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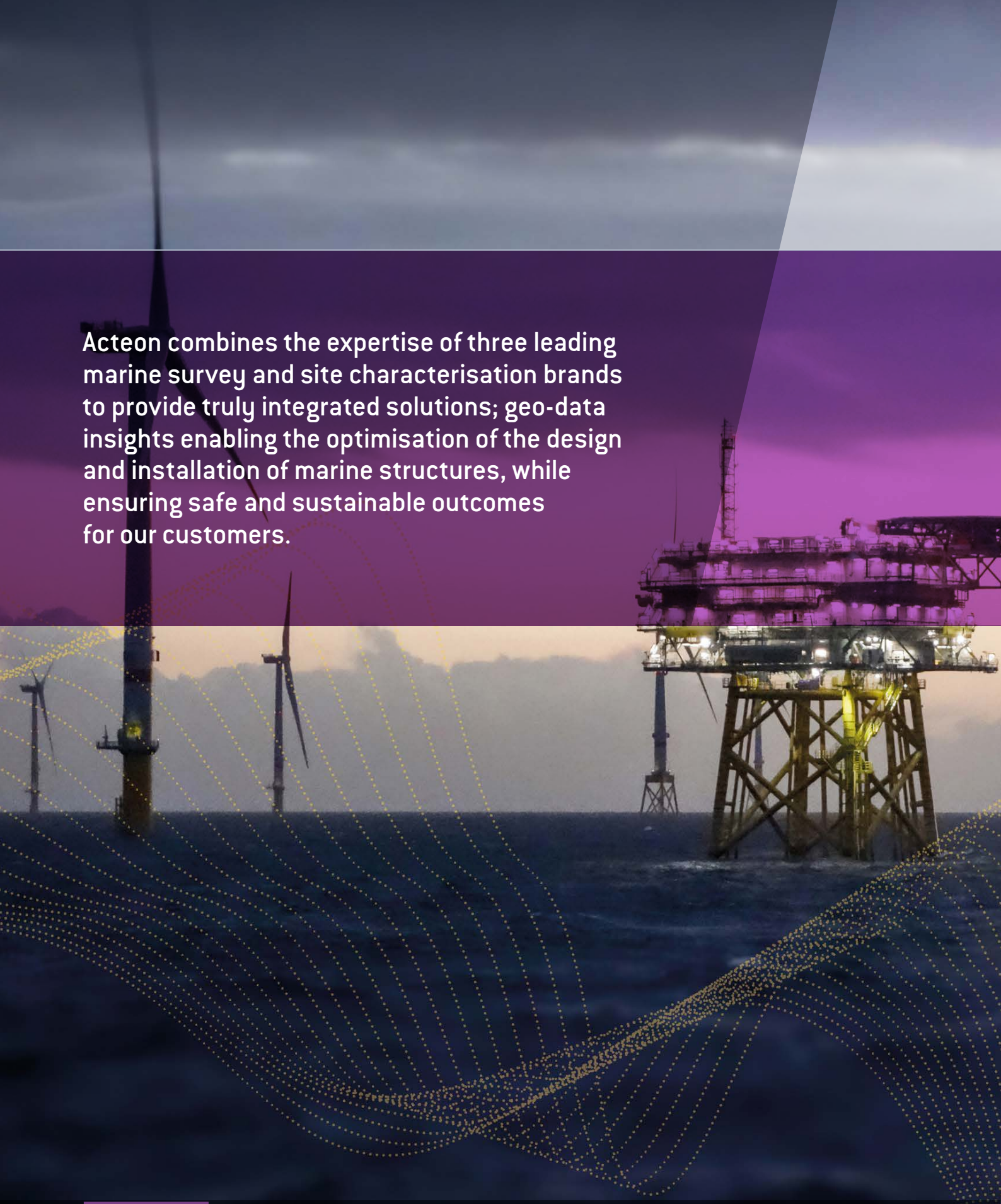
DATA AND
ROBOTICS

GEO-SERVICES CASE STUDY PACK

Solutions for transforming data into critical insight

MAXIMISING DATA EFFICIENCY

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Acteon combines the expertise of three leading marine survey and site characterisation brands to provide truly integrated solutions; geo-data insights enabling the optimisation of the design and installation of marine structures, while ensuring safe and sustainable outcomes for our customers.

MAXIMISING DATA EFFICIENCY

Acteon provides customers with geo-data that helps them to gain critical insights and make better-informed design and construction decisions. Our marine surveys and site characterisation services provide integrated solutions that optimise the design and installation of marine structures.

Our capabilities include engineering and consultancy services; geophysical and geotechnical site investigations, construction survey support, digital solutions, asset integrity management, hydrographic / environmental, laboratory testing, and land survey.

