REMOTE UNDERSEA SURVEILLANCE DATA PROCESSING, ANALYSIS AND NETWORKING
CAPABILITY AND EXPERIENCE
This list of research groups and organisations may assist with building collaborative teams for an Activiator Fund project. If you would like your copmany detaisl to be included please email enquiries@defenceinnovationpartnerhip.com

Company Name	Describe the research and innovation capabilities of the individual / research group / organisation	Describe the research and innovation interests of the individual / research group / organisation	Describe any previous collaborative projects or initiatives in which you have been involved.	Contact Person / Details
Acacia Systems	Acacia's core deep technology embodied in the Onyx platform is automatic target detection, tracking and localisation, supporting cross sensor and cross platform fusion. While domain and sensor agnostic, the platform is optimised for the USW environment to support both active and passive cross theatre submarine and UUV localisation. Onyx is deployed in the Australian AWD, the UK Type 23 and with an allied submarine force. We have collaboration agreement with Saab for collaborative ASW capability for the Hunter class, and are in contract with the RAN to support the Autonomous Warrior exercises with Onyx.	Acacia is particularly interested in the generation of algorithms for automatic target detection and tracking. Acacia's Onyx system uses Joint Probabilistic Data Association, Multiple Hypothesis Tracking and Unscented Kalman Filters. Acacia is interested in implementing the next generation of algorithms including Cubature filters and Random Finite Sets.	Acacia has conducted research in the area of classifying acoustic signatures, in collaboration with the University of Adelaide's Australian Institute of Machine Learning, conducted collaborative R&D with the University of South Australian under a Defence Innovation Hub grant in the area of Command Decision making and supported a number of collaborative engagements for uncrewed autonomous vessels.	Mr Horden Wiltshire E: horden.wiltshire@acaciasystems.com.au M: 0418 886 061
AIML	Machine learning, AI, robotics			Dr Ehsan Abbasnejad E: ehsan.abbasnejad@adelaide.edu.au M: 0406 654 964
Amazon Web Services	https://aws.amazon.com/government-education/research-and-technical-computing/	https://aws.amazon.com/government-education/research-and-technical-computing/	AWS actively supports research projects and initiatives in Australia and globally. AWS works with Australian universities, CSIRO and research cooperatives in AI/ML, quantum, simulation, EO, digital twins, autonomous vehicles, and many other areas.	Tim Hussey E: tghussey@amazon.com.au M: 0499 440 076
AMC Search	AMC Search is the training and consultancy division of the Australian Maritime College. In the field of advanced Autonomous Maritime Systems (AMS), our research capabilities are focused on the development of advanced warfare and hydrographic technologies. Our facilities include the provision of Australia's most extensive fleet of Autonomous Underwater Vehicles (AUV) and Uncrewed Surface Vessels (USV) and support services. Our AUV capabilities include both small AUVs including an IVER4-500 and Australia's only commercially registered large ISE Explorer Class AUV. Capabilities extend to personnel that include specialist AMS engineers, naval architects, scientists, programmers and technicians.	The objective of our research group is focused on enhancing and supporting future warfare procedures, sensors, kinetics and training programs for the operation of AMS technologies. Presently our research interests include the development of sensors, data collection and processing solutions, the development of precision LARS technologies and the provision of advance Test and Evaluation services.	Previous collaborations include working with DSTG and several commercial Defence primes and other 2nd tier multinationals. Past collaborations and project portfolio can be discussed through the provision of a Confidentiality Deeds.	Robert Palmer E: robert.palmer@utas.edu.au M:0474 747 073
Arkwright Technologies	Arkwright Technologies designs, fabricates and installs optical fibre sensors based on fibre Bragg gratings. Our sensors are inherently intrinsically safe and have no electromagnetic signature. We are able to detect physical parameters including temperature, strain, pressure, and vibration.	Intrinsically safe sensors for monitoring fluid levels, depth, and vibration.	DIH P20-287463 Phase 2 Mechanical Vibration Sensing and Reporting for Collins Class.	Prof Professor John Arkwright E: john.arkwright@arkwright-technologies.com M: 0447 112 887
