DYP

MAGASINET FRA FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI NR 1, 2014

FFU
FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI

16: FFU-SEMINAR 2014

SAMLING PÅ BUNN

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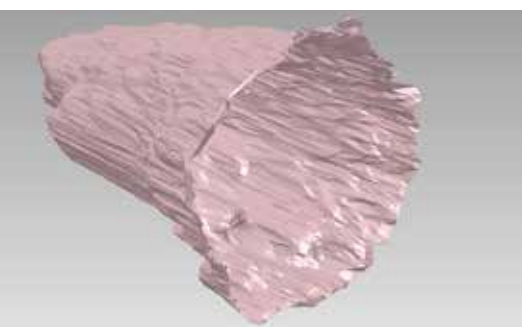
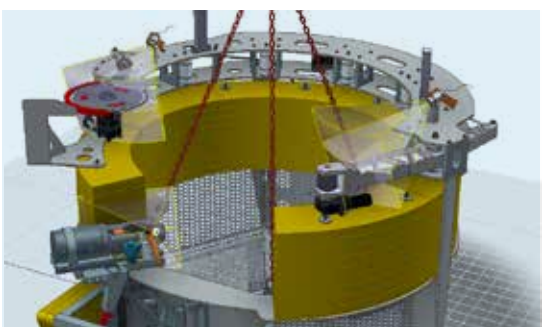
12" WI Header Ball Valve leakage

11: Fjerning av blindflens med ROV
i utfordrende omgivelser

14: Stinger
Suksess med mikro-teknologi





FFU
FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI

DYPMAGASINET

FRA FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI NR 1, 2014

Velkommen til seminar

Godt nytt år – alle nye og gamle FFU-medlemmer. Vi i undervannsbransjen har hatt noen gode år bak oss, og selv om det generelle offshore-markedet nå gjerne kjølner noe av framover, så tror jeg at de aller fleste av oss skal se fram til et nytt år med nye og spennede oppgaver knyttet til vår del av bransjen.

I vår første utgave av DYP i 2014 har vi fått med artikler med ulike temaer og innhold. Våre nye bedriftsmedlemmer, Nexum og Envirex har fått plass i to separate artikler hvor de skriver om deres tjenester og produkter. Dette er begge relativt nystartede firmaer som blant annet jobber med hydrauliske systemer og verktøy til bruk under vann. Begge bedriftene har sprunget ut fra den eksisterende Jærindustrien, så til tross for relativt ung alder på begge bedriftene så er det både kompetanse og erfaring å finne hos dem begge.

Videre så kan dere lese om DeepOcean sine erfaringer fra en fjernstyrt ventil-reparasjon på en undervannsmanifold. Her har det vært benyttet friksjons-sveising for å reparere et hull i en ventil knyttet til vanninjeksjonssystemet.

I den sydlige delen av Nordsjøen har Subsea 7 vært ute og installert nytt utstyr og fjernet gammelt, og de deler sine erfaringer med oss i dette nummeret.

Til slutt vil jeg minne om FFU-seminaret 30.01.14 som i år arrangeres på Quality Airport Hotel på Sola i Stavanger. Etter fjorårets 25-årsjubileum seminar, er vi nå tilbake til vår opprinnelige form på seminaret, med noen mindre endringer. Dere finner en artikkel om seminaret i magasinet sammen med programmet for arrangementet.

Da håper jeg at de av dere som ikke allerede er påmeldt til seminaret går inn på vår hjemmeside, www.ffu.no og tar en kikk på seminarprogrammet og deretter melder dere på dersom dere har tid og mulighet til det.

God lesning!

Christian Knutsen
Leder FFU

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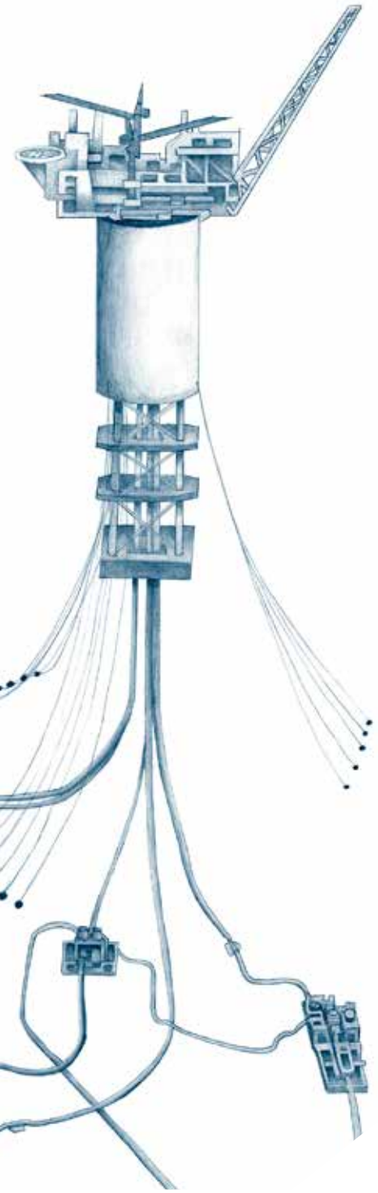


MELVÆR & LIEN Illustration: Kris Lundø

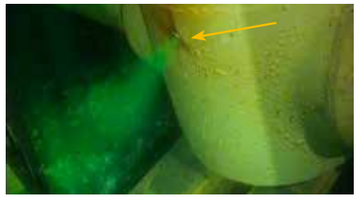
seabed-to-surface

12" WI HEADER BALL VALVE LEAKAGE

Author: Jann Bjørnnes DeepOcean, co-authors:Magnus Aarbakke, DeepOcean, Dave Gibson, Technical Advisor, Proserv UK; Arne Kinn, Principal Engineer, Imenco Norway; Torgeir Trydal, Technical Manager, Scopos AS,

Background

Suspecting a small system leak, inspection by ROV in Oct 2012 revealed a leakage in a water injection (WI) ball valve in a subsea template at 280 metres. A test port plug was missing, venting approx. 250 bar water pressure to sea.

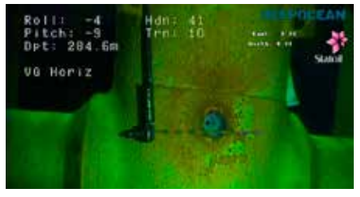


Leakage as discovered October 2012.

Quickly scanning proven designs, two types ROV installable sealing plugs (IK and Nexum) were made for FAT testing.

ROV installable sealing plug (by IK).

Meanwhile, the WI continued. In January 2013, prior to installation, a final survey was performed to check exact hole tolerances. It was found that the original ø 12 mm port had become a rough crater, approx.70-80 mm ID at the opening.



Crater being investigated, January 2013

The rough surface made sealing difficult. Probably caused by cavitation, the big ID hole forced the shutdown of WI. The plug solution had to be abandoned.

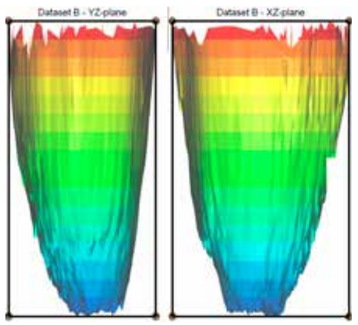
Task Force worked several solutions using simple contract structure

Starting from scratch, a task force was established, meeting several times a week, developing three methods of ROV repair in parallel. The aim was to have at least two working solutions at mobilisation. Solutions should be pre-qualified/used before. Using established IMR Frame Contracts, a simple and workable contract structure was made.

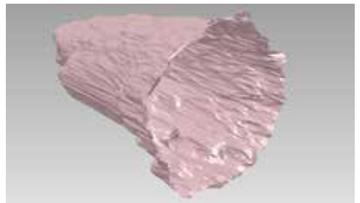
3D ROV Camera to make hole replica

Due to insufficient drawings and documentation, Scopos was hired to measure the valve dimensions, surrounding structure and the crater. Using their special 3D camera attached to the ROV, several pictures per second from several angles were taken.

Data was processed as follows: From the pictures, a point cloud can be generated by measuring distances to each point. From these, a 3D model can be built in a computer, combining all data. This can be done in real time (offshore) or in a computer lab afterwards.

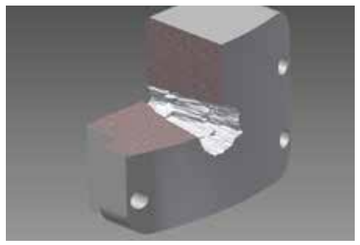


3D data YZ and XZ planes



3D generated crater surface

The method allows for the mapping of unplanned targets later (provided enough pictures taken). The hole was located in an un-machined HIP moulded surface of the valve housing, with uncertain local radius. The mapping verified the local radius as input to design of the seal for proper fit. The mapping also included the jagged hole. The resulting 3D data were processed into a CNC programme. This was used to make Super Duplex replicas of wall section and hole for tool tests. 3D plastic models were also made.



Sectioned test fixture with reproduced crater, and a CNC machined replica

The Scopos 3D mapping capacity was experienced to be superior both in accuracy and vessel time efficiency, compared with traditional measurement.

Chosen repair methods and selection criteria

Two of the three methods were selected for further development: The Sealing Clamp and the Super Duplex Subsea Friction Weld method. Important selection criteria were: Minimise complex subsea ROV work. Maximise existing design elements. One method should not block for the use of another.

Super Duplex Subsea Friction Weld method

Proserv UK and Norway has supplied friction welding for retrofit of anodes and studs subsea, for over 15 years. Example: Retrofit anodes on existing pipelines or FPSOs: The studs are welded through the coating onto a live pipeline/hull using Proserv's HMS3000 friction welding system mounted on an ROV and powered by its hydraulic system.

Proserv's HMS 3000 friction welding gun

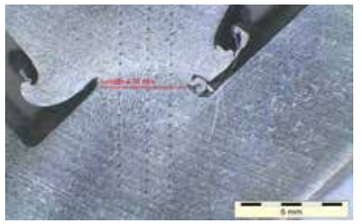
The welding tool is controlled and the process monitored via a data link in the ROVs umbilical. Each weld is tested by applying a tensile pull with the HMS3000. Based upon experience with these welds, Proserv began by testing studs in super duplex. The material proved to be very suitable.

Super Duplex studbolt welds incl bend test

The method was gradually refined into a friction welded sealing plug in a pre-prepped hole, adapting the HMS 3000 for subsea machining as well as welding. An accurate (repeatable-position) docking mechanism was developed by DeepOcean for the HMS 3000 ROV tool.

The work was carried out as a collaboration between Proserv's friction welding team (UK), DeepOcean's ROV specialists, and consultations with The Welding Institute.

Plug weld, and material testing sample showing fusion line length (red line)



The method will be ready for use early in 2014.

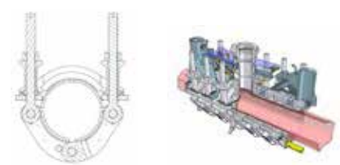
Method used: the Imenco Clamp Sealing method

A specially designed clamping device, developed by Imenco, was successfully installed on 20th June 2013. It seals the hole by applying an elastomer seal on the valve housing outside surface. The seal is incorporated in a seal plate held in place with a 50 tonne force clamp embracing the upper valve housing. All the installation work was done by ROV aided by a topside crane.

The concept was initially proposed during a brain storming session, but was temporarily abandoned after preliminary calculations indicated a very heavy object (300-400 kgs). Furthermore, the sealing mechanism would have to be developed from scratch and be qualified according to internal procedures.

Design Adaptation from Tee to Leakage Repair Clamp

However, DeepOcean contacted Imenco, who had already developed, qualified and installed a clamp tool for hot tap 'T' on Åsgard Subsea Compression, the so-called Retrofit Tee Clamp for ÅSC MFP project.



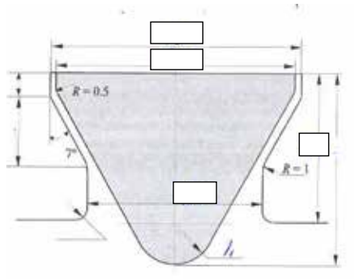
The retrofit Tee Clamp, and sectional view

Imenco proposed to use part of the existing clamp design.

