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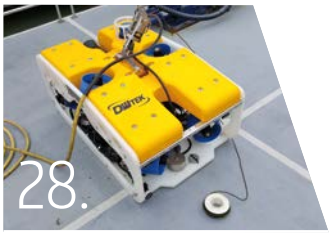

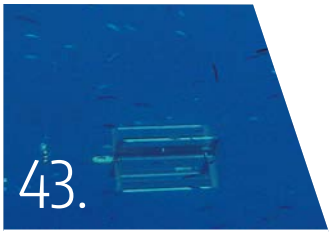

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The magazine of choice for Subsea
Construction and ROV Professionals

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ABOUT

With approximately 11,000 email distributions and 2,000 printed copies delivered to the offices of ROV & subsea construction related companies, oil majors and also distributed at trade shows – ROV Planet aims to become the leading publication, online news portal, and forum of the ROV & subsea construction industries.

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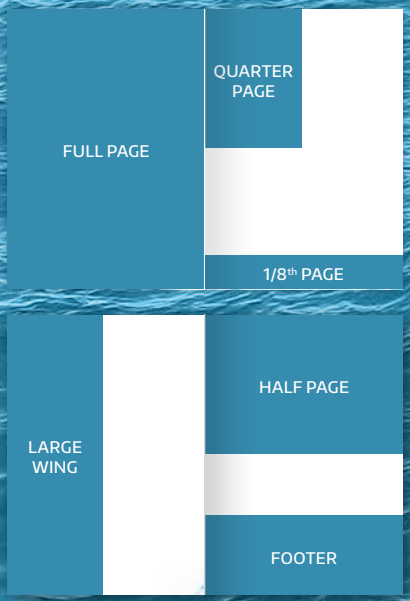

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EDITOR-IN-CHIEF
Richie Enzmann

COPY EDITOR
Will Grant

CONTRIBUTORS
Richie Enzmann, Jill Zande, Lynn Dohm, Sudhir Pai

DESIGN & LAYOUT
Milan Farkas

SPECIAL THANKS TO
Bill Mallin, Christina Tran, Stephen Gibb, John Benson, Doug Trail, Julian Lalanne, Victor Sepuvelda, Trevor Bayfield, Lisa Wu, Doowon Choi, David Jaramillo, Karl Scheuermann, Andrejs Cernavskis, Anette Isabella Bergaas, Matt Bates, Willard Balthazar, Eduardo Moreno, Rich Lawson, Larry Hagstrom

Oceaneering
Balmoral Offshore
Sidus
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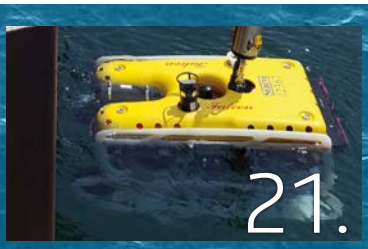

Front Page Cover Photo: Courtesy of Oceaneering | Poster Photo: Courtesy of Northwestern

WELCOME TO ROV PLANET

My name is Richie Enzmann, and allow me to welcome you all to the latest issue of ROV Planet!

Dear Reader,

Heave compensation is becoming more and more frequent with some operators opting to upgrade their existing systems to extend the weather windows, improve the safety, and reduce the risks during launch and recovery. In a separate article we are also looking at the option of using a Pass-Through TMS when deploying an ROV. This patented solution was pioneered by Doug Trail to reduce the cost of ROV operations by getting rid of the main lift umbilical and to reduce the footprint of an ROV system.

Earlier this year I have witnessed the DWTEK I-90 ROV trials at the Ocean Business conference and exhibition in Southampton, England. DWTEK has a versatile electrical vehicle that they were demonstrating to the audience and I also have had a shot at piloting the ROV from the boat. You can read about it in this issue.

We have decided to steer the magazine in a direction to include other types of "remotely operated vehicles", other than just ROVs. From now on the new unmanned section called "UNMANNED & UNTETHERED ROVs" will look at AUVs, Surface Vehicles, Hybrid solutions, and Autonomy. In my opinion this is where the industry is going and most of the skills are also transferable. This is not just true for operating these assets but also for the manufacturing supply chain.