Customers benefit from our application of machine learning, remote access, and advanced processing techniques. We increase productivity by using the portable remotely operated drill (PROD) system, providing a flexible solution to seafloor drilling challenges. We also deploy uncrewed surface vessels (USVs) to minimise the number of vessel days and personnel on board, resulting in reduced project footprints. Our construction survey specialists work across all phases; pre-engineering and pre-installation, pipelay and structure installation, metrology, and as-built reporting.

GEO-SERVICES CASE STUDIES

The case studies in this pack demonstrate the capabilities and expertise provided through Acteon's strategic geo-services business segment and brands.

The projects in this pack:

- CPT site investigation for Equinor's Baltyk II and III offshore wind farms
- Doubling survey capabilities accelerates wind project operations
- Integrated survey and positioning for FPU in the Gulf of Mexico
- Geotechnical solution accelerates data delivery
- Remote monitoring on construction project offshore Norway
- Remote processing increases efficiencies for decommissioning project offshore Mauritania
- De-risking first-use LBL solutions on FLNG project
- Installation of demonstration tidal turbine offshore Japan



CPT SITE INVESTIGATION FOR EQUINOR'S BALTIC II AND III OFFSHORE WIND FARMS

PROJECT OVERVIEW

Benthic, a Geo-services brand in Acteon's Data and Robotics division, completed a site investigation comprising cone penetration tests (CPTs) using its portable remotely operated drill (PROD) that has enabled the design of foundations for about 100 wind turbines and two offshore substations for the Baltic II and III wind farms offshore Poland in the Baltic Sea. The work for the developments, which are 50–50 joint venture between Norwegian energy company Equinor and Polish power utility company Polenergia, was performed at 16 locations in 40–55 m water depths.

The PROD unit, supported by the survey services of Acteon Geo-services brand UTEC, was deployed from the Ocean Zephyr offshore supply vessel. The geotechnical work began in December 2022 and the three-month project was completed in March 2023. Wind farm construction is expected to start in early 2024, and the first power export is anticipated in 2026.

PORTABLE REMOTELY OPERATED DRILL (PROD)

MARKET-LEADING SEABED SAMPLING AND IN-SITU TESTING ENABLING DESIGN AND ANALYSIS FOR:

- Renewables
- Oil and gas
- Civil engineering
- Mining
- Scientific investigation

MORE THAN

75 PROD PROJECTS

SAFELY DELIVERED IN AFRICA, ASIA PACIFIC, EUROPE, AND THE AMERICAS FOR OVER 20 YEARS.

“Acteon is a global leader and brings years of experience to our Coastal Virginia Offshore Wind pilot project. The data we are able to obtain through Acteon's surveys and inspections is helping inform our larger commercial project as we work to bring reliable, renewable energy to our customers.”

Michael Lundsgaard, Director Offshore Wind Operations, Dominion Energy

DOUBLING SURVEY CAPABILITIES ACCELERATES WIND PROJECT OPERATIONS

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TerraSond entered a partnership with ASV Global (now L3 ASV) to provide a full geophysical survey kit on an autonomous surface vehicle (ASV) to support the primary survey vessel.

THE CHALLENGE

TerraSond, a Geo-services brand in Acteon's Data and Robotics division was required to provide a full geophysical survey kit on an autonomous surface vehicle (ASV) to support the primary survey vessel.

CUSTOMER GOAL

The offshore wind operator needed to multiply the offshore work and data collection force on a renewables surveys for the local authority.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS

Market-leading services and integrated solutions

- As a proof of concept, TerraSond entered a partnership with ASV Global (now L3 ASV) to equip a remotely and autonomously operated 40' vessel with the necessary survey equipment. We put together a full geophysical survey kit on an autonomous surface vehicle (ASV) to support the primary survey vessel.
- Acteon's offshore expertise and techniques allowed the highest possible quality data and specifications for the customer.

Optimise the project to increase commercial value

- The control van for both the primary 24-hour operating survey vessel and ASV, was installed on the deck of the primary vessel.

PRODUCTS USED

- Applanix POSMV
- CNAV 3050 GNSS
- Veripos GNSS
- EdgeTech 4200 SSS
- Geometrics TVG
- R2Sonic 2024 MBES
- Sonardyne Mini Ranger USBL
- Innomar Medium SBP
- In-situ flow meter
- Surface sound velocity sensors
- Triple plate boomer

The vessel was able to operate remotely and safely 24 hours per day to optimise operations.

Combine digital technology and data to enhance our expertise

- The survey equipment included an Applanix POSMV, CNAV 3050 GNSS, Veripos GNSS, EdgeTech 4200 SSS, Geometrics TVG, Two R2Sonic 2024 MBES, Sonardyne Mini Ranger USBL, Innomar Medium SBP, in-situ flow meter, surface sound velocity sensors, and an applied acoustics triple plate boomer. All this equipment was remotely operated, including during recovery and deployment which helped to minimise the project footprint.
- Communications were carried out with redundant long-range radio connections and real-time data connection and transfer while using collision avoidance sensors such as Wi-Fi Radar, 3D cameras, FLIR Cameras, night vision and thermal imaging cameras. This enabled the vessel to operate remotely and safely 24 hours per day to optimise operations.
- Survey data acquired by the ASV met specification while working in tandem as a force multiplier to the mother ship during acceptance testing, proving that autonomous surface vessels can produce COP level survey data.

