

Seismic sub-bottom profiling integration in submarine cable tracking

Publieke samenvatting / Public summary

Aanleiding

Seekable BV has developed the TN-1, an electromagnetic (EM) system that accurately measures the depth of burial (DoB) for subsea power cables, pipelines, and fibre-optic data cables. Regular monitoring of DoB is essential to protect subsea assets from threats like fishing, anchoring, and sabotage. While the TN-1 is effective for power cables with strong EM signatures, it struggles to detect cables with low or no current, such as pipelines carrying natural gas or (in the near-future) hydrogen. This limitation poses significant risks, including costly damage and service interruptions. A 2019 study by the University of Strathclyde found that power cables experience 0.003 failures per kilometre per year, meaning a 100 km cable has a 30% chance of failure each year, with repair cost ranging from \$1.8M and \$30M, depending on the cable type. To address these challenges, Seekable and Metinco will develop an acoustic add-on to the TN-1 system, enhancing its ability to monitor all subsea assets. This project will help protect critical infrastructure, reduce costs, and support the reliability of offshore energy systems.

Doelstelling

The primary objective of this project is to develop an innovative, integrated cable tracking system that combines Seekable's existing EM sensing technology with seismic sub-bottom profiling. This dual-sensing approach will provide precise and reliable data on the burial depth of all types of subsea assets, including power cables, pipelines,

Projectinformatie / Project information

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Algemene informatie / General information

Penvoerder / Secretariat
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and fibre-optic cables, all of which are critical to the Green Transition. By integrating these technologies, the system will enable proactive maintenance, significantly reducing the risk of damage and the associated costs of repair. Seekable's dedicated algorithms will optimize survey efficiency, allowing for better data acquisition in less time, reducing the frequency of cable failures, and minimizing the need for personnel during inspections. The comprehensive nature of this system will also allow it to detect existing infrastructure, facilitating the safe and efficient installation of new cables and pipelines. Ultimately, this project aims to deliver a more effective and versatile monitoring solution.

Korte omschrijving

The project will begin with synthetic studies to determine the optimal acoustic waveform and frequency required for effective detection. To support this, a sandbox environment will be developed to simulate real-world conditions and analyze how to optimize acoustic transmission for maximum detection range with minimal power consumption. Concurrently, discussions with hardware manufacturers will be conducted to select the most suitable components for integration. Once the sandbox simulations are fine-tuned and the appropriate hardware is identified, the next phase will involve developing a hardware prototype. This prototype will undergo rigorous testing in nearshore environments to validate the simulation outcomes and ensure it meets operational requirements. Following successful nearshore trials, the project will progress to real-world field tests with industry partners, focusing on operational performance and system reliability. These trials will be crucial for finalizing the system integration and preparing the solution for market introduction.

Resultaat

The expected outcome of this project is the development of a fully integrated and operational cable tracking system that combines EM and seismic sensing technologies. The primary deliverable will be a demonstrator device capable of providing high-resolution subsurface imaging and

precise burial depth estimation for a wide range of submarine cables and pipelines. This demonstrator will undergo extensive testing in both controlled and real-world environments to validate its performance, reliability, and accuracy. Additionally, the project will develop advanced data processing algorithms and a software platform to handle the large volumes of data generated by the system. These algorithms will ensure that the system delivers actionable insights in real-time, enabling proactive maintenance and reducing the risk of costly failures. The knowledge gained from this project will not only enhance the current state of submarine cable monitoring but also pave the way for future innovations in the field. Ultimately, this project will contribute to the long-term sustainability and safety of offshore energy systems, aligning with the broader objectives of the EKKO initiative.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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