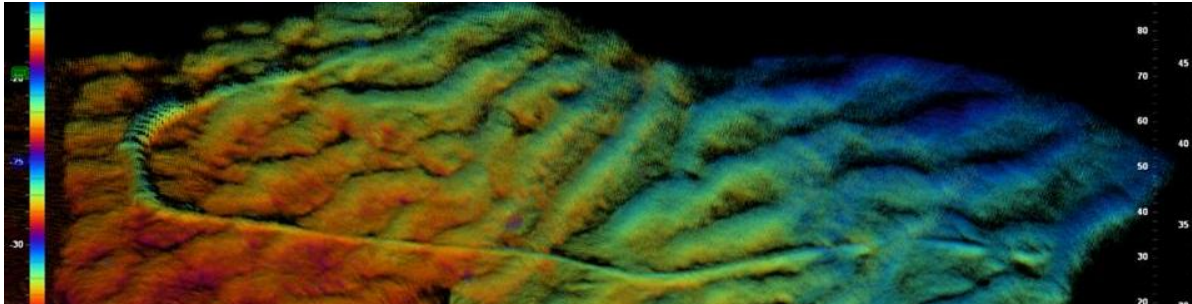


## Real Time Touch Down Monitoring: Cable Jointing Using CodaOctopus Real Time 3D Sonar - Echoscope®



The ability to join two high voltage cables on a vessel is becoming an increasingly common occurrence in the UK's offshore wind farm industry. Wind farm sites that are situated a long distance from shore require multiple 'export cables' to be laid and later joined together in order to provide a continuous high voltage connection from the wind farm site to the onshore terminus.

On a recent project, DONG Energy contracted VSMC (Visser & Smit Marine Contracting), an international submarine power cables installation contractor specialising in intertidal and offshore markets, for the laying of two high voltage cables to the wind farm of West of Duddon Sands in the East Irish Sea. The project utilised two major vessels: the first vessel to lay the cable and the second was equipped to make the joints on the newly installed cables. The ends of these cables needed to be located, retrieved and brought to the surface in a safe, controlled and efficient manner without the use of ROVs or divers. The cable ends were then joined on board the second vessel by the cable manufacturer. Due to high tidal differences, the subsea suspended cables needed continuous monitoring to ensure that the cables were not placed under any excess stress or exceed the designed bend radius during the entire jointing operation. The resulting jointed cable was safely deployed back to the seafloor to a pre-determined location. Finally, an as-laid survey was conducted to map and document the final resting place of the jointed cable.

Since the Echoscope®, the world's highest resolution real time 3D sonar, provides fully georeferenced 3D imagery of the subsea scene, Nautikaris b.v. (our long-standing CodaOctopus agent for the Benelux area and contracted to VSMC for the duration of this project) selected two Echoscope® systems combined with a CodaOctopus F190™ system to accurately image and position the cables. The dual Echoscope® systems were used to simultaneously monitor the initial recovery of the cables and the subsequent continuous monitoring of both cable catenaries in the water column. Nautikaris b.v. integrated the cable touch down position outputs from the Echoscope® systems into their Tug and Anchor Management System which was used to dynamically control the vessel's relative location to the cable touch down point during the entire project.

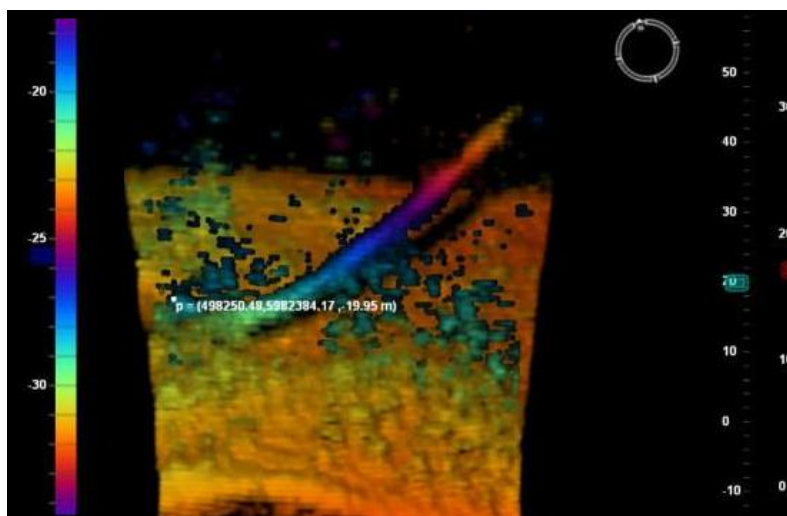
Lieven Geers of Nautikaris states:

*“After having convinced VSMC to involve Nautikaris b.v. in their upcoming project preparations, we were able to design a concept for a monitoring system based on the intended work method, the wishes of the client and our extensive experience with the CodaOctopus Echoscope® system. Since two cables were raised from the seabed and attached on deck for several days while experiencing changing and difficult tidal conditions, we needed to keep the touch down points of both cables in view during the entire period in order to be able to calculate the bend radius and have a visual check of the cables at all times.*”



