SMART**SAT**NEWS

SMARTSAT
COOPERATIVE RESEARCH CENTRE

Australian Government
Department of Industry, Science,
Energy and Resources

Business
Cooperative Research
Centres Program

Contents

Front image: A Centauri Satellite in Low Earth Orbit, image via Fleet Space.

CEO Welcome

Dear Colleagues

Welcome to the June edition of the SmartSat newsletter. I hope you are all keeping well and adjusting to the easing of COVID-19 restrictions in many states. Our team is largely back on deck at SmartSat HQ with business operations continuing as usual.

We have now launched the Tactical Research Fund (TRF), an initiative designed to quickly progress small projects from conception to approval to assist and support our partners during COVID-19. We have also engaged a research team from Deakin University to complete a small research project to determine the impacts of COVID-19 on our partners. Furthermore, our partners from Western Sydney University are helping us to conduct a Space Skills Gap Analysis, the results of which we will share with you when complete.

We have several new staff who I would like to congratulate on their appointments and welcome to the SmartSat team - Dr Sarah Cannard (Deputy Industry Director), Prof Jill Slay (Cyber Security & Resilience Theme Leader), Alison Bowman (Communications Officer) and Elizabeth Weeks (Project Officer: Research Programs).

I am pleased to announce that the Board approved three new projects at the May Board meeting with an additional 18 projects currently under development. More information on our approved projects is available here. We are continuing to work on several strategic initiatives including the development of the End-user Advisory Board Sector Plans, the Diversity and Inclusion Strategy and Action Plan and the establishment of the SmartSat state nodes.

I encourage you to read on to see the other achievements and activities in which our partners are involved. Our success is defined by the achievements of you, our partners.

Thank you for your ongoing support and commitment to SmartSat.

Stay well!

Andy Koronios
Chief Executive Officer

"We are continuing to work on several strategic initiatives including the development of the End-user Advisory Board Sector Plans, the Diversity and Inclusion Strategy and Action Plan and the establishment of the SmartSat state nodes."

Comms & Outreach

Director, Communication & Outreach - Nicola Sasanelli

Dear Colleagues,

I hope I find you in good health and managing well despite these difficult times due to the current pandemic. These last three months have changed the way we engage with our community; meetings, workshops and conferences have turned into videoconferences or online seminars. These adaptations have helped, as we miss human contact which is an important element for our creativity.

In this framework, as part of the SmartSat Distinguished Speaker Series, two webinars were organised in June inviting Dr Max Pastena from ESA and Professor Kay-Soon Low, from STAR at NUS. Further on in this newsletter are details of their presentations on the new generation of Cubesats .

We also organised three internal thematic workshops: AI Project Development in April, Venture Capital Roundtable and Asset Management Project Development Workshop in June. These events were well received with more than 280 attendees registered for all five events. The scope of these events is to facilitate discussion and sharing of state-of-the-art technologies and relevant needs from the end-users. These webinar events will assist in the development of potential project opportunities for collaborative innovation in SmartSat.

In addition, SmartSat supported two Australia-UK online Forums attended by 160 people, in conjunction with Catapult Satellite Applications and Quantum Technology Exchange. Topics discussed were Upstream Space Applications and Space Applications and Agriculture, which I participated in as a speaker. These forums encouraged Australian-UK business engagement and cross-sector opportunities for collaboration.

SmartSat has also recently sponsored initiatives to support outreach activities, mainly to stimulate the end-users technological providers engagement such as: Maxar Spatial Challenge; SpotGEO Challenge; Australian Technologies Competition; Gravity Challenge.

I encourage you to share our newsletter with your national and international colleagues who may be interested and please do not hesitate to provide your feedback.

Communications Officer - Alison Bowman

I have recently joined the SmartSat team in June 2020 as Communications Officer and will be assisting Nicola with Communications and Outreach activities. This will include looking after the SmartSat website, social media, corporate publications, newsletters as well as management of events.

Whilst I am new to the space industry, I have held communication roles in a range of industries including health, film and television and the water sector. I am familiar with the research environment, having previously worked as Marketing and Communications Manager for the Goyder Institute for Water Research. I am excited to have the opportunity to bring this experience to SmartSat. Outside of work, I enjoy regular walks on the beach with my dog, attending dance classes and traveling when I can!

I look forward to meeting SmartSat's partners and associates over the coming months, especially as we return to face-to-face events with easing of COVID19 restrictions. In the meantime, please feel free to contact me if I can assist you with communications and outreach activities.

I can be contacted on 0481 273 462 or alison.bowman@smartsatcrc.com

"The scope of these events is to facilitate discussion and sharing of state-of-the-art technologies and relevant needs from the end-users."