Finally, we are still working on our brand new ROV/AUV parts and equipment directory. The publication is scheduled for launch in January 2018. This will be printed in 4,000 copies and also available online, so please feel free to get in touch if you would like your company to be listed!

Best regards,
Richie Enzmann

UPCOMING EVENTS

1-3 November, 2017 – Oceanology International – Qingdao, China
The event provides domestic and international suppliers the opportunity to capitalise on China's rapidly developing offshore energy and marine industries.

13-16 November, 2017 – ADIPEC Offshore & Marine – Abu Dhabi, UAE
The Abu Dhabi international petroleum exhibition and conference.

21 November, 2017 – Underwater Vehicles Conference – Aberdeen, UK
Subsea UK's annual Underwater Vehicles Conference.

30-31 January, 2018 – Undersea Defence Technology (UDT) Asia – Singapore
The leading underwater defence & military exhibition within the Asia Pacific region.

6-8 February, 2018 – Underwater Intervention (UI) – New Orleans, LA, USA
The world's premier event for Commercial Diving Contractors, Remotely Operated Vehicles, and Manned Submersibles.

7-9 February, 2018 – Subsea Expo – Aberdeen, UK
Europe's largest annual subsea exhibition and conference

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E-ROV concept design (Courtesy of Oceaneering)

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OCEANEERING MISSION SUPPORT CENTERS

Oceaneering has long been recognized as an industry leader in the provision of remotely operated vehicles (ROVs) and related services to the oil and gas market. From its first ROV deployed in the Gulf of Mexico in 1989 to the Oceaneering® eNovus electric ROV, Oceaneering technologies and capabilities have continued to evolve. Changed, too, are the applications that ROVs are used for. Decades of expertise positions Oceaneering to fully support customers in completing operations in varied environments – from challenging salvage operations, to scientific and research missions, and from surveys to asset integrity analyses of wind farm installations.

"Our fleet continues to be used in many of the traditional ROV applications that our customers have trusted us to execute for decades," said Egil Egeland, ROV Manager, Europe. "However, in the current economic climate, and as technology and capabilities advance, so do the demands for new and innovative methods of using our ROV products and services. We've been diligent about staying ahead of the curve and responding to our customers' needs on a global scale while focusing on the value-adding nature that Oceaneering ROV operations have always delivered."

Combining the traditional and diversified uses of ROVs has also driven a step change in the tooling, advanced technologies, and operation of ROVs. Deeper water depths are a challenge. The desires to reduce day rates and carbon emissions are even more challenging. The requirement for new tooling to support a diversified work scope is also a challenge. But where there are challenges, Oceaneering identifies opportunities.

Recent advancements in ROV control, including Oceaneering remote piloting and automated control technology (RPACT), have enabled operators to not only save costs, but to also operate more efficiently while encouraging interaction between client representatives and remotely based subject matter experts (SMEs). Tooling suites – including the new Oceaneering ROV cutting transport system (RCTS) and ROV workover control system (RWOCS) – further capitalize on the full capabilities and diversification of ROV-based work scopes. Both solutions not only reduce topside footprints, but also provide increased control capabilities during operations.

CENTERS SERVE TO INCREASE CAPABILITIES AND SUPPORT

In addition to operating a premier ROV fleet, Oceaneering has also transformed its mission support capabilities. Bolstered by superior 4G connectivity and RPACT capabilities, Oceaneering opened its first dedicated Mission Support Center in Stavanger, Norway, in 2016. This center provides a base for supporting offshore operations using remotely located personnel. As technology and approaches to completing operations evolve, Oceaneering remains at the forefront by taking strategic, calculated steps for delivering solutions that provide efficiencies, decrease operational risks, and enable customers to benefit from both small- and large-scale cost savings.

"Our Mission Support Center in Stavanger replicates a typical ROV control container, but with additional space and capabilities to support all the involved operational personnel," said Erik Sæstad, Vice President and Country Manager for Oceaneering in Norway. "With the growing demand for ROV operations and technologies, we expanded this center in October 2017. In terms of efficiency and collaboration, our Mission Support Center is a game changer. With this center, our customers can interact with our team within a local, familiar base of operations where they have direct access to subject matter experts and can watch operations in near real time. The interest and response to the center has been tremendous, and we anticipate that having this kind of base for ROV operations will continue to increase in popularity."

