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CODA OCTOPUS - NPCC SURVEY

REAL TIME 3D SONAR AIDS DEPLOYMENT OF PIPELINE INSTALLATION WHITE PAPER

*Benefits to be derived in pipeline installation
by using real time 3D Sonar*

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Real Time 3D Sonar Aids Deployment of Pipeline Installation

Background

National Petroleum Construction Company (NPCC) was awarded by Zakum Development Company (ZADCO) a major offshore contract for Upper Zakum (UZ) 750 oilfield expansion. This project included the installation of several platforms, 32 pipelines and 11 cables with 400 crossings at various locations along the proposed pipeline and cable routes. This process required the deployment of 2500 concrete crossing sleepers used for aiding installation. The precise seabed location, lay position and physical asset separation measurements of the sleepers were designed to ensure the permitted bend radius of the pipeline was maintained with the required separation between the two pipelines, being approximately 300mm.

In the performance of this contract, the key objectives for NPCC were (i) to maximize the overall productivity and (ii) enhance the safety during the sleeper installation operations while (iii) simultaneously delivering the project to the highest standards possible.

Historically, sleepers have been deployed using multiple divers performing taut wire techniques relative to seabed-deployed datum blocks and the existing subsea assets. This is a very time consuming task that can only be conducted during daylight hours due to concerns over diver safety.

Accurate deployment of concrete sleepers is critical within an already congested seabed, and requires precise placement with real-time monitoring. Client installation tolerances for position and orientation of +/- 0.7 meters and 5° respectively are to prevent damage to existing live critical pipelines and cables.

New Methodology

NPCC Survey combined out-of-the-box thinking and state-of-the-art technology to find a solution that incorporated all of the requirements set out by ZADCO, the end client, in the congested and live environment.

To achieve this NPCC invested in the CodaOctopus® Echoscope® real-time 3D imaging sonar paired with the latest edition of the Underwater Survey Explorer™ software (USE) with the solution forming the prime technology tool, enabling real-time scene visualization. Using real time three-dimensional sonar images NPCC could monitor deployment of sleepers from their initial over boarding through to their final positioning – all as it happened.

A critical benefit of this technique over an acoustic ‘positioning-only’ solution such as USBL is the ability to continuously incorporate the proposed sleeper placement as models into the USE real-time visualization and see these relative to the existing subsea infrastructure.

In addition to meeting the client-specified installation tolerances, the Echoscope® was able to produce a complete ‘as-built’ survey with little additional effort or post processing.

The Trial Operation

The Coda Octopus Team, headed by Blair Cunningham, Coda Octopus' President of Technology, undertook an initial sleeper operation assessment and derived the expected usable ranges on the target from the real time 3D Echoscope[®] sonar head to the sleeper target. This was based on known water depths and sleeper dimensions allowing NPCC to confirm to their client the installation tolerances combined with the integration of the traditional methods to allow comparative data.

Due to the fast track nature of the project installation schedule, an initial meeting was arranged with the project team to review the proposed methodology and obtain the necessary sleeper dimensions and individual separations for the typical crossing configuration. This data was required by CodaOctopus[®] to allow accurate simulation and planning in the CodaOctopus Underwater Survey Explorer[™] (USE) software.

The expected distances from the barge-mounted Echoscope[®] to the crossing structure were 27 meters, 21 meters and 17 meters. This information was reviewed taking into consideration the tight installation tolerances and the challenge of operations around live subsea pipelines and cables.

A decision was made to conduct a trial to verify the optimum distances and angles between the Echoscope[®] and the sleepers. This provided an assessment of deployment times and accuracy whilst delivering initial system training to the NPCC survey team.

The trial was a success and readily illustrated that the proposed deployment methodology would be accurate and repeatable. In addition to meeting the precise tolerances it was evident to both the NPCC Project Manager and ZADCO, the client, that the solution would provide a significant increase in overall productivity and an enhancement to safety.

In conjunction with Coda Octopus, a dedicated installation trial plan was undertaken to train survey personnel while performing a real time series of sleeper installations.