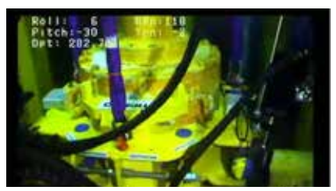
The Imenco Sealing Clamp for Vigdis

A seal plate was saddle-shaped to fit on the cylinder shaped body. Ball joint at the seal plate base prevents separation between the seal and valve wall during clamp actuation and clamp flexing. The HNBR seal was developed in the Tee project. It is a specially designed dovetail seal that is 'forgiving' against the un-machined valve body surfaces and small gaps that may occur along the circumference.

The valve housing is hipped, and may also have a slight outer diameter variation. The seal was originally designed for the (unprepared) outside surface of a pipeline. The clamp was ROV installed, using lifting slings and buoyancy, and is located around the valve with the seal plate covering the hole. The clamp arms are wrapped around the cylindrical housing energised by hydraulic cylinders.



The HNBR Dovetail Seal



The sealing clamp being installed

After engaging the lock pin at the rear, the clamp was tightened using two torque tools on the two tensioning bolts, one at either side, until the preload was approx. 50 tonnes. The clamp is protected by dedicated anodes.

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By MacArtney

A PERMANENT SUBSEA LEAK DETECTION SYSTEM

has been developed and installed on the seabed under an oil platform in the North Sea.

Nodes are distributed around the area to be monitored and connected by cables for direct data transfer topside and to land. In addition to sonars and sniffers, current meters are used to measure the strength and direction of sea currents. The latter is an important parameter that affects the "signature" of a leak.

The system records data 24 hours a day, and this information is fed into the historical PI database for control room monitoring and automatic detection.

Configuring the link in a ring allows power and signals to travel in either direction. This ensures that the system remains operational even if cables break in one place.

The integrated solution combines two different and independent measurement principles to achieve the required reliability. Sonars are used for direct detection, along with a technique sensitive to the concentration of methane molecules dissolved in water.

Acoustic waves emitted by the sonars, located atop stands several metres high on the seabed to give optimum coverage, are reflected from gas bubbles in the water. Continuously scanning over 360 degrees, the horizontal sonar provides a "radar image" with a full view of the sea floor. The vertical sonar is pointed remotely at a suspected echo on the radar screen for further investigation and verification.

The system provides automatic alerts of possible leaks. However, many echoes in the sonar images from the seabed, from fixed structures and, in some cases, from fish or other animals must be filtered out and algorithms for filtering out unwanted noise has been developed.

The second technique utilises sensors popularly known as “gas sniffers”, which work by detecting that portion of the gas bubbling up from a leak which becomes dissolved in seawater.

Dissolved methane molecules will be scattered from the leakage point, depending on the strength and direction of the sea currents. Sniffer sensors are highly sensitive and can measure the concentration of methane molecules down to the natural background level in the sea.

How these two methods work in combination can be illustrated by thinking about the smoke rising from a smouldering fire in the dark. A person will immediately feel ("sniff") that something smells burnt, without having localised the source. If the strength and direction of the wind are known, the suspected source can be narrowed down. At the same time, the flames are easier to spot, and correspond to rising gas bubbles which can be localised by sonar echoes.

To support its leak detection and seabed monitoring system, the project has also developed a control system which allows remotely operated vehicles (ROV) to be controlled over the internet.

This allows rising trends and/or alarms to be followed up by visual inspection using a MicroROV system launched by a technician on the platform and controlled by a specialist pilot located in a control room on land. Live video is distributed both on land and offshore.

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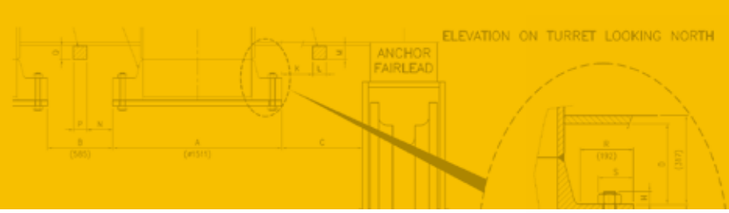
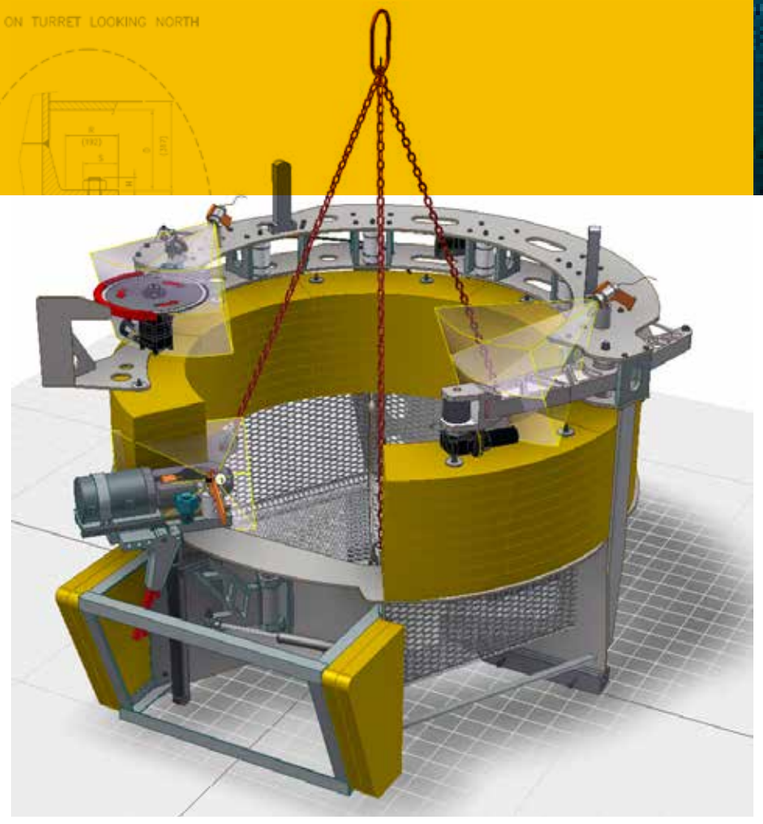
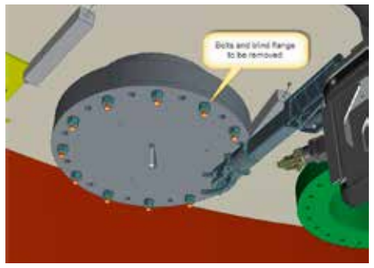
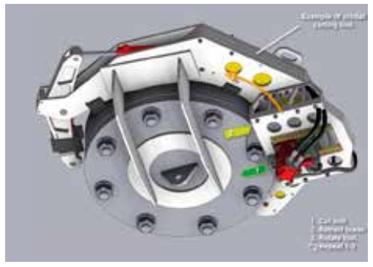


SAFE BLIND FLANGE REMOVAL IN LIVE AND CONGESTED AREAS







The first campaign of an EPCIC contract was a diver-less intervention to remove a blind flange under a live operational FPSO turret located in a harsh North Sea environment. This was achieved by the design and build of a bespoke tool: The Subsea 7 BFRT (Blind Flange Removal Tool).

Text: Mitchel Low
Photos/illustrations: Subsea 7

Interfaced directly with the ROV, the vehicle docks the tool onto the flange and then controls its rotation around the flange, cutting the twelve bolts from the top of the flange using a saw blade attached to a feeding arm. The offshore campaign to remove the blind flange was on the critical path of the project as the next workscope was to install a Bend Stiffener Connector to the flange, to allow a riser pull-in.

Concept Design and Key Challenges

The nature of in-house design of custom tooling means that whilst several aspects of the design are unique to a project, the evolution of this type of tool is evident from previous Subsea 7 design projects. In this case the design has evolved from a rotating pipe cutting tool, used in the vertical orientation, at a depth of 80m.
The key deliverables for the project design team were mechanical, hydraulic, electrical, controls, design and testing, coupled with ROV interfacing, offshore support and creating procedures, design reviews and risk assessments.

The project was based on a built documentation from the client, and more recent survey data from the adjacent guide tube. The blind flange cover was secured using twelve nuts, bolts and washers around the circumference of the flange. The bolts were industry standard M45, measuring around 72mm between the flat faces of the nut, the washers underneath were around 4mm thick. The M45 bolts weigh around 5kg each. Other key known dimensions were as follows:

- Blind Flange Material: **Carbon Steel**
- External flange diameter, **1016mm**
- Blind Flange Diameter, **1511mm**
- Blind Flange Thickness, **40mm**
- Blind Flange Weight, **800kg** (560kg submerged)

The restricted access was a challenge in relation to the ability of the ROV to remove the bolts from the top of the flange. From previous operational experience, contingencies to the primary saw blade were researched and deemed valid, along with a greater focus on completing the workscope in a single ROV dive.

Confirmation from the FPSO operator that the flange could be supported topside, via an internally attached pad-eye, was one favourable development to the specification.

The nature of work underneath the turret was considerably different to previous projects, so assessing the fitment of the tool subsea., interfacing with the tool, and failure contingencies was a very high focus. For example, there had been no previous requirement to thoroughly consider the weight of the tool itself, the 'Dead Sub' ROV scenario (and assistance from the supporting ROV), or the various control system and configurations allowable.

All the above considerations shaped the final tool specifications:

1. The 12 flange nuts would be cut from the top of the Flange, and a basic basket attachment would be added to catch the flange bolts upon removal.
2. A hydraulically functioned Dual Acting Nut Splitter (DANS) would be used as the secondary/contingency method for cutting the nuts
3. The tool will be as neutrally buoyant as possible, to assist in attachment and recovery operations
4. The tool would clamp onto the Flange during removal and release operations, but would not be required to support the weight of the Flange.

The requirements for onshore testing were very well defined as the tool had to be able to rotate around a test flange and cut twelve bolts using the saw blade and nut splitter. The testing scope was conducted between April and May 2013.

Offshore Operations

The offshore operations were conducted in July 2013. As part of the preparations the guide tube, flange and turret were cleaned using the standard ROV jetting equipment. From this initial operation it became apparent that the restrictions and challenge would be greater than anticipated: the limited access meant that some marine growth could not be removed from between the flange and turret, reducing the available head-room further.

When the tool was deployed for the first time, it was found that the 'guide posts' were too long, as the overall head room restriction was greater than expected. The tool was removed from the flange and the 'guide posts' were cut by 50mm using an ROV grinder.

When the tool was mounted for a second time and the rotational tests carried out, a clash between the two anodes at either side of the flange and the cameras on the tool was apparent. The second ROV was able to provide visual assistance to cut two of the bolts. The tool was again removed, and the higher specification survey inspection camera was mounted to the ROV handle, and a better approximation of the true dimensions was established by scaling the captured images.

With increasingly challenging current under the turret, the tool was docked and successfully cut the remaining 10 bolts around the flange unobstructed. This final operation was completed in under an hour, with the tool able to rotate freely 360° around the flange once more, to confirm that all the bolts were cut.

The remaining bolts stayed in place rather than falling down into to the basket; they were released when the flange itself was lowered by the FPSO.

Conclusions and Further Developments

The BFRT was a success and functioned as expected, despite extreme challenges faced by the lack of space. As with all bespoke tools, the continuous improvement system within Subsea 7 works well to capture and implement any refinements highlighted from offshore operations.

Engineers consider themselves lucky if they are fortunate enough to have similar projects back-to-back rather than years apart. This was indeed the case for the Blind Flange Removal tool: shortly afterwards a Bell-mouth Cutting Tool was produced, implementing the project-specific recommendations to reduce the number of hot stabs, using similar components, and using the same test facilities as before to cut the same specification of bolts.

This project was completed later in the year and received the full benefit of the months of experience on the Blind Flange Removal Tool, proving to be a highly rewarding project for all involved.