INTEGRATED SURVEY AND POSITIONING FOR FPU IN THE GULF OF MEXICO

Subsea 7 required a strategic partner to support them with an FPU tow-out and in-field hook-up for their client over a three-month period. The FPU needed to be dry towed from South Korea to the US Gulf, and the FPU final integration activities were to be completed alongside at Kiewit Offshore Services, Ingleside, Texas.

THE CHALLENGE

Subsea 7 required UTEC, a Geo-services brand in Acteon's Data and Robotics division, to mobilise the FPU at Kiewit Offshore Services fabrication yard in Ingleside, Texas, where the FPU underwent final preparatory work and regulatory inspections before heading 380 miles offshore to its ultimate home, nearly 200 miles south of New Orleans.

Integration activities needed to be undertaken before the FPU could be towed to the final offshore site. This involved remote positioning of 8 x TUGs and Hook-up vessel, including the interfacing of sensors and dimensional control services, position monitoring of the FPU during connection to the towing fleet and during navigation of the inshore tow section, offshore tow section, and upon arrival at the field and mooring hook-up.

A bathymetric and hazard survey of the in-shore tow channel survey needed to be performed before the tow-out to verify the results of the existing survey and to ensure that no major changes had taken place during the intervening period between those surveys and the tow-out scope.

The survey would verify that the channel was free of any obstructions or debris that may adversely affect the tow-out operations along with seabed bathymetry/features and confirmation of the positions of any existing seabed structures.

CUSTOMER GOAL

Subsea 7 required position monitoring equipment consisting of GPS-based transmitters on all vessels involved in the tow, reporting to one master data processing unit and monitor located onboard the FPS with slave monitors on the tugs.

They required the following parameters to be displayed, in real-time:

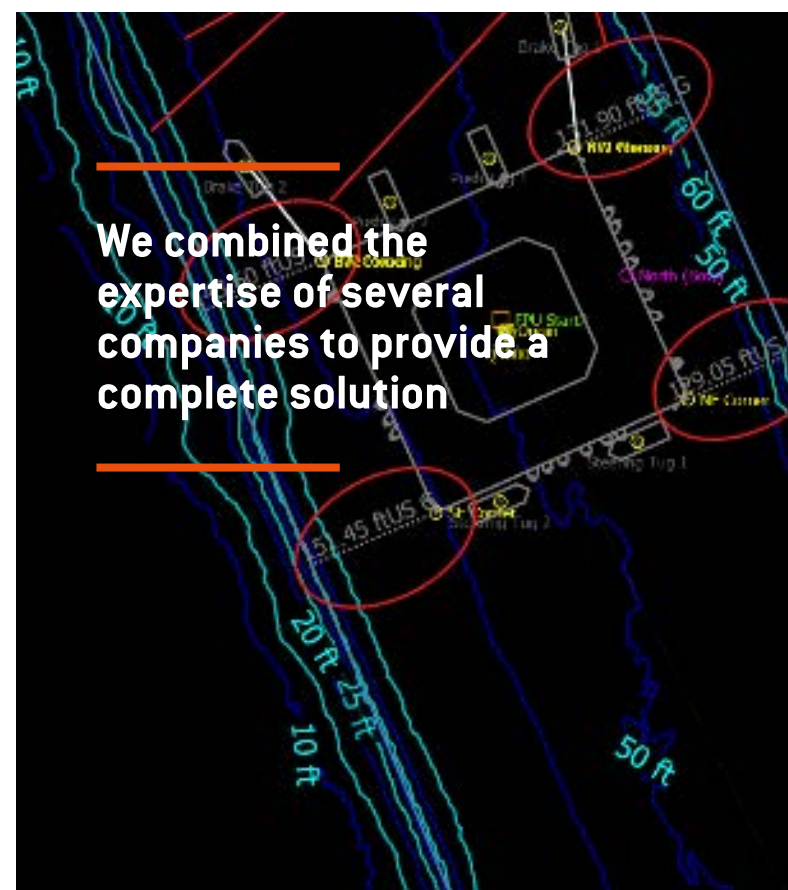
Position, orientation, bearing, and speed (overground) of the FPU and all vessels involved in the tow.