Accuracy and Efficiency

The trial was conducted whilst moored alongside the jetty at the NPCC Fabrication Site and Base at Mussaffah in UAE during the 2nd to 4th April 2013.

The purpose of the trials was to verify the proposed solution met the client's requirements and to provide in-project training to the survey personnel. Additionally, the trials were used to illustrate to the project and diving teams the potential time saving obtainable by using this innovative technique rather than the previous diver deployed installation aids.

The CodaOctopus[®] USE software contains the ability to import user specific models into the 3D environment, enable control and manipulate position and orientation relative to targets on the seabed. The Echoscope's[®] easy method of measuring range and bearing relative to a given target were emphasized.

The scope of the trials was to deploy three crossing sleepers at proposed locations from the NPCC Pipe Lay Vessel PLB648 (pictured) using the stern mounted crane. The vessel was stationary on the quayside to allow surface positioning system verification whilst monitoring and verifying the position of the sleeper. Dual CNav DGPS and Gyro were set up in the field engineer's office onboard the PLB648 and these as well as the Eiva Navipac online navigation package and the Echoscope[®] were interfaced to ensure real-time positioning for the complete system.



NPCC Pipe Lay Vessel PLB648

The deployment of the three trial sleepers at proposed locations was monitored by surface positioning and the CodaOctopus[®] Echoscope[®] system with divers used for final positioning and disconnecting slings.

Divers would then make physical tape measurements between sub-sea sleepers to compare against the Echoscope[®] derived measurements. The trials were observed and monitored by the operations engineers and survey management.

The trials proved to operations engineers, surveyors and divers that using the CodaOctopus[®] Echoscope[®] sleepers could be successfully deployed and fully installed at the nominated ranges and all within required tolerances with an average deployment time of approximately 20-30 minutes each. This was compared to anything between 1 hour and 3 hours using the old methodology. Also using this solution the efficiency of sleeper placement was increased substantially, diver operations were reduced and overall safety was enhanced.

As expected the resolution achieved increased if the Echoscope[®] was used at a closer distance to the sleeper giving easier to interpret images with more fidelity.

This interpretation was also greatly enhanced by using the software feature of colouring the data relative to the height from a known or placed model contained in the CodaOctopus[®] USE software package.

A remote monitor was set up in the crane cab with a live feed of the Echoscope[®] view. The crane operators quickly understood the information being displayed and maneuvered the crane quicker and more accurately towards the proposed location using their own initiative and the detailed screen displayed image.