For customers, the center's benefits are clear. The Mission Support Center enables clients to not only receive real-time

Mission Support Center in Stavanger (Courtesy of Oceaneering)

feeds of their operations, but to also actively engage and participate in these ROV missions. The center is also a direct response to customers who are looking for ways to optimize efficiencies, reduce carbon footprints, and operate in a more environmentally friendly manner. The Oceaneering center meets these criteria by requiring fewer mobilizations of personnel and providing access to specialists who are typically based onshore, thus optimizing time and resources for a more cost-efficient operation.

"The Mission Support Center strengthens our partnerships with our customers, and enables us to continue growing our technologies," Sæstad said. "Our customers continually approach us with ideas on how they can use the Mission Support Center in new applications, and we help them by creating the solutions they need. Vessel operators working with our ROVs also see the center as a key driver in reducing costs and maximizing uptime. The growth of this support concept has been impressive."

PUSHING BOUNDARIES AND ADVANCING CAPABILITIES

Oceaneering has long been renowned for its commitment to expanding its vast global footprint and for continually developing ROV capabilities and technologies. Oceaneering has dedicated resources to the development of a truly resident ROV concept that builds on the success of its self-contained, battery-powered work class ROV (E-ROV) concept and combines experience, RPACT, and Mission Support Center capabilities to introduce a game-changing and efficiency-increasing solution to the ROV industry.

"The goal of the resident ROV concept is to develop a remotely operated vehicle that can 'live' subsea without needing to be recovered during deployments of up to six months," said Arve Iversen, Manager of ROV Operations and Special Projects for Oceaneering. "Essentially, the resident ROV acts as a subsea janitor, and will be capable of performing many common ROV tasks – such as surveys, inspections, valve operations, cleaning, torque tool operations, manipulator-related activities, and underwater inspection in lieu of drydocking (UWILD) activities. The Oceaneering conceptual design is modular, supporting the interface of varied, operation-specific front-end panels that provide the ultimate in flexibility and efficiency."

CHANGING SUBSEA OPERATIONS THROUGH RESIDENT ROVS

Oceaneering believes the resident ROV will be pivotal in supporting the future development of the subsea factory concept where rigs and vessels are not primary assets, along with areas that are under ice or difficult to access. The vehicle will be supported by a docking station and will have hybrid functionality that will enable it to operate in two modes – 1) either with a tether that provides real-time control; or 2) running autonomously on batteries, without a tether.

Why is there such a push for resident ROVs? A resident ROV presents distinct advantages and commercial benefits. As resident ROVs are deployed more and more from docking stations, operators will see a reduction in vessel days required to complete operations. Additionally, as carbon footprints continue to emerge as a primary concern, elimi-

E-ROV mobilized for offshore trials (Courtesy of Oceaneering)

Mission Support Center ROV operations (Courtesy of Oceaneering)

nating vessel emissions related to ROV operations represent another advantage of this subsea technology.

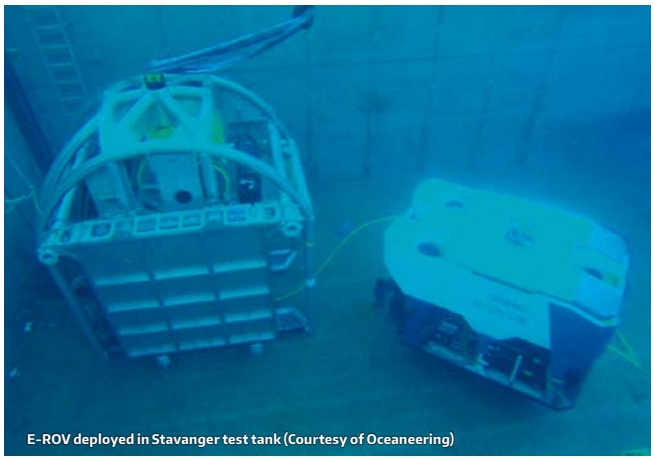
The speed of intervention that a resident ROV offers is also a driving factor. Because the vehicle is strategically located, already subsea, and equipped to be piloted from an onshore location, the benefits of emergency and timely intervention are clear. Resident ROVs also enable operators to take advantage of favorable weather windows. The ROV can be deployed to complete inspections and other tasks unaffected by surface conditions, rather than deploying a vessel-based vehicle and hoping that the weather cooperates. Again, this not only increases efficiency and time-on-task, but also saves vast unnecessary expenditures.