- Graphical presentation of the FPS, the tugs, and the lines connecting them.
- Bathymetry during the inshore tow.
- Horizontal clearance to seabed and channel boundaries.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS

Market-leading services and integrated solutions

- The FPU, being such a giant structure, proved to push the limitations of being towed through the Quinta and Corpus Christi Ship Channel to Port Aransas before going out through the Aransas Pass to the Sea Buoy. We provided the end customer with reassurance on the channel limitations through a prep-tow-out 3D representation, giving us a competitive advantage as we were able to flag potential issues in the software, drawing on previous experience from similar projects to minimise risk.
- Environmental elements such as a water depth of 13.7m [45 ft] at the inshore section and wind impacted the tow route due to tidal streams that occurred particularly in the area just outside the Aransas Pass channel jetties. UTEC worked across the Geo-services segment, who have extensive experience working in this channel, to execute the pre-tow channel survey to ensure that no major changes had taken place during the intervening period between the two surveys and the tow out scope, and the route was free of obstructions.



- InterMoor, a Moorings and Anchors brand in Acteon's Engineering, Moorings and Foundations division provided mooring engineering and offshore support, for Subsea 7.
- Subsea 7, with InterMoor's support, first performed the mooring line pre-lay, installing over 8,220m of chain. The team then towed the FPU from Ingleside, Texas to its final offshore site in Green Canyon and hooked up the FPU to the pre-laid mooring lines using Island Offshore's anchor handling vessel Island Victory. InterMoor's work scope also included equipment marshalling and dock services from their shore base in Fourchon, Louisiana.

Operational bases across the world

- UTEC's and Subsea 7's Houston offices are within proximity of each other, which allowed for ease of equipment interfacing and testing of UTEC's spread into Subsea 7's container.
- Utilising our regional base allowed for in-person demonstrations of the software development which saved time and mobilisation costs.

Work at scale with a proven track record for delivery

- Subsea 7 required UTEC to manage and execute this complex scope of work, which was tied to the all-encompassing project on which Subsea 7 has been a prime contractor for several years.
- We provided a single point of contact for contracting and project management and were able to streamline processes based on previous contracts with this customer.

Optimise the project to increase commercial value

- UTEC used SIMOPS during the preparation for the mobilisation phase which included dimensional control and final interfacing of the provided equipment package for the entirety of the FPU preparation to meet the requirements of the project schedule.
- The Corpus Christi Ship Channel needed to be closed to other traffic for the duration of the inshore towing operations which avoided disruptions from vessel traffic from both commercial and pleasure craft during the inshore tow.

Combine digital technology and data to enhance our expertise

- UTEC collaborated with third-party software developer 4D Nav to develop a 3D model of the FPU with real-time graphical navigation of the tow out from the Kiewit yard through the ship channel to the sea buoy, followed by offshore tow to the field location. The 3D representation aided in navigation and incorporated alarms that mitigated impact with the channel sides or bottom.

- UTEC leveraged cross-segment knowledge by sub-contracting TerraSond, to perform a bathymetric and hazard survey along the La Quinta channel up to the Aransas pass before the FPU inshore tow to ensure safe and efficient operations during the tow out. The DTM (digital terrain model) generated from this channel survey was displayed in 2D and 3D in the navigation software during the tow out.
- UTEC were able to identify issues and anomalies before they happened using the pre-tow channel survey data provided through the Geo-services segment to fulfil customer requirements.

PRODUCTS USED

- Online survey and surface positioning systems
- Tug management system

"We are proud to have worked on this complex project with Subsea 7 where we were able to apply our experience and expertise in both onshore operations and development, as well the technical proficiency demonstrated by our field staff, to deliver highly accurate survey and positioning services using engineering intelligence and digital technology, resulting in successful project execution with no environmental adverse impacts being encountered. The client was satisfied, and we look forward to collaborating on future project scopes," said Brad Paul, UTEC Business Development Manager - Americas

"UTEC being part of the Acteon group provided an opportunity to combine the expertise of several companies to provide a complete solution to support the tow out of the FPU to Subsea 7. Throughout the planning and execution, the UTEC team worked closely with the Subsea 7 survey and engineering teams which resulted in the successful tow out and installation of the FPU," said John Brader, Subsea 7 SURF Survey Operations Manager, North & Central America



GEOTECHNICAL SOLUTION ACCELERATES DATA DELIVERY

PROJECT OVERVIEW

An offshore operator required geotechnical surveys at an oil field in the North Sea from UTEC, a Geo-services brand in Acteon's Data and Robotics division.

The recent scope of work involved sample recovery using vibrocore and cone penetration testing (CPT) along and around cable routes and structures of the development.

THE CHALLENGE

Geotechnical site investigations are normally carried out onboard dedicated vessels where there is an abundance of deck space for operations including lifts, deployments, recoveries and sample processing and testing.

However, for this project the work needed to be carried out onboard a client supplied vessel which was not configured for geotechnical operations, and presented a challenge due to limited deck space, because of the vessel's configuration for its normal operations.

UTEC's knowledge and experience was required to integrate the geotechnical spread with the vessel.