Engage and Enhance

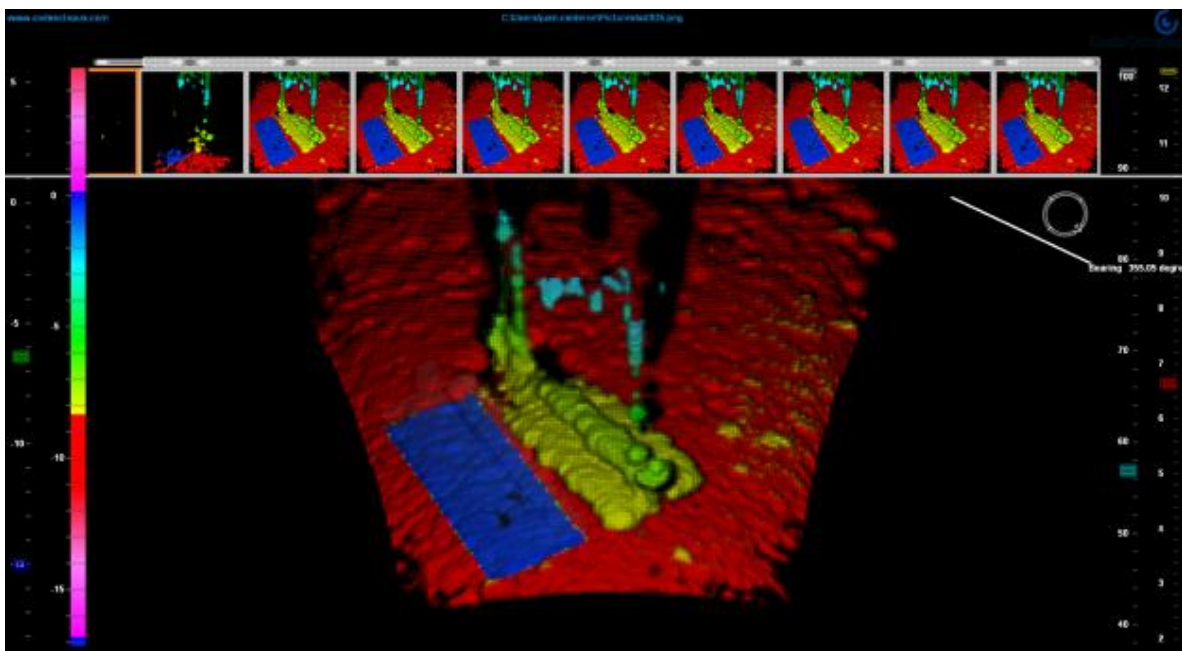
At the time of the trials it was determined that Automatic Subsea Asset Tracking – which is a unique feature only available in CodaOctopus® Construction Monitoring System (CMS) software would be of great benefit. The capability allows a user to see a CGI model of a concrete armor block like an ACCROPODE™ or XBloc™ overlaid on the 3D data from the Echoscope® and track it automatically using the real time 3D data as a guide.

Provided that accurate heading and position information is provided, CMS has the ability to build up a database of block locations and orientations with a full rendering displayed on-screen.

Furthermore, CMS allows the operator to detect variations between the block location database and the current situation, showing any movement in the laid blocks through quick and easy in-operation survey of the area for absolute validation.

A natural extension to the CMS software is to allow sleeper model tracking and ultimately this would provide a very intuitive real-time display for the crane operator, engineers and operations during these placements. Coda Octopus proactively engaged NPCC and provided a recommendation for software customization to better suit their project specifications.

A second trial was undertaken at NPCC base after the Underwater Survey Explorer™ software enhancement modification, with the aim of checking the reliability of the Echoscope® results using existing conventional methodology. From 25/10/13 to 27/10/13 Ixsea GAPS beacons and a CDL TOGs gyro were deployed, and the position and orientation results derived using them were compared with those derived from the Echoscope® data. It was found that the two sets of results correlated well thus verifying the accuracy and repeatability of using the Echoscope®.



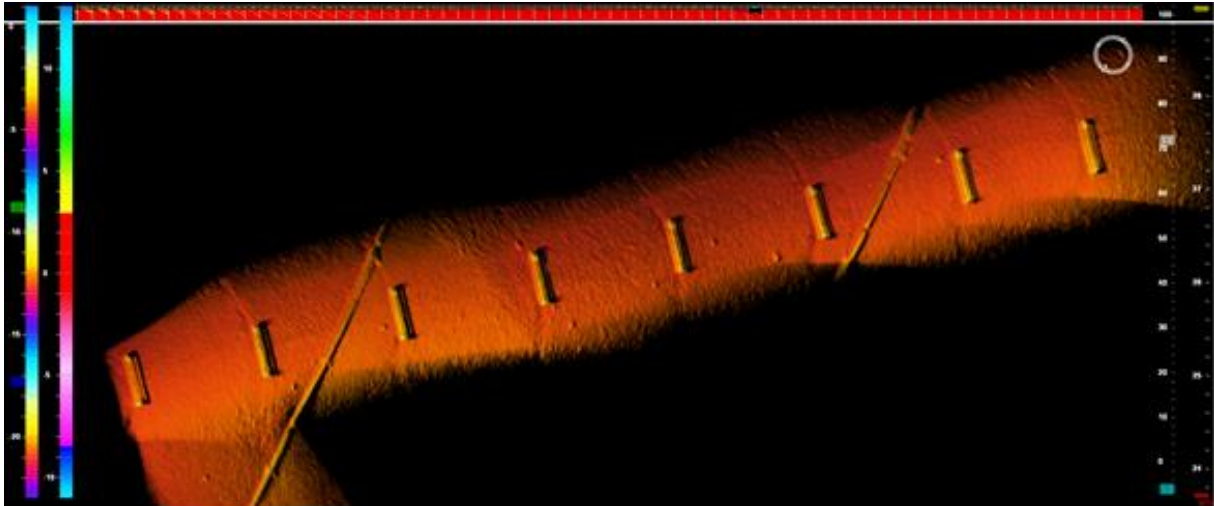
Echoscope® data giving spatial feedback when placing objects with accuracy