Research

Chief Research Officer – Dr Nick Stacy

It has been an interesting time under the COVID-19 social distancing restrictions to build momentum in the SmartSat research program. We appreciate the partner support for virtual workshops and meetings and continue to learn how to make these as effective as possible.

We were delighted to welcome Prof Clinton Fookes to the role of Artificial Intelligence theme coordinator role. Clinton will lead the 'intelligent' thrust of the three research programs to maximise research and development of coordinated AI technology. The successful workshop in April generated key focus areas of mutual interest to industry and research partners.

The May SmartSat Board meeting approved three projects and a new COVID-19 response, the Tactical Research Fund. The first project in Research Program 1 addresses new waveforms and architectures for Search and Rescue communications that enable additional emergency information, two-way communications and smaller end user devices. The second project in the same program will research very high bandwidth free-space optical communication technology using frequency combs to achieve small super-channel transmitters. The third project in Research Program 3 addresses autonomous algorithms for the real-time surveillance of fires using a virtual constellation of geostationary and low earth orbit systems with modes suited to fire detection and mapping.

SmartSat is developing new approaches for developing research proposals with the aim of improving the industry – research partnering opportunities and alignment as early as possible in the process. The primary change is an expression of interest with Project Concept and Response sections. This allows project ideas to be developed in alignment with the research investment criteria in a way that additional SmartSat partners can be sought to address gaps in the impact, utilisation or research aspects. We welcome your participation in this approach and advice on how to make it as effective as possible for the proposers and the reviewers.

Research Update:
Artificial Intelligence for Space

Professor Clinton Fookes, SmartSat AI Theme Leader

At SmartSat, our role in helping to catalyse the growth of Australia's space industry is clear, with our core mission to develop new capability and new technologies that will make communication, remote sensing and space systems more 'intelligent'. This intelligence is a key word for us at SmartSat, as we are looking directly at the field of Artificial Intelligence (AI) to help us to build this capability into new space technologies.

We see a huge opportunity and capacity to use AI for a whole range of tasks from discovering new patterns on sensor payloads through to enhancing decision-making capabilities of humans. One of the first challenges that confronts us is to execute modern deep learning models on the satellite itself. Unfortunately, the computational power which exists on edge computing hardware which could be sent to space is far smaller than what we might have at our fingertips in many other application domains. As such, we need to leverage sophisticated model compression and optimisation approaches which can make such models compact and efficient, but still powerful and with accuracy as close as possible to their 'deep' counterparts. This is just one example where developing new solutions will open huge opportunities to transform satellites from simple passive recorders into an intelligent sensor which can execute analytics and intelligent behaviours onboard the satellite itself.

A second area with enormous potential, not just for space, but fundamentally for a range of industries is in the mix of AI and Radio Frequency (RF). The congestion within the RF spectrum will only intensify as the growth of CubeSats in orbit over coming years join the billions of other new devices (phones, environmental sensors, and radio-connected devices) as part of an ever-expanding Internet of Things. There is now an increased demand for machine learning capability to operate in this space to see, understand, and manage this resource; to secure and detect abnormal RF signals; and to share the spectrum in new intelligent ways across many applications. Add to this the opportunities with AI and optical communications, as well as other satellite specific comms demands, there is much to be addressed.

And lastly, given the unique perspective of satellite sensor payloads looking directly at our earth on a scale that cannot be easily replicated on the ground, there are enormous opportunities to better use AI on this data to advance earth observation analytics. This can be used to better understand the climate and our impact on it; to design new early warning detection, management and prediction systems; and to advance a range of agricultural, defence, mining and other environmental applications with clear paths for tangible impact on the Australian economy.

As SmartSat's AI Theme Leader, I am keen to work with you to advance AI to improve how our satellites observe, reason, communicate, plan and execute their missions. If you have new ideas to help us achieve this aim, or if your organisation wants to engage more in this space, please reach out and let us know.

Education & Training College

Dr Ady James, Education & Training Director - Industry Training

In the last newsletter it was reported that the Skills Analysis EOI was approved; this was circulated on 31st of March and received six good proposals in response. The selection panel awarded the project to Western Sydney University, under the guidance of Professor Steven Freeland, in partnership with the Asia Pacific Aerospace Consultants (APAC). This work will commence before the end of this month with the expectation of receiving some results before the end of the year.

The number of SmartSat HDR students is beginning to grow, with two full and three top-up scholarships awarded in association with approved research projects, and a further five full and another top-up through the initial open call. This open call is now closed, and we are currently in discussion with the research leads to identify priority discipline areas for the next call sometime towards the end of July. This will be for areas of research that wouldn't naturally fall into a well-defined research project, which are often too focused or of limited duration, but which align with the overall development roadmap.

