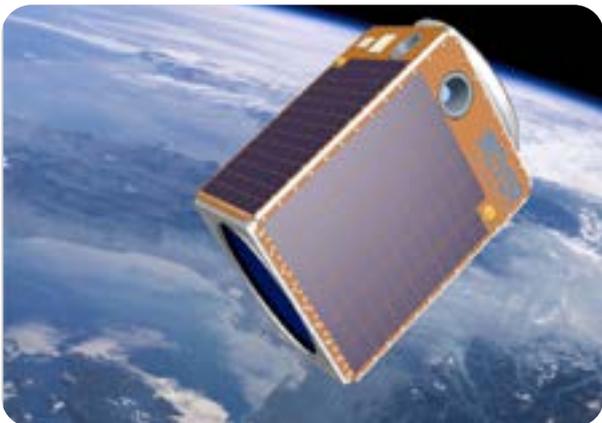
Inovor Technologies has brought forward development of the Australis class to meet Australia's growing demand for larger, trusted sovereign Australian-owned space technologies.

Inovor Technologies founder and Chief Executive Officer Dr Matthew Tetlow said: "Australia's defence and science organisations want to be able to conduct a broader range of missions using small satellites, and we can help them do that.

"We're excited to be building upon the technology we have developed in our Apogee Cubesat bus and, with support from international partners, we will be expanding our capabilities with the Australis range of spacecraft.

We're able to enter the small satellite market earlier than planned, so we are, and we look forward to making another exciting announcement later in the year."

Inovor Technologies is currently servicing satellite missions for the CSIRO (CSIROSat-1), Defence, Science and Technology Group (Buccaneer Main Mission), Defence Innovation Hub (Hyperion), the University of Melbourne (SPIRIT), and the Government of South Australia (currently called SASAT1, a project led by SmartSat) with its Apogee bus.



New partnerships, services and funding at NovaSystems

Nova IGS-N connecting satellites to earth

Nova Systems is supporting several international ground stations through its Intelligent Ground Station-Network (IGS-N) site in Peterborough, SA, and is about to secure its first European customer.

The IGS-N is used to track low earth orbit satellites.

The initiative has been designed to have the capacity to support Government and Australian Space Agency activity out of Lot Fourteen, as well as catering for the data download needs of the ever-increasing number of satellites and constellations.



New Electromagnetic Spectrum (EMS) engineering and regulatory services

Nova Systems has just onboarded two of the country's most prominent EMS engineers and to provide services to government, industry and Defence sectors.

All major industries rely on wireless technologies that depend on EMS access to function; from public safety and national security, mobile communications, Global Positioning Systems to wireless medical devices.

Nova Systems' EMS engineers are experts in the field and use domestic and international policies and laws combined with high fidelity engineering techniques to enable the use of EMS dependent systems, while removing the chances of harmful interference.

\$2.5m funding for improved space facilities

Australia's spacecraft and satellites will better survive damaging radiation and extreme conditions thanks to \$2.5 million in funding for improved space testing facilities at The Australian National University (ANU).

Nova Systems will support ANU with its space expertise, bringing to bear its knowledge of qualification testing, Australian testing facilities and space sector players. Nova Systems will also support the development of an online database of off-the-shelf tested parts.

The new funding will help create a national network of space testing facilities led by ANU researchers that will launch Australia into an elite group of countries with this kind of advanced capability.

Thales Alenia Space and partners selected by the European Space Agency to supply deep space antenna for New Norcia ground station in Australia

The European Alliance for Deep Space Antennas (E-DSA²) formed by Thales Alenia Space (a joint venture between Thales 67% and Leonardo 33%), Schwartz-Hautmont and mtex antenna technology has been selected by the European Space Agency (ESA) to supply a fourth deep space antenna for the New Norcia ground station near Perth, Australia. This new-generation 35-meter antenna will enable ESA to increase its communications capacity in X, K and Ka bands and to round out its network of antennas for tracking spacecraft and collecting science data from solar system missions, such as Exomars TGO, currently in orbit around the Red Planet, and BepiColombo, en route for Mercury, as well as upcoming missions including the Euclid astronomical observatory or the Juice mission to Jupiter, both set to launch in 2022. New Norcia is part of ESA's ESTRACK global network of ground stations.

Thales Alenia Space is the consortium partner in charge of overall performance of the antenna, set for commissioning in 2024. It will also be responsible for the antenna's systems engineering, the overall system and equipment (RF, power, cooling, etc.). The construction of this deep space antenna marks a first for Thales Alenia Space. The challenge is to pick up very faint signals and then boost them considerably for transmission from and to objects in deep space, to enable reception of science data and uploading of commands to space probes.