Never overlooking the importance that reducing risk plays, operators also benefit from risk mitigation, as fewer personnel need to be deployed offshore. The resident ROV enables offshore specialists to remain onshore and provide their expertise and oversight from one of Oceaneering's Mission Support Centers. Client personnel can also be based at these centers, thus fostering enhanced collaboration and decision making during operations.

Additionally, the resident ROV approach supports the industry's drive for simplified, standard subsea systems that increase operational efficiency. Designing subsea systems to interface with the resident ROV can help shape the design of future infrastructure. For example, the system currently being developed will enable a massive increase in depth rating capabilities. The resident ROV will be capable of operating in water depths down to 6,000 meters (19,685 feet) – far surpassing previous ratings of 3,000 meters (9,843 feet). This provides additional access to restricted areas and previously inaccessible locations, increasing our capabilities to serve markets in challenging geographic locations, such as in subsea mining.

BUILDING ON THE SUPPORT CONCEPT

Today, the Oceaneering Mission Support Center in Stavanger is home base to a growing number of ROV and subsea SMEs who help guide critical operations in the North Sea. Oceaneering will have several such centers around the globe to serve operators in the Gulf of Mexico and in other offshore locations. As operators gain increasing access to resident ROV capabilities and to these Mission Support Center experts, the demand for these services is expected to continue its rapid growth.


E-ROV deployed in Stavanger test tank (Courtesy of Oceaneering)

ROV, AUV buoyancy

and umbilical flotation

1 Umbilical floats

A standard range of floats is available to suit most control umbilicals. Comprising symmetrical half shells Balmoral floats are designed to permit flexing within specified bend radii.

2 Flexlink™ articulated umbilical buoyancy

Designed to ensure umbilical lines remain out of the ROV work zone, Flexlink is installed onto lines of 25-75mm with uplifts of 6-12kg in operating depths to 6000msw.

3 ROV buoyancy

Offering a full in-house service Balmoral Offshore Engineering designs and creates intricate ROV/AUV buoyancy profiles with virtually no size limitation. Balmoral's unique composite and pure foam systems are designed to operate at depths of 1000-10,000msw.

The company's refurbished ROV plant incorporates an end-to-end process that includes temperature controlled curing facilities and a state-of-the-art buoyancy block boring and milling plant.

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QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

Remote Operated Vehicle (ROV) PRODUCTION, SALE AND SERVICE:

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Tether length 120 m (up to 150 m),
Color camera 700 TVL,
4 Thrusters: 1 vertical, 2 horizontal, 1 lateral.

RB 300
Working depth till 200 meters
Tether length 220 m (up to 300 m)
Color camera 700 TVL
5 Thrusters: 2 vertical, 2 horizontal, 1 lateral.

RB 600
Working depth till 300 meters,
Tether length 300 m (up to 1200 m),
Full HD, zoom, autofocus color camera,
7 Thrusters: 2 vertical, 4 horizontal, 1 lateral.

RB MIRAGE
Working depth till 400 meters,
Tether length 400 m (up to 1200 m),
Full HD, zoom, autofocus color camera,
12 Thrusters: 4 vertical, 6 horizontal, 2 lateral.

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AHC upgrade of LARS done in only 3 days: **Scantrol and their UK winch partner, Hydramec Offshore Hydraulic Systems Ltd, upgraded a Leopard ROV LARS to have AHC in only 3 days. The client, Kaiyo Engineering, a Japanese marine science company, is using the Leopard to explore the feasibility of seabed mining. (Courtesy of Kaiyo Engineering)**

PULLING THEIR WEIGHT: WHY ACTIVE HEAVE COMPENSATION IS CRUCIAL FOR TODAY'S ROV OPERATIONS

There's no doubt about it, it's a tough time for the ROV industry. Challenging markets and demanding clients mean that ROV service providers need additional technologies to help support a number of areas: to increase ROV operational time, improve system reliability, and reduce some of the tougher operational burdens.