CUSTOMER GOAL

The customer needed to be prepared for mobilisation within a dynamic window based on the vessel's operational schedule. They also required expedited analysis of the collected geotechnical data with results made available as soon as possible to allow them to understand their design and construction tolerances.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS

Market-leading services and integrated solutions

- Seamlessly sourced a geotechnical spread including a 3m-9m vibrocore system, Neptune CPT system and over boarding chute.
- Mobilised a small geotechnical spread to suit the customer-sourced vessel.
- UTEC leveraged the expertise of Acteon companies MENCK and Aquatic to provide specialised equipment for the undertaking of this scope of work, and logistical expertise to ensure the timely transfer of samples to onshore laboratories for testing.
- UTEC is realising an increase in this sort of geotechnical survey application to maximise the utilisation of customer owned vessels and the integration with incumbent survey providers on more complex projects.

Operational bases across the world

- Multi-skilled personnel from across the Acteon Geo-services segment were utilised to provide around-the-clock support.

Work at scale with a proven track record for delivery

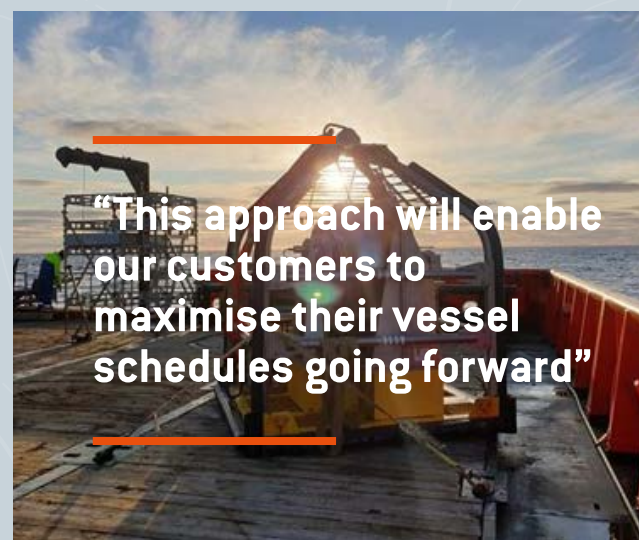
- The UTEC geotechnical team have an extensive track record of supporting customers on similar scopes of work, some with short notice mobilisation periods.

Optimise the project to increase commercial value

- The congested back deck was extensively modified in collaboration with the customer to enable the performance of geotechnical investigations. Packers were installed to level the deck and allow for a flat surface to land various equipment, enabling personnel to operate without encountering trip hazards.

PRODUCTS USED

- Neptune 5000 CPT System
- GMSS Geo-Vibro Corer



REMOTE MONITORING ON CONSTRUCTION PROJECT OFFSHORE NORWAY

PROJECT OVERVIEW

A UTEC comms hub was installed on a construction support vessel to facilitate a remote processing project on a development offshore Norway. UTEC, a Geo-services brand in Acteon's Data and Robotics division designed the comms hub to be flexible and to have the capability to deliver all types of remote services including processing, operations, and monitoring. The flexibility of the system is crucial to support the ever-changing nature of offshore operations.

THE CHALLENGE

After the mobilisation of the comms hub, Havfram, UTEC's customer, was requested at short notice to assist the central control room of an offshore production facility with the commissioning of a well. This required streaming video to monitor ROV valve operations in real-time at the offshore production facility and in separate client offices onshore. UTEC was able to quickly enable streaming services on the comms hub to meet this requirement without affecting the originally planned remote processing configuration.

CUSTOMER GOAL

Havfram's goal was to complete the commissioning support activities as requested by their customer at short notice. The comms hub was used to do this by providing a cost-effective and rapid alternative to the mobilisation of a video telemetry system which would have taken several days to arrive in the field as well as involving extra equipment costs, personnel mobilisations, and additional time to install the equipment, both on the platform and the vessel.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS

Market-leading services and integrated solutions

- UTEC used the comms hub to live stream ROV video directly to the platform control room and multiple onshore locations as requested by Havfram with no delay, resulting in the valve operations being completed safely, quickly, and successfully.
- Multiple technicians were able to monitor the operation without the need for additional personnel and equipment mobilisation, saving time and reducing cost.
- Havfram's end client was able to perform vital operations to maintain production with minimal disruption.
- The UTEC comms hub facilitates all aspects of remote services by providing a secure and resilient communications link whilst being extremely efficient in its use of bandwidth.

Optimise the project to increase commercial value

- The comms hub provided live video streams from the ROV to the central control room, as well as additional onshore sites, to avoid the delay, cost and HSE exposure involved with mobilising extra equipment and personnel. This type of operation would normally require the use of a video telemetry system which would involve the mobilisation and installation of equipment in at least two locations.

