

Australian Institute of Marine Science Response to the Department of Infrastructure, Transport, Regional Development and Communications Domestic Commercial Vessel Safety Legislation Review

Introduction

The Australian Institute of Marine Science (AIMS) welcomes the opportunity to support the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) review of the Domestic Commercial Vessel (DCV) safety legislation. As Australia's tropical marine research agency, AIMS is committed to the safe and sustainable operation of our research fleet in tropical Australia.

AIMS is also championing the introduction of innovative technologies including uncrewed and autonomous systems to efficiently expand the scale and capability of our at-sea operations. We are the Challenge Agency for the Department of Industry, Science, Energy and Resources (DISER) Business Research Innovation Initiative (BRII) Challenge to employ technology to streamline the assurance of marine autonomous systems and are also home to ReefWorks – Australia's tropical marine technology test range at our headquarters in Cape Cleveland, Queensland. We also fully support efforts by the Australian Association for Uncrewed Systems (AAUS), the Trusted Autonomous Systems Defence Cooperative Research Centre (TASDCRC) and regulators to understand the risks of uncrewed systems and the current regulatory requirements.

While we recommend the DCV legislation be reviewed as a whole to refresh current risk management best practice from fatigue management through to crewing requirements, we will focus this submission on a critical gap in legislation: uncrewed systems.

DCV Legislation Safety Review – Response to Consultation Questions

The approach for our response was based on addressing the first question proposed in the consultation aid for the DCV Review, and expanding on the implications:

DCV Review Consultation Aid – Q1: Is Australia's legal framework for the safety of domestic commercial vessels fit for purpose?

The current legislation is not fit for purpose for safely regulating marine uncrewed (including autonomous) systems. Examples to support this position include:

- Uncrewed systems have a different risk profile to that of crewed vessels. They have new hazards that are not addressed by existing legislation (such as recharging), and some existing legislation hazards, and risk controls are not applicable (e.g. minimum crewing). One risk we face when transitioning regulations associated with crewed vessels to uncrewed vessels is inadvertently missing a bespoke hazard associated with uncrewed vessels. Battery management is one example, but there are likely others such as the safe implementation and maintenance of on-board decision-making algorithms.
- Surveyors and regulators often have minimal experience in marine uncrewed systems, yet current legislation doesn't allow for uncrewed systems experts to formally assist in the safe regulation of these systems.

- Small, uncrewed vessels deployed from a DCV are treated with the same regulations as a large DCV. This is not appropriate and is causing unnecessary overheads for processing exemptions and certificates on the industry and regulators.
- Test and evaluation of marine uncrewed systems under development does not have a fit-for-purpose pathway through the regulation process. The temporary operations exemption process is valid for 90 days, which is insufficient time for development & acceptance testing for an uncrewed (especially autonomous) system.
- There is no pathway for marine autonomous system swarms (multiple platforms). Yet, autonomous systems are often adopted to enable organisations to efficiently scale their operations through force multiplication.
- There is no licensing or accredited training programs suitable for marine uncrewed (including autonomous) systems.
- The legislative requirements for uncrewed (including autonomous) marine systems are not transparent. This results in confusion, and conflicting advice.
- Currently, each uncrewed vessel application is a bespoke process. This needs to be streamlined to enable consistency in the approval processes for new vessels and also to cater for changes in configuration for existing vessels (some of which could be software changes). There needs to be guidance on what constitutes a change requiring recertification for artificial-intelligence driven vessels too.
- The inflexibility of the current legislation means regulators are unable to adapt to meet the current and evolving needs of the autonomous systems industry. Even simple things such as the definition of a vessel becomes blurred when hybrid (air-land-sea) autonomous vessels are under development.

Suggested approaches to address uncrewed systems in future legislation

Uncrewed systems are markedly different from crewed systems and therefore they require a first principles based regulatory approach. Furthermore, the regulation process requires a level of flexibility if it is to be futureproofed to meet the needs of the rapidly changing marine uncrewed industry. It is recommended that the following points are taken into consideration:

- Legislation must be fit for purpose for uncrewed (including autonomous) systems, addressing their risks with appropriate controls and standards (e.g. licensing).
- Test and evaluation for autonomous systems under development, or for the purposes of accreditation must be more streamlined and more cost effective. This could be through working with test ranges such as ReefWorks to establish pre-approved controls or locations where developers are able to safely test their vessels, without requiring the full regulatory application process of the current legislation.
- Legislation must take a risk-based approach and enable the regulators to focus their efforts on the higher risk vessels while having a more streamlined path for lower risk vessels (such as small uncrewed vehicles).
- Legislation must be flexible to account for operating environments requiring different risk-mitigation controls, and enable the adaption of new, safer controls as they are developed (e.g. improved underwater communications systems).
- Legislation must be adaptive to keep up with the fast-paced evolution of the autonomous systems industry. This requires an interdisciplinary approach with autonomous systems industry bodies as well as surveyors, engineers, navigators, operators, and legal experts.

- There is a need for a multi-domain approach to autonomous systems regulation across air, sea, and land domains. There are many synergies across these domains, yet they require an expertise base in autonomous systems, and the leverage of an interdisciplinary team to completely address.
- The development of a forward-thinking licensing and accreditation process that enables Australia to keep pace with international autonomous systems development is essential.
- Legislation must enable the adoption of a risk managed approach to autonomous systems that enables safe operation while keeping the larger scale, multiple deployments vision for these systems in mind. The learnings of the air domain by being restrictive of Beyond-Visual-Line-Of-Sight (BVLOS) when this is where much of the industry wanted to get to, caused an unnecessary stovepipe and subsequent burden on all sides. This DCV legislation review has the opportunity to take the current vision for the future of marine uncrewed systems in Australia into account in the future regulation framework for these systems. This has the potential to attract uncrewed developers to Australia from overseas as the rest of the world struggles in adapting their legislation to manage these systems.
- The Safety Management System associated with an uncrewed or autonomous system is more complex than a crewed system. Guidance for regulators and industry on the typical Safety Management System architecture for differing types of uncrewed vessels would assist establish a common reference framework for the expectations and risks to address.
- Current legislation incorporates specifies a number of vessel classes. One approach to address the immediate gap in legislation for uncrewed systems could be to create a new class – Uncrewed and Autonomous Vessels. This new class of vessel could then have an area of operation determined by the capability of the vessel, the risk and the level of redundancy. For example, if operating from a mothership much like a tender, it may be appropriate for autonomous systems to be classed as ship's equipment (as per a RAV) due to operating within the proximity of and under the command of a mothership.

Conclusion

Uncrewed and autonomous systems are currently not addressed by Australia's DCV safety legislation. AIMS welcomes the opportunity to work with DITRDC to establish a regulatory approach that future proofs our nation for safely establishing a sustainable marine autonomous systems sector in Australia.