Thales Alenia Space will be relying on Thales' expertise in Australia to finalize the terms of the civil engineering contract and oversee its execution, and on lessons learned by Telespazio, the joint venture of Leonardo (67%) and Thales (33%), in charge of the maintenance of one of the three ESA antennas for deep space communications in Malargue, Argentina.

Leonardo Australia is a SmartSat Supporting Partner with an office based at Lot Fourteen, Adelaide.

Read the full media release [here](#).



Deep Space antenna New Norcia (Thales Alenia)

Challenges



HAPS Challenge

Congratulations to the three selected Australian SMEs that now progress into Phase 2 – Engineering. The successful entrants are pushing technologies to deploy HAPS at low-cost for persistent missions. Phase 2

will last four-months, with the entrants undertaking an engineering design study, mostly document based, in preparation for further development, testing and trials in Phase 3- Prototype Development and Demonstration. Australian companies are welcome to apply for Phase 3 entry by participating in Phase 2. Visit the [HAPS Challenge website](#) for more details.

HAPS Challenge management (Sir Lawrence Wackett Defence & Aerospace Centre @RMIT, SmartSatCRC, Trusted Autonomous Systems and RAAF Air Warfare Centre) commend and thank all entrants for their applications.

Gravity 03 Challenge



GRAVITY Challenge is a global technology innovation program for corporates, entrepreneurs and universities to design and build solutions to real industrial, social and environmental problems using space enabled technology and capability.

Registrations are now open to solve challenges from one of the 12 organisations across the globe participating in the third round of GRAVITY. GRAVITY is inviting participants from Australia, Japan, the United Kingdom, the United States, Germany, France, Luxemburg, Austria, Poland, Hungary, Romania, and the Czech Republic, making it one of the furthest reaching space innovation programs globally.

Gravity HQ is hosted at the Lot Fourteen innovation precinct in Adelaide. View more information [here](#).

International Rover Challenge (iRoC)



The International Rover Challenge for students (iRoC) features Australian and International high school students building, operating and competing their semi-autonomous rovers in a simulated martian environment, accomplishing navigation, and construction tasks

while assisted and mentored by universities, industry and government partners.

The rovers will conduct in-situ semi-autonomous tasks and interact with the environment using a robotic arm. In addition to the physical challenge, students present their rover designs to industry professionals, academia and iRoC judges. iRoC will be delivered in conjunction with COSPAR-K a free Space STEM event. See more details [here](#).

Upcoming Events

SmartSat Events



SmartSat Participants Conference 18 -19 November 2021 (Brisbane)

In November 2021, SmartSat will be hosting its inaugural Participants Conference. This event is an opportunity to bring our research and industry partners together to:

- review the initial two years research projects
- discuss SmartSat's Strategic Directions
- Meet the SmartSat Chair, CEO and Chief Research Officer and Research Leadership team
- share knowledge and ideas amongst our industry and research partners

More information will be provided to all SmartSat participants in the coming weeks.



Distinguished Speaker Series

Dr. Christa D Peters-Lidard

NASA Goddard Flight Centre

Webinar: 26 August 2021

NASA's Earth Information System: A Cloud-based Open System for Integrated Earth Science and Applications

Dr. Christa D. Peters-Lidard is currently the Deputy Director for Hydrosphere, Biosphere, and Geophysics in the Earth Sciences Division. She was the Acting GSFC Chief Scientist from 2020-2021.

Register for the webinar [here](#).

Other Events



Advancing Earth Observation Forum
25 August 2021
Now online

Due to ongoing travel and COVID restrictions the Earth Observation Australia Inc. has made the inaugural Advancing Earth Observation Forum a one-day fully online event on 25 August 2021

View details [here](#).

12th Australian Space Forum 15 September 2021 Adelaide Convention Centre

The 12th Australian Space Forum will be run along similar lines as the previous Forum, which has attracted a range of international and national speakers including around 1157 participants and 65 organisations in the exhibitor area.

Following the welcome speeches from the Premier of South Australia and the Australian Minister for Industry, Science and Technology, this Forum plans to welcome Heads of the Australian and NZ Space Agencies and more international speakers.

Following this three panels will discuss:

- From CubeSat to small satellites – building Australian expertise and capability.
- EO technologies for space based applications - Agriculture and Natural Resources
- On-Earth and off-earth remote operations



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