As a result, Active Heave Compensation (AHC) has become a popular add-on to operators' Launch and Recovery Systems (LARS). This feature can dramatically increase efficiency and reduce downtime related to equipment damage.

For this reason the Norwegian supplier of AHC controls, Scantrol, is seeing interest in AHC for LARS, both on Work Class ROVs and Observation Class ROVs. '30 % of the Scantrol AHC systems supplied are for ROV handling equipment', says Rolf Krogh Hjelmeland, Business Development Manager for AHC.

AHC FOR BOTH WORK CLASS AND OBSERVATION ROVS

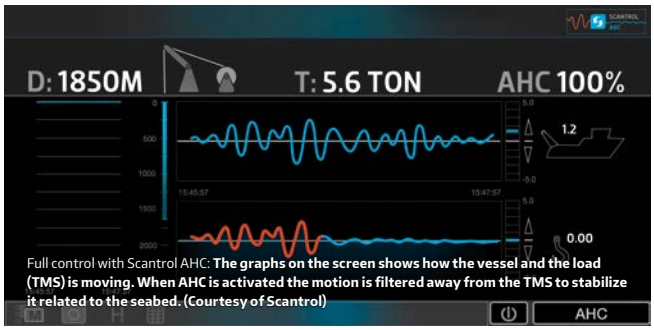
Scantrol AHC makes it possible to filter away vessel motion that would otherwise have been transferred to the load, and facilitates safe and efficient operation even in extreme weather conditions. The system was originally used mainly on offshore cranes and subsea winches, and was mostly reserved for larger projects due to acquisition costs and lack of accessible technology.

As subsea operations have become more challenging, the demand for time-saving technology and cost-efficient solutions has increased. Challenges for multi-purpose vessels – such as time spent mobilising heavy deck equipment or weather-related downtime – are expensive bottle necks that can easily be remedied through the use of functions such as AHC.

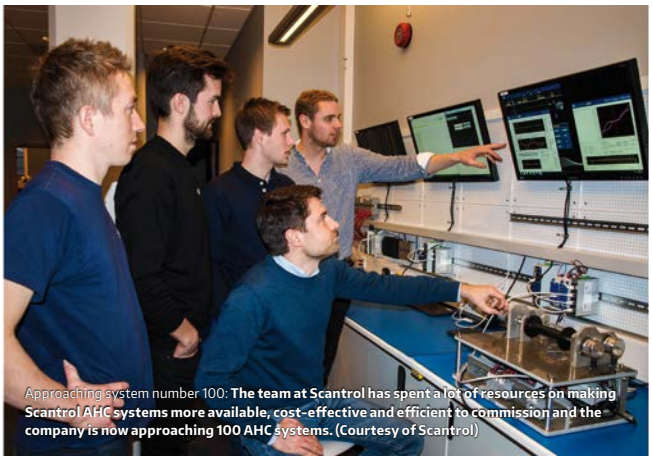
Scantrol is experiencing growing interest from subsea operators looking to have AHC installed on ROV handling equipment. Extended weather windows, decreased risk of damage, auto-depth functions, and monitoring of the umbilical are all important reasons to include this function in the system. Furthermore, making the decision to have an AHC function installed as part of the systems on board a vessel can in many cases be the deciding factor in whether or not an operator will win a contract.

In order to meet the demand for practical and cost-efficient solutions Scantrol has spent the last eight years focusing its expertise on developing AHC systems for a wider range of applications making the sought-after technology more available.

AHC for new and existing systems: **Scantrol has worked closely with Fugro Subsea Technologies and their hydraulic supplier, Bosch Rexroth, to find the best solutions for implementing AHC on both new and existing LARS systems. (Courtesy of Fugro Subsea Technologies Pte Ltd)**



Full control with Scantrol AHC: **The graphs on the screen shows how the vessel and the load (TMS) is moving. When AHC is activated the motion is filtered away from the TMS to stabilize it related to the seabed. (Courtesy of Scantrol)**



Approaching system number 100: **The team at Scantrol has spent a lot of resources on making Scantrol AHC systems more available, cost-effective and efficient to commission and the company is now approaching 100 AHC systems. (Courtesy of Scantrol)**

FOCUS ON SAFETY AND INCREASED OPERATION TIME

Adding AHC to the LARS means that clients can work in harsh sea conditions as the system keeps the Tether Management System (TMS) stable relative to the ROV. Scantrol AHC keeps the TMS in a fixed position. This ensures that the docking of the ROV against the TMS can be done safely and controlled, without the vessel's heave motion compromising the TMS's position. The AHC function will also give improved control when deploying and retrieving. The operation time will increase as less downtime will be spent waiting for better weather conditions.

