



Australian Government
Department of Defence
Defence Science and Technology Group

REMOTE UNDERSEA SURVEILLANCE

Community Advisory Group

Call for members

EXPRESSION OF INTEREST



Defence is seeking expressions of interest from Australian universities, research organisations and industry to join an advisory group to advise on the research and innovation activities of the Remote Undersea Surveillance STaR Shot, a large-scale, multi-party, multi-disciplinary research initiative aimed at securing Australia's maritime interests through the provision of persistent and responsive undersea situational awareness.

Introduction

The maritime domain is critical for Australia: it is an important source of natural resources and food; it carries our trade and communications. Our ability to protect our interests in this domain depends on our awareness of activities on and below the water, but building this situational awareness is challenging. The undersea environment is complex and is becoming increasingly congested with a greater density and variety of undersea vehicles and infrastructure.


Australia's future Defence force will have significant undersea surveillance capability through Hunter class frigates, Attack class submarines, and Poseidon maritime patrol aircraft, but our region of interest is too vast to surveil with crewed platforms alone; theatre level awareness requires a change in paradigm. New technologies are needed to enable Defence to achieve persistent, agile, and robust undersea situation awareness over specific and wide area regions of interest beyond the reach of these crewed platforms. The Remote Undersea Surveillance STaR Shot program was initiated by the Australian Department of Defence to develop these technologies.

To meet its ambitious innovation targets, the Remote Undersea Surveillance STaR Shot is creating a community advisory group to advise on the development, implementation and quality assurance of its research and innovation program.

Background

Australia is a maritime nation. We are heavily reliant on sea transport for the vast majority of our imports and exports with over 99% by volume and 74% by value transported by ship. In 2019 international shipping transported \$284 billion worth of exports and \$209 billion worth of imports from and to Australia. Our maritime jurisdiction is enormous and diverse, covering 13.6 million square kilometres (or 4% of global ocean areas). This encompasses the Exclusive Economic Zone, extended continental shelf and marine areas adjacent to the Australian continent, islands such as Ashmore, Norfolk, Cocos, Christmas, and Heard, and the Australian Antarctic Territory. Australia's region of responsibility for maritime search and rescue is even larger and covers over one-tenth of the Earth's surface.

In principle, awareness of the maritime domain consists of the same technical elements as other sensing network applications: sensors, data processing, communications and control. However, many of these are much more difficult in the maritime domain because of the challenging environment in both a physical and signals sense, the limited ability to communicate, and the sheer size of the region of interest.



The Remote Undersea Surveillance STaR Shot is pursuing the technology needed to provide the Australian Defence Force with undersea situation awareness beyond the reach of its crewed platforms. It is not enough to prove concepts, the STaR Shot is seeking to build partnerships between innovators, industry and Defence to integrate and mature technology and build the sovereign capabilities we need.


The community advisory group will support the STaR Shot in seeding a STEM workforce; guiding the selection of key technologies; maturing ideas through demonstration of prototype systems; and integrating concepts into the broader Defence context. The priority research areas include:

- Distributed environmental awareness using deployable sensing systems, data-driven models and inference to monitor and predict the environmental impact on vehicle and sensor performance;
- Low size, weight and power sensors with the sensitivity to detect low contrast objects from small autonomous platforms;
- Stand-off sensors capable of surveillance from longer range to support situation awareness of broader areas and hard to access locations;
- Distributed autonomous data processing capable of interpreting sensor observations in remotely deployed systems without human intervention;
- Autonomous networks that robustly configure themselves in the presence of unreliable and limited-capacity communication links;
- Human-machine teaming to support decision making;
- Communication technologies and strategies for deployable underwater systems.

Call for Partners

Defence, through the Defence Science and Technology Group (DSTG), is calling for expressions of interest from Australian universities, Australian research organisations and industry to partner with Defence to form a community advisory group that will support and assist in the development, implementation and quality assurance of activities under the Remote Undersea Surveillance STaR Shot.

In order to cover the full scope of requirements, it is anticipated that the advisory group will consist of a diverse range of partners. A multi-party approach is preferred. Members will be expected to contribute to the design of the program, generate white papers, and assist with the development, quality assurance and evaluation of complementary programs and activities.



It is expected that advisory group partners will have strong capabilities and existing research programs that could support innovation efforts in one or more of the following areas:

- Underwater environmental sensing, modelling and forecasting;
- Acoustic sensing and propagation;
- Active and passive optical sensors for submerged objects;
- Automated data processing for object detection and recognition;
- Dynamic and robust sensor networks.

It is expected that the community advisory group will be able to identify activities which would lead to longer term mutual benefits.

Partnering Opportunities

This call for expressions of interest is a unique opportunity to partner with DSTG and other parties with an interest in remote undersea surveillance to co-design capability as part of the Remote Undersea Surveillance STaR Shot.

DSTG will:

- commit to a multi-party collaborative agreement where the parties are named as part of the community advisory group for this STaR Shot.
- provide access to data, information and other materials, to be used as inputs to develop outcomes sought by the STaR Shot.
- provide guidance and supervision where appropriate.

Essential Requirements

- Demonstrated capability and experience in one or more of the described priority research areas; and
- Capacity to work with Defence and other partners to co-design activities aligned with a provided mission such as: 'unattended surveillance of a remote location'.

Desirable Requirements

DSTG is interested in fostering and building enduring relationships with appropriate partners. As such, the following will be considered desirable when assessing expressions of interest:

- Multi-party submissions including stakeholders from across the innovation system.
- Genuine interest in developing and growing a sovereign research capability within their organisation in a related field, and promoting an ongoing partnership with Defence;
- Clear vision for the development of an ongoing capability;
- Capacity to:
 - appoint an academic chair (or equivalent) to provide program oversight and set the foundation for an enduring capability driven partnership, and
 - appoint a part-time postdoctoral fellow (or equivalent); and
- Support of their organisation(s) to undertake activities supporting the Community Advisory Group.

How to Apply:

DSTG is inviting expressions of interest from Australian universities, research organisations and industry, including small to medium enterprises. Submissions should be no longer than four (4) pages outlining relevant experience and interest in the program addressing the following:

- A model of engagement which includes capacity and capability to establish and maintain partnering capability; and
- The proposed expertise that they can provide to the advisory group
- Their understanding of the research and innovation challenges in the area of remote undersea surveillance
- Their capabilities or current research activities in one or more of the five priority research areas outlined above.

Submissions should be provided in pdf format and sent via email to: STaRShot_undersea@dst.defence.gov.au by **12 November 2021**.

Submissions will be assessed by a panel from DSTG. Selected submissions will then be invited for discussions to further develop the community advisory group. All submissions will be handled in confidence.

Engagement Model:

DSTG will engage through multi-party agreements under the Defence Science Partnering Deed for universities, or via the appropriate MOU instrument where the partners are from research organisations or industry.

Contact:

Technical Information and Requirements

Dr Sam Davey

Remote Undersea Surveillance STaR Shot Leader

Telephone: (08) 8393 3782

Email: Samuel.davey@defence.gov.au or

STaRShot_undersea@dst.defence.gov.au

Dr Scott Foster

Remote Undersea Surveillance STaR Shot Deputy Leader

Telephone:

Email: scott.foster@dst.defence.gov.au

Contracting and Administrative Support

Stephen Johns

Assistant Director: National Partnerships

Telephone: 0418 393 475

Email: stephen.johns@dst.defence.gov.au

Bullet List