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Sonar device sees through bubble clouds

18 November 2010

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Engineers at Southampton University have developed a new underwater sonar device that can detect objects through bubble clouds that would effectively blind standard sonar.

Conventional sonar uses the differences between emitted sound pulses and their echoes to detect and identify targets. These include submerged structures such as reefs and wrecks, as well as objects including submarines and fish shoals.

However, standard sonar does not cope well with bubble clouds resulting from breaking waves or other causes, which scatter sound and clutter the sonar image.

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Now, Prof Timothy Leighton of Southampton University's Institute of Sound and Vibration Research (ISVR) has developed a new twin inverted pulse sonar (TWIPS) system that can do just that.

Leighton's team first showed theoretically that the TWIPS system could enhance the scatter from a target while simultaneously suppressing the clutter from bubbles. Then, the researchers set out to see whether the TWIPS would work in practice, distinguishing echoes from bubble clouds and objects that would otherwise remain hidden.

Using a large testing tank, they showed experimentally that the TWIPS system outperformed standard sonar at detecting a small steel disc under bubbly conditions resembling those found under oceanic breaking waves.

Encouraged by their findings, they then conducted trials at sea aboard Southampton University's coastal research vessel the RV Bill Conway. They compared the ability of the TWIPS system and standard sonar to discern the seabed in Southampton Water, which handles seven per cent of the UK's entire seaborne trade. The seabed in this area varies in depth between 10 and 20m.

'TWIPS outperformed standard sonar in the wake of large vessels such as passenger ferries,' said Dr Justin Dix of the university's School of Ocean and Earth Science (SOES) based at the National Oceanography Centre in Southampton.

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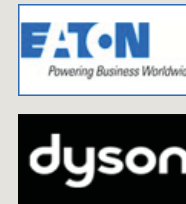
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