InciteShip – a Measurement and Incentive System for Mitigation of Ship Underwater Noise

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INTRODUCTION

Opportunistic measurement stations for ship underwater radiated noise (URN) are established, e.g. ECHO program[1], MARS[2] and PIAQUO[3,4] projects. These initiatives collect URN signatures on a large scale and link them to incentives for noise reduction.

The InciteShip project (2024-2026) designs an advanced ship URN measurement and incentive system for shallow waters. Measurement buoys were recently deployed near the main channel into the port of Gothenburg and south of Södertälje harbour.

The InciteShip buoys measure ship URN signatures using three cabled hydrophones.

System design

The InciteShip measurement system is inspired by the forthcoming ISO/DIS 17208-3 standard for ship URN measurement in shallow waters (>30 m).

An incentive score is calculated from a URN signature by assessing the combined environmental impact on marine mammals, fish and invertebrates.

The project partner Clean Shipping Index is preparing to integrate this score into its broader ship environmental performance rating.

This would establish a financial incentive for ship URN reduction at the ports and national fairway operators that employ the index.

Technical design

The technical design of the system is based on battery and solar-powered, low-cost electronics housed in a marine buoy.

AIS data triggers recordings, using three bottom-mounted hydrophones.

A 4G connection transmits ship noise spectra to a land station, where signatures and incentive scores are calculated and stored in a database.

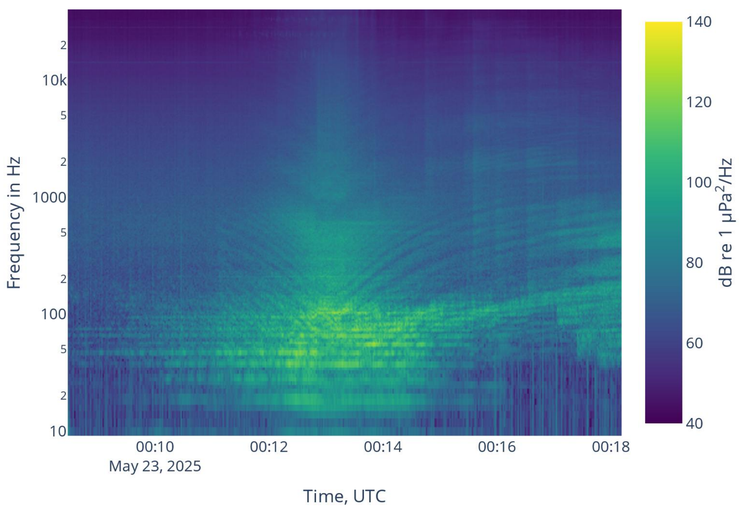
Data is available to ship owners upon request.

We will share the design and software openly and freely for anyone to use.

Early results

The summer of 2025 is a test and evaluation period for the InciteShip measurement system. Early results from a total of two months at sea show reliable operation and good data quality.

The full measurement and incentive system will be validated during the summer of 2026.



Spectrogram of underwater radiated noise collected by the InciteShip system during a ship passage.

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https://www.ivl.se/english/ivl/project/inciteship.html

1. Malinka CE et al. (2023). Evaluating the Benefits of Noise Reduction Mitigation: The ECHO Program. The Effects of Noise on Aquatic Life XXX
2. Robin O et al. (2022). The MARS project: identifying and reducing underwater noise from ships in the St. Lawrence estuary. Can Acoust 50 (3), 112-113.
3. Gaggero S et al. (2022). SHIP URN: UNIGE Activities in the Context of LIFE-PIAQUO Project. Prog Mar Sci Tech 6, 512-521.
4. Quiet Oceans (2023), The Underwater Radiated Noise Catalog. https://urn.quiet-oceans.com/.

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