



Developing Innovative Solutions to Ship-Source Underwater Noise

Research Project Concept Outline for CISMART 2020

November 2020

clearseas.org



UNDERWATER NOISE AND MARINE MAMMALS

[#clearfacts](#) [#underwaternoise](#) [#marinemammals](#)

Each day, Canadians benefit from commercial marine shipping.⁽¹⁾ However, these activities which we rely upon for global trade take place across many complex ecosystems that are home to at-risk marine life such as whales.

With increased marine traffic in Canada's coastal waters comes an increase in underwater noise from vessels – and a need to understand the impacts on marine mammals who use sound to communicate, feed, navigate and reproduce.

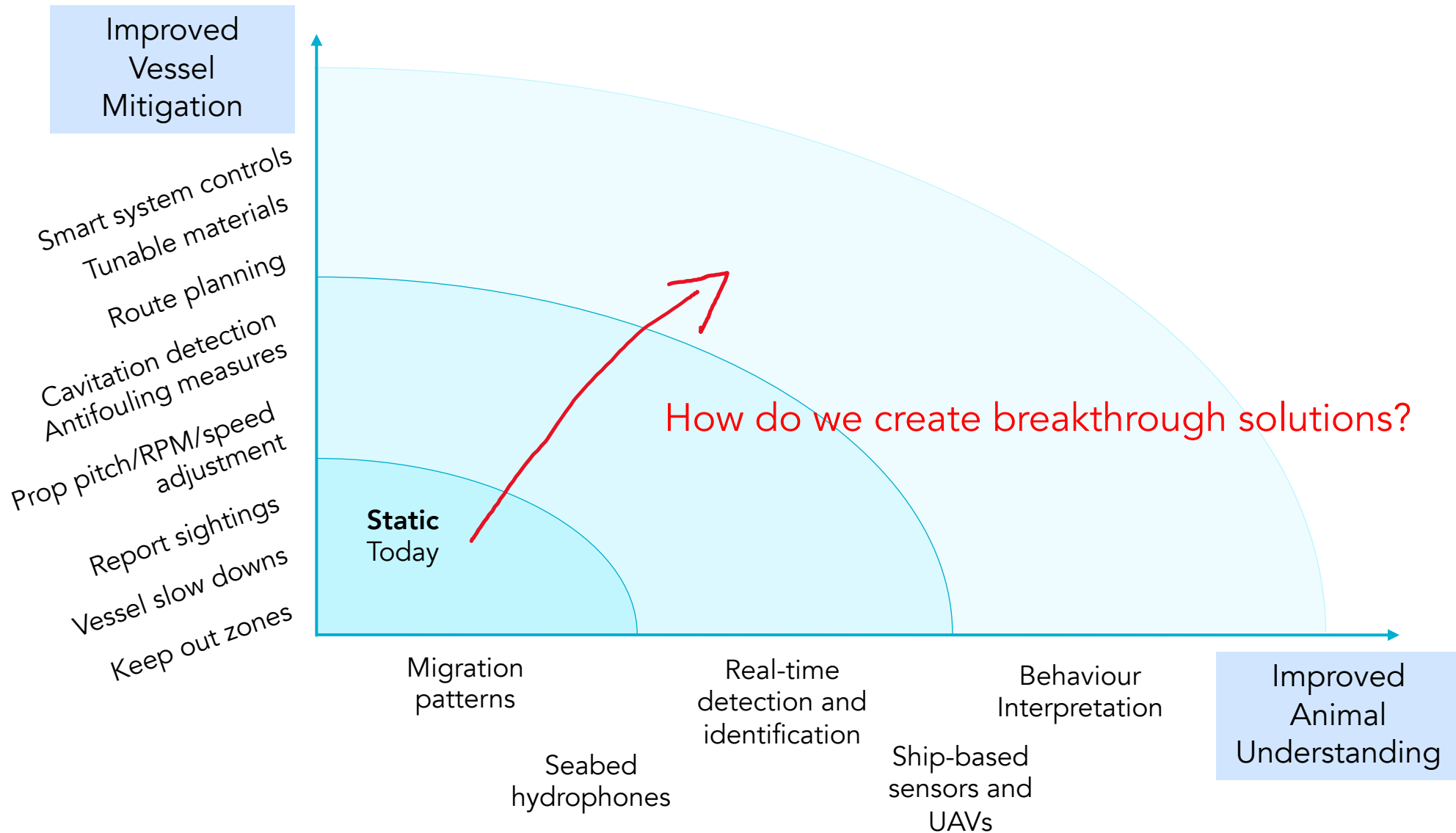
This site's purpose is to share objective information about the impact of underwater noise from marine traffic on marine mammals – in particular on whales – and to encourage informed conversations about the issue.

This site was created by [Clear Seas Centre for Responsible Marine Shipping](#), an independent research centre that supports safe and sustainable marine shipping in Canada.

