ANNUAL REPORT

FOR PUBLIC RELEASE

2018 - 2019

FEB 2020

TRUSTED AUTONOMOUS SYSTEMS DEFENCE COOPERATIVE RESEARCH CENTRE

MESSAGE FROM THE CEO

Professor Jason Scholz
CEO

Trusted Autonomous Systems is Australia's first Defence Cooperative Research Centre and is uniquely equipped to deliver world-leading autonomous and robotic technologies to enable trusted and effective cooperation between humans and machines. Our objective is to improve the competitiveness, productivity and sustainability of Australian industry by:

- developing highly self-sufficient and survivable systems
- developing highly self-determining and self-aware systems
- developing human-autonomy systems that are human and context aware
- increasing the speed to reach a deployable state for trusted autonomous systems
- increasing the scalability and reduce the cost of autonomous systems technology solutions
- educating in the ethics and legal aspects of autonomous systems
- advocating and shape national policy and regulations.

During the financial year of 2018 - 2019, we have established our operations, delivered on commitments and commenced research projects with Industry and Research Participants. The past financial year has been highly productive and successful. The Centre Board and Executive Team look forward to continued success in the years to come.

REPORT HIGHLIGHTS

Highlights for the reporting period include:

- Following strong interest from Defence Industry, Government and Academia in the Centre's programme, objectives and methodology, the Centre has commenced delivery of four Industry-Led Projects and two Centre run Activities in support of those Projects, creating indirect employment and investment opportunities with Project participants in Defence, Industry and Academia. The Centre is presently in discussion with major Defence Industry and Academic partners in respect to two further Projects to be finalised in the next reporting period.

- Finalisation of a Financial Incentive Agreement with the Queensland Government, to establish a Brisbane-based headquarters for the Centre, world class testing ranges, support research and technology projects, support industry to develop standards for autonomous systems and the development of platform technologies for unmanned aerial systems. The direct and indirect financial assistance provided by Queensland in support of Activities and Projects is $51M.

- Held an International workshop on 22-24 May 2019 at Lady Margaret Hall, Oxford University key five-eyes nations personnel, NATO and regional research and government representatives to re-examine the law and ethics of Trusted Autonomous Systems.

- The Centre Projects and Activities are now operationalising, with reportable outcomes achieved for the financial year and to become more numerous in the next reporting period.

- The Centre applied for membership of the Defence Industry Security Program in April 2019 (post this reporting period DISP membership has been granted).

- The Centre held a Queensland launch on 20 June 2019, presided by the Hon. Kate Jones, Minister for Innovation and Tourism Industry Development and Minister for the Commonwealth Games. Centre industry partners with a formal role in projects were invited in addition to a number of prospective project participants from industry and academia.

L-R: Professor Jason Scholz (TASDCRC CEO), Professor Bronwyn Harch (UQ DVCR), Professor Rob Sale (former CEO TASDCRC and current Deputy Chair & Strategy Director), the Honourable Kate Jones MP, Minister for Innovation, Tourism Industry Development and Commonwealth Games [now Cross-River Rail], Dr Shane Arnott (Boeing Phantom Works), Dr Michele Allan (TASDCRC Chair), Dr Susan Pond, AM (TASDCRC Board Director) and Dr Tanya Monro (Chief Defence Scientist – DST).

QUEENSLAND LAUNCH

PROJECTS & ACTIVITIES

Following is a summary of the projects and activities conducted by the Centre in FY2018-2019.

Projects are industry-led programmes of work with academic and Government partners.

Activities are centre-wide and aim to deliver a common good to projects, participants and key stakeholders, as well as the wider national and international community. Any IP generated by activities is available to all projects.

PROJECT 1.
TRUSTED SCALABLE SEARCH WITH EXPENDABLE DRONES

DefendTex-led with RMIT University, the University of Melbourne, and the Department of Defence Science and Technology (DST). Approved by the board in August 2018. The project is set to place the team in a position to compete in the US on the DARPA Subterranean Challenge.

PROJECT 2.
DISTRIBUTED AUTONOMOUS SPECTRUM MANAGEMENT (DUST)

Led by Consunet Pty Ltd with RMIT University, the University of Melbourne, the University of Sydney and DST. Approved by the board in November 2018. DUST aims to research, develop and demonstrate near real-time autonomous spectrum management to deliver orders of magnitude increase in agility and efficiency cost savings for Australian Defence and commerce.

PROJECT 3.
JUSTIFIED AUTONOMOUS UNMANNED AERIAL SYSTEM (UAS) EFFECTS

Led by Skyborne Technologies and Cyborg Dynamics Engineering with the University of Queensland (UQ) and DST. Approved by the board in February 2019. The project aims to research and develop autonomous live reconnaissance effects assessment using AI and machine vision for day and night UAS operations over land. The system aims to advise operators on the legal and ethical aspects of fire support missions in near-real time.

