

Transforming subsea cable protection through real-time vessel detection

STFC Hartree® Centre worked with Indeximate, a climate tech startup, to enhance their ability to reliably detect vessel activity near critical subsea cable infrastructure, strengthening Indeximate's capability to identify risks early and prevent costly, avoidable damage.

Challenge

Subsea cables are critical infrastructure, carrying power, data and telecommunications that keep modern society running efficiently. Damage to these cables can cause service outages, economic disruption and repair costs running into millions. Given their importance, continuous monitoring and assessment of cable health is essential. This is where Indeximate plays a key role. Using Distributed Acoustic Sensing (DAS) technology, Indeximate monitors the subsea cable environment to identify risks, prevent damage, and enable early intervention. While this approach is effective for natural environmental factors, detecting real-time activity from third-party vessels presents a new challenge. Unlike most environmental factors, vessel signatures are transient, meaning detection tools need to work effectively in real time. If Indeximate are going to be able to help asset owners prevent damage from activity, such as anchor dragging or illegal trawling of the ocean floor, then new methods are needed.

Approach

We worked with Indeximate to improve vessel detection near subsea cables. Traditional monitoring methods using DAS data to identify general acoustic disturbances are limited in their effectiveness in challenging weather conditions. This is because the environmental noise from rough seas can obscure vessel signals and lead to false positives or missed detections. By analysing Indeximate's large, aggregated DAS dataset, we identified advanced machine learning techniques capable of distinguishing acoustic patterns associated with vessel activity. Automatic Identification System (AIS) data were used to identify nearby vessels and train the model. Applying this model to unseen real world data was a success, enabling more reliable detections and improving situational awareness.

“Working with the Hartree Centre has been highly beneficial for Indeximate. Their clear explanations and high-quality code allowed us to quickly implement their solutions after handover, and place us in an excellent position to rapidly build in this area in the near future.”

Paul Clarkson
Director, Indeximate



Credit: Adobe Stock

Benefits

The solution enables earlier, preventative intervention to reduce accidental and avoidable damage to essential subsea cables by enhancing insight using existing DAS data and sensor capabilities with advanced computational techniques. For cable owners and operators, this can significantly reduce the likelihood of costly repairs and service disruption, delivering both operational and financial benefits. For Indeximate, the solution directly supports their mission to prevent subsea cable failure. This new capability strengthens their service offering and increases the value they can deliver to infrastructure operators. At a national level, improved protection of subsea cables helps safeguard the resilience of essential digital infrastructure that underpins everyday life and economic activity.

At a glance

- Lowers risk of service disruption and reducing costly accidental damage
- Solution enables preventative action from actionable insights
- Enhanced awareness around critical infrastructure
- Directly supported Indeximate's mission and strengthens their service offering

Who we are

The Hartree Centre was created by UK Government to help businesses and public sector organisations accelerate the adoption of high performance computing (HPC), big data analytics, artificial intelligence (AI) and quantum technologies. We play a key role in realising UK Government's Industrial Strategy by stimulating applied digital research and innovation, creating value for the organisations we work with and generating economic and societal impact for the UK. We are proud to be part of UK Research and Innovation.

What we do

- Boost productivity and innovation for industry
- Offer training and skills development
- Provide insights into future technologies
- Give tailored business development support
- Build bespoke small teams around your project