24 hour Operations

After the successful deployment of the sleeper, the final position and orientation were derived by both the Echoscope[®] system and Ixsea Gaps beacons with CDL TOGs gyros. These results were within the error budget calculated as per the proposed installation tolerances.

The operators on the project had been selected due to their experience in pipeline installation projects and familiarity with the process onboard the proposed installation vessels. This ensured continuity throughout the project installation schedule for NPCC.

The installation pipe laying barge was mobilized on 25 October 2013 to complete the initial 250 sleeper campaign. This included Echoscope[®] trained survey personnel, senior hydrographic surveyors and project support from NPCC with a field engineer from Coda Octopus.



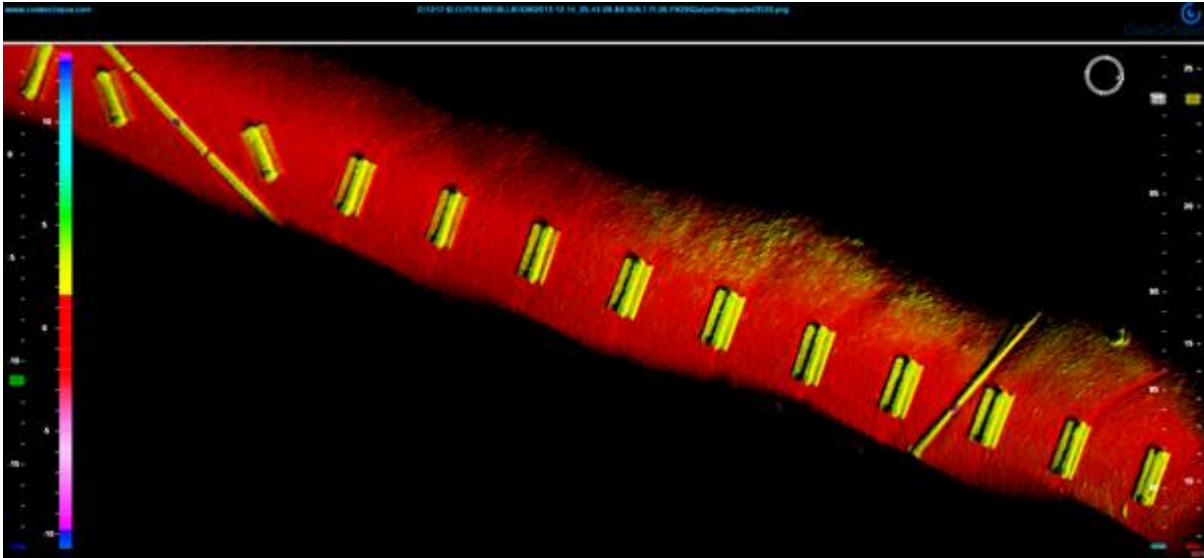
Post sleeper lay survey to determine actual positions and accuracy of placement

Outcome

The comparison between the Echoscope[®] method and previous methodologies demonstrated that sleepers were accurately positioned meeting the prescribed specifications. The end client then approved the use of this new methodology for the project. NPCC henceforth conducted 24-hour operations with minimal diver intervention during the sleeper deployment process. The diving team only being used for disconnecting the slings from the dedicated lift points on the sleepers once placed in position. A measurable and significant productivity gain was achieved.