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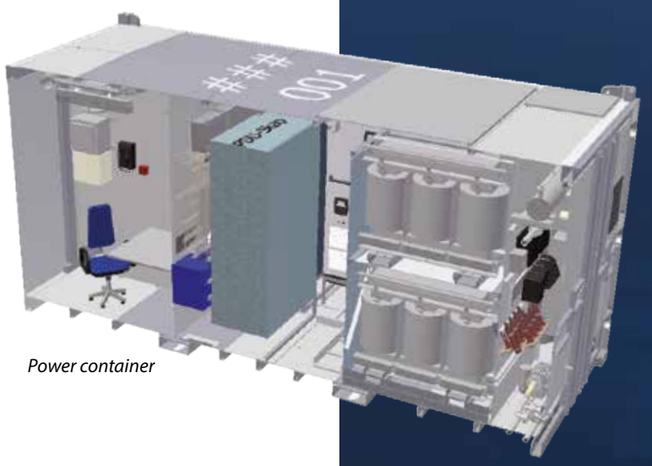

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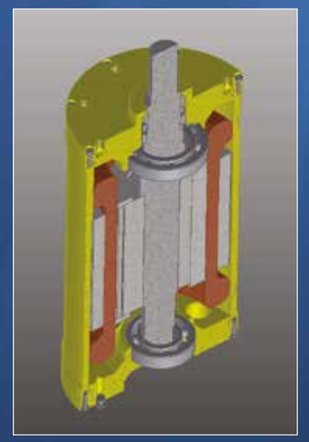

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En subsea mars rover fra Stinger Technology AS i Stavanger gjør det betydelig billigere med ROV-operasjoner rundt faste installasjoner i Nordsjøen.

Tekst: Stig Johansen Foto: Stinger

STINGER

SUKSESS MED MIKRO-TEKNOLOGI

– Der andre tenker større og kraftigere foreslår vi mindre og lettere utstyr. Så lite at det knapt merkes at vi er om bord. For å levere våre undervannstjenester 24/7 har vi tatt teknologien enda et skritt videre. Stinger har utviklet og drifter verdens første kommersielle system der pilotene sitter på land og fjernstyrer ROV-farkoster under plattformer i Nordsjøen, sier gründer og eier av selskapet Bjarte Langeland.

Raskere, rimeligere og sikrere

Utfordringen fra kunden var klar. Man ønsket et enkelt plattformbasert ROV-system. Enhetene måtte være så små at de kunne håndteres av dekksmannskap uten bruk av kran eller annet løfteutstyr. Pilotene til ROV-systemet skulle flyttes fra plattformen til land og det skulle ikke sendes eget personell ut i forbindelse med operasjoner. Systemet måtte være i beredskap til å kunne gå i vannet 24/7 og operasjoner skulle være sikre og rimelige.

Stinger Technology har helt fra etableringen av selskapet i 2003 jobbet med å redusere størrelse, vekt og kompleksitet på offshore systemer. Da selskapet ble utfordret til å utvikle enklere og rimeligere løsninger for ROV-operasjoner, var det naturlig å se til romfarten. Hvorfor skal man ikke kunne fjern-operere en ROV i Nordsjøen når man kan gjøre dette på Mars?

Det finnes mange utfordringer og løsninger innen romfart som kan tilpasses for å utvikle bedre undervannsoperasjoner. «Curiosity Rover» er NASAs Jet Propulsion Laboratorys pågående prosjekt for utforsking av Mars. For de som ønsker å lære mer om dette NASA prosjektet kan vi anbefale en serie med videoer lagt ut på YouTube med tittelen «Mars in a minute».

Bruken av «mikro» undervannsfarkoster i olje- og gassindustrien har blitt mer og mer vanlig de siste par årene. Trenden ser man også på norsk sokkel. Pris og fleksibilitet er gode grunner for å benytte slik mikro-teknologi, i tillegg kan en mikro-ROV settes i vannet på en sikker måte mens større utstyr ofte blir stående på dekk på grunn av for røffe værforhold. Størrelse, vekt og manøvreringsdyktighet betyr også at man kan inspisere områder som før var utilgjengelige på grunn av fare for å ødelegge dyrt subseautstyr. Mikro-ROV kan påmonteres sonar, posisjoneringsutstyr og en lang rekke med instrumenter og sensorer. De egner seg derfor svært godt til visuelle inspeksjoner.

Tekniske utfordringer

Integrering i kundens datanettverk krever spesiell kompetanse og godt samarbeid på tvers av mange faggrupper. Mye data av forskjellig format skal flyte mellom ROV i vannet og piloten som sitter på land. Kontrollersignal, sonar og video må ha minst mulig forsinkelse slik at det oppfattes som interaktivt av pilotene. Nettverket må være stabilt og ha tilstrekkelig båndbredde. Dersom man mister forbindelsen med farkosten må den automatisk gå over i en sikker modus til kontakt er gjenopprettet. Det hender fra tid til annen at strømmen stenges ned på en plattform. Det er derfor viktig at ROV-systemet får strøm fra nødnettet slik at dette ikke påvirker operasjonen.

Operasjonelle forutsetninger

Dekkspersonell på plattformen hjelper til med å sette ROV i vannet. Siden den er liten og lett gjøres dette ved å senke farkosten i vannet etter kabelen. I denne fasen sikrer bruk av en egen (ex-) mobiltelefon god kommunikasjon mellom mannskapet på plattformen og pilotene i land. Når ROV er senket i vannet tar pilotene over kontrollen uten videre behov for dekkspersonell. Våre dyktige piloter gjennomfører sikker navigasjon i trange områder mellom borerør og plattformstruktur. Vi kan for eksempel «fly» i stummende mørke med kun sonaren som navigasjonsinstrument. For å sikre kvaliteten på våre operasjoner jobber vi med strenge rutiner for opplæring, service og vedlikehold.

Hvor går veien videre?

Et spennende alternativ til å låre ROV fra dekk , er å installere systemet permanent neddykket. Stinger Technology utvikler et slikt system og har allerede en pilot i operasjon i sjøen ved selskapets testanlegg i Stavanger. Her undersøkes vanninntrenging, marin vekst, korrosjon og andre faktorer som påvirker vedlikeholdsintervall for neddykkede systemer. Stinger vil i nærmeste fremtid også kunne tilby denne neddykkede løsningen kommersielt. Ulike hensyn til installasjon og driftsforhold vil avgjøre hvilken løsning som passer den enkelte kunde best.

Stinger sitt system for fjernstyring av ROV fra land har vært i drift i snart ett år.
Tilbakemeldinger fra kundene har vært gode og forespørsler om flere mikro-ROV installasjoner er mottatt. Inspeksjon og overvåking av eldre plattformer og brønner er et stort marked i årene som kommer. Vi tror fjernstyrte mikro ROV-systemer vil bli tatt i bruk på mange av installasjonene i Nordsjøen de kommende årene.

Stinger Technology AS er en innovativ leverandør av teknologi med fokus på små, lette og kostnadseffektive undervannssystemer. Selskapet utvikler, produserer og drifter en rekke innovative løsninger spesielt tilpasset for subsea bruk i offshore olje-og gass-sektoren. Det fokuseres på fire markedsområder; plattform integritet, integrerte operasjoner, havbunn til overflate samt brønn og boring.

FFU-SEMINAR 2014

TORSDAG 30. JANUAR 2014

SAMLING PÅ BUNN

Årets FFU-seminar arrangeres på samme lokasjon som i 2013; Quality Airport Hotell, Sola.

Arrangementet arrangeres over samme lest som ved tidligere år med både presentasjoner av teknologiske prosjekter, samt mer markeds-relaterte innlegg.

Det er som vanlig utfordrende å finne gode navn på våre seminarer, årets navn er ikke noe unntak, men arrangementskomiteen føler at med alle pågående aktiviteter relatert til undervannskompresjon, undervannsfabrikken, flere dypvannsfelt osv, så vil vi til slutt "Ta samling på bunn" alle sammen.

Arrangementet ledes som alltid av vår stødige hånd fra Universitet i Stavanger, Arnfinn Nergaard, og vi har som vanlig et messeområde rett ved forelesningssalen hvor til sammen ca 20 bedrifter stiller med egne stander.

Nytt av året er at vi har forlenget de to kaffe-pausene til 45 minutter hver. Til sammen med lunsjen på en time, skal dette gi deltagere og utstillere tid til å besøke standene og snakke med kollegaer i andre firmaer. Videre så har vi en time fra registreringen starter til første presentasjon, som også er en fin tid å bruke på kaffe og besøk på standene.

Da ser jeg fram til å treffe nye og gamle medlemmer på årets seminar, og håper at flest mulig av dere får muligheten til å delta.

Påmelding og ytterligere informasjon om arrangementet kan dere få ved å gå inn på vår hjemmeside www.ffu.no.

Vel møtt!

Christian Knutsen
Leder FFU

FFU
FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI

08:00 – 09:00	**Registrering og kaffe**
09:00 – 09:10	Åpning v/ FFU leder Christian Knutsen, Technical Director, IK Stavanger AS
09:10 – 09:25	**"Rekruttering til næringen"** v/ Konferansier Arnfinn Nergaard, Professor – Offshore Technology, University of Stavanger
09:25 – 09:50	**Towards the subsea factory: opportunities and challenges** Rune Mode Ramberg, Chief Engineer Subsea Technology & Operations Statoil ASA
09:50 – 10:15	**A Picture Paints a Thousand Words: the value of high resolution subsea imaging** Mark Lawrence, Managing Director ADUS DeepOcean
10:15 – 10:40	**Levetidsforlengelse av undervanninstallasjoner og utstyr** Hva kan vi lære av levetidsforlengelsesprosjektene som kan brukes til få forbedre framtidige prosjekter? Bjørn Søgård, Business Development Manager Det Norske Veritas AS
11:20 – 11:45	**Statoil IMR approaching 2020 - the subsea factory** Kathleen Tveit, Senior Engineer Subsea, Statoil ASA Kristian Skoglund Obrestad, Senior Engineer Operations Subsea Statoil ASA
11:45 – 12:10	**Using Mini ROV`s for subsea NDT operations** Mads Ringen, Project Manager Ocean Installer AS
12:10 – 13:10	**Lunsj**
13:10 – 13:35	**Reparasjon av lekkasje i 12`` WI Header Kuleventil på Vigdis** Rolv D. Skre, Overingeniør, prosjektleder, Statoil ASA Magnus Aarbakke, Project Engineer, DeepOcean
13:35 - 14:00	**Ormen Lange IMR** IMR problemstillinger gjennom drift av Ormen lange fra 2007 til 2013 Jan Andrè Furnes, Subsea IMR Lead A/S Norske Shell
14:00 – 14:25	**42`` Horizontal Clamp Connection System** Experience from Subsea Connection System and tooling Gunalingam Gunadasan, Engineering Manager GE Oil & Gas
14:25 – 15:10	**Kaffepause**
15:10 – 15:35	**AIV – a game-changing technology** James Jamieson, Technology Manager Life-of-Field Subsea 7
15:35 – 16:00	**Oceaneering Subsea Emergency Response** Steffan Kruse Lindsø, Project Manager, Remote Intervention Technology, Deepwater Technical Solutions Oceaneering AS
16:00 -16.10	**Avslutning med utlodning av iPad air**
16:45 – 18:30	**Årsmøte FFU**

INNOVA

www.innova.no

MATRIX MK II

The Matrix MK II is a stand-alone fibre optic multiplexer and control solution, providing a simple, plug & play interface for a large array of sensors and equipment to any remotely operated system.

The system delivers low-latency, transparent data transmission for a wide range of data formats over a single fibre, based on Innova's LINK fibre optic multiplexer technology.

The Matrix MK II consists of a compact, one-atmospheric subsea unit manufactured in hard anodised aluminium, and a 19" rack mount topside unit.

ALSO AVAILABLE FOR RENTAL

Dimensions: Ø230 X 600mm

COMPACT HYDRAULIC REMOTE CONTROL UNIT

The Innova Quattro is an ultra-compact hydraulic controller unit with 4 valves each capable of providing up to 22 lpm hydraulic flow, proportionally controlled over a serial line. The system is ideal for controlling hydraulic tooling, such as torque tools, inspection tools etc., and generally for increasing the capacity of any ROV or tooling system in a simple manner.