Axant Corporate Advisory	Our business works with researchers and industry to develop innovative application for and with Australian Defence. We have previously engaged by Arkwright Technologies to develop a successful DIH application based on using Arkwright's fibre optic pressure sensors to detect and monitor vibration on the Collins Class submarine. This work was developed by Dr. John Arkwright and was supported by his previous work at Flinders University.	We are interested in applying machine learning and artificial intelligence models for predictive maintenance challenges in defence, oil and gas, and mining.		Mr Alexander Farrugia E: alex.farrugia@axant.com.au M: 0406 000 915

Axiom	Axiom can provide a local source for complete manufacturing, from components through to full assembly and test capability inside our state of the art, purpose-built facility. From the Design phase through to final assembly, Axiom can provide all capabilities required to get the job done. Specialising in precision CNC machining and fabrication, Axiom can also provide onsite; design, prototyping, 3D modelling as well as assembly and integration. All of this can be achieved under the AS9100 Quality Management System.	Axiom is interested in offering a sovereign capability to provide DIP members a one-stop-shop for all their manufacturing requirements, including classified manufacturing where required. With Axiom's extensive experience in product development, prototyping and production, along with our collaborative approach we can rapidly bring projects to reality.	Axiom has previously partnered with multiple defence primes to produce a number of successful projects. Working alongside DSTG to produce the Silvershield CIED protection system, ASC Collins class submarines and the future submarine program. Axiom is currently leading a consortium of local companies to develop of a Personal Electronic Counter Measure under a Defence Innovation Hub sponsored program.	Mr Craig Maynard E: craigm@axiompm.com.au M: 0418 826 557
Babcock Australasia	Babcock Australasia is a Defence, Aviation and Critical Services company trusted to deliver technical support services for customers, ranging from fleet and asset management, sustainment, and technical training, to life saving helicopter emergency medical services.			Mr Leith Biddell E: leith.biddell@babcock.com.au M: 0488 933 263
Codehaus	Codehaus have active contracts to the Commonwealth in the following areas: - open standard development - distributed system development, middleware assessments and recommendations - ML/AI research, ML at the edge, ML integration in a tactical environment - C2, situational awareness research and development, sensor integration			Mr Mathew Pink E: mat@codehaus.co M: 0450 884 561
Coherics	Coherics specialises in the integration of technology and capability through the design, development, integration and analysis of complex training systems and training system architectures. We combine a wealth of Defence experience with bespoke data analytics to provide unique solutions for our clients. Coherics was founded, and is staffed, by former Defence staff and Defence Science & Technology Group scientists with backgrounds in training, operations and research and currently operates offices in Adelaide and Melbourne. Our broad backgrounds and expertise across a range of domains allows us to operate and integrate solutions between the academic, scientific and Defence worlds.			Mr Stephen Baker E: stephen.baker@coherics.com.au M: 0402 460 079
Daronmont Technologies	Australian-owned systems integration SME Daronmont Technologies has been supporting Australian Defence and security for over 20 years, operating primarily in the Defence C4ISREW sector. Daronmont designs, integrates and supports passive surveillance systems, command and control applications and deployable shelter systems for Australian and Allied export customers. Daronmont designs, delivers and supports software, electronics and mechanical systems and integrates these into both fixed and deployable solutions.			Mr Lee Stanley E: lstanley@daronmont.com.au M: 0407 870 520
Edith Cowan University	The Centre of Green and Smart Energy Systems at ECU focuses on two key research themes: - Smart Energy Systems and - Smart Digital Technologies, And has the following capabilities: * Reliable and long-range underwater communications for enhancing undersea warfare capabilities * Sensor technologies and sensor calibration techniques. * Remote data acquisition and processing * Green communication and network technologies for Industrial Internet of Things	Our research team is interested in research and development of the following areas: * Underwater communications for messaging systems, localisation, data acquisition and processing * Sensor technologies for remote data collection and calibration. * Data processing and analysis * Machine learning and Artificial Intelligence * Undersea wireless communication networks using hybrid acoustic and optical technologies.	The research group has been in contact with DSTG regarding a number of defence related projects. DSTG provided top up scholarship for our research projects.	A/Prof Iftekhar Ahmad E: i.ahmad@ecu.edu.au M: 0449 073 272