According to one of Scantrols' clients, Fugro Subsea Technologies Pte Ltd, AHC technology will reduce the demands on ROV piloting skills during extreme weather conditions. With AHC technology, the pilot will be able to maintain the position of the TMS unit whilst focusing on the docking and undocking operations. Pilots will be able to avoid any disastrous situations, such as damaging the delicate tether, the 'life line' of any ROV system.

The Scantrol AHC interface also makes sure that the operator has full control of the different scenarios at all times. One function, Auto-depth, automatically takes the TMS to the desired operational depth at the selected line speed.

Another important feature is the Umbilical Manager. This monitors and – if necessary – raises an alarm for the umbilical's condition. The Manager gives the operator an indication of where the umbilical has the most wear. Also, if parts of the umbilical need maintenance, the umbilical manager tells the operator when and where.

SHORT DELIVERY TIME, EFFICIENT COMMISSIONING, AND REMOTE SUPPORT

Scantrol's strategy is to make AHC available also for smaller size lifting equipment by providing standardised systems that are straightforward, reliable, and efficient to commission. One of their most recent projects for a Japanese client – a retrofit system – was commissioned in only three days, meaning minimal downtime. Efficient testing, tuning, commissioning, as well as easy access to remote support is crucial in order to offer effective AHC systems to companies worldwide.

Scantrol has developed a set of smart and supportive tools that are used during the design, testing, operation, and remote support. The AHC toolbox ensures adequate AHC winch capacity, time-savings in testing, intuitive monitoring of operations, and rapid and cost-efficient support independent of the vessel.

In order to cut commissioning time, Scantrol's AHC for LARS comes with a remote testing tool called Dynatest. The AHC winch is tested on shore by service engineers that have been trained by Scantrol. This leaves only the fine tuning to be done after installation. After training the clients should be able to do most of the support on the Scantrol systems themselves. This saves the ship operator, the LARS manufacturer, and Scantrol time and cost. It is this toolbox that makes it possible for Scantrol to complete a retrofit within three days.

There are now close to 100 systems in operation worldwide. Scantrol's R&D department are continuously striving to include value adding functionality. In a short time the development team expect to have a full auto-tuning function included as an integrated part of the software.

Another feature of this package is the AHC Link, a concept that assures cost efficient utilisation of Scantrol components when the vessel has more than one Scantrol AHC installed on board. The AHC Link can be integrated into the infrastructure of multiple systems onboard the vessel to reduce costs.

AHC UPGRADES – EXISTING SHIPS NEED AHC TO BE COMPETITIVE IN TODAY'S MARKET

In order to secure new contracts for offshore work, vessels are often required to have AHC equipment installed on board. Vessels who do not have this can potentially be excluded from the bidding process. 'For many operators, having AHC on one or several handling systems may be critical for winning a contract in today's market.', explains Hjelmeland.
'For most vessel owners the investment of including the AHC function can easily be returned by avoiding downtime with expensive day and project-delay rates for the vessel.'

Many LARS winches and other winches used for subsea work can be upgraded to AHC with minor modifications to the drive system. Scantrol AHC will increase the uptime of your subsea operations, improve system stability, as well as reduce some of the tougher operational burdens on the winch operator. Fitting Scantrol AHC to a winch is a cost effective solution to help increase your asset value and keep up with the competition.

'AHC solution from Scantrol is modular and could easily integrate into our existing Launch and Recovery System (LARS) control logic without the need to start from a clean sheet of paper.', says William Lee, Managing Director of Fugro Subsea Technologies Pte Ltd.

'Scantrol has been very helpful in assisting the company to incorporate field proven AHC solutions into our existing LARS packages, without the need for major and expensive re-engineering activities, or doubling the size of the hydraulic power unit.'