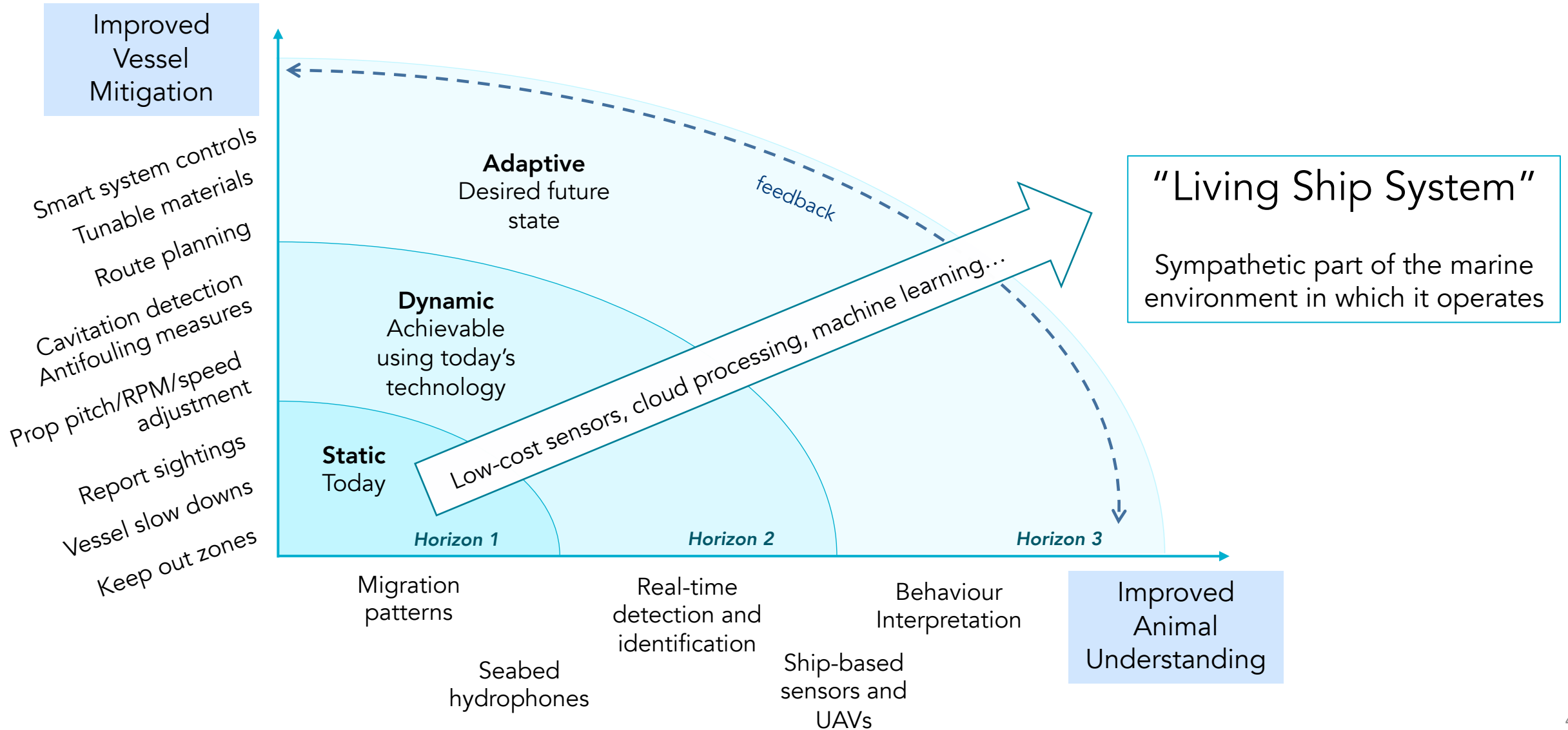
Visit:

clearseas.org/underwater-noise

HORIZONS FOR SOLUTION DEVELOPMENT



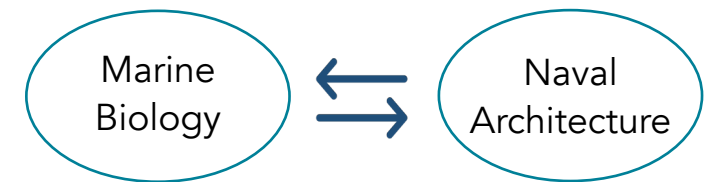
HORIZONS FOR SOLUTION DEVELOPMENT



OPPORTUNITY

How can we leverage emerging technologies through interdisciplinary collaboration in order to develop new solutions to reduce marine mammal disturbance from underwater noise?

- Can we use machine learning to process data and predict noise in real-time onboard vessels?
- How can ships help us to improve our understanding of the sensitivity and response of marine mammals to underwater noise?
- Will noise reduction strategies also help meet industry decarbonization targets or reduce costs in the long run?
- What will the next generation of ships look like?



Need knowledge exchange across disciplines

RESEARCH OBJECTIVES



Looking to the future: Designing ships with URN mitigation in mind

- Smart hulls, tunable propellers, mobile hydrophones?
- AI, machine learning, cloud processing – available onboard?

Create novel system-based solutions to the negative impacts of underwater noise on marine mammals

- Use full suite of AI and machine learning to predict URN onboard vessels during operations and assess marine mammal response to vessel noise mitigation strategies
- Deploy smart adaptive strategies leveraging new materials, sensors and controls to mitigate noise and avoid ship strikes
- Cross boundaries of naval architecture, oceanography, marine biology – create partnerships in academia and industry
- Find the win-win solutions (e.g. quieting vessels while reducing emissions and increasing fuel efficiency)

PROPOSED APPROACH

- University collaborative research program, multi-year project jointly led from Naval Architecture and Marine Biology
- MAsc/PhD students from each discipline
- Post-doctoral research fellow to manage project
- Clear Seas to provide funding in partnership with other industry collaborators - matched with Mitacs, NSERC and other sources of funding

WE ARE LOOKING FOR

- Feedback on the project approach
- Potential academic research partners
- Industry collaborators
- Funding agency support

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