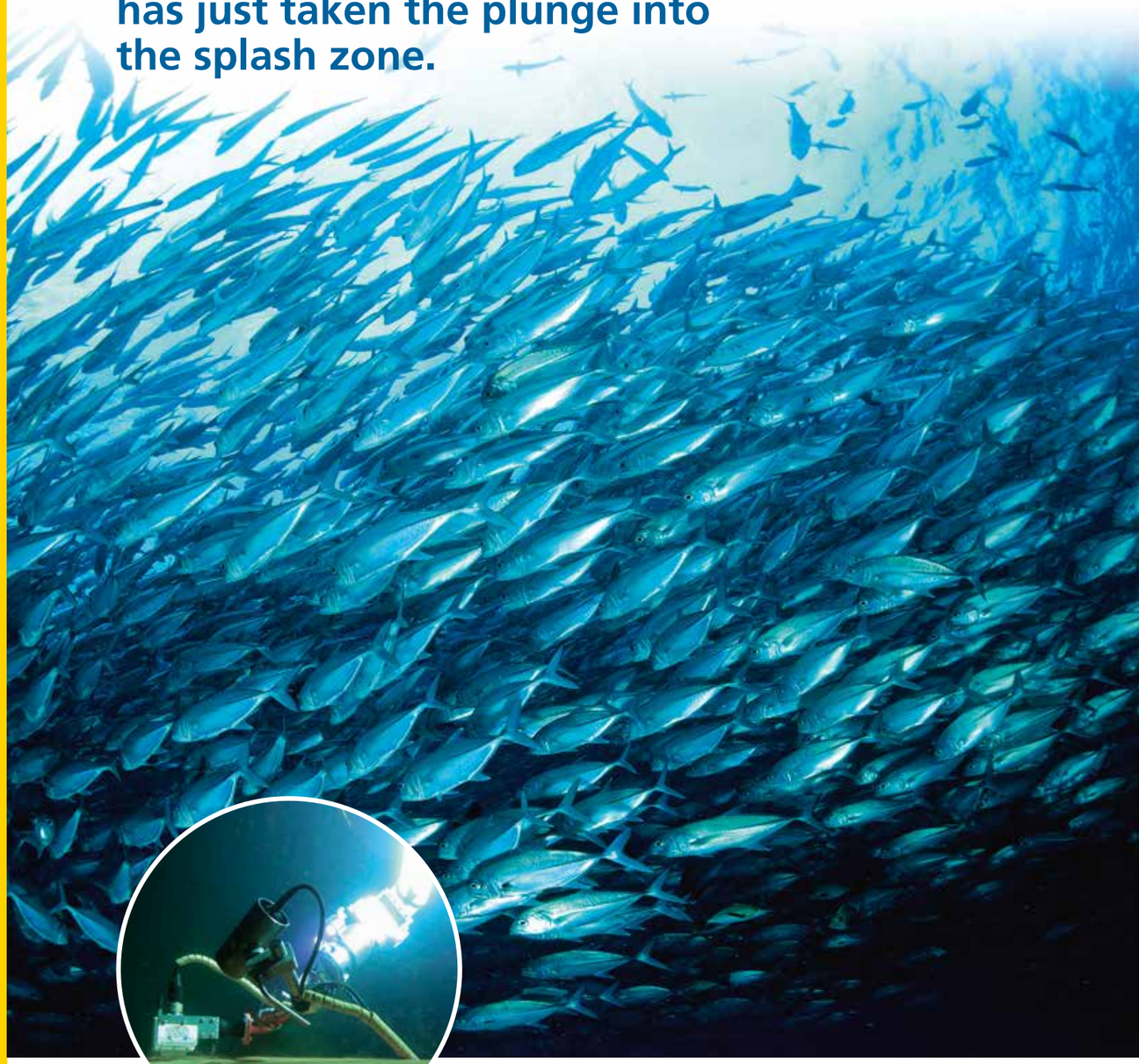
TECHNICAL SPECIFICATIONS

- **4 off 4/3-way proportional valve functions, each capable of 22 lpm**
- **1 off proportional pressure reducing valve**
- **2 off pressure sensors**
- **Analogue and digital inputs for external sensors**
- **RS232 and RS485 serial communication**
- **Size: 268 x Ø178 mm including connectors**
- **Depth rating: 3000 m**

ALSO AVAILABLE FOR RENTAL

Visitor addr: Innova AS, Jakob Askelandsvei 13, 4314 Sandnes. Postal addr: Innova AS, PO Box 390, 4067 Stavanger. Phone: +47 51 96 17 00. E-mail: post@innova.no

Something new and exciting has just taken the plunge into the splash zone.



ACFM® TSC Inspection Systems

Take a closer look if you are working with subsea inspection.

Something new and exciting has just taken the plunge into the splash zone. The LBO Splash Zone Equipment consists of a remotely operated robotic arm, fixed to the offshore installation by tailor made access tools to provide a stable platform for inspection, repair and maintenance in the harsh splash zone. The equipment allows close up inspection. Recently, we have added ACFM® - electromagnetic technology - to our inspection tool box, for detecting and sizing surface breaking defects in metal structures.

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VALVES OF VALUE

Durable and effective valves are crucial for any oil and gas operation, but submerging complex electronics to depths as high as 3.000 meters is no easy feat. Nexum Engineering took the clever simplistic approach, and their version of the Danfoss PVG 32 valve central is now ready for subsea operations.

Text: Magnus Birkenes, Drivkraft Photo: Gry G. Thorsen

"Subsea valves are problematic. Intricate electronics and software solutions have a hard time standing up to the immense atmospheric pressures related to subsea operations, mostly due to sub-par components and deficient assemblies," explains Kenneth Langerud of Stavanger-based Nexum Engineering.

They decided to take their ideas for solving this long-running challenge to Hyco, their local supplier of Danfoss Power Solutions hardware. The collaboration resulted in the creation of the Nexum PVG 32; a subsea conversion kit for the renowned Danfoss Power Solutions Proportional Valve Group.

Tested and ready

In use since the late 1980's, Danfoss' PVG 32 valve central has long since proven its worth on dry land. Until Nexum came along, however, its offshore compatibility had been somewhat restricted.

In late fall of 2013, a prototype of the newly devised Nexum version of the valve central underwent successful test runs. The beta test was carried out by Nexum Engineering and Innova; the latter that helped design and program the unit's software.

"It's basically a brand new assembly with improved software. It can sustain operations on depths as high as 3.000 meters beneath the surface, is compatible with any type of existing ROV equipment and can easily be retrofitted to all modern ROV models," says Langerud.

"It also comes with integrated pressure compensation, which offers more and better controlled movements and allow for multitasking properties," he adds.

One key element of the Nexum PVG 32 is its "Lego"-like properties, where the set of valves placed within the central can be customized for a wide range of actions. This differs from the current industry norm, where each valve pack is specially designed for unique functions, says Langerud:
"This modular feature, devised by Danfoss, enables changes in spool capacity, the addition of integrated shock- and anti-cavitation valves and options to fit an LS AB pressure limiting valve, which can control pressure on individual A and B ports and more. In practical this means that it is possible to run a hydraulic cylinder with same speed and same power in both directions, regardless of different volume and area on piston and ringside on the cylinder."

Short lead times

As the Nexum PVG 32 consists of largely Danfoss-provided parts, most of them readily available locally through Hyco, a newly finished module can be delivered within a fortnight. Basing the majority of the hardware components on stock parts also contributes to lower production costs, making the overall solution more cost-efficient for end users.

Neither Danfoss nor Hyco are conflicted by Nexum's PVG modifications. Rather the opposite, seeing as Hyco is involved in both the development and the production of the product:

"It is mutually beneficial. It's a way for us to expand our market and sell more units, as well as contribute to the innovation process. We helped assemble the prototype, and we will assist in the production of future models," says Hyco General Manager Frode Reve.

A market for the taking

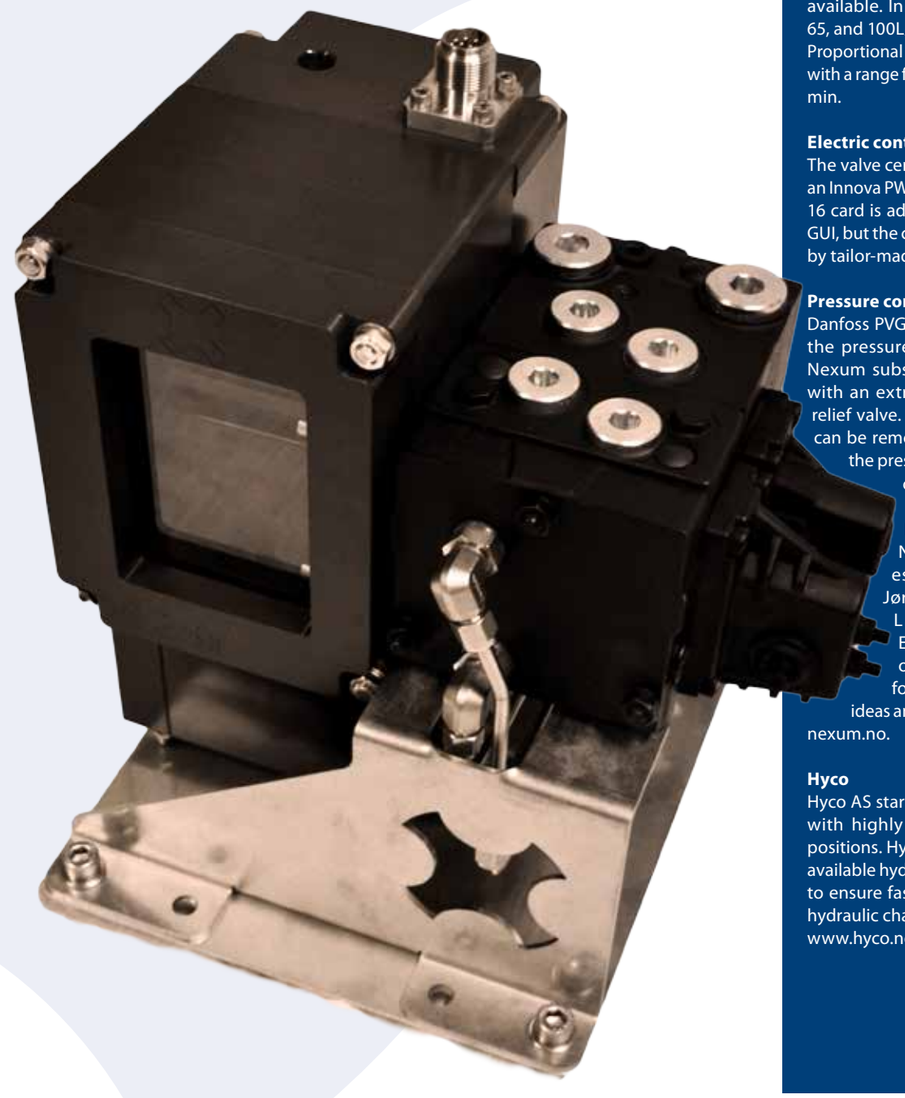
Great innovation, short lead times and low production costs means little if the market is small or the customer base is reluctant to embrace the technology itself. The Nexum team is however confident:

"We know there is a need for this product. We know the market is there. The Nexum Engineering team consists of people with decades of experience in the field, and we have been working with challenges related to subsea hydraulics since 1998. The product we have come up with now solves problems you didn´t even know existed," says Nexum's Technical Manager Jørn Bolstad smilingly.

Several major oil and gas service companies have expressed interest in the Nexum solution, and two units are already delivered.

"By the end of 2014 we expect to have between 10 and 15 units delivered to various projects on the Norwegian Continental Shelf," says Bolstad.

With a seemingly ever-growing international subsea market, the prospects for the ingenious flexible innovation are vast.



Technical Specification:
Pressure
Max 350 bar

Flow
The lowest flow rate is 0-5L/min and 0-130L/min is the highest flow rate available. In between there is 10, 25, 65, and 100L/min.
Proportional flow control for each spool with a range from 0-5 l/min up to 0-130l/min.