PROJECT 4.
COGNITIVE INTELLIGENCE SURVEILLANCE RECONNAISSANCE ELECTRONIC WARFARE

Led by Boeing Australia and approved by the TASDCRC Board in March 2019, this project will examine the embedding of machine learning techniques on board an uninhabited system to better understand and react to the threat environment. The project will design and test cognitive artificial intelligence algorithms to enable sensing under anti-access conditions and to navigate and conduct enhanced tactics in denied environments.

ACTIVITY 1.
ETHICS AND LAW OF TRUSTED AUTONOMOUS SYSTEMS

Led by University of New South Wales (UNSW) and the University of Queensland (UQ), with DST. Approved by the board in November 2018. The aims are to develop ethical and legal assurance for projects and the benefit of participants, through advice and policy development at National and International levels, supported by case analysis, education and enculturation. TASDCRC are represented as a non-government organisation at the United Nations (UN) Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems (LAWS) to ensure the development of autonomous systems accord with ethical principles and the laws of armed conflict (LOAC).

ACTIVITY 2.
ASSURANCE OF AUTONOMY

Led by the Centre and funded by the Queensland Government. Approved by the board in February 2019. The aims are to create a trusted environment for test, risk analysis and regulatory certification support of autonomous systems and establish an independent world-class assurance service to global industry based in Queensland.

OPERATIONS

ENGAGEMENT

During the reporting period, the Centre engaged in many forums to establish Defence needs, capabilities and requirements. This engagement allowed the commencement of activities to meet each of the required performance milestones. Engagement has continued with defence, industry and research institutions via a number of forums, including direct contact, project-based meetings and collaborative workshops to develop project proposals and activities.

The programme on Ethics & Law of Trusted Autonomous Systems held an International workshop on 22-24 May 2019 at Lady Margaret Hall, Oxford University. The workshop achieved its aims of developing a relationship between like-minded key five-eyes nations, NATO and regional research and government representatives. Forty persons attended and presented, including senior ADF and DFAT representatives. Contributions to the workshop are forthcoming in a book: Lethal Autonomous Weapons: Re-Examining the Law & Ethics of Robotic Warfare, Oxford University Press.

Engagement with the International Committee of the Red Cross (ICRC) in Australia and in Geneva has ensued, on technical and legal innovations from the Centre to improve protection of hospital facilities and objects. This is a significant issue arising from recent conflicts in Yemen and Syria. The Centre was represented as an NGO at the UN CCW GGE meeting in Geneva in March and August 2019. The Centre is organising a March 2020 workshop in Geneva at the CCW meeting on the humanitarian benefits of AI and Autonomy in weapon systems. This will support development of TAS by Australian industry and advance government policy.

LEVERAGE

The Centre is creating a vibrant community of collaboration between universities, Defence and industry through industry-led projects and centre-led activities. Co-investment and engaged stakeholders provide strong evidence of the Centre's success against this overarching objective. The Centre has already leveraged almost $100 Million dollars of investment from the initial Next Generation Technologies Grant funding of $50 Million, providing an expansion ratio of 2:1. Co-investment has come from across our stakeholder group, including the Queensland State Government. The Centre is also generating significant workforce capacity, with a projected level of effort of over 250 person-years invested in Projects and Activities across the Centre's term, and with 44 individual students and post-doctoral positions created. Strong participation from Defence primes and SMEs, and from academia and DST, has been achieved, generating significant intellectual and technical outcomes through collaborative effort. Combined with the workforce achievements, the Centre's efforts are producing an enduring capacity in autonomous systems expertise across industry and academia. The Centre's third-party Participants provide support to the projects and activities with cash and in-kind commitments.

ADMINISTRATION

GOVERNANCE

Defence CRC TAS Limited (Company) manages the centre and is an unlisted public company limited by guarantee, incorporated and domiciled in Australia. Its national office is located in Brisbane, Queensland.

The TASDCRC Board conducts activities of the Trusted Autonomous Systems Defence CRC through the Chief Executive Officer (CEO) and delegates specific powers and responsibilities to the CEO.

The Board's role is to govern the Defence CRC by:

- providing appropriate leadership
- contributing to and approving the Defence CRC's strategic plan
- approving operational plans and budgets to ensure consistency with the goals and objectives
- monitoring performance of the Defence CRC and its management
- assessing risks and ensuring that appropriate risk management strategies are in place
- setting and promoting appropriate values and standards.

STAFF

TASDCRC appointed staff to a small number of specialised roles in the reporting period. The appointment of these staff has enabled a greater degree of specialisation in roles to support achieving Centre objectives. This includes increased attention to establishing governance, security, communication and reporting systems. The Centre also offers itself as a workplace for key Brisbane-based DST interlocutors on Centre Activities as an alternate to other local DST facilities.

FINANCIALS

The Centre is in a sound financial position as at 30 June 2019. The Centre has implemented robust financial process to ensure prudent financial management. The Centre reports on expenditure to third-party Participants.

Intentionally Blank
End Page