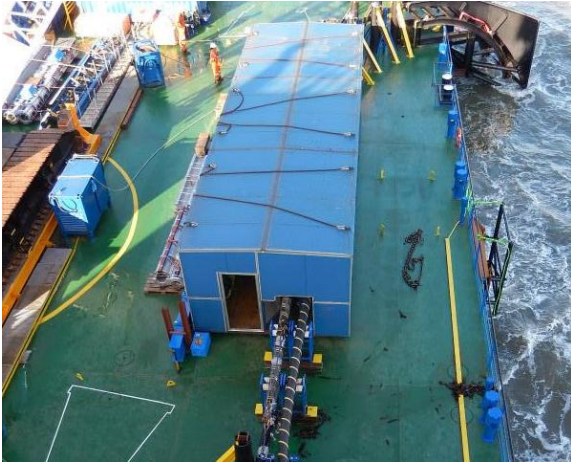
*Dual Echoscope® systems deployed from a single mounting frame*

*We designed a dual head Echoscope® frame which can be mounted in any condition offshore that allowed us to pan both sonar heads individually to the desired angle. The early involvement and close cooperation with VSMC paid off and was the key to make this project into a success that will be repeated in future jointing operations. “*



*Echoscope® image of the suspended cable displaying the touch down position on the seafloor*

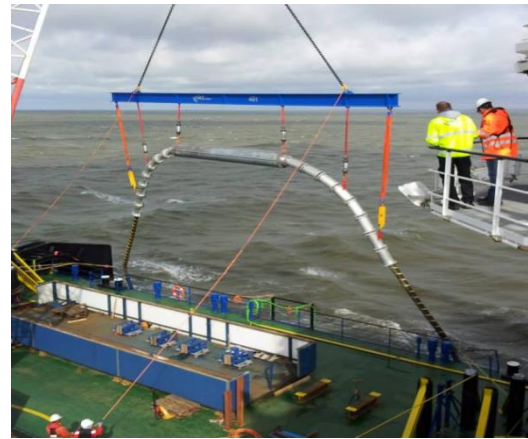




*The two cables in the process of being joined*

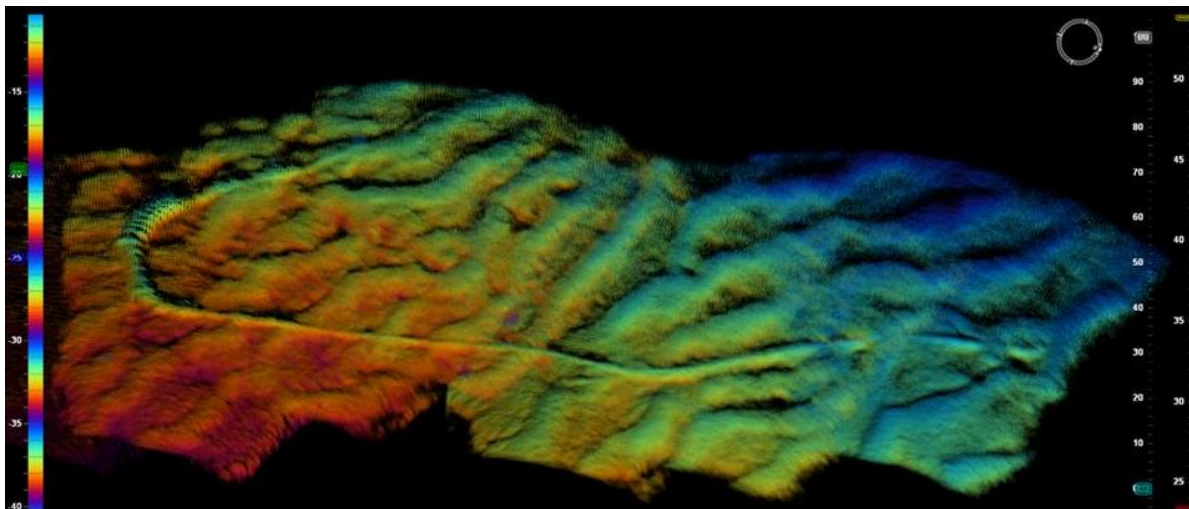
Dual Echoscope® systems were used to locate the ends of both cables and these were raised to the surface to be joined on board the vessel. The systems were used to continuously monitor both subsea suspended cables during the entire joining operation in challenging sea states.

The joined cable was then raised from the vessel deck and deployed back to the seafloor. Dual Echoscope® systems were used at all times to monitor the safe deployment of the cable through the water column to its touch down location.



*The joined cable being deployed to seafloor*

After the joined cable was safely deployed, the surrounding seafloor area was mosaiced using the Echoscope® Underwater Survey Explorer (USE™) software to provide an as-laid survey of the installation.



*As-laid survey as viewed in the Echoscope® Underwater Survey Explorer software*



This project highlights the Echoscope® system’s versatility to provide pre and post survey data and to support project operations with accurate, detailed real-time 3D imagery and positional data not available from any other sonar systems. Consequently, the project is completed with increased safety, speed of efficiency, and accuracy of placement while reducing risk and costs.

For further information on touch down monitoring, cable lay, recovery, jointing or other related applications please contact [sales@codaoctopus.com](mailto:sales@codaoctopus.com)

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