ELMTEK PTY LTD	elmTEK is a 100% Australian owned and operated company specialised in the rapid delivery of sophisticated, viable, and practical Science, Technology, Engineering and Mathematics (STEM) products and services for the Australian defence market. We identify early Technology Readiness Level (TRL) ideas and then nurture them to eventually merge them into our clients' existing and evolving infrastructures and provide ongoing support. Specifically: - We operate in undersea technologies involving EO & LASER systems. - We develop multi-physics Modelling, Simulation and Analysis (MS&A) capabilities to enhance undersea operations for Defence.			Mr Mike Holmes E: mike.holmes@elmtek.com.au M: 0423 783 230
ESpy Ocean Pty Limited	Ability to detect and analyse submarine wakes	Submarine detection		Mr Ian Dewey E: ceo@espyocean.com.au M: 0410 697 783
Fleet Space Technologies	Fleet Space Technologies, an Australian leader in 'New Space', is known for its advanced micro satellite communications and subsurface exploration technologies. Fleet leverages innovative technologies such as artificial intelligence, 3D printing, and advanced signal processing. With over 100 employees, metal and plastic 3D printing hardware, Their core capabilities include edge computing, sensing systems, data analytics, and beamforming in microsatellites. The company also designs seismic sensors for subsurface exploration. Fleet is distinguished by its agile development methodology, allowing for rapid capability development and the delivery of unique solutions.	Fleet is leveraging their expertise to research satellite-connected, autonomous, persistent and distributed undersea detection and analysis solutions for Defence. Advanced signal processing, beamforming and match field processing, acoustic data acquisition and cloud processing. In addition to this, Fleet is researching space based Electronic Warfare applications in antenna design, micro satellite capabilities and LEO SATCOM for Defence.	ASCEND2LEO, a contract with Defence Space Command, is for the demonstration of point to point voice and data communications from Fleet's low Earth orbit satellites. A collaboration between government, defence industry and academia. Defence Science and Technology Group (DSTG), Fleet Space Technologies, University of South Australia, Rice Satcom Pty Ltd and SmartSat CRC are taking advanced research and technologies to demonstrate LEO capabilities to the war fighter.	Mr Ryan McClenaghan E: ryan.mcclenaghan@fleet.space M: 0436 344 217
FLINDERS UNIVERSITY	Maritime Autonomy, specialising in development of uncrewed underwater vehicles and surface vehicles, development of fault-tolerant vehicle control systems, mission planning and guidance systems, autonomous launch & recovery of uncrewed underwater vehicles from surface vessels, submarines, XLAUVs. Bio Inspired Signal Processing of optical/sonar images and acoustic signals. The signal processing techniques are applicable to wide range of sensing systems for signal extraction from background clutter. Acoustic anomaly detection and classification using Machine Learning techniques.	Maritime Autonomy for remote sensing Remote Undersea Sensing using diverse sensing modalities Mine Counter Measure applications.	Defence Innovation Partnership Trusted Autonomous Defence CRC Defence Innovation Hub ARC Industry Transformation Training Centre Numerous national/international defence industry and DSTG projects	Mr Tony Kyriacou E: tony.kyriacou@flinders.edu.au M: 0411 132 690
FrontierSI	FrontierSI brings together the best people to anticipate and solve complex problems and represents a partnership base of over 30 organisations across Australia and New Zealand. Our partners include research agencies, government departments and private sector companies who are global leaders in space and spatial information across a range of disciplines including positioning, applied geodesy, spatial data infrastructures and earth observation and rapid spatial analytics. Our work is improving location information, increasing data accessibility, and improving service delivery, as well as delivering new ways to generate answers through automation.	Our collaborative group has space and spatial expertise including positioning and geodesy, data and infrastructures, spatial analytics, and space advisory. This expertise can assist any sector, from space to health and resources, to improve location-based information and increase data accessibility for improved decision support and service delivery.	A Proof of Concept and feasibility study utilising space technologies to advance the aquaculture markets in Western Australia remote and regional areas: https://smartsatcrc.com/research-programs/oysterqual/ The aim of the project is to develop a simple online workflow, for both technical and non-technical users to manage UAV or Aircraft capture projects, to ensure the supplied data is fit-for-purpose. https://frontiersi.com.au/project/qa4imagery/	Ms Paula Fievez E: pfievez@frontiersi.com.au M: 0423 282 651