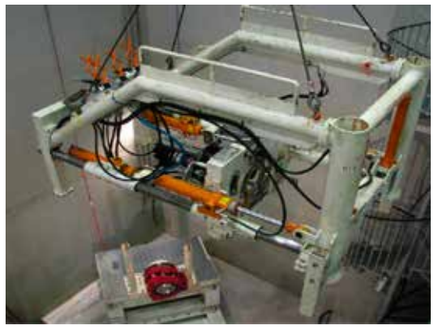
Electric control
The valve central can be supplied with an Innova PWM 16 controller card. PWM 16 card is adapted to the Innova Cute GUI, but the card can also be controlled by tailor-made GUI.

Pressure control
Danfoss PVG 32 can be set up to limit the pressure out on each port. The Nexum subsea kit can be equipped with an extra proportional pressure relief valve. This valves electric spool can be remote controlled and allows the pressure reduced individually on the A and B port.

Nexum Engineering
Nexum Engineering was established in 2009 by Jørn Bolstad and Kenneth Langerud. Nexum Engineering was founded on the will to realize the founder's long experience, ideas and skills to products. www.nexum.no.

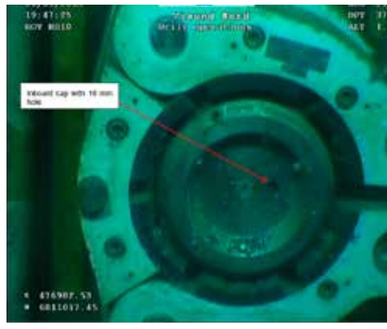
Hyco
Hyco AS started in 2009. Hyco is setup with highly skilled personnel in all positions. Hyco aim to deliver the best available hydraulic products from shelf to ensure fast response on all kind of hydraulic challenges.
www.hyco.no

FJERNING AV BLINDFLENS PÅ VISUND NORD



Det ferdige «drilling toolet» før testing i Aker Solutions sitt testbasseng på Ågotnes.

Fartøyet Lewek Connector.



«Inboard cap» etter drilling.

Visund Nord er en av Statoils fast-track utbygginger som ble satt i drift i 2013. Feltet er lokalisert ca. 10 km nord for Visund A og omfatter en standard havbunnsramme med to brønner. I sommer oppstod det problemer da feltet skulle kobles opp mot plattformen.

Tekst:Ove Lillebø og Jan Kåre Bredal
Foto: Ove Lillebø

Koblingssystemet som er benyttet på denne havbunnsrammen er levert av Aker Solutions og er av type RTS (Remote Tie-In System). I slutten av juli var IMR-fartøyet «Polar King» mobilisert med RTT (Remote Tie-in Tool) for å gjøre de siste oppkoblingene før feltet skulle settes i drift. Da blindflensen (inboard cap) på bunnrammen skulle demonteres satt denne imidlertid helt fast, og det ble gjort flere forsøk på å få løsnet capen uten å lykkes.

Det var mistanke om at årsaken til at den ikke lot seg løsne, var hydraulisk lås/vakuum på baksiden. Det ble derfor besluttet å bore et hull i inboard cap for å utligne trykket. Da dette problemet hindret oppkobling mot Visund plattformen var det meget viktig for Statoil å få løst denne utfordringen så fort som mulig. Aker Solutions har ved flere anledninger hatt et tett samarbeid med Oceaneering.

– Det var for oss i Aker Solutions naturlig å kontakte Oceaneering for hjelp til å løse dette, sier prosjektleder Ove Lillebø til DYP.
– Det ble tidlig klart at Oceaneering hadde en subsea boremaskin som muligens kunne benyttes, men det måtte gjøres en god del tilpasninger for denne oppgaven. Blindflensen (inboard cap) var produsert av et Super Duplex materiale med en tykkelse på 120 mm.

– Dette ga oss noen utfordringer med tanke på selve boreoperasjonen som skulle utføres på 350 meters dyp. Forberedelser og grundig testing for å få definert alle skjæreparametre var en forutsetning for å lykkes, sier en fornøyd prosjektleder i Oceaneering , Jan Kåre Bredal.

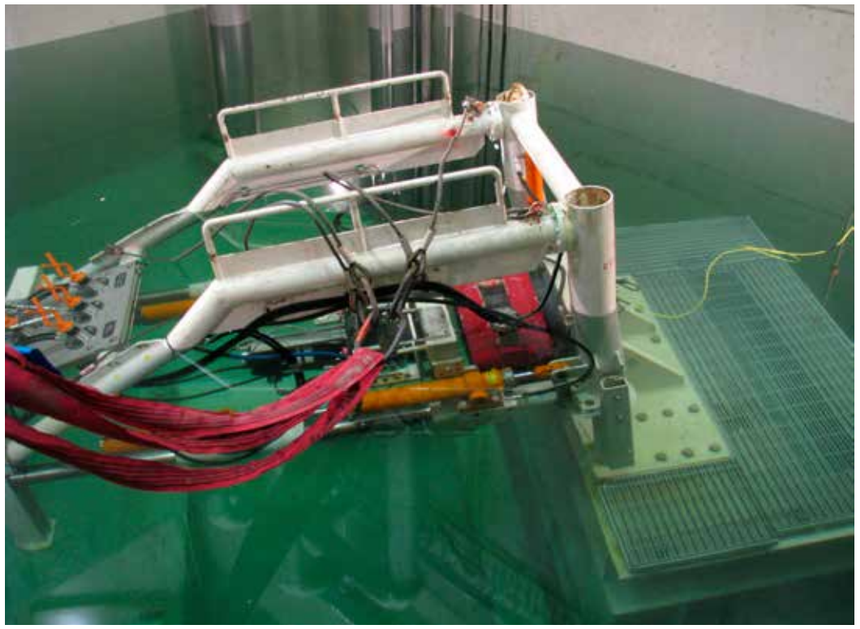
Parallelt med at det ble jobbet med nytt interface (tilpasninger) for boremaskinen, produserte Oceaneering Mechanica en testjigg for å bore i en blindflens som var identisk med den som stod subsea på Visund Nord. Blindflensen ble supplert av Aker Solutions, og testingen ble igangsatt under en uke etter at avgjørelsen om boring var tatt. Etter omfattende testing ble det bestemt at det skulle bores med et Ø18 mm bor med innvendig spyling for å bli kvitt spon underveis.

Aker Solutions hadde kommet frem til at rammeverket på CIT (Connector Installation Tool) kunne bygges om til å fungere som "tool carrier" for boremaskinen. Dette er et verktøy som normalt brukes i Aker, og det ble sendt til Oceaneering for de nødvendige tilpasninger. Dette innebar å bytte ut eksisterende ventilpakke med et ROV panel i tillegg til å fabrikkere de delene som var nødvendig for å få et fullt funksjonelt boreverktøy.

20 dager etter at Aker Solutions hadde kontaktet Oceaneering ble det utført en vellykket fullskala test i et av Aker sine testbasseng på Ågotnes. Dette viser at Aker Solutions, i godt samarbeid med fleksible og gode underleverandører, kan reagere kjapt med å løse utfordringer for sine kunder.

Etter testen ble det spesialtilpassede boreverktøyet sendt direkte fra Ågotnes til Kristiansund, hvor det sammen med Aker Solutions' Tie-In verktøy (RTS) ble mobilisert på IMR-fartøyet «Lewek Connector». 3. september 2013 ble kursen satt mot Visund Nord for å bore hull og fjerne blindflensen. Værforholdene var såpass gode at operasjonen kunne starte direkte etter ankomst, og 6. september ble boreoperasjonen gjennomført som planlagt. Da Tie-in verktøyet til Aker Solutions gikk i sjøen for å fjerne blindflensen løsnet den som normalt. Dette bekreftet teorien om at vakuum/hydraulisk lås var årsaken til problemet. Noen dager senere ble tilkobling av den aktuelle linjen fullført, kun litt over fire uker etter prosjektets start. Produksjonen på feltet kunne da igangsettes.
Dette oppdraget viser at ved samarbeid mellom alle involverte parter, kan utfordringer løses på en rask og effektiv måte, og til kundens fulle tilfredsstillelse.

– Da dette ikke har vært gjort tidligere noen gang, var jobben både utfordrende og spennende. Men vi hadde stor tro på at samarbeidet mellom Aker Solutions og Oceaneering ville gi et vellykket resultat. Dette viste både testene hos oss og hos Aker Solutions, sier Jan Kåre Bredal. Ove Lillebø hos Aker Solutions må si seg helt enig.



Drilling toolet på vei subsea fra Lewek Connector for å gjøre «bore operasjon».

WWW.FFU.NO

Safe operations

IKM Subsea have highly qualified ROV pilots and cutting edge ROV technology for safe ROV operations in the offshore industry.

IKM Subsea have today 100 employees, we are building and operating our own Merlin WR200 - 20 ROV systems in our asset pool. IKM Subsea are one of the leading ROV operators in the world.

Safe economy
Quality based solutions – 98,7% uptime in 2012

Safe environment
Electrical propulsion - minimized hydraulic

Safe choice
"Since April 2011 the Merlin WR200 ROV have been part of our AHTS Sandfjord and AHTS Saltfjord. This have become a great success for us, the reliability from the Merlin WR200 ROV combined with our large AHTS have been our success for this period.

All of our clients are very satisfied with the overall performance of equipment and personell."

Carl Sørensen, Senior Charterer, K-Line Offshore AS

Zero injuries - an overall objective!

IKM Subsea AS

Nordlysvegen 7, 4340 Bryne, Norway
T: +47 962 00 210, www.ikm.no

ABM Group performs small to medium sized **EPC** projects. We specialize in fabrication and testing of subsea equipment.

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We also supply lifting equipment, both standard solutions and equipment for special lifting operations. Besides design and construction, we are approved as third part certification and inspection of all types of lifting equipment.

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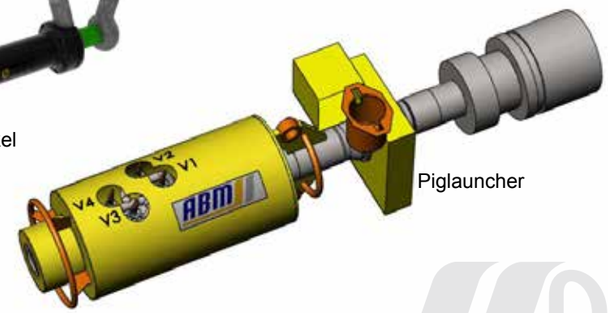
- Flushing
- Lifting
- Slingmax
- Hydrobolt

Fotograf: Bureauet.no

SLINGMAX RIGGING SOLUTIONS

ROV Shackel



Piglauncher

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3D INTERACTIVE SUBSEA SURVEYS

ADUS DeepOcean is headquartered in Scotland and provides high-resolution interactive 3D visualisation tools for use in the oil & gas, renewables, decommissioning and marine salvage markets.

By Mark Lawrence MPhil, Managing Director ADUS DeepOcean

The company was originally founded by marine archaeologists Mark Lawrence and Martin Dean at the University of St Andrews, and digital 3D animation expert
Chris Rowland at the University of Dundee. DeepOcean UK, a subsidiary of DeepOcean Group Holding BV, recently
acquired a 50% interest in ADUS to form ADUS DeepOcean Ltd.

ADUS DeepOcean has established itself as the world leader in shipwreck survey and visualisation, working for international salvage companies and government agencies, on large-scale wreck removal and monitoring projects since 2008. Such wrecks often present significant environmental hazards or are a danger to shipping. More recently ADUS DeepOcean's work has expanded to include the visualisation of a variety of other manmade structures subsea which require detailed investigation and monitoring, such as oil & gas seabed infrastructure, sunken oil platforms and offshore renewables assets.

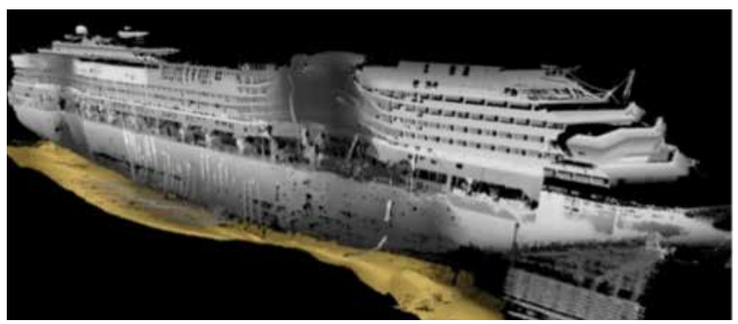
Notable high profile surveys have included the survey of the sunken Deepwater Horizon oil rig in the Gulf of Mexico, which lies at a depth of 5000ft, and was the cause of the largest oil spill in US history, and the Costa Concordia in Italy using both laser and sonar (subsea) and mobile laser (in air) in support of the ongoing wreck removal operation.

