



BUSINESS RESEARCH AND INNOVATION INITIATIVE

Automating the detection of whales at sea

Fact sheet

Challenge summary

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is seeking the development of new and innovative technologies that could be deployed to improve the efficiency and effectiveness of marine fauna detection. This improved detection ability has the potential to enhance the management of offshore activities, and improve the confidence in environmental outcomes, specifically for marine fauna. These technologies could be deployed by vessels to provide automated, real-time and accurate detection, identification, and distance measurements of marine mammals at sea (e.g. whales) – all backed by a verifiable and auditable digital photographic record. The challenge also involves finding ways to effectively collate and report automated marine fauna data and associated vessel responses.

Potential themes

Advanced technology, artificial intelligence, data automation, digital imaging and marine fauna conservation.

Overview of challenge

Seismic vessels operate in Australian waters, and those of other countries, for the purposes of petroleum reservoir exploration and development. Seismic surveys emit high intensity, low frequency sound into the marine environment day and night for varying periods of time, from weeks to months. There is potential for this sound to impact marine mammals if activities are not managed properly. There are also growing community concerns about the potential impacts to marine mammals from other offshore activities and other industries such as commercial shipping.

Enhancing the ability to detect marine mammals will improve the effectiveness of existing control measures that seek to reduce marine fauna disturbance from offshore activities. It will also improve the understanding of the distribution and status of marine mammals around Australia. This information is necessary to inform environmental impact assessment and regulatory decision-making. It can also help industry plan seismic surveys and other offshore activities so that it avoids areas and times with high potential for whale interaction, which can disrupt activity.

There are two parts to the challenge being proposed that require innovative solutions. The first part is to consider what additional technologies could be deployed by seismic, commercial and research vessels to provide automated, real-time, round-the-clock, accurate detection and distance measurements (and, where practical, species identification) to marine mammals at sea, all backed by a verifiable/auditable digital photographic record. The second part is to consider how to more effectively collate and report those automated marine fauna data (during seismic activity and other vessel-based activities) and associated vessel responses in real-time from offshore locations to multiple audiences, including seismic operators, ships' officers, marine mammal observers and regulators.

Solution requirements

The scope for innovation involves leveraging recent technological advances to develop an automated and integrated system for real-time detection of whales at sea. NOPSEMA is aware that digital imaging (such as thermal infrared) and artificial intelligence (AI) are valid options, however, applicants should feel free to consider other technologies and methods that can address the challenge.

There is currently no suitable, commercially available technology on the market that can be mounted on ocean-going vessels that uses automation to detect, locate and identify large whale species during day and night time operations, and that has a high degree of accuracy and reliability. The solution needs to improve the efficiency and effectiveness of marine mammal detection, be operated in all weather conditions, and capable of being retro-fitted to existing vessels. The solution should be operable by trained marine mammal observers or researchers on board the vessels, and it should function with a high degree of reliability. The marine mammal observations and vessel responses need to be communicated in real-time from remote offshore vessels, and to interface effectively with existing marine mammal databases, where possible.

A solution should also have scope for commercialisation on a national or global scale.

Benefits of the solution

The product that solves this challenge has the potential to be commercialised in Australia, but sold and used worldwide. There are more than 50 seismic companies operating worldwide that could adopt the solution once commercially available. The international regulatory community is actively seeking solutions to address the rising concern over the impact of seismic noise on whales and other marine fauna species, presenting a global market for the solution.

Developing a technical solution to this challenge will bolster Australian expertise in emerging and advanced technologies, such as digital (thermal) imaging and AI image recognition. There will also be improved environmental and industry outcomes, including a better understanding of whale distribution. An improved ability to detect whales will reduce potential impacts from seismic sound even further, and allow for better planning and management of seismic surveys in order to avoid important places and periods of whale activity.

How to apply

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

Additional markets for an automated and integrated whale detection system extend beyond the seismic survey industry. A technological solution could potentially be used for marine research purposes or during other activities that may impact on marine mammals. These activities might include:

- offshore operations and drilling
- decommissioning of ports
- mining, dredging and military exercises.

The technology may find subsequent commercial application on ferries and cargo vessels where ship-strike of whales is of concern.