Fujitsu Australia Limited	Fujitsu Limited spends over $1B AUD annually on research and development (R&D) worldwide and holds 32,000 patents. Locally, our innovation and R&D arrangements include partnerships with the University of NSW (UNSW) Defence Research Institute (DRI); Macquarie University, who hosts the Fujitsu Digital Transformation Centre (DTC) in Sydney; as well as emerging partnerships with the Australian Institute for Machine Learning (AIML) at the University of Adelaide. Globally, Fujitsu maintains a significant global research infrastructure with laboratories addressing technology and methodology innovation in multiple countries. This includes Fujitsu Laboratories, Japan and Cognitive Centre for Advanced Technologies (CCAT), United Kingdom.	Fujitsu Australia provided our quantum inspired Digital Annealer (DA) to UNSW DRI to assist with research into the "Shepherding" problem. DA is used to optimise problem sets at a rapid rate and is available for research applications. CCAT focuses on the shift from ICT to Cognitive Technologies. This is a specific focus on bringing together key technology areas of future compute, AI and digital twin technology to enable better decision making. Specifically: • Neurosymbolic AI to enhance trust, safety and accountability of AI; and • Hivemind to enhance the ability of leaders to ask better questions and deliver better outcomes.	Defence Research Institute (DRI) at UNSW is the most recent collaboration. Fujitsu provisioned Digital Annealer (DA) to the school in 2022 to support the research into the "Shepherding" problem. Beyond technology provision, Fujitsu engaged an associate professor at ANU to build a centre of excellence to support the research endeavour. Through this collaboration Fujitsu sought the support of DRI to assist with a real-world RAAF problem (currently low TRL), and in-turn DRI sought Fujitsu's help in submitting a paper in the ENAIRE air traffic management technological challenges contest (https://retos.enaireopeninnovation.com/en/) which was globally shortlisted.	Fujitsu Force E: DefenceTeam@fujitsu.com M: 02 9776 4555

Insight Via Artificial Intelligence	Insight Via Artificial Intelligence (IVAI) is an innovative Adelaide-based SME with extensive experience in the research, development and deployment of Artificial Intelligence, Machine Learning, Computer Vision, Virtual/Augmented Reality and Data Analytics technologies. In addition to developing and implementing sophisticated algorithms, IVAI also does full-stack development. We design the schemas and databases that constitute a data processing pipeline that feeds into a machine learning algorithm and an accompanying web-based user interface for engaging, visualising, and interpreting the data and predictions. Our focus is on advancing the state-of-the-art in ethical and responsible artificial intelligence and developing AI that augments human capability.	We work in all areas of AI including Machine Learning, Computer Vision and Natural Language Processing. We also work in Virtual and Augmented Reality. We have a focus on developing AI powered solutions that augment human capabilities. We are working in areas such as human integrated sensor systems, developing compressed ML algorithms for use in limited bandwidth Agile C2 scenarios, explainable AI, AI powered cyber security applications, human AI teaming, detection, tracking, classification and identification.	Much of our work has been funded by advanced technology programs such as the Next Generation Technology Fund, the Defence Innovation Partnership Collaborative Research Fund, the Defence AI Research Network (DAIRNet), and the Office of National Intelligence and the Defence Science Technology Group. Our projects are strongly aligned with several of the key Defence Science STarShots. IVAI has been funded by the Information Warfare, Agile Command and Control (C2) and CBRN STarShots. We are also working with Australian Defence Primes and mid-tier SMEs. The nature of the work is covered by Non-Disclosure Agreements and can't be described in detail.	Mr Ian Will E: ian.will@ivai.com.au M: 0422 531 417