Of interest to those engaged in subsea operations is that unprecedented levels of detail can now be obtained on structures almost regardless of depth, utilising recent advances in high frequency multi beam sonar technology and also subsea laser, combined with improved positioning capabilities and the unique methodologies and visualisations developed by ADUS DeepOcean.

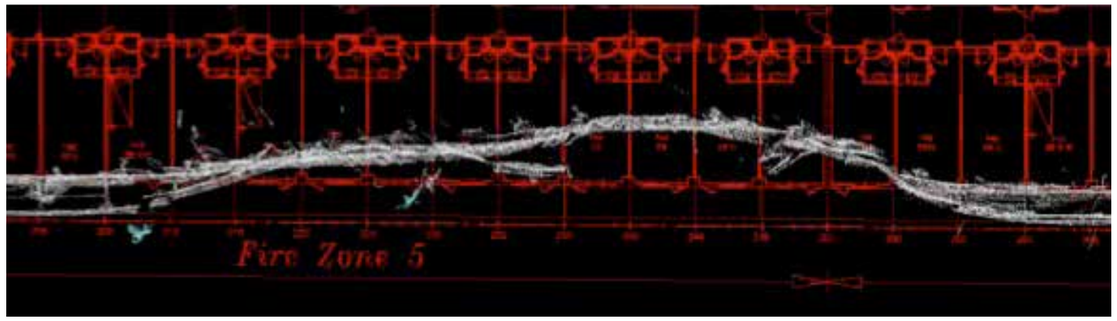
A precise assessment of the damage sustained on the starboard side of the Costa Concordia was possible as a result of the ADUS DeepOcean survey conducted immediately after the ship was pulled upright in September 2013, an event which was covered by the world's media.

The survey comprised three data sets from the three different pieces of survey equipment deployed from a 'multicat' survey vessel. Surface (topo) laser was used to collect data from the water line to the top of the wreck, subsea (blue) laser was used to collect data on the starboard side from the waterline down to a depth of 11m and sonar was used to collect data from 7m below the surface up to and including the seabed.
In terms of equipment used for the Costa Concordia survey, the sonar was a Reson SeaBat 7125-SV2, a 400kHz multibeam echo sounder system, capable of measuring 512 depths per ping, up to 50 Hz, with 0.5° across track and 1° along-track beamwidth, with a maximum 140 swath angle. The subsea laser used was a 2G Robotics ULS-500 subsea laser scanner, a mid-range measurement system ideal for capturing high-detail measurements in areas spanning from 1m to over 10m but requiring clear water. The laser scanner had a 50° swath angle and a data capture rate of up to 250,000 points per second.

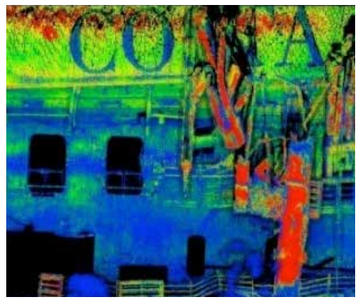
Costa Concordia immediately after Parbuckling operation in September 2013



ADUS DeepOcean survey of the starboard side damage on the Costa Concordia once she had been Parbuckled upright in September 2013.



Utilising the high resolution data to compare against 'As Built' data (in red) to accurately assess damage to the starboard side of Costa Concordia.



Example of the high resolution subsea laser data acquired on the Costa Concordia.

Although the subject matter in this instance is a wreck it might be more appropriate for the purposes of this article to consider it as an asset that requires management. Information derived from standard hydrographic surveys or video footage is readily available to those engaged in asset management but often lacks detail or is not metrical in nature. So, in 'asset management' terms the value of high resolution metrical data subsea is significant, allowing a precise and measurable 'snapshot' of the asset to be created at a point in time, with an ability to easily derive accurate measurements directly from the data. This can then provide an effective means by which change over time can be assessed - a fundamental in terms of successful asset management, and essential for the purposes of informing subsequent intervention strategy in the renewables and oil & gas sectors in particular.
The value of high resolution data subsea is also apparent in the creation of 'As Built' plans where none exist, of particular interest for the decommissioning market. Recently ADUS DeepOcean were presented with some 3rd party sonar data acquired on an older oil & gas asset for which no detailed design drawings or plans were available to the client. ADUS DeepOcean re-processed the data and created an interactive visualisation to allow the detail of the structure to be clearly understood by the viewer. Utilising this and also ROV footage of the structure, a precise 3D surface model, created in industry standard format, was made to fit the point cloud dataset exactly.
ADUS DeepOcean have an ongoing R&D programme based at Dundee University and are continuing to exploit advances in visualisation technologies specifically for the benefit of oil & gas and renewables sectors.

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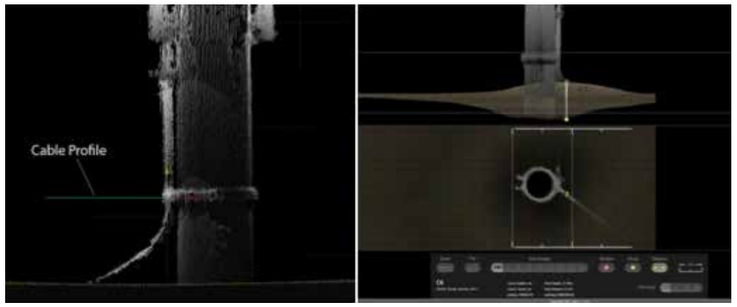
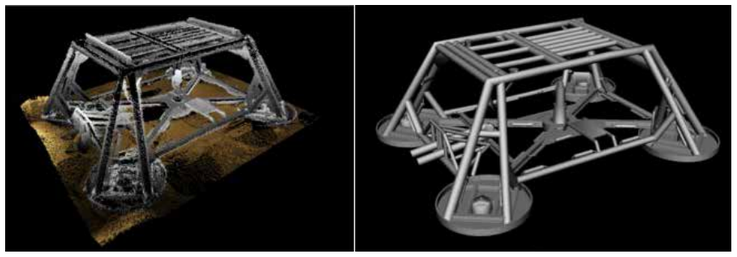
Further information can be found at www.adusdeepocean.com.



High resolution subsea sonar data useful for asset management in the offshore wind sector: images show detailed cable profile and seabed scour surveys around the base of an offshore wind turbine in UK Waters.

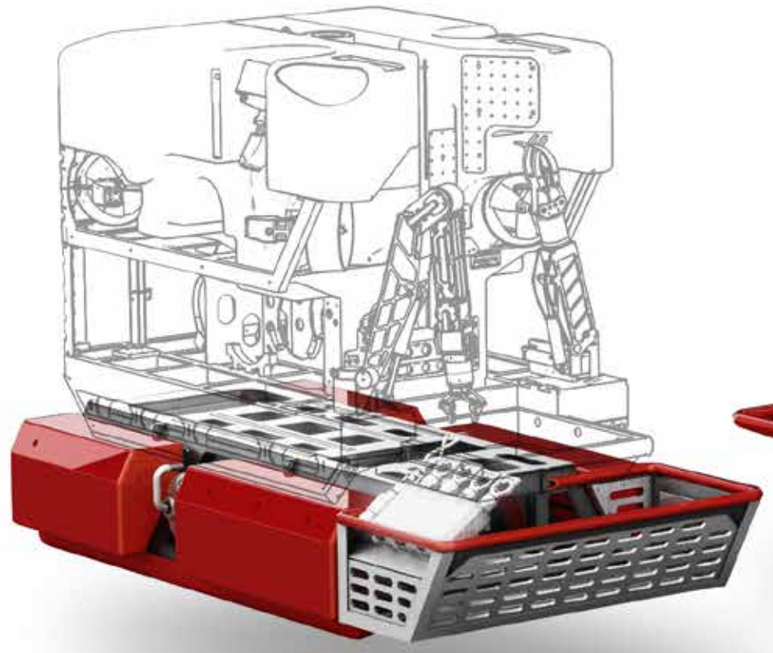


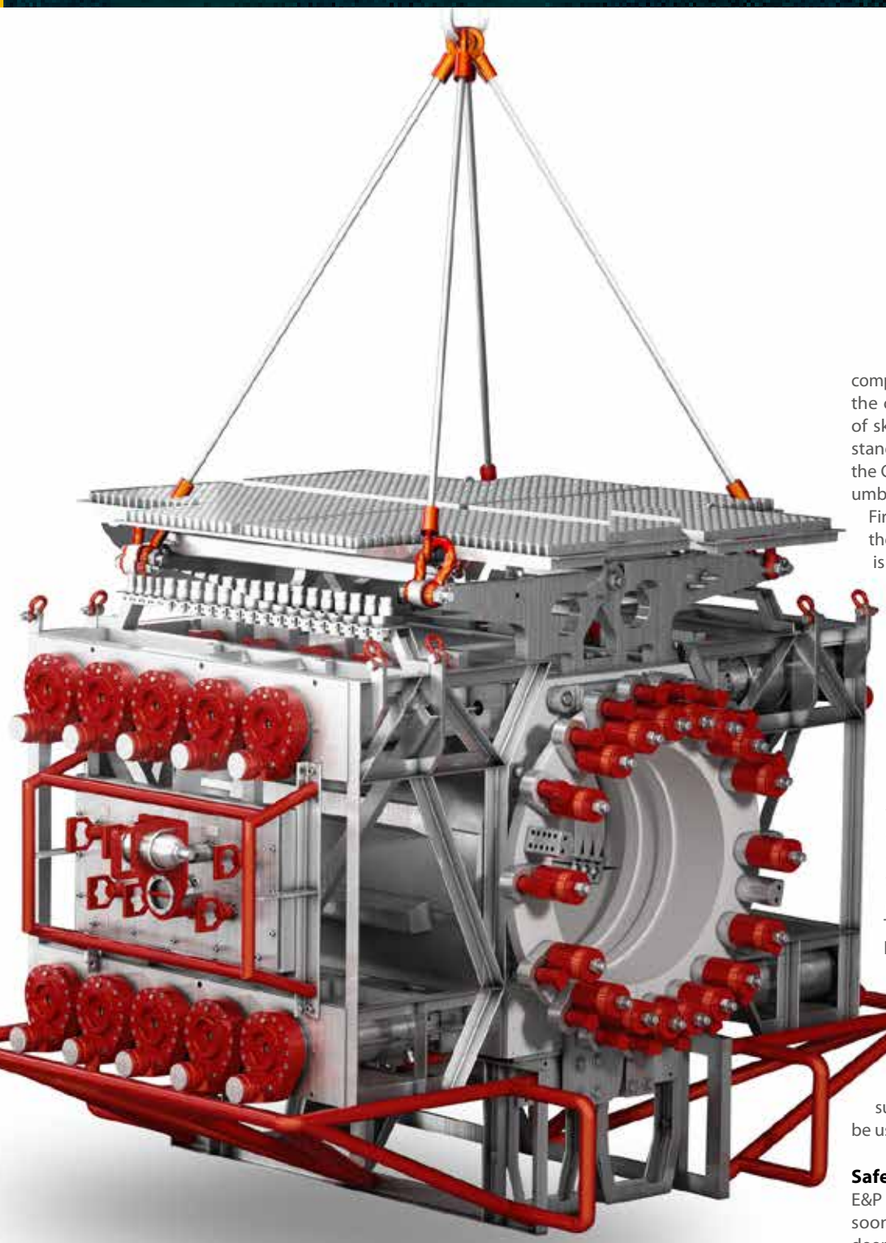
ADUS DO interactive visualisation of the sonar data on a well head protection structure on the left with the 3D surface model derived directly from the data on the right.

GO FURTHER DEEPER SAFER

Increasing deep-water operational capability and safety through remote technology.