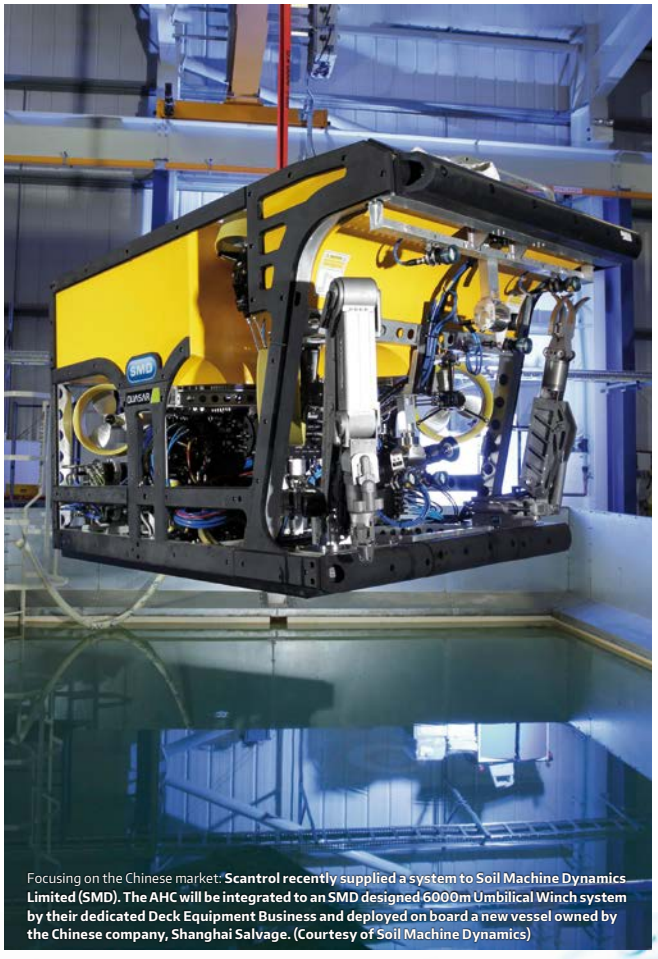
Scantrol software packages have tools that can easily calculate the AHC capacity of existing lifting equipment. Without changing anything except the control system into an AHC control system, some AHC-performance can usually be achieved. If more capacity is needed, hydraulics experts – many of whom are now partnered with Scantrol – can retrofit the equipment to perform much higher speeds and torque than was initially possible. This comes at a cost that's much lower than building a new winch or crane, and it will increase the operation specification of a vessel dramatically. By upgrading existing equipment, smaller vessels can also start competing with large offshore vessels, while reducing the cost for the end users who want to get the job done quickly and efficiently.


Courtesy of Fugro Subsea Technologies Pte Ltd.

TARGETING THE CHINESE MARKET

China has been, and will continue to be, a target market for Scantrol. The company recently signed a contract with a new agent in China in order to increase market presence and make AHC available for Chinese manufacturers. Scantrol recently received an order to supply an AHC control system that will be integrated in to a 6,000m Umbilical Winch system designed by Soil Machine Dynamics Limited (SMD), one of Scantrol's clients. The system will be deployed on board a new vessel owned by a Chinese engineering company.

'We believe that there is great potential for AHC in the Chinese market, and we want to make this function available to all those companies who do not have this technology.' says Marketing Communications Manager, Anette Isabella Bergaas.
'The Chinese project is a very interesting project and will be an important reference for Scantrol in China.'



Focusing on the Chinese market: **Scantrol recently supplied a system to Soil Machine Dynamics Limited (SMD). The AHC will be integrated to an SMD designed 6000m Umbilical Winch system by their dedicated Deck Equipment Business and deployed on board a new vessel owned by the Chinese company, Shanghai Salvage. (Courtesy of Soil Machine Dynamics)**