JARMYN ENTERPRISE SPACE	Jarmyn Enterprise Space is a start up company in South Australia that is developing 3 services: 1. Liquid fueled launch vehicles for sub orbital and orbital applications 2. Liquid fuel propulsion systems 3. Propulsion development and testing facilities, vacuum test facilities, fuel cell testing area. These facilities are at the moment being developed in South Australia.	Propulsion systems, test and evaluation of propulsion systems, remote IT data management systems, space and high altitude launch systems		Mr Malcolm Jarmyn E: malcolm.jarmyn@jarmynentprise.com.au M: 0427 803 862
Palo Alto Networks	Palo Alto Networks is the worlds largest cyber security company. Our history was founded on the Next Generation Firewall, but over the last 5 years we have become a leader in cloud security as well as Security Operations.	Palo Alto Networks have a history in partnering with Defence Primes and SME's providing cyber security thought leadership in the technical design phase. Our aim is to collaborate with other DIP members submitting a proposal to ensure their solution is fully compliant with cyber security standards.	Palo Alto Networks have collaborated in many Defence projects both in Australia and globally. US DevSecOps Reference architecture is based on our solution and principles. Most recently we have been integral in partnering with down selected Defence Primes for a key project in the Air domain. (more info can be provided under NDA)	Mr Mark Cappelluti E: mcappelluti@paloaltonetworks.com M: 0437 818 578
PRIORIANALYTICA PTY LTD	We are an Adelaide based AI/Machine Learning company, and we use our internally developed machine learning algorithms and "eXplainable Artificial Intelligence" (XAI) to build solutions for the Defence, Resources, Energy and Logistics sectors. Our underlying XAI and Machine Learning has been used for many years in the oil & gas sector and we are now applying our knowledge and expertise to Defence and other sectors.	Our research is focused on applying AI and ML to various sectors with a core focus now on Defence and building Australia's sovereign defence capability. We are currently conducting research and actively developing solutions across areas of AI/ML Sonar classification, Vibration analysis and fault prediction and Corrosion prediction and maintenance optimisation.	We have recently worked with a Defence prime contractor and other groups to develop an advanced Machine Learning Sonar Classification technology for undersea warfare, deployable to low-powered autonomous undersea systems. We have also successfully demonstrated vibration analysis maintenance solutions for Royal Australian Naval vessels via a DIH Phase 2 grant and following positive feedback are progressing this innovation directly with the Navy.	Mr Stuart Miller E: stuart.miller@priorianalytica.com M: 0451 504 148
QuantX Labs	QuantX Labs is a premier, sovereign provider of high precision timing and sensor products used in Defence and space. Our photonic production and test facility is providing a unique industrial capability to support Australian Defence and Space programs. These leading-edge technologies are just the beginning of the innovative solutions being designed for a range of sovereign and global applications including resilient position, navigation and timing services.	Our current focus is on three programs: • Precision clocks and oscillators - Our flagship product is the world's most precise clock and is ready for deployment into Defence over-the-horizon radar • Optical Atomic Clocks – a ground-breaking development of an atomic clock based on optical technology for ground and satellite applications • Quantum magnetometers - developed to sense extremely small changes in local magnetic fields for networked undersea and underground surveillance.	In addition to multi-stage project with Defence primes to mature products to acquisition, QuantX Labs have also successfully lead collaborative research projects with university partners such as a DIP collaborative research project on quantum time transfer.	Dr Fred Baynes E: fred.baynes@quantxlabs.com M: 0422 361 008
Saab Australia	The research group has capabilities in signal processing; acoustics and vibrations modelling; underwater platform design. The research team contains mechanical, electrical and software engineers with masters and PhDs in range of fields from naval architecture to signal processing.	The research group is heavily focused in the underwater domain focusing on underwater networks, development of signal processing algorithm to detect underwater objects and surveillance/capability payloads for autonomous systems.	The research group is currently working with universities and Australian small to medium enterprises to develop new and novel signal processing algorithms to detect underwater objects (boats, marine mammals etc.). As well as, developing payloads for autonomous systems like decision support systems and mission capability modules.	Dr Francesco Larizza E: francesco.larizza@au.saabgroup.com M: 0433 357 082

