KRAKEN ROBOTICS

Acoustic Corer Sub-Seabed Cobble and Boulder Survey

Gennaker Offshore Substation (OSS)

Kraken Robotics completed an Acoustic Corer (AC) sub-seabed survey to support the design and safe installation of the Gennaker Offshore Substation (OSS), located within the German Baltic Sea, on behalf of IV Offshore and their joint venture partners.

The purpose of this survey was to identify the presence of sub-seabed boulders with diameters of 0.2 m or greater. Previous towed 3D seismic surveys had failed to deliver the required resolution. The client requested use of the AC which, by combining high-frequency chirp (HF), low-frequency chirp (LF) and innomar chirp sources, can achieve market-leading resolution, penetration and accuracy.

Kraken's Acoustic Corer (AC)

The project comprised of two OSS, each with four pin pile foundations. The AC survey was required to map 0.2 m diameter boulders and penetrate to 30 m below the seabed.

Each scan location consisted of a triple acoustic core. Three 12 m diameter acoustic cores were collected and merged in a triangular pattern to form a single interpretable acoustic volume. Each acoustic core was laterally and vertically aligned to ensure a continuous response with no offsets between each acoustic core.

Efficiency and Clarity that Reduce Operating Costs

Efficient & Accurate Surveys

The seabed and geological conditions were variable throughout the survey area, with the presence of seabed boulders and coarse sands. Despite the unfavorable conditions, the AC signal penetration was sufficient to resolve cobbles and boulders through the sediments, with a total of 1057 acoustic anomalies suggestive of cobbles/ boulders interpreted across 24 scan locations.

Operational Assurance

Following the delivery of results, IV Offshore were able to ensure the design of the pin piles took into account the on site geological conditions and that each pile would reach the required depth of penetration.

Cost & Schedule Savings

The foundation's locations were also modified, rotating the OSS within the footprint of the 3D data set to remove the risk of encountering boulders during installation, enabling accurate installation forecasts and reducing the commerical risk to the project.

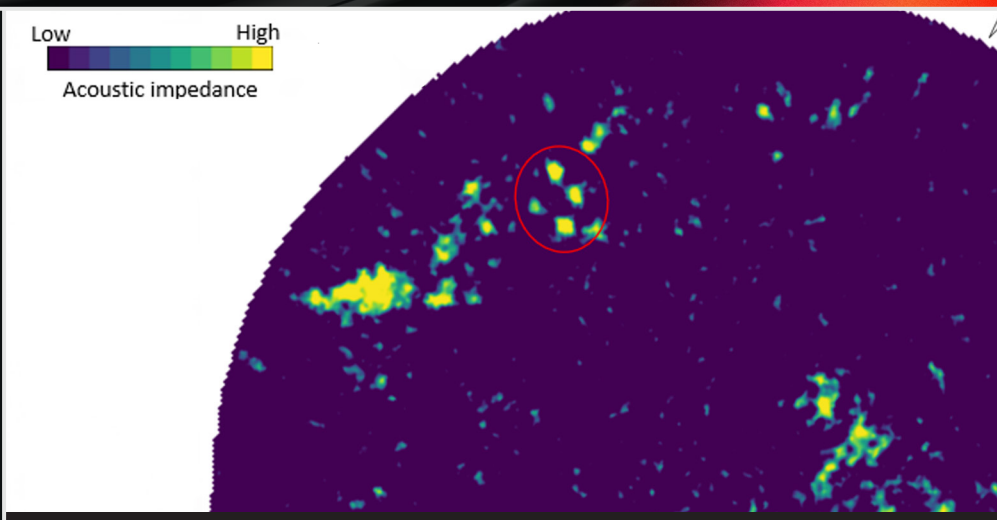
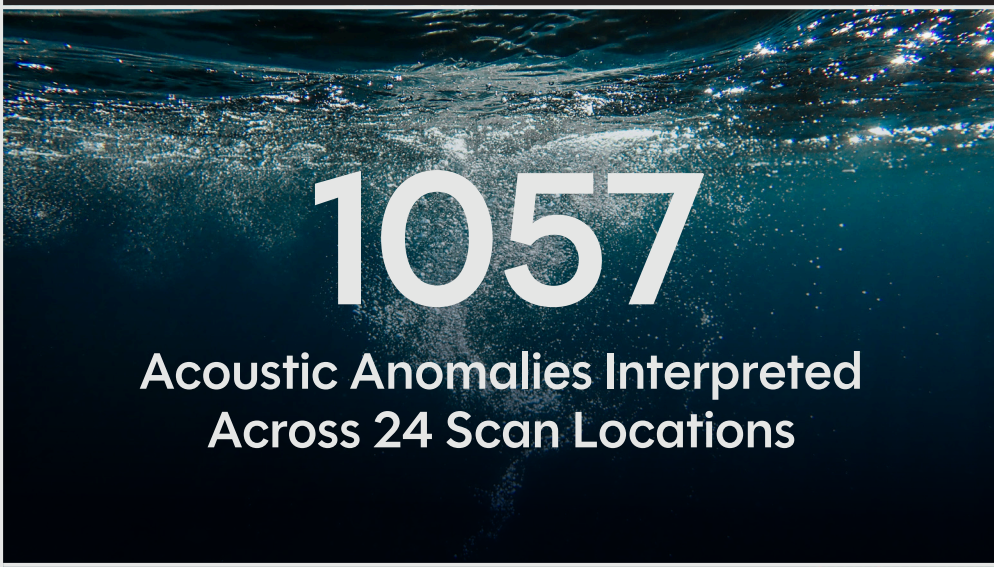


Figure 1 - Profile view slice within an acoustic core. Three 0.2m diameter anomalies suggestive of cobbles are shown



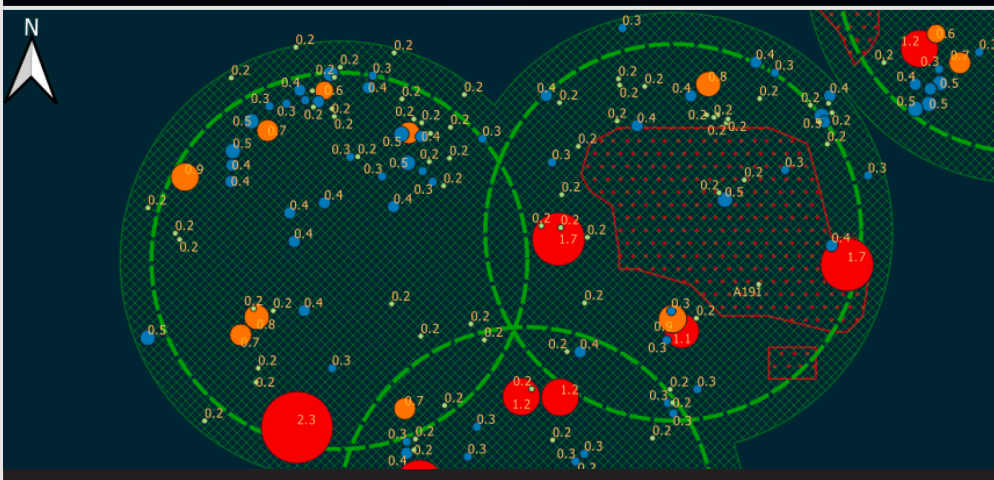


Figure 2 - Triple acoustic core results compared to another 3D acoustic system's results. The hashed red area is from the other 3D acoustic system and the dots are the AC results