



Fact sheet

Using technology for a streamlined path to marine autonomous systems assurance

Challenge summary

The Australian Institute of Marine Science (AIMS) is one of many technology-driven agencies seeking a standardised approach to gathering the test and evaluation evidence required to:

- assure new marine robotics and autonomous systems with artificial intelligence (RAS-AI)
- manage impacts to trusted autonomy through future engineering changes to RAS-AI systems.

The test and evaluation framework solution needs to apply novel data, analysis and intelligent decision-support technologies. It must be designed to dynamically adapt for evolving RAS-AI technologies, Australian standards and Australia's future regulatory state.

Potential themes

Advanced technology, artificial intelligence, legal, regulatory, assurance, certification, marine autonomous systems.

Overview of challenge

RAS-AI systems present a new world of complexity for Australian air, land and sea regulators. In the maritime sector, Australia is leading the way with small



unmanned systems development, including niche systems such as AIMS' [CoralAUV](#) (autonomous underwater vehicle), and the [Bluebottle](#) by Ocius. It is also developing simpler, scalable systems such as Queensland University of Technology's [Rangerbot](#) and systems by startups such as [Surfbee](#).

However, the ability to operationalise these systems and establish a viable maritime RAS-AI market sector in Australia is hamstrung by onerous regulatory and compliance processes, which vary between domains and regulators. In addition, Australia does not have standards or agreed processes for the technical assurance of RAS-AI technology in a maritime context. Even a control system update in a RAS-AI system can require a suite of new approvals. A revised safety case supported with both simulated and real-world test and evaluation evidence is a prerequisite to obtain the required approvals to deploy these systems in the field.

Assuring autonomous systems requires a significant, collaborative and multi-faceted approach that is beyond the capacity of a single small-to-medium-sized enterprise. However, an innovative technological approach to create a standardised test and evaluation framework for RAS-AI systems, which meets Australia's cross-domain and regulatory needs, would be a game-changer for the RAS-AI industry.

Solution requirements

The test and evaluation framework solution needs to apply novel system data, analysis and intelligent decision-support technologies. It must be able to dynamically evolve to adapt to changes in Australian standards and Australia's future regulatory state for RAS-AI systems. Regulatory guidance, environmental and societal issues, and autonomous systems technology are evolving at a rapid pace. As such, technology developers, users and regulators are spending inordinate

amounts of time understanding how to safely operationalise marine autonomous systems.

This BRII challenge is seeking a technology solution to help Australia leapfrog the marine autonomous systems development curve and deliver a dynamic, evidence-based test and evaluation framework to support Australia's marine autonomous systems industry and marine regulators. [AIMS' ReefWorks](#), the [Queensland Flight Test Range](#) and the [NQ SPARK](#) are examples of initiatives developing safe places to trial technologies such as unmanned and autonomous systems across air, sea and land domains.

Autonomous systems developers and end users would use the test and evaluation framework to guide the operationalisation of their products. Typically, these developers and end-users do not have a strong understanding of legislative requirements or changes in policy and standards. Regulators would use the framework to ensure their core concerns are flagged to developers,

and to enable consistency in assurance assessments. The framework could also be used to help regulators provide updated guidance to RAS-AI developers as regulations evolve or as new autonomous systems technologies come online.

Benefits of the solution

A standardised test and evaluation framework, supported by regulators, would result in significant efficiency gains. It would also ensure a high level of trust and safety by operators, regulators and the community for RAS-AI systems.

A standardised approach to gathering the test and evaluation evidence required to assure new marine RAS-AI systems, and engineering changes to RAS-AI systems, would potentially save years in the development cycle. More importantly, a standardised approach would help support the sustainability of Australia's marine RAS-AI development and manufacturing market sector.

The market potential for an innovative, streamlined test and evaluation framework for marine autonomous systems could also be applicable to aerial and land autonomous systems. Countries across the globe are struggling to meld often archaic, local legislation with a globalised autonomous systems industry.

If a solution to this BRII challenge can break through the overheads to show a streamlined test and evaluation path to operationalisation (by fusing local legislation, regulation and standards with autonomous systems development), it could be a global gamechanger. The legislation is different between countries, but in many cases the problem is the same: autonomous systems are developing faster than government/regulators can keep up with. An innovative solution could incorporate data fusion and decision-support technologies, making it readily applicable to multiple jurisdictions and potentially realising a globally commercial opportunity.

How to apply

For information on how to apply, visit business.gov.au/BRII