



## AUTONOMOUS MINE SEARCH USING HIGH-FREQUENCY SYNTHETIC APERTURE SONAR

### MISSION IN BRIEF

Increase the capabilities of autonomous underwater vehicles by using synthetic aperture sonar to quickly and reliably detect, classify, and localize mines.

### OVERVIEW

The overall programme goal is to develop a mine countermeasure system that accomplishes the end-to-end mission—from mine search to disposal—using autonomous maritime vehicles. This specific project focuses on increasing the processing and decision-making capabilities onboard the MUSCLE AUV, which uses multi-resolution, multi-aspect synthetic aperture sonar to create detailed images of the seafloor.

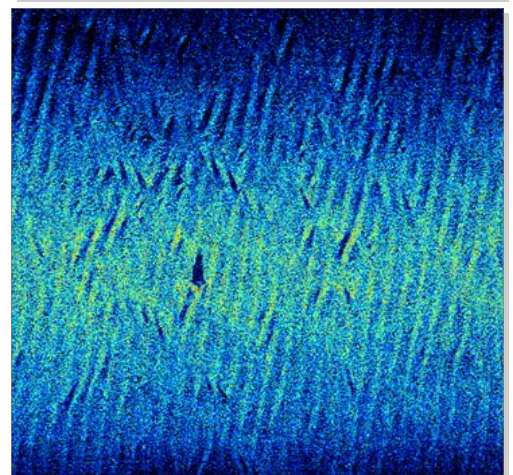
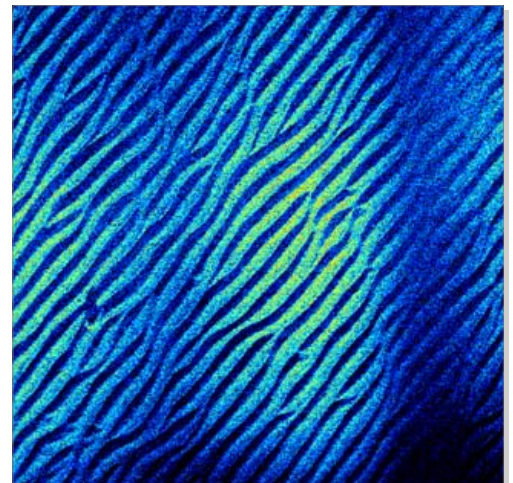
Recent work has focused on two objectives. The first objective uses techniques from machine intelligence to develop AUV behaviours that can help ensure complete coverage of a mine hunting area. For example, when sonar is used in areas with a rippled seabed, mine detection can be compromised at certain angles. Scientists are programming a behaviour so that the AUV can detect this type of seabed and then move into a better position.

The second objective is to develop automatic target recognition algorithms that can increase confidence that an object is classified as a mine. Accurate classification is key to efficient autonomous mine countermeasures.

Moving the algorithms and behaviours onboard the AUV has the potential to significantly increase the speed of operation on mine countermeasure missions.

### CONTACT

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*Top: An AUV can detect a rippled seabed, where it is difficult to view targets at certain angles. Bottom: They can then adapt their position to get a better view of the target.*