



TAS

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AN AUSTRALIAN LEADER IN TRUSTED, UNCREWED AND AUTONOMOUS SYSTEMS

It's hard to imagine the field of trusted autonomy in Australia today without the contribution of Trusted Autonomous Systems (TAS), Australia's first Defence Cooperative Research Centre. Established in 2018, TAS' focus on industry-led collaborations has seen remarkable advancements in development of trusted and reliable autonomy capabilities for Defence.

TAS CHIEF EXECUTIVE OFFICER Glen Schafer says that in only six years, working closely with the Defence Science and Technology Group (DSTG) and service innovation groups, TAS' agility and independence have led to significant new Defence capability.

“As an independent, above-the-line entity, we've brought together the research expertise of universities, coupled with industry-led commercialisation of IP, to deliver results.

“We've enabled our industry partners to succeed by equipping them with IP ownership and connecting them with the best available research.

“This approach has allowed us to accelerate ADF capability across all domains, including spectrum, supported by a suite of ethical, legal, and regulatory resources.

“In only a short time, we've leveraged Next Generation Technologies Fund (NGTF) and Queensland government funding to deliver considerable value for both the Australian Defence Force and SMEs.”

“TAS has been a great success, accelerating ADF capability across all domains.”

Using its best practice methodology, TAS has delivered 23 projects and two common-good activities. Six of these projects and one activity were funded through the NGTF, with an initial \$50 million investment which has seen a significant return.

Autonomous underwater and surface vessels

TAS has invested in the Thales Australia Mine-Counter Measures “MCM in a Day” project to design, develop, test, and evaluate teams of autonomous underwater vehicle (AUV) swarms and autonomous surface/subsurface vessels.

This aims to deliver autonomous mine clearance research and technology to assist amphibious zone preparation. This new approach has the potential to support a significant operational step-change by removing ADF members from harm’s way and accelerating the speed of mission execution.

TAS’ scope of work is not limited to small-medium AUVs. The Patrol Boat Autonomy Trial, led by Austal Australia on behalf of the Royal Australian Navy Warfare Innovation Navy branch, aims to establish robotic, automated, and autonomous elements on a former Armidale Class patrol boat.

Vision-based AI systems

Athena AI is one of the only vision-based AI systems on the market that combines AI computer vision, AI-enabled decision support, and display of the AI information in a user interface.

Athena AI is an outcome of the TAS NGTF and Queensland co-funded project Joint Autonomous UAS Effects, a joint venture by Skyborne Technologies and Cyborg Dynamics that has achieved several million dollars in continued investment and military purchase orders in Australia and allied markets.

AI-enabled ground vehicles

The four-year program of work on the BAE Systems TAGVIEW system uses artificial intelligence that would allow multiple uncrewed ground vehicles (UGVs) to operate simultaneously to carry out mission objectives while identifying and evading potential threats. TAS was instrumental in developing the project, reviewing its technical progress and achievements, and working with participants on the design of trials and demonstrations.



TAS CEO Glen Schafer

Collaborative uncrewed systems

TAS continues to work with Mission Systems-led ‘Hyperteaming’ supported through the Australian Army Robotic and Autonomous Systems Implementation Coordination Office (RICO), to further operationalise collaborative uncrewed systems and human-machine teaming.

Novel airship designs

In 2020, TAS, alongside numerous partners, commenced the FireFly project to advance research into another novel technology offering potential strategic benefit for Defence. This project was then advanced through a High-Altitude Pseudo Satellite Challenge developing autonomous station keeping, flight control a novel airship design, and concluded with an initial test flight.

Optimised spectrum utilisation

Trusted autonomy and teaming between humans and robotics systems is reliant on assured communication. The TAS-funded Consunet-led Distributed Autonomous Spectrum Management (DUST) system uses machine learning and AI to plan and allocate spectrum usage to achieve optimised spectrum utilisation in congested, contested, and complex environments.

The system is being incorporated into a significant ADF investment with the Air 6500-1 engineering technical lead, Lockheed Martin, saying: “Consunet has worked with Lockheed Martin Australia for over three years and brought a wealth of Australian-developed AI and cyber security spectrum management expertise to Defence’s Joint Air Battle Management System - Air 6500-1 program.”

Why trust matters

While this technological innovation is undoubtedly impressive, Schafer says that such innovation can only succeed when there is trust.

“Without trust, new technology does not have the social licence necessary for it to be accepted by users and without users, the technology becomes obsolete,” he said. “Due to the speed of technology development in the autonomous systems industry, a challenge for TAS has been the lack of established and fit-for-purpose assurance and accreditation requirements to ensure regulatory compliance and operational reliability among early adopters and promote public confidence.

“To address this issue, TAS has developed a suite of common-good products comprising the Robotic and Autonomous Systems Gateway: a digital resource hub for unmanned systems operators, the Responsible AI for Defence toolkit to help identify and manage the legal, regulatory, and ethical considerations of autonomous systems and a Maritime Autonomous Systems Code of Practice.

“These products form part of TAS’ legacy for those seeking to pursue trust in robotics, autonomous systems and AI.”

Systemising best practice

Schafer believes that future defence industry success lies in systemising and sustaining TAS’ best practice approach.

“We hope TAS can continue to play a role in bringing best practice methodology to the pursuit of Defence capabilities designed to help reduce the human cost of conflict.” ■

Accelerating trusted autonomy for Australian Defence



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AUTONOMOUS
SYSTEMS**
DEFENCE CRC

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