By George Lim, Business Development Manager, T.D. Williamson





Exploration and Production (E&P) teams have been wading into more remote areas and diving into ever-deeper waters for years. In their search for the next subsea field, E&P has often outpaced itself in constructing, operating and maintaining the assets that follow initial discovery.

Due to these growing challenges, operators tasked with responsibly managing these assets have been in search for solutions to effectively address maintenance and repair concerns in their deeper subsea field infrastructure. Innovative solutions are also needed for operators to efficiently pursue future developments, as many of these lines – and a growing number of potential opportunities – exist in depths down to 3,000 meters (9,842 feet), well beyond the reach of the most advanced divers.

Pipeline service providers, such as T.D. Williamson (TDW), relish the opportunity to design and engineer bold new solutions that take technology higher and operators deeper. In 2012, TDW addressed the most immediate needs of deep water operators – maintenance, emergency repair and tie-ins – through developing the remotely controlled Subsea 1200RC tapping machine. The Subsea 1200RC is a topside-driven machine with a passive ROV interface capable of reaching those ever-deeper waters. As an additional benefit at shallower depths, when pre-existing clamps are installed, the Subsea 1200RC can completely remove divers from the tapping process, greatly reducing the risk of inaccurate or erroneous tapping action.

While the Subsea 1200RC was primarily developed to meet the deep water needs of operators whose lines were fitted with pre-existing clamps or tees, TDW recognized that subsea operators, as a whole, could greatly benefit from broader access to such services. This being so, TDW's next and newest development was the remotely operated, logical complement to the 1200RC – the TDW Clamp Installation Tool (CIT), launched in 2013.

Clamp Installation Tool

Ideal for use in emergency response scenarios, the CIT was designed to provide pipeline operators with a safe, less expensive way to remotely install repair clamps and hot tap tees. The CIT is readily deployable, using any standard work-class remotely-operated vehicle (ROV). Controlled from a laptop, onboard a platform or Diving Support Vessel (DSV), the CIT offers clamp installation capability at any depth, including the extreme depths being developed by many operators.

The CIT was also designed to provide operators with maximum flexibility in a single tool. In addition to repair clamps and tees, there are many other bolt-on, clamp-like products requiring similar activation, including connecting spools during pipeline repair and installing retrofit launchers and receivers for pigging purposes.

How the CIT Works

As with the Subsea 1200RC tapping machine, the CIT is a topside-driven tool with a passive ROV interface. The CIT is a modular system comprising clamp-running tools framed around the clamp, and a control system consisting of skid-mounted hardware and a laptop. A standard work-class ROV provides power to the CIT and communication to the DSV via an umbilical.

First, the control skid is attached underneath the ROV, and the clamp and frame assembly is assembled on the deck of the DSV and hooked to the vessel's crane. The entire system is pre-tested for proper function before being lowered into the sea. The control skid is transported by the ROV traveling alongside the clamp assembly. When it arrives at the pipeline, the ROV connects a hot stab to the frame, and the CIT opens the clamp using cylinder actuation. Technicians onboard the DSV engage the bolts from the laptop. Every function is carried out with a dedicated stab that the ROV picks up from the skid.

After the body bolts are spun and tensioned to secure the clamp, the longitudinal bolts are secured and activate structural grips. Technicians inspect and monitor the installation via sensors and cameras installed on the CIT and ROV, respectively. To verify the seals, pressurization of the annulus between the seals is conducted by a test-stab. The removable frame is then disengaged from the fitting and transported to the surface. With its modular design, the CIT may be used again immediately.

Safer Today

E&P teams won't be slowing down anytime soon. They will continue to go further and deeper than they did the year before, which means the operators who follow behind them will have mounting needs of increasing complexity. Pipeline service providers, such as TDW, have evolved their solution-based approach to more proactively address these needs, anticipating the hidden challenges that await operators at the next subsea field. Remote technologies like the Subsea 1200RC tapping machine and Clamp Installation Tool are the next generation of high technology to safely support the industry as it goes further and deeper than ever before.

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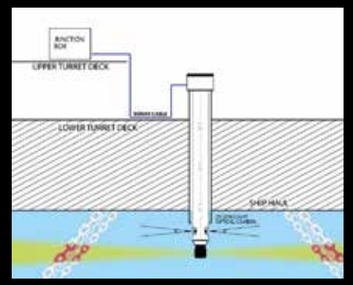
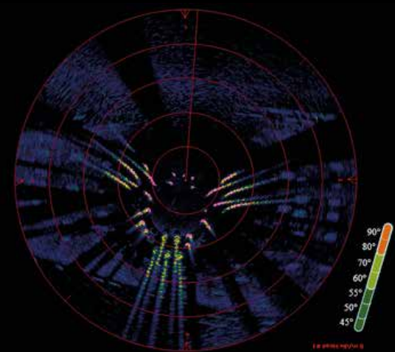


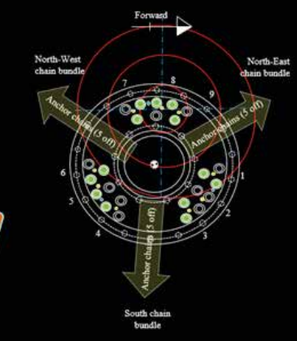
REAL-TIME MONITORING OF MOORING SYSTEMS AND RISERS

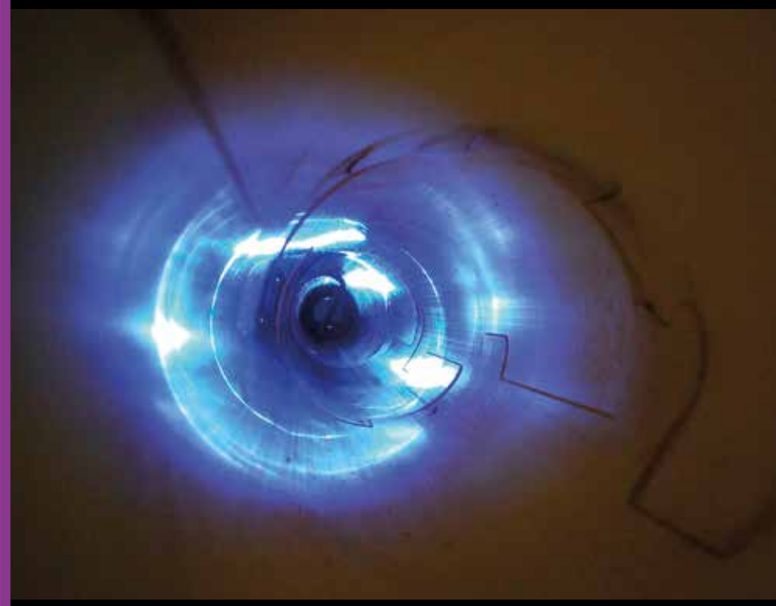
Stinger Technology AS has developed a real-time anchor chain monitoring system for floating facilities, like an FPSO vessel. This allows for simultaneously monitor the presence of and exact position of all the anchor chains and risers in real time.

Because of its slim design, the system can be retrofitted and deployed into one or several spare camera tubes with the benefit of not occupying empty I-tubes allocated for future riser pull in`s.

The deployment and installation of the system is supported by Stinger`s innovating and patented zipper pipe. The pipe was originally developed to perform seabed drilling in deep waters. No existing technology could satisfy the requirements for dimensions, weight and performance in such extreme environments. The invention relates to







Inside patended zipper pipe

a rigid pipe comprised of hinged and semi-cylindrical pipe sections that are sequentially joined together to form a rigid pipe. Because the two separate chains of pipe sections are articulated prior to being assembled, the chains may be stored on spools in a housing or separated in a basket prior to assembly, thus achieving considerable economy of space. A major advantage is the possibility to have power cables/ hoses and such inside for supply at the telescoping end.

Several scanning sonars can work in parallel and to a large degree overlap all the sectors for the anchor chain spread and by this adding redundancy to the overall system and reducing the chances of false alarms.

The tailored software supporting the system detect the point of failure and generates an alarm in real time to the Client CCR alarm system. As the sonar pings, it images a 360 degree slice of the water column. The return echoes of the risers and anchor chains are converted by the software to range and bearings. From witch the precise position of the target is calculated in real time and displayed in a preview software. The principals of the software system is that it expects to see sonar return in a specific spot. If a chain has failed or moving outside it`s expected position it trigs an alarm in the software.

STINGER

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PRESENTASJON AV **DET GLADE BUDSKAP** PÅ SKOLENE

Under årsmøtet i FFU i januar 2013 ble ulike oppgaver og mål for FFU diskutert. Da FFU ble etablert for 25 år siden, så var det et betydelig behov i undervannsbransjen for samarbeid og koordinering som ikke ble fylt av andre aktører.

Nå er det mange av oppgavene som FFU dekket tidligere som i dag naturlig blir ivaretatt av andre organer og funksjoner. Med dette som bakgrunn ble FFU-oppgaver behandlet og diskutert på årsmøtet. Etter ulike innspill og ideer ble det vedtatt at FFU skulle jobbe med rekruttering av ungdom inn i undervannsbransjen. Videre ble det vedtatt å innvilge FFU-styret kr 200.000 til dette arbeidet.

Dette arbeidet har FFU-styret besluttet å iverksette gjennom to ulike tiltak:

1. FFU har sammen med kommunikasjonsbyrået Cox etablert et jubileumsmagasin, som er utgitt med utgangspunkt i at det er 25 år siden foreningen ble etablert. Dette magasinet kom ut i et opplag på 100 000 som innstikk i Dagbladet den 25. oktober 2013. Dette magasinet inneholder artikler om de ulike sidene av undervannsbransjen, forsøkt beskrevet på en enkel men spennende måte. Samtidig har også magasinet blitt sendt ut til alle medlemmene i FFU som vedlegg til DYP 03, 2013 som ble utgitt i slutten av oktober.

2. FFU-styret har nedsatt en komité som skal bidra til at FFU-medlemmer enkelt kan gå ut til skoler og undervisningsinstitusjoner for å gi en enkel og tilpasset presentasjon av bransjen, og alle mulighetene som den kan gi for framtidige jobber og virksomhet. Dette er blitt iverksatt og gjennomført på flere skoler, og FFU-styret håper at flere av medlemmene kan gjøre dette lokalt på de plassene de bor ved å bruke materiellet som er etablert av komiteen.

Fra utdanningskomitéen i FFU har Svein Halleraker og Gunnar Kalberg besøkt tre ungdom/videregående skoler i 2013. Skolene som har fått besøkt av utdanningskomitéen i FFU er:

- Time Videregående skole – 80 til 90 elever
- Godalen Videregående skole – 80 til 90 elever
- Sveio Ungdomsskole – 50 elever

Før møtet på skolene samlet komitéen seg, og satt opp en felles presentasjon som ble brukt på alle skolene. Grunnen til dette var at vi ønsket å presentere det samme budskapet på alle skolene. Presentasjonen inneholdt ulike videoer og tekst som vi håpet skulle slå an hos skoleelevene. Presentasjonene ble holdt i skoletiden til elevene og varte i ca. 45 minutter. Det har vært enkelt og komme kontakt med skoler for å avtale tid for en presentasjon av bransjen. Responsen fra elevene under presentasjonen har også vært veldig positiv. Mesteparten av elevene fulgte med under presentasjonen og hadde mange interessante spørsmål. Ett av spørsmålene som gikk igjen var "Hvor mye tjener folk i «oljå»? Tilbakemeldingene fra skolene etter møtene har også vært veldig positivt. Skolene setter veldig pris på at FFU som organisasjon setter av tid til å presentere bransjen, og alle mulighetene som den kan gi for framtidige jobber og virksomhet for elevene deres. Så FFU håper å fortsette med disse presentasjonene i 2014.

Dersom andre medlemmer i FFU / lesere av DYP ønsker å gjøre en lignende innsats i sitt nærområde, så er det bare å kontakte undertegnede på SHalleraker@Deepoceangroup.com. Jeg kan være behjelpelig med materiell og eventuelt råd og tips.

Svein Halleraker
DeepOcean

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WE CARE ABOUT THE DETAILS DRIVE FOR PERFECTION

Året 2013 går i bøkene som et fantastisk år for Envirex, både ved å delta som prosjektansvarlig for flere tyngre prosjekter og samtidig som ansvarlig for omfattende totalleveranser. I tillegg ble produktbredden utvidet til kompetanse på også elektronikk og styringssystemer. Avanserte forespørsler på subsea engineering har blitt en daglig del av Envirex.