Tareq Abdulla A Al Marzouqi, NPCC Survey Manager, who was the key driver in proposing the Echoscope[®] for the project stated; *“the system greatly enhanced the overall efficiency and safety. The technology surpassed the previous number of sleepers being deployed within 24 hours. By utilizing real time 3D technology and task specific software, it offered endless opportunities and benefits to the offshore survey and construction business streams.*

With the introduction of 24 hour operations, and once the swift learning curve had been achieved, an average of 30 sleepers were deployed during phase 1 of the Project”.



Blair Cunningham, Coda Octopus' President of Technology played a strategic role in the implementation of the Echoscope[®] system and oversaw the education and training of the NPCC survey personnel.

Blair said *"The results we have seen have been quite remarkable; Coda Octopus has worked on numerous projects that involved subsea asset tracking but none of which exposed such gains in productivity, operational efficiency and safety standards.*

The relationship between Coda Octopus and NPCC made this the success it has become. NPCC's commitment to the technology whilst displaying a creative and enterprising approach on this project led to the incredible synergy that has presented measurable impacts.

Without their cooperation, understanding and willingness to elevate the Echoscope[®] system into new operational areas, none of this would have been at all possible."

The subsequent 500 sleeper placement campaign took place using the Echoscope[®] technology and NPCC has seen record breaking results. The overall average productivity has increased fourfold. This was just not achievable by traditional diver taut wire techniques.

Tareq Abdulla A Al Marzouqi continued; *"NPCC have completed installing almost 700 sleepers already in a record time. The fastest installation was in early 2014 where we installed 38 sleepers in 12 hours."* This compares to NPCC's original target for the project of 6 sleepers per shift.

NPCC will begin phase 2 which includes a 1500 sleeper lay operation. There will be a continued refining approach of sleeper placement to assist pushing efficiency boundaries into new, more challenging environments and operations.

****Ends****

About Coda Octopus Group, Inc.

Originally founded in 1994 as Coda Technologies, the Coda Octopus Group is now headquartered in Lakeland, Florida. The Group consists of a Marine Products business in Florida and Edinburgh, Scotland, and engineering businesses in Utah and Weymouth, England. Each of the Group companies are technology innovators with a particularly high level of sonar expertise. The Group has facilities in Florida, Utah, the UK and Norway.

Alongside providing custom engineering and development for defense applications, and oil and gas, companies, one of the Group's key products is the CodaOctopus® Echoscope® - the first real-time 3D sub-sea sonar. The Echoscope® is also at the heart of the Underwater Inspection System™ which is being adopted for homeland security, and other applications in ports around the world.

With this patented, revolutionizing sub-sea visualization capability, and the existing systems integration skills within Coda Octopus Colmek, Inc. and Coda Octopus Martech Ltd., the Coda Octopus Group believes they can become a world leading integrated sonar technology supplier.

For further information, please visit <http://www.codaoctopusgroup.com> or contact Coda Octopus at info@codaoctopusgroup.com.

Safe Harbor Statement:

This document contains certain forward-looking statements. These forward-looking statements can generally be identified as such because the context of the statement will include words such as Coda Octopus Group plans, expects, should, believes, anticipates or words of similar import. Stockholders, potential investors and other readers are cautioned that these forward-looking statements are predictions based only on current information and expectations that are inherently subject to risks and uncertainties that could cause future events or results to differ materially from those set forth or implied by the forward-looking statements. Certain of those risks and uncertainties are discussed in registration statement on Form SB-2 and include, but are not limited to, market acceptance of Coda Octopus' planned products and their level of sales, access to the capital necessary to finance and grow the business, a highly competitive environment in the security field that includes numerous large and well established companies much larger than ours, and our ability successfully to deploy our technologies and products to meet the technical demands and market requirements of our customers. These forward-looking statements are only made as of the date of this press release and Coda Octopus Group does not undertake any obligation to publicly update such forward-looking statements to reflect subsequent events or circumstances.