At our last meeting on the 9th June, an overview of the STEM Outreach strategy was introduced for discussion. The College Advisory Board discussed this in detail and came up with some overarching principles which could form the basis for prioritisation of activities and a foundation for appropriate KPIs in this area. These principles include adherence to SmartSat's values and overall goals, scalability, alignment to curricula and clear linkages to skills and future careers. The strategy will be developed along these lines over the next few weeks before publication.

In other areas, 2 initiatives were approved by the executive; the first was support for the South Australia Premiers Reading Challenge, where a SmartSat sponsored challenge was added to the STEM stream; the second was support, for 3 years, for the Undergraduate Thesis Prize in Space Engineering awarded by the National Committee on Space Engineering (NCSpE) in Engineers Australia.

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Diversity and Inclusion (D&I) Committee Update

Dr Eva Rodriguez Rodriguez, Research Program Manager

On the 24th April 2020, the SmartSat Diversity and Inclusion Committee met for the first time. This committee has been established as a committee of the Board, and will provide D&I related advice, drive inclusion, diversity and the operationalising of SmartSat's values by ensuring these are widely understood and consistently adhered to. Part of the activities undertaken by the Committee to date include the revision of its current membership, to ensure broad and diverse representation of the SmartSat community, the commencement of its annual workplan, and the identification of dedicated D&I initiatives that will be commenced in the coming months. The Committee is looking forward to progressing works in this space, and to leverage the great work undertaken so far by the SmartSat D&I interim Working Group.

Aurora Start-Up Cluster

Dr Tim Parsons

As outlined in previous newsletters, SmartSat has setup a wholly-owned subsidiary company and full partner of SmartSat, the Aurora Space Startup Cluster, to enable the large number of space startups, (and SMEs with an interest in joining space supply chains), to have a more direct relationship with SmartSat. A steering group of leaders drawn from the startup community was established at the start of the year, and since then we've run two 'ask us anything' webinars, featuring the SmartSat executive team, as well as an in-depth presentation by Chief Research Officer, Dr Nick Stacy about SmartSat's Research Programs and Themes. Two Special Interest Groups (SIGs) have also been setup, one focused on Earth Applications led by Ozius co-founder Alisa Starkey, and one focused on Small Satellites led by Southern Launch Head of Engineering Andrew Barton. Both SIGs are currently exploring project opportunities which are attracting interest from SmartSat partners. Work is now being finalised on the company constitution and a formal board election process will be announced and launched soon, along with Aurora's offering to members in return for a modest membership fee. More news will be provided soon.

Industry

Peter Nikoloff, Director, Industry Advisory Board

SmartSat would like to welcome Dr Sarah Cannard as the recently appointed Deputy Industry Director. Dr Cannard is an experienced Senior Engineer and Project Manager with over a decade of demonstrated history working for Nova Systems in the defence and space industry. Sarah has a degree in Mechanical Engineering, a Bachelor of Science (Physics) and holds a Doctor of Philosophy (PhD) from the University of Adelaide. Sarah is also a Fellow with Engineers Australia, an Amelia Earhart Fellow (Zonta International), and a Graduate of the AICD.

Sarah has been involved with many complex defence, space and civil programs including the JAXA Hayabusa I Spacecraft re-entry, hypersonic rocket launches, Woomera Test Range trials and activities, the Joint Navy/DTSG Autonomous Warrior 18 activity, and the Hunter Class Frigate Program. She is also the Program Director and Project Manager for Australian Remote Operations for Space and Earth (AROSE.org.au).

Sarah has a deep passion for space and growing a sovereign Australian industry through cross-sector collaboration and understands the academic environment and challenges that come with cross-sector and industry partnerships. She is also passionate about STEM and creating opportunities for future generations.

Sarah's role at SmartSat will focus on enabling and driving collaborative projects between SmartSat research and industry partners as industry liaison. She will also be guiding SmartSat Test and Evaluation (T&E) data base and capabilities to support SmartSat research. She will also be supporting me with the Industry Advisory Board and supporting the development of end user sector plans.

Sarah can be contacted at sarah.cannard@smartsatcrc.com

Awards

Dr Jacqueline (Jackie) Craig FTSE - Member of the Order of Australia

Congratulations to SmartSat Board Member Dr Jackie Craig, who received a Member of the Order of Australia medal in The Queen's Birthday 2020 Honours List, for significant service to science and technology research in the defence capability field.

Dr Craig graduated with a PhD in physics from St. Andrews University in 1981 and was employed by the UK Ministry of Defence for nine years.