Minimise the environmental impact

- To deliver this solution no extra travel, personnel, or equipment was required which contributed to reduced HSE risks and reduced environmental impact by avoiding unnecessary CO2 emissions.

Combine digital technology and data to enhance our expertise

- The comms hub was interfaced with the vessel video system and the ROV video was live streamed to multiple sites to provide a real-time solution that required no additional equipment.
- The UTEC video streaming client minimised the bandwidth used whilst allowing multiple users to see the data.
- The flexibility of the UTEC system allowed it to stream video simply by enabling a streaming license.

PRODUCTS USED

- UTEC Comms hub

"We provide full video of the activities from the operations to multiple involved parties."

REMOTE PROCESSING INCREASES EFFICIENCIES FOR DECOMMISSIONING PROJECT OFFSHORE MAURITANIA

PROJECT OVERVIEW

Havfram was contracted by an energy operator to perform a decommissioning project offshore Mauritania which involved the removal and disposal of subsea infrastructure.

UTEC, a Geo-services brand in Acteon's Data and Robotics division was contracted by Havfram to provide survey services including post-decommissioning multibeam echo sounder surveys (MBES) to be carried out by a remotely operated underwater vehicle (ROV). A UTEC Comms hub was to be installed on the Havfram vessel, Island Victory and automated file transfer functionality used to facilitate remote data processing.

THE CHALLENGE

This project required several post-decommissioning surveys including six umbilicals, nine jumpers, nine mooring lines, and various site surveys. All these surveys were planned to be completed before vacating the field which would require non-stop data processing support throughout the survey activities. The survey data needed to be processed and results delivered as soon as possible.

Usually, jobs of this nature require at least two data processing personnel onboard the ship working a 12-hour rotation to meet a tight deadline. However, on this project, only one data processor was onboard, and one remote processor worked onshore. An automated file transfer system within the UTEC comms hub would be required to achieve a quick turnaround of results.

Another challenge was the requirement to log the MBES data with the backscatter intensity enabled. This significantly increases the volume of data that needs to be transferred. The functionality within the UTEC Comms hub would be used to overcome this challenge, without requiring additional bandwidth, by compressing the raw data and reducing the file size before automatically uploading it to the cloud for remote processing.

CUSTOMER GOAL

Havfram's goal was to complete the project using remote processing techniques to reduce their carbon footprint and project costs.

To do this they needed to securely get data ashore where it could be accessed by onshore personnel. This provided the additional flexibility of allowing onshore management to review and make decisions based on the real field data whenever required.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS

Market-leading services and integrated solutions

- UTEC used the comms hub to bring the data ashore securely and efficiently in close to real-time, allowing the onshore data processor to work as if onboard the ship. This allowed UTEC to complete the processing activities as requested by Havfram on time.
- The UTEC Comms hub facilitated all aspects of remote services by providing a secure and resilient communications link whilst being extremely efficient in its use of VSAT bandwidth.

Optimise the project to increase commercial value

- Havfram only needed to pay for the data processor for the time they worked on the data, and not the mobilisation and stand-by time associated with utilising offshore personnel.
- No additional equipment or software licenses were required as UTEC's remote data processors accessed centralised data processing resources remotely.
- Data was made available onshore immediately for management review to assist with any critical decisions related to the project operations.

Work at scale with a proven track record for delivery

- Using the comms hub and centralised data processing resources, UTEC delivered results efficiently within the customer-defined timeline. This adds to an extensive track record and proves that UTEC can deliver results at scale for future projects.

Minimise the environmental impact

- The UTEC Comms hub allowed the remote processor to work from the UK while the project was in Mauritania, reducing HSE exposure, saving time, minimising costs, and reducing carbon footprint.

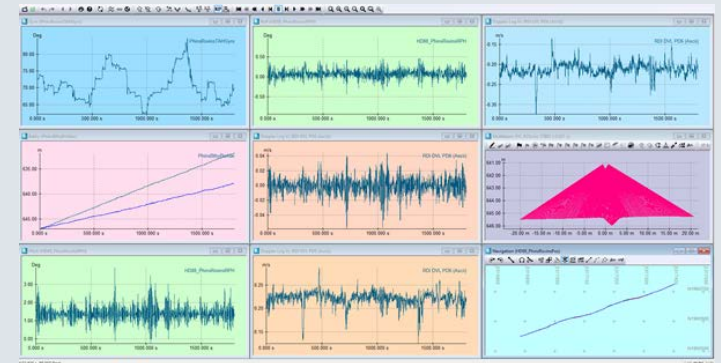
Combine digital technology and data to enhance our expertise

- The comms hub was interfaced to the vessel network system and the ROV survey data, including video, and was uploaded to the cloud in real-time with minimum user involvement.
- The network resilience of UTEC's SD-WAN tunnel minimised the bandwidth required for data transfer by eliminating packet loss and WAN delays to provide seamless and highly secure data transfer.

