



# SMARTSAT

COOPERATIVE RESEARCH CENTRE

**Australia's  
Premier  
Space  
Research  
Centre**

**400+**

RESEARCH  
PARTNERS

**150+**

RESEARCH  
PROJECTS

**5**

PATENTS

**71**

PHD  
SCHOLARSHIPS

**135+**

PARTICIPATING  
ORGANISATIONS

**230+**

PUBLICATIONS &  
TECHNICAL REPORTS

**9**

TECHNOLOGIES ON  
MATURATION PATH

**11**

PHD  
COMPLETIONS

## AUSTRALIA'S PREMIER SPACE RESEARCH CENTRE

The SmartSat Cooperative Research Centre (CRC) is a consortium of universities and other research organisations, partnered with industry, that has been funded by the Australian Government to develop know-how and technologies in advanced telecommunications and IoT connectivity, intelligent satellite systems and Earth observation next generation data services.

SmartSat's agile organising team brings together academic researchers, industry and end users to develop, manage and deliver useful technologies, algorithms and knowledge that supports every sector of our economy.



**ADDRESSING REAL WORLD CHALLENGES TO BENEFIT OUR NATION IN KEY RESEARCH AREAS**

Enhancing communications and situational awareness across the Indo-Pacific Region to **enable regional security** and **protect Australia**.

Improving Earth observation satellite technology for nationwide **water quality** and **quantity monitoring, forecasting** and **data publishing**.

Leveraging technologies in IoT connectivity, Earth observation, navigation and timing applications for **disaster resilience** and **climate prediction systems**.

Creating sovereign agricultural and environmental intelligence capability from space through **Earth observation** and **space sensor technology**.

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DELIVERING **VALUE** FOR OUR **PARTNERS**  
AND **IMPACT** FOR OUR **NATION**

**SmartSat is a powerful collaborative R&D engine for the Australian space industry and plays a pivotal role in space innovation for the development of Australia's space ecosystem at this very critical and exciting juncture in Australia's space industry development.**

Our research develops intellectual property and specialist industry expertise to grow the Australian space industry, create export economic value and generate new high-tech jobs for our future space leaders.

A strong collaborative partnership between Australia's internationally respected R&D ecosystem and industry is critical in order build capacity and autonomy in space and so that it may realise the benefits from the soon-to-be trillion-dollar global space industry.

Through the support of the Australian Space Agency, the Australian Governments Cooperative Research Centres Program, and a number of other Government initiatives, paired with a collaborative approach between research and

industry, the tempo of growth of the Australian space industry is accelerating to new heights.

SmartSat has more than 135 participating organisations, comprising universities, government research labs, such as Defence Science and Technology Group (DSTG) and CSIRO, large global companies such as BAE, Thales and Saab, as well as a network of over 60 SMEs and start-ups.

## SMARTSAT'S BROADER ECOSYSTEM...



# RESEARCH OUTPUTS



## EMERGENCY MANAGEMENT

**SmartSat is pioneering technology to support emergency and disaster management through advanced communications, onboard processing and AI to improve data downlink times.** One program of work is developing an enhanced emergency safety distress beacon, particularly for remote locations. This communications waveform offers low-power satellite communications with secure, low-latency messaging and beacon geolocation. In partnership with NASA, this technology is being adapted for the challenging lunar environment, to provide astronauts with reliable and functional emergency communications, supporting NASA's Artemis program. It is also being modified for Push-to-Talk (PTT) capabilities for tactical voice communications and data transmission where connectivity is limited. Additionally, SmartSat is also addressing disaster and emergency response with the development of advanced onboard processing and AI to provide verified, high quality, real-time information. This includes onboard processing strategies to identify fire smoke, reducing large raw data volumes and improving downlink speed, as well as automated, near-continuous, and near-real-time surveillance of potential fire activity across Australia. SmartSat is also developing projects in flood mapping, detection of water quality events and AI models to assess building damage following natural disasters.



## AQUAWATCH AUSTRALIA

**SmartSat has partnered with CSIRO on the AquaWatch Australia program for water monitoring.** Along with other agencies, we are developing technologies to have a single, 24/7 comprehensive, national monitoring system that can provide precise, decision-ready information on the quantity and quality of Australia's inland and coastal waterways. This information is essential for the operation of all levels of government, large numbers of industries, and for sustaining basic water services for all Australians.



## SCARLET LABORATORY

**The Scarlet Laboratory is a leading initiative focused on advancing spacecraft autonomy, onboard Artificial Intelligence (AI), and data analytics.** Its work is critical to next-generation space systems, improving responsiveness, reducing communication and data latencies, and cutting costs for both space and ground operations. Research in the Scarlet Lab includes the development of autonomous algorithms for small and distributed spacecraft, enabling them to make independent decisions, optimize resources, adapt to changing conditions, and handle critical situations without Earth-based intervention. Further work is focused on enhancing autonomous capabilities for satellite self-inspection and Earth observation. It is exploring the integration of onboard and offboard autonomy, optimizing data acquisition, downlink, and energy-aware planning.



## SATELLITE COMMUNICATIONS

**SmartSat has a suite of research advancing ground and satellite communications.** It is addressing capabilities in deployable optical satellite communications with the world's first Compact Hybrid Optical RF User terminal. This offers higher bandwidth, lower observability, and more secure communications than current RF-only tactical communications technologies across maritime vessels, aircraft and land vehicles. SmartSat is also working on delivering fiber-like connectivity via free-space channels, using a compact optical ground terminal capable of high data rate links (100+ Gbps) to moving platforms. Additional research in communications includes advanced cognitive radio techniques, novel communications technologies for resilient satellite constellation communications architecture and quantum-enhanced communication technologies.

# KANYINI: SMARTSAT'S ON-BOARD AI MISSION

**Kanyini was launched into Low Earth Orbit onboard a Space X Transporter 11 mission in August 2024 and is the first satellite commissioned by a state government in Australia to support day-to-day operations of a State Department, in areas such as environment, water, energy, agriculture and emergency services.**

The mission, led by SmartSat, is a collaboration between the South Australian Government represented by the South Australian Space Industry Centre, Adelaide-based commercial satellite manufacturer Inovor Technologies and global IoT provider Myriota. Kanyini is named for the Pitjantjatjara word, which translates for 'responsibility and unconditional love for all of creation', encompassing the key principles of Aboriginal life including creation.

Kanyini is more than just another cube-sat; it is an advanced satellite equipped with next generation technologies and on-board processing capabilities. Onboard Kanyini, cosine's advanced HyperScout 2 imager will support monitoring of crops, vegetation, soil moisture and water. It

also incorporates Myriota's next generation IoT sensor, enabling Kanyini to collect data from thousands of ground sensors each orbital pass. Additionally, Kanyini is Australia's first "smart" satellite, equipped with an onboard computer and advanced AI algorithms for real-time image processing. This allows the satellite to send actionable insights directly to the ground, reducing the need for transmitting large amounts of raw data for post-analysis.

SmartSat has developed a full suite of research projects for the Kanyini mission in onboard AI, machine learning, hyperspectral imaging analysis and efficient satellite operations. There will also be joint research with ESA's Φ-lab on Kanyini's Hyperscout 2 data as the mission progresses.





# INTERNATIONAL COLLABORATIONS & ENGAGEMENTS

SmartSat has established strong research partnerships with international agencies, research organisations and the global space business community.



## GET INVOLVED...

Join our journey in building the global space industry for a better world. Contact us at [info@smartsatcrc.com](mailto:info@smartsatcrc.com).