In 1990, Jackie began her 26 year science career with the Australian Defence Science and Technology Group. She has extensive experience in lasers and optics, space-based airborne Intelligence, Surveillance and Reconnaissance (ISR) systems, UAVs and cyber and electronic warfare systems. She led the science and technology input into ISR, geospatial intelligence and space-related Defence projects for ten years. As Chief of Electronic Warfare and Radar Division, Jackie established and lead the Cyber and Electronic Warfare Division, focussed on developing solutions to defeat a wide range of threats. She was a member of the Defence Senior Leadership Group for eight years and held numerous senior executive leadership positions within the five-eyes Defence and Intelligence S&T forums, spanning the areas of space, digital systems, autonomous systems, big data, cyber and ISREW.

Jackie was awarded the 2001 Ministers Award in Defence Science and elected a Fellow of the Australian Academy of Technology and Engineering (ATSE) in 2016.

With so many mountains and rock walls still to climb Jackie retired from DST Group in 2016. She is very active in the ATSE Digital Futures Forum, and as an Honorary Fellow of DST Group contributed to the development of the Australian Defence Space S&T Strategy.

Dr Joseph O'Leary

The International Astronomical Union (IAU) PhD prize in Division A: Fundamental Astronomy and the Michael Miller Medal from the University of South Australia have been awarded to Dr Joseph O'Leary for his thesis General relativistic and post-Newtonian dynamics for near-Earth objects and solar system bodies.

Joseph is a postdoctoral research fellow for Electro Optic Systems (EOS) Ltd. and recently graduated from the School of Information Technology and Mathematical Sciences, University of South Australia. As a research fellow with EOS, Joseph is tasked with the design of spacecraft orbit propagation tools using semi-analytic satellite theory.

The primary focus of Joseph's PhD research was the study of general relativity within the space sciences. Topics ranged from: seeking exact solutions to the Einstein field equations of general relativity, mechanics of celestial bodies and post-Newtonian effects for near-Earth objects such as geodetic and navigation satellites. During his time at UniSA, Joseph developed skills in Mathematica, Maxima, Maple, MATLAB and Fortran where he was able to use his knowledge of Computer Algebra Systems to greatly facilitate his research in exact solutions to the Einstein field equations which are notoriously nonlinear and computationally demanding.

The technical recommendations and resolutions of the IAU played a major part in Joseph's PhD, and he was honored to receive their recognition of his dissertation. He also grateful for his UniSA supervisors Prof. Jim Hill (UniSA), Dr. James Bennett (EOS Space Systems) and Dr. Sam Drake (DST).

Joseph will present his PhD research to the IAU at the 2021 General Assembly in South Korea. Joseph works out of SmartSat HQ as part of his role with Electro Optic Systems Pty Limited.

Eva Rodriguez Rodriguez receives the 'Highly Commended' Award in Women's Leadership at the 2020 APSEA Awards

We would like to congratulate Eva on this fantastic achievement and recognition of her contribution to the Australian space sector. This is well deserved recognition for all of Eva's work strategically growing the Spatial sector in Australia, particularly focusing on connections to the space sector. The support for Eva's nomination was very strong and reflected the three themes she has continuously focused on: connecting space and spatial, diversity and inclusion, and collaboration as the only road to success and growth.

Eva is a SmartSat Research Program Manager and member of our Diversity & Inclusion Committee.

The Asia-Pacific Spatial Excellence Awards (APSEA) celebrate the achievements of top spatial information enterprises and individuals and showcase the finest projects and most significant performance of professionals that the Surveying and Spatial Industry have to offer. Projects and individuals attaining recognition at this premier event are deemed to be truly outstanding achievers and pre-eminent in their field. Read more here.

CSIRO's Dr Sarah Pearce named NSW Telstra Business Woman of the Year 2020
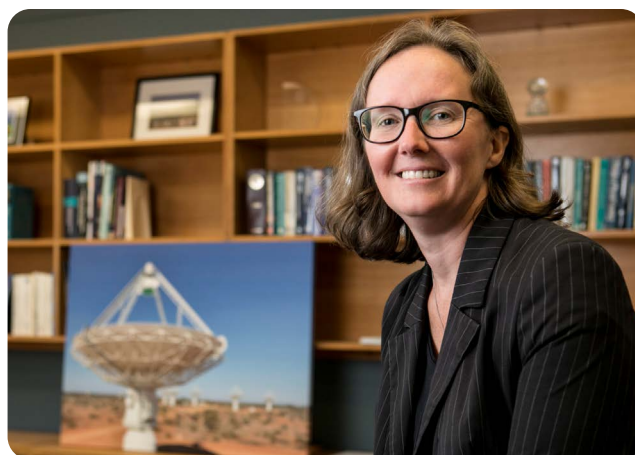
Dr Sarah Pearce, Deputy Director of CSIRO Astronomy and Space Science, has been recognised for her contribution to the development of the astronomy and space sectors as NSW Telstra Business Woman of the Year 2020, and winner of the NSW 'Public Sector & Academia' category.