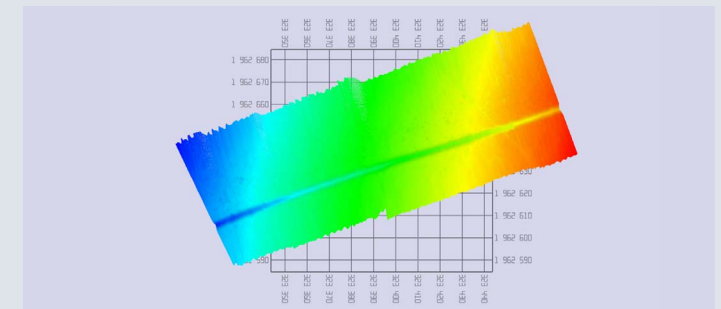
PRODUCTS USED

- UTEC Comms hub

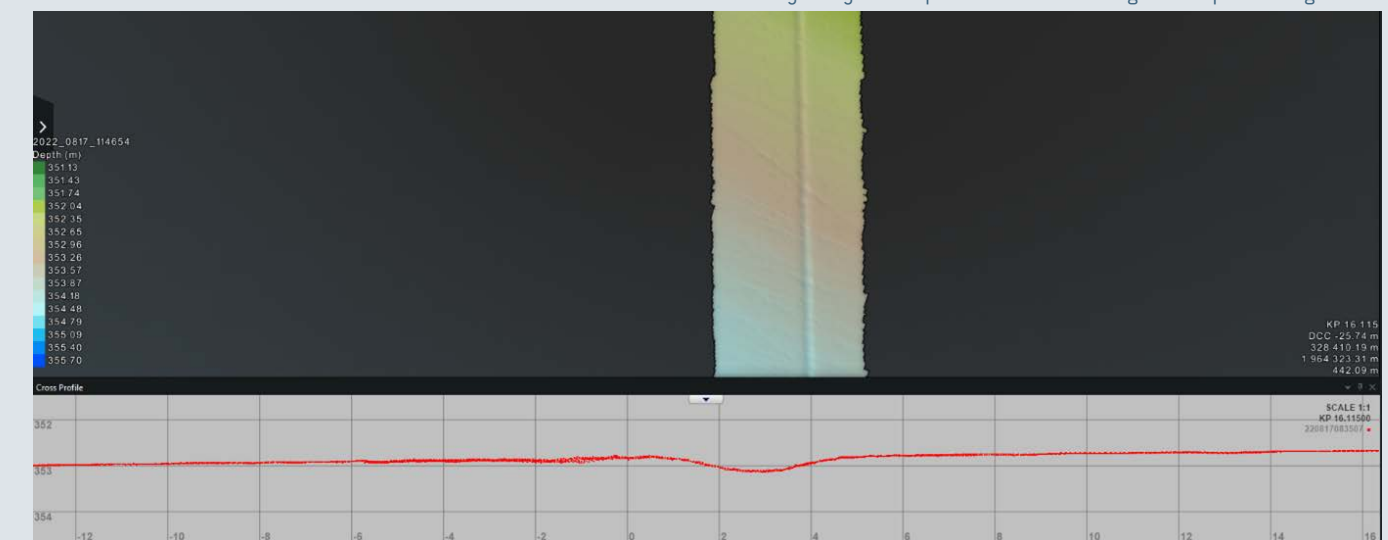
"Once again UTEC's remote technology has provided our customer with an innovative and cost-effective solution to successfully complete the project while minimising the carbon footprint of our operations as well as reducing the HSE exposure of our personnel. We are proud to be able to deliver these remote services to our customers at scale," said Ross Leitch, UTEC EA Region General Manager.



NaviEdit in use during remote data processing



MBES Bathymetry data in point cloud form during remote processing



Processing MBES data in DTM form

"Remote technology has provided our customer with an innovative and cost-effective solution."

DE-RISKING FIRST-USE LBL SOLUTIONS ON FLNG PROJECT

PROJECT OVERVIEW

A major subsea contractor required specialist support survey work on the development of an FLNG (floating liquefied natural gas) project off the East coast of Africa.

THE CHALLENGE

The project involved accurate subsea positioning in ultra-deepwater – and wanted to achieve vessel time savings using new technologies; sparse LBL (long baseline) for ROV positioning.

The choice of the sparse LBL system and its use on the project was UTEC's (a Geo-Services brand in Acteon's Data and Robotics Division) responsibility and UTEC had the flexibility of choosing a technology provider with the system best suited to optimise the project. The chosen system was iXblue's Canopus and Ramses. Although the system had been presented to the industry during trials and demonstrations, it had never been deployed on an actual large commercial project within the energy industry, and UTEC would be the first user of the system. This presented significant risks: failure of the system to deliver would result in delays and extra costs for the customer.