Shoal Group Pty Ltd	Shoal has research and innovation capabilities in Systems Engineering, Model-Based Systems Engineering, Modelling and Simulation, Digital Engineering, Systems Analysis and Systems Integration. We also have the ability to leverage Data Analytics, Machine Learning and Artificial Intelligence technologies to support our main capabilities. Shoal has applied these capabilities in the Defence (Land, Air and Maritime), Space, Transport and Infrastructure domains.	Shoal has research and innovation interests in the areas of systems architecting, modelling and analysis, as well as Machine Learning and Artificial Intelligence. Shoal has a growing interest in autonomous systems (modelling, analysis, and assurance), as well as undersea warfare (mission systems and integrating data to form an operational picture).	Business Research and Innovation Initiative (BRII) – Assurance of Maritime Autonomy. Smartsat CRC - Compact Hybrid Optical-RF User Segment (CHORUS), Swinbourne University Air Hub. Defence Trailblazer.	Dr Derek Rogers E: derek.rogers@shoalgroup.com M: 0466 561 678
Team 3	Data discovery, harmonisation and fusion. Orchestration of information operations.	Joint-domain operations, joint domain command & control.	CSIRO/DST DStart, UniSA ICC, DIH proposal (latter was ultimately rejected, but progressed to stage 3 with good feedback).	Mr Andrew Savchenko E: andrew@team3.au M: 0466 955 925
Ultra Electronics	Signal Processing and use of AI/ML to enhance this work			Mr Mike Turton E: mike.turton@ultra-electronics.com.au M: 0409 759 071
UniSA	UniSA's research capabilities include: • Acoustic sensing • Hyperspectral sensing from space • Optical sensing - Signal processing and target tracking • Interoperability (data linking) • Artificial Intelligence and Machine Learning • Data fusion • Data analytics • Data visualisation (AR/VR/MR) • Narrative visualisation • Decision making (AI, cognitive, individual and teaming) • Material and surface engineering • Thin film coatings • Additive manufacturing • Human-centred design • Human sciences	UniSA brings together multiple disciplines to solve complex research and innovation problems. Defence research at UniSA is underpinned by innovation and excellence. Our researchers are passionate and dedicated to bridging the gap between knowledge and real-world solutions. We are committed to successful engagement with the Department of Defence and defence industry to build and support the defence capability of Australia.	Previous DIP CRF projects include: • Deep Sensing: ML Enhanced Optical Fibre Hydrophone • VR to manipulate digital human mannequins • Freeform optics for small satellites • Nanofluidic satellite thrusters • Narrative Visualisations of Simulations • Optimal target detection of marine radars	Mr Sebastien Hebert E: sebastien.hebert@unisa.edu.au M: 0478 401 560
University of South Australia/Industrial AI Research Centre	The Industrial AI Research Centre (IAI) at UniSA includes 100+ researchers from Computer Science, Mathematics, and Engineering who work on practical problems in areas such as Artificial Intelligence, Machine Learning, Statistics, Control Theory and Analytics, over to Software Engineering, Data Management and Interoperability. This background permits the Centre to cover research in AI, data and analytics, autonomous and adaptive systems and Industry 4.0, to help industry partners solve real world problems in application domains such as Manufacturing, Defence, Health, Agriculture, Transport, Energy and Resources.	Artificial Intelligence, Machine Learning, Statistics, Control Theory and Analytics, Software Engineering architectures for AI, Data Management and Interoperability	Research Program Lead - Data to Decision CRC (Integrated Law Enforcement project 2015-19) Research Program Lead - Future Energy Exports CRC Open Analytics Interoperability Project (FEnEx CRC 2021-24, partners AssetInstitute, MIMOSA) Asset Reliability and Risk Interoperability to Optimise Maintenance (FEnEx CRC 2023-24, partner INPEX) Application of Interactive Narrative Visualisation and Big Data to Improve High Value Manufacturing (2020-23, IMCRC, partner BAE Systems) NGTF Advanced Integrated Modeling Environment (partners DST, U Wollongong) NGTF Rapid Situation Awareness using Network Knowledge and AI Reasoning (partners DST, U Wollongong, U Adelaide, Data61) DIH Mobile AI-enabled VR training and simulation for the ADF (BAE, Lumination)	Prof Markus Stumptner E: mst@cs.unisa.edu.au M: 0417 089 602
Dr Thuraiappah Sathyan	Detection, tracking and data fusion algorithm and architecture development using statistical techniques augmented by machine learning.			Dr Thuraiappah Sathyan E: sathyan.thuraiappah@global.lmco.com M: 0438 535 302