In her role as Deputy Director of CSIRO Astronomy and Space Science, Dr Pearce leads CSIRO's involvement in the international Square Kilometre Array (SKA) project to build the world's largest radio telescope, and was Australia's science negotiator for the SKA international treaty. Dr Pearce also leads CSIRO's space research program, which includes the CSIRO Centre for Earth Observation and our share of the NovaSAR-1 satellite facility.

Sarah has worked closely with SmartSat on the AquaWatch program and also with the development of SmartSat's Diversity & Inclusion activities.

Read more here.

Events

SmartSat Distinguished Speakers: Dr Max Pastena & Professor Kay-Soon Low

In the last decade, the NewSpace paradigm shift resulted in exploding commercial and scientific opportunities, encompassing an emerging investment philosophy and technological advancement. Two of the major technologies allowing these advancements and enabling those new trends and philosophies are cubesats and artificial intelligence. During June, 120 SmartSat partners attended online presentations on these technologies from two Distinguished Speakers, Dr Max Pastena from ESA and Prof Kay-Soon Low from the National University of Singapore.

Dr Max Pastena (Future Studies Technology Development and Frequency Management Engineer at European Space Agency)

AI integrated in CubeSat for EO - Future Missions / Earth Observation Programs (EOP-ΦM)

This lecture discussed the cubesat revolution and the immense opportunities of Artificial intelligence for Earth observation, highlighting the important role that these systems can have in the future and how their contribution can keep modelling the space of the future. In particular, Dr Pastena examined the possibilities that cubesats allow and how artificial intelligence on board cubesats can represents an enabling factor to disruptive application. The lecture concluded with the show case of PhiSAT, the first mission of the European Space Agency dedicated to demonstrating the capabilities of artificial intelligence on board a cubesat for Earth Observation.

Professor Kay-Soon Low (Director, Satellite Technology and Research Centre (STAR) and Professor in the Department of Electrical and Computer Engineering at the National University of Singapore)

In Prof. Kay-Soon Low's lecture, he delivered a brief history of the cubesat, discussing some of the earlier satellite programs conducted in the Satellite Research Centre of Nanyang Technological University (2003-2016) including satellites from 0,3 u to 6u.

He also gave an overview of the in-orbit experiments from these programs including remote sensing, fault tolerant system, peak power solar energy tracking, model predictive control, radio occultation experiment, precision navigation and inter-satellite data relay system.

In the second part of the lecture, some of the latest efforts in developing 12u to 27u satellites in STAR@NUS were presented. The flagship program of STAR is a formation flying program with 3 sets of 12u satellites (Lumelite-1, -2 and -3).

Its potential applications include collaborative sensing, tracking of assets such as ships or aircraft. Another 12u satellite program for maritime safety and communication program (Lumelite-4) using the VDES (VHF data exchange system) system were also discussed. To conclude, Professor Low presented inter-satellite communication with high data rate program (Lumelite-5). All of these satellites are under development and will be completed for launch from the year 2022 onwards.

AI Workshops

During the SmartSat AI Workshop held in April, a few clear themes emerged for us to tackle. These included: the development of new multi-modal and multi-sensor machine learning approaches; to optimise machine learning architectures for onboard processing; AI for RF spectrum sensing; and AI for anomaly detection/change detection. We also saw the importance of trust in AI systems and their decisions emerge as a key issue in making outcomes in these areas interpretable and explainable to human operators and industries who use them.

Since this workshop, we have worked with our industry partners to capture these themes and their specific requirements into concise project concepts. Over the coming weeks these will be shared with other SmartSat Industry partners before seeking responses from our academic partners on new R&D ideas to address them. We have also recently kicked off a new Artificial Intelligence in Space Research Network (AIinSpace) as a vehicle to bring together researchers from academic and industry sectors with the aim to increase collaboration in AI for space. We are hosting the Inaugural Workshop for this network to work through its terms of reference and to decide on future activities on Friday 3rd July from 9:30-11am AEST.

Future Events

Distinguished Speaker Series
Date: Thursday 2 July

Douglas Wiemer, Director, Cyber Security Solutions at RHEA Group

In his role as Chief Technology Officer – Cyber (CTO-Cyber) at the RHEA Group, Douglas is responsible for the management, development and delivery of cybersecurity related services to European and Canadian agencies and industry, including the European Space Agency, NATO and private industry clients.

The presentation will describe the path taken to establishing the commercially oriented Cyber Security Centre of Excellence (CSCE), geared towards improving cybersecurity resilience of space systems, and challenges, successes, lessons learned and outcomes.

View here for more information.

10TH AUSTRALIAN SPACE FORUM
Date: 25 November 2020

The South Australian Space Industry Centre (SASIC) is delighted to announce the date of the 10th Australian Space Forum will be Wednesday 25 November 2020, held at the Adelaide Convention Centre in South Australia.