CUSTOMER GOAL

The customer wanted accurate subsea positioning to support their installation of manifolds, flexible pipelines and umbilicals with the associated pre- and post-installation surveys.

They also wanted to use new technologies to achieve vessel time savings that could be repeated on future larger projects, whilst minimising the number of the offshore survey team required.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS TO THE PROJECT

Market leading services and integrated solutions

- Sparse LBL was used, which is a method that combines INS (inertial navigation system) with acoustic ranges to seabed transponders to position ROV's to similar or better accuracy than conventional LBL while using fewer transponders.
- The experienced teams of UTEC surveyors operated the specialist positioning system in conjunction with other survey and positioning equipment to provide the positioning accuracies needed for the efficient installation of the projects' structures, pipelines and umbilicals.
- By undertaking a detailed risk assessment and implementing mitigation measures, UTEC was able to successfully be the first user of the Canopus and Ramses positioning system.

Work at scale with a proven track record for delivery

- UTEC has 15 years of experience providing positioning and survey support for hundreds of pipeline and structural installation projects around the world and has developed industry-leading knowledge and capabilities in subsea positioning systems.
- UTEC provided experienced offshore survey teams for the duration of the project – maintaining the standard even as the project extended past its original end date and crew changes were severely impacted by COVID-19 travel restrictions.
- As this was the first time that Canopus and Ramses were being deployed, UTEC ensured that all field personnel received training in the system and had the opportunity to specify changes necessary for operational efficiency.

Optimise the project to increase commercial value

- Sparse positioning meaning fewer transponders to be deployed and recovered resulted in vessel time savings.
- Efficient power management in the Canopus transponders enabled them to operate three to four times longer than alternative transponders saving further vessel time by not needing to replace any exhausted units.
- UTEC evaluated the available sparse LBL positioning solutions and selected the system with the clear technical and commercial advantages, including the longer battery life, backed up with proactive support. This combination achieved the most cost-effective solution for the customer.
- Predicted time and cost savings were achieved, and a wealth of experience, to be used on future projects, was gained by all parties.

Combine digital technology and data to enhance our expertise

- A satcom link was established between onshore technology specialists and the actual Ramses units fitted to the ROVs, enabling the onshore support team to directly configure and operate the system, providing flexibility if the offshore personnel encountered problems. Although the offshore personnel did not need this support, it was proved operational and now provides an option for reducing the number of offshore personnel needed on future projects.



INSTALLATION OF DEMONSTRATION TIDAL TURBINE OFFSHORE JAPAN

PROJECT OVERVIEW

Helix Robotic Solutions partnered with UTEC, a Geo-services brand in Acteon's Data and Robotics division, to provide survey and positioning services to support the installation of a demonstration tidal turbine in the Naru Strait, Japan, for end-client Simec Atlantis Energy. This is the first full-scale trial project of AR500 tidal turbine. The turbine has been temporarily installed subsea and run at 500kW output power whilst its performance is being monitored. After at least six months the turbine will be recovered and inspected for wear and tear. Foundation and export cables will remain offshore. If trials are successful, these turbines could be re-used in a possible second phase project, subject to approval.

THE CHALLENGE

UTEC needed to provide vessel positioning onboard the installation vessel, the Grand Canyon 2; subsea positioning of the ROV and turbine during deployment and installation on the foundation; and installation of the deep water section of export cable. The water depth at the turbine location was approximately 40m. The project presented challenging conditions and narrow operation windows due to high tidal currents.

CUSTOMER GOAL

Helix Robotics Solutions required a strategic partner to provide survey and positioning services to support the installation of a demonstration tidal turbine in the Naru Strait, Japan, for end-client Simec Atlantis Energy. This demonstrator project would seek to capitalise on Japan's wealth of tidal resources.

OUR SOLUTION AND ITS COMMERCIAL BENEFITS TO THE PROJECT

Market leading services and integrated solutions

- UTEC provided vessel positioning onboard the installation vessel, subsea positioning of the ROV and turbine during deployment and installation on the foundation, and installation of the deep water section of export cable.
- UTEC provided the as-laid survey of turbine and cable.
- Operations were completed in January 2021. The risks of challenging conditions and narrow operation windows were successfully mitigated. The turbine has already started generation and the project developers will now perform various tests ahead of the official start of the demonstration phase.

This is an exciting project for Acteon to be involved with at such an early stage in a region where we are starting to grow the market.



ACTEON | DATA AND ROBOTICS

ELECTRONICS AND TOOLING

J2 **seatronics**
subsea

GEO-SERVICES

Benthic **TERRASOND** **UTEC**
INNOVATION TO THE CORE PRECISION GEOSPATIAL SOLUTIONS

STRUCTURAL MONITORING

PULSE Structural Monitoring

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CORROSION MANAGEMENT

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CUTTING AND DECOMMISSIONING

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