Tekst: Kjetil Njærheim
Foto: Envirex

Envirex besitter bred faglig kompetanse på design, engineering, montering og testing innenfor hydraulisk utstyr og spesielt innenfor subsea. Fellesnevneren for de fleste prosjekter er spesialtilpasning og nyvinning. I produksjonslokalene finnes derfor alt av ressurser som trengs for montering og funksjonstesting av prototyper og annet hydraulisk utstyr.

Blant annet hydraulikk aggregat med arbeidstrykk opp til 1000 bar samt flow opp til 170L/min for testing av diverse verktøy og utstyr med mineral olje.
Aggregat for vann/glycol med flow opp til ca 35 L/min er også tilgjengelig for testing. Veldig ofte bærer også produksjonen preg av fast-track prosjekter med skift arbeid og stramme fremdriftsplaner.

Mest kritisk er at kvaliteten alltid holder det planlagte nivå gjennom hele prosjektplanen. Derfor har Envirex innført rutiner hvor prosjektingeniører har en utøvende rolle i hele prosjektforløpet fra design og spesifikasjon, til innkjøp, montering og testing. Dette sikrer høy overføring av kompetanse og riktig informasjon. Måten prosjektingeniørene er involvert i prosjektene har gjentatte ganger vist seg å være en viktig faktor for å sikre at leveransen utføres til den avtalte kvalitet og tid.

Envirex er i løpet av siste årene blitt en totalleverandør som ikke bare kan utvikle og ferdigstille utstyr og komponenter, men også påta seg en rådgivende rolle innen bruk og styring av hydraulisk utstyr. Vår siste satsing på elektroniske styringssystemer, kybernetikk, og bruk av egenutviklet software tillater også en helt annen presisjon og sikkerhet enn det som tidligere var mulig.

I flere av prosjektene utført har vi fått særdeles gode tilbakemeldinger på at de komplette elektrohydrauliske systemene som er levert, har tilrettelagt for økt effektivitet og svært reduserte driftskostnader. Senest har vi utført leveranse av styringsmoduler tilpasset operasjoner for mer enn 3000 meter dybde.

Foto: Morten Berentsen

Envirex er lokalisert i Klepp, utenfor Stavanger. Alle ressurser er samlet i samme bygg. Den 1000m2 store produksjonshallen huser nødvendig utstyr som sveiserom, trykkrom, krane, og større uteområde.

Flere av de komponenter vi har skreddersydd for vår lagerpark til å kunne utføre service-on-site er også tilgjengelig som leieutstyr. Dette har vist seg å være svært verdifullt for våre kunder for både langvarig og kortere leieperioder. Utstyr som trykkenheter, måleutstyr og power packs blir ofte etterspurt. Til tider har også Envirex utviklet kundetilpasset utstyr for spesifikke forespørsler som går på utleie.

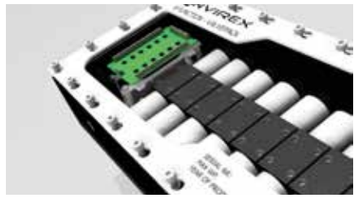
Envirex skal alltid være en pålitelig leverandør som kan utfordres til de tøffeste oppgavene!

Vi er svært takknemlig for alle de avanserte og kritiske operasjoner og prosjekt vi har fått deltatt i gjennom 2013. Vi ser frem til de nye utfordringer som kommer i tiden fremover!

Sleve Tool

I forbindelse med stabilisering / jekking av en produksjons plattform i Nordsjøen ble Envirex tildelt jobben for utvikling og total leveranse av kontroll systemet til IK Stavangers Pile / Sleve Tool som skulle benyttes for å jekke opp og stive av en produksjonsplattform i Nordsjøen.

Envirex leverte design, produksjon, montering og testing av alt hydraulisk utstyr. Envirex supplerte også med offshore personell for å installere, drifte og styre systemet offshore.



Subsea ventilpakke for bruk opp til 350 bar. Levert med GUI kontroll og proporsjonale ventiler.

Foto: Lars Mittet

Envirex leverte kontrollsystemet til IK Stavangers Pile / Sleve Tool som skulle benyttes for å jekke opp, og stive av en produksjonsplattform i Nordsjøen.

Universal vannbasert HPU

Envirex utførte en fast-track leveranse for Shell, hvor design, engineering, montering og suksessfull fat ble utført innen seks uker fra mottatt ordre. Enheten ble designet for å maksimere enkelheten i vedlikehold. Samtidig ble rammen delt inn i to operasjonspaneler for å adskille lavtrykks operasjoner og høytrykksoperasjoner. Det ble installert egen sirkuleringskrets for fylling, drip tray samt væskeuttak til væskeprøver for analysering.

«HPU ble brukt til pre-deploymenet, teste juletre, teste og og operere subsea Tree Running Tool (TRT) og Tree Cap Running Tool (TCRT). Den er veldig anvendelig til alle applikasjoner der vannbasert hydraulikkvæske brukes. Den blir også benyttet til trykktesting av mindre volum (<2m3) med påkoblet data logger. Enkelheten i styring og drift gjør enheten anvendelig og brukervennlig.»

Bjørn Heradstveit (Project Manager, Shell)

Pumpemoduler er montert på skid for å forenkle tilkomst og vedlikehold.

Tekniske data
- Resato P200 Double acting LP pump
- Capacity of 15L/Min and MWP of 305 bar (4350 PSI)
- Resato P160 -115-2t
- Capacity of 4,5L/min and MWP 790 bar
- Pumps installed with one air piston and two high-pressure pistons.
- ATEX approved for Group II, category 2 zones G & D
- DNV 2.7.3 approved

Besøk oss på www.envirex.no

Kontrollsystem av CT-skanner

På verdens første subsea CT skanner har Envirex utviklet et kontrollsystem som skal overvåke og styre applikasjonen. Leveransen besto av en skreddersydd Subsea kontroll modul, og en spesial utviklet software med fokus på en bruker vennlig og unik grafisk brukergrensesnitt. Envirex er her total leverandør på både hardware og software.

ROV Control Panel

ROV-vennlige kontrollpaneler leveres i henhold til kundens krav og spesifikasjoner. Panelene blir bygget i henhold til ISO 13628-8. Dette panelet er brukt i forbindelse med kontroll systemet til sleeve tool.

Styringskortet PWM Control PCB™

er et egenutviklet produkt som kan leveres i flere versjoner. Kortet kan leveres med opptil 12 PWM utganger (analog / digital) og opptil 14 analoge innganger. Spesialtilpassede kontrollkort kan også leveres.

FFU

FORENING FOR FJERNSTYRT UNDERVANNSTEKNOLOGI

FFU arbeider for å:

- Formidle kunnskap og erfaring innen fjernstyrte undervannsoperasjoner.
- Skape kontakt mellom utdannelsesinstitusjoner, forskning, brukere, operatører, produsenter og offentlige instanser.
- Holde kontakt med andre aktuelle foreninger.
- Formidle kunnskap om næringen ut i samfunnet.

FFU i dag

FFU har siden opprettelsen i 1988 opparbeidet en solid økonomi. FFU har over 70 medlemsbedrifter og har gjennomført flere utredninger knyttet til aktuelle undervannsteknologiske problemstillinger.

Hvem kan bli medlem?

Medlemmene og styrets sammensetning består av representanter fra brukere, operatører, produsenter, myndigheter og utdannelsesinstitusjoner. Se under for priser og kategorier.

Utstillinger og konferanser

FFU er faglig representert ved undervanns-teknologiske arrangementer i Norge.
På denne måten søker foreningen å bidra til at tidsaktuelle tema blir tatt opp.
FFU arrangerer hvert år et fagseminar i slutten av januar, hvor bedriftsmedlemmer og andre ressurser møtes til seminarer og bedriftsutstillinger.

Utredninger

Som et ledd i foreningens virksomhet har FFU initiert og deltatt i flere utredninger knyttet til bransjen. Typiske eksempler er:

- Behovskartlegging av forskning og utvikling innen fagfeltet fjernstyrte undervannsoperasjoner.
- Behovskartlegging for utdanning innen fagfeltet fjernstyrte undervannsoperasjoner.

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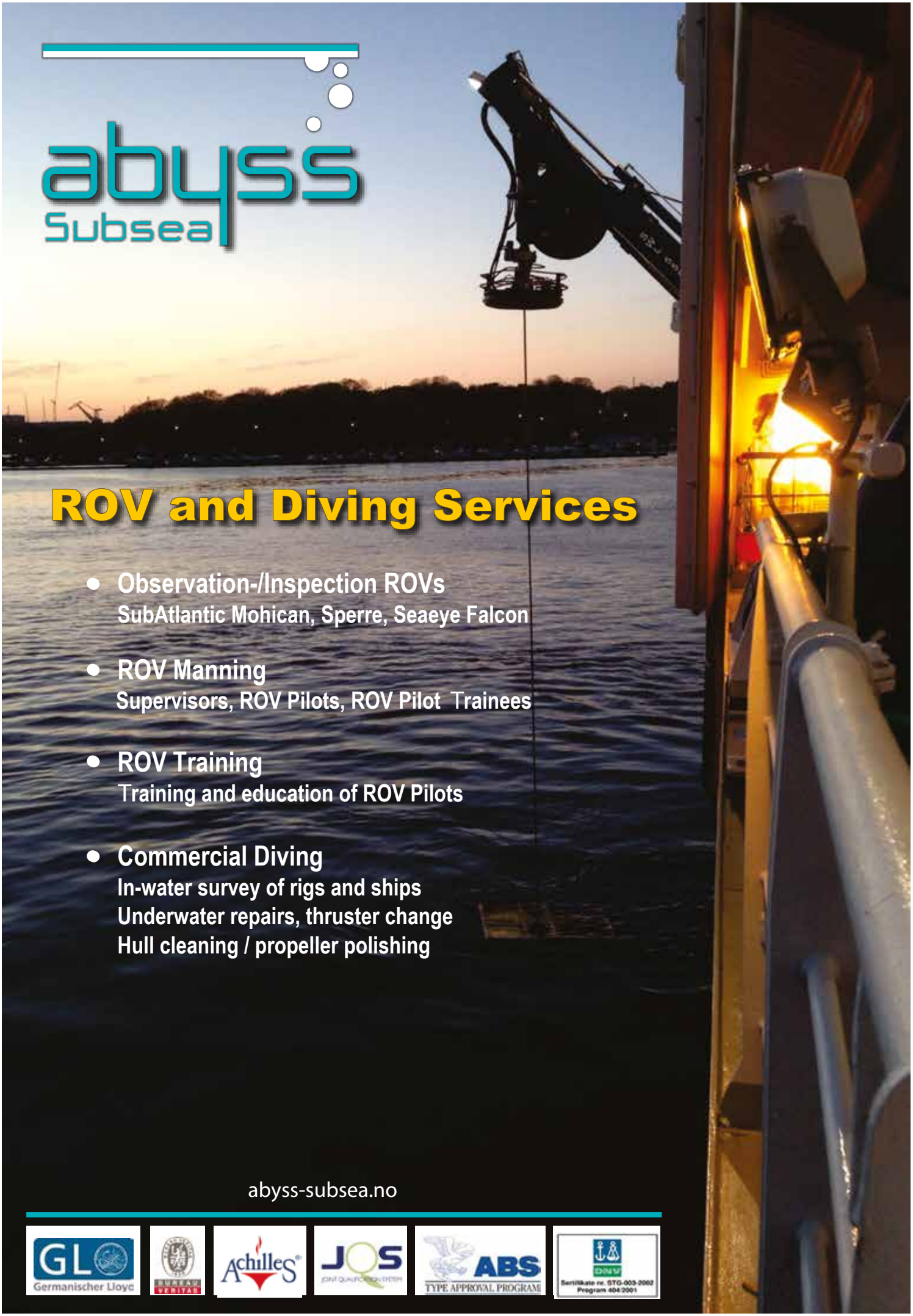
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