The biannual forum has fast become one of the foremost events on the national space industry calendar and continues to grow with each edition. This event will be no exception with another high-profile program in the works, designed to showcase the best of the Australian space sector and encourage collaboration and investment. The event will have a focus on the following pertinent themes: International Collaboration; Venture Capital; and Research and Development and SmartSat's involvement.

Companies are invited to express their interest in becoming a sponsor or exhibitor at the event via email to spaceoffice@sa.gov.au. This will ensure that your company is one of the first to be notified of the opportunities once they become available.

Projects

Compact Hybrid Optical-RF User Segment (CHORUS)

The Compact Hybrid Optical-RF User Segment (CHORUS) project, is SmartSat's first collaborative project with Defence Science and Technology (DST).

Defence scientists will work colleagues from industry and academia on a high-risk, high-payoff satellite communications (SATCOM) research venture that has the potential to significantly enhance military capability. The project will see a cross-sector team exploring ways of integrating both laser-based optical and radio frequency (RF) communications technologies in a single SATCOM user terminal.

SmartSat's industry partners for the project are EOS Space Systems and EM Solutions, Lyrebird Antenna Research and Shoal Group, and academic partners the Australian National University and the University of South Australia.

This project has been established to develop world-leading Australian technologies that will improve the resilience of military satellite communications, and potentially provide leapfrog technology for commercial markets. By combining optical and RF communications, satellite operators will have more options to provide high-availability, high-capacity and high-resilience satellite communications services without requiring additional access to scarce and expensive radio spectrum. This will lead to DST integrating hybrid optical-RF SATCOM terminals into military aircraft, land vehicles and ships using innovative technology developed through the project.

During the first phase of the research, the team will assess the viability of different design options and create a virtual representation, or 'digital twin', of the CHORUS concept to support the development of a demonstration terminal later in the project.

Funding for Phase 1 represents an investment by SmartSat and project participants of about $1 million over 12 months.

Defence will contribute $12 million in funding to SmartSat over seven years. As a core participant in the consortium, DST will support research projects that address Australia's need for sovereign space capabilities or explore disruptive approaches to delivering space-enabled services for the Australian Defence Force.
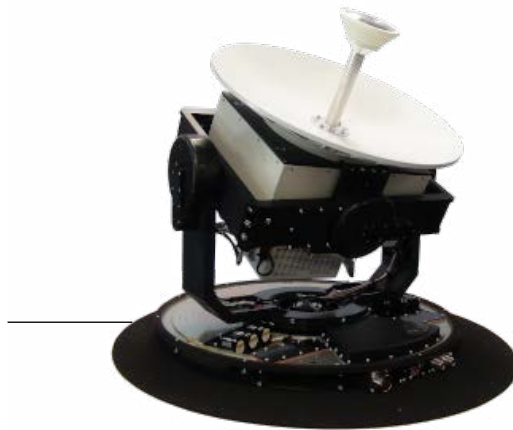
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News from our partners

Saber Astronautics selected for the Australian Space Agency Mission Control Centre

The Department of Industry, Science, Innovation, and Resources in conjunction with the Australian Space Agency has awarded Saber Astronautics a $6 Million grant for the development of Australia's Mission Control Centre at Lot Fourteen. This project received grant funding from the Australian Government's Space Infrastructure Fund.

Branded as the "Responsive Space Operations Centre" (or RSOC for short), Saber will bring next generation space mission control technologies to make it easier to fly new spacecraft. Capabilities include concurrent design, pre-flight testing, launch support, as well as live operations during flight. The RSOC will also be the first professional control centre in the world to use machine learning in spacecraft day-to-day operations along with 3D gaming technologies.

Based at the same location as the Australian Space Agency and SmartSat, the RSOC is expected to have a baseline capability ready in six months. There will be a close collaboration with the Australian Space Discovery Centre, providing education to the general public on the importance of Australia's growing aspirations in space, as well as exciting STEM opportunities. Australians will be able to design their missions in the same place that they will fly, and gain new missions access to advanced operational capabilities.

The RSOC is supported by a select marketplace of telescopes and dish networks to track Australia's future fleet of spacecraft. This will be a new model for the Australian space community to access dish capability from suppliers worldwide. Saber Astronautics will also engage with Deloitte as their preferred service provider to design secure business models relating to this marketplace, as well as providing expertise in cyber security and experience design.

Once completed the RSOC will support day-to-day mission control for small and medium enterprises, using Saber's technologies to reduce risk for investors.

Fleet Space awarded Accelerated Discovery Initiative grant funding to accelerate mineral discovery in regional South Australia from Space

Adelaide based nano-satellite manufacturer and Internet of Things (IoT) startup Fleet Space Technologies has been awarded a significant grant through the Accelerated Discovery Initiative (ADI), a South Australian Government program. With aims to accelerate mineral discovery through innovative exploration and research projects in regional and frontier terrains, this will be a world-first trial of an exciting new approach to remote monitoring, with applications for groundwater, geothermal energy and space exploration.

Currently, environmental considerations are a high priority for Australia, and the availability of natural resources are of great economic concern. The challenge facing mining companies is the effective discovery of minerals given the level of cover required, and the effectiveness of these current methods is beginning to adversely impact downstream returns.

Until now there hasn't been the alternatives to traditional exploration methods, but we are coming to a point where technology has caught up to meet these needs.


Fleet Space understands the challenges faced by their customers, successfully proving the ability to bring together a number of complex ingredients to solve their problems, while also providing huge value to the companies. Being awarded funding from a body that is not space related is testament to our ability to solve our customer's real world problems.

The Fleet Space large-array wireless sensing project, which is a collaboration with OZ Minerals and University of Adelaide, will see the remote mapping heat flow project present a new approach to mineral exploration beneath cover. Utilising their current fleet of four low earth orbit nano-satellites, Fleet Space's planned network of 100 satellites will provide a global digital nervous system that will plug directly into the millions of digital sensors to transform many industries. Fleet Space will help power the next industrial revolution.

"Nanosatellites are beginning to play a huge part in making industry, and our society in general, more efficient," said Flavia Tata Nardini, CEO and co-founder of Fleet Space. "The potential outcomes of this geophysical deep imaging project should fundamentally improve the ability to locate IOCG deposits through their thermal footprint underneath deep sedimentary cover".
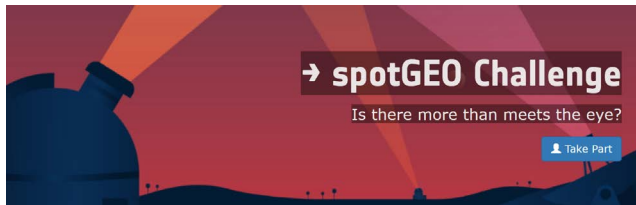
spotGEO Challenge

 The SpotGEO competition is jointly organised by researchers at The University of Adelaide (UoA) and the Advanced Concepts Team (ACT) of the European Space Agency (ESA). The competition challenges space researchers to develop algorithms that are capable of detecting objects in images of the geostationary orbital belt acquired using low-cost astronomy cameras.

Objects in the geostationary orbit hover above the same location in the sky, a property crucial for satellite-based telecommunications and meteorology applications. This makes the geostationary orbit one of the most valuable "real estate" in space. With space debris becoming a pressing issue, it is vitally important to monitor that particular orbit. Recent analysis by astrodynamicists suggests that the geostationary environment is more dynamic than previously thought.

The SpotGeo competition follows from a longstanding collaboration between the team of Associate Professor Tat-Jun Chin at the Australian Institute for Machine Learning (UoA), Dr Mark Rutten of InTrack Solutions, the team led by Dr Matthew Tetlow at Inovor Technologies, and Mr Travis Bessell at DST Group. The connection to the ACT at ESA was recently established following the successes of the Adelaide-based researchers in several important fronts in space R&D; in particular, the development of AI-inspired algorithms for space problems.

To construct the dataset for the competition, the researchers spent many nights capturing thousands of images, which were then carefully curated and labelled to form a decent-sized collection ready for public release. The "AI-style" challenge is very much suited to be undertaken during lockdown.

Space Weather Industry Lead co-locates with SmartSat at Lot Fourteen.

As the Australian space industry continues to go from strength to strength, and as the world increasingly becomes dependent on space-based systems and other technologies, it is essential we think about Space Weather.
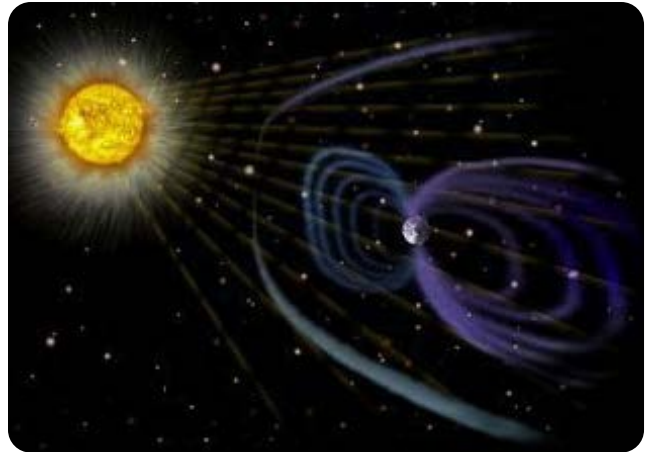
Space Weather offers serious threats to increasingly complex communications and technological systems across the broader economy. In recognition of this, the Bureau of Meteorology's Space Weather Services team have landed a dedicated Space Industry Lead at Lot Fourteen in Adelaide.

Co-located with SmartSat, this new role provides an opportunity for the Bureau's Space Weather Services team to link directly into the Australian space industry partners at Lot Fourteen, to better understand the needs and challenges faced in relation to Space Weather. Building this understanding will allow the Space Weather Services team to develop new products and partnerships to support the space industry. These new opportunities will contribute to the Australian space industry's resilience to the effects of Space Weather as it continues to become a major player in the global space economy.

Since 1947, the Bureau's Space Weather Services team has provided services to manage the impacts of space weather on humans and technology. Based in Sydney, the Bureau's expert team monitors and forecasts space weather conditions, including solar activity, and geophysical and ionospheric conditions. The Space Industry Lead will work closely with the Space Weather Services team to share new industry-based information and knowledge which will support new opportunities to add value and impact to the space sector.

For more information about the products and services currently provided by the Space Weather Services team or if you would like to share your experiences or requirements and challenges relating to Space Weather, please get in touch with Zandria Farrell, Space Industry Lead – Space Weather Services on Zandria.Farrell@bom.gov.au or visit www.sws.bom.gov.au

Australian Youth Aerospace Association

Harrison Papagianis, Strategic Partnerships Coordinator (Australian Youth Aerospace Association Inc.)

The Australian Youth Aerospace Association (AYAA) (https://ayaa.com.au/) is a not-for-profit organisation run by and for students and young professionals. Together we strive to promote education, awareness and involvement in the Australian aerospace industry and greater STEM community. The AYAA engages with people across Australia, launching connections between industry and the growing youth STEM community. Igniting the passion of the Australian youth STEM community is done through National scale events including the Aerospace Futures (AF) conference, the Australian Youth Aerospace Forum (AYAF), and the Australian Universities Rocket Competition (AURC). These events are complemented through the frequent running of local state events.

The AF Conference covers a wide range of topics from civil aviation, engineering and astronomy to geospatial intelligence, space science and law. To date, the event has been an immense success with a total of 1500 student delegates and 80 organisations involved. In 2021, Aerospace Futures returns to Adelaide where it has previously been highly successful in engaging both the current and future generations of aerospace forerunners. The event is focused on undergraduate and postgraduate students, and young professional from across Australia and New Zealand.

The AURC is Australia's first tertiary competition for student rocketry teams from around the world. Teams are required to design, build and launch a solid-propellant sounding rocket to either 10,000 ft or 30,000 ft which carrying a cube-sat payload. Projects are assessed throughout their design cycle, from project management approaches, FMEA, simulations and modelling through to manufacturing decisions, industry and community engagement to testing, launch and recovery success. The 2021 event has 22 teams registered, encompassing more than 600 students across Australia and New Zealand.

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Maxar Technologies

On April 8, the sale transaction of MDA by Maxar Technologies (NYSE:MAXR)(TSX:MAXR) to a consortium led by Toronto-based investment firm Northern Private Capital (NPC) officially closed. This marks the return of MDA to Canadian control as a private, independent company headquartered in Canada.

Founded in 1969, MDA is Canada's largest space technology developer and manufacturer, with over 1,900 employees across the country. Through a strong collaboration and partnership with the Government of Canada that spans several decades, MDA has delivered world-leading, iconic technologies such as the Canadarm family of space robotics for the U.S. Space Shuttle program and the International Space Station and three generations of RADARSAT Earth observation satellites for the Canadian Government.

NPC, led by John Risley and Andrew Lapham, has appointed Mike Greenley as Chief Executive Officer of MDA. The NPC-led consortium has acquired all of MDA's operations across Canada and the UK.

Read more here.

Launch of the M2 Pathfinder satellite by UNSW Canberra

A UNSW Canberra team, led by the university's Space Director Professor Russell Boyce, have launched the M2 Pathfinder satellite and are now successfully communicating with it.

M2 Pathfinder is a collaboration between UNSW Canberra Space researchers and engineers and the Royal Australian Air Force (RAAF). It is the second of four cube satellites to be flown in the program, and follows the launch of M1 in late 2018.

The launch took place on Rocket Lab's "Don't Stop Me Now" 12th mission from New Zealand's Māhia Peninsula on June 13. Successful communication with the satellite has been established via UNSW Canberra Space's satellite ground station hosted by Cingulan Space, near Yass in NSW.

Professor Russell Boyce said M2 Pathfinder was an important mission for Canberra as it would test home-grown communications architecture and other satellite technologies, which would assist in informing the future space capabilities of Australia.

Read more here.

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