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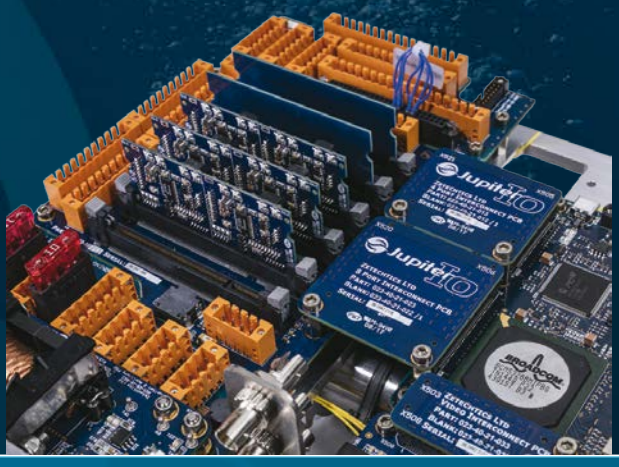

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AN ALL IN ONE PLUG AND PLAY ROV DEPLOYMENT SOLUTION

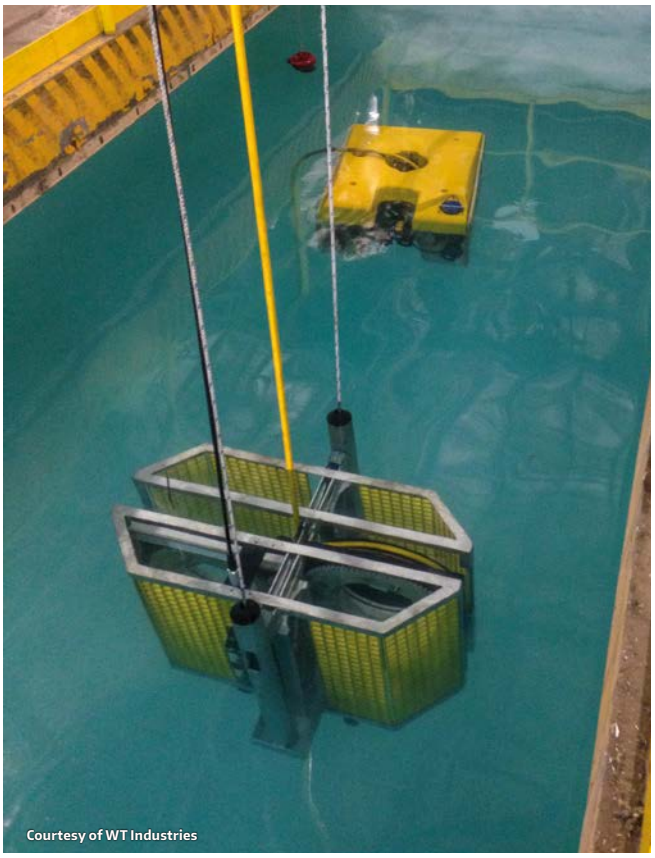
WT Industries – based in Houston Texas – have developed a radically new patented deployment system for use in both offshore and inshore ROV markets.

The entire industry has had to adapt in order to find cost effective solutions in this very challenging marketplace. With this in mind, CEO Doug Trail has developed a self contained and complete single lift, compact ROV deployment system. The Contain-A-LARS is a 20ft container that houses an umbilical winch, 10ft × 7ft controls cabin, extendable launch frame, ROV, and Pass Though TMS (PT-TMS). The umbilical is deployed directly to ROV through the PT-TMS), via a patented constant tension system. This gives the ROV the reliability of a free flying vehicle, but with all the functionality of a TMS. A camera, tilt, and lights are mounted within the TMS, to monitor all umbilical operations. The ROV excursion is now limited only to the amount of umbilical on the main winch, not what the traditional TMS drum can hold. Independent deployment cables to the PT-TMS, suspend the PT-TMS from the extendable launch frame. As the PT-TMS is lowered, the winch pays out the umbilical as required automatically. When the PT-TMS is at the required depth, the PT-TMS simply passes the umbilical to the ROV for operations.

The use of the patented PT-TMS makes the use of an expensive main lift umbilical redundant. The elimination of the armored lift umbilical not only reduces the overall weight of the system and associated equipment, but makes LARS required SWL capacity minimal and independent of depth. With previous deepwater LARS systems, the weight in water of fully armored umbilical and TMS exceeded the in air weight of ROV and TMS, and thus required LARS structure have larger SWL capacities making everything progressively bigger and heavier.

Courtesy of WT Industries

Courtesy of WT Industries


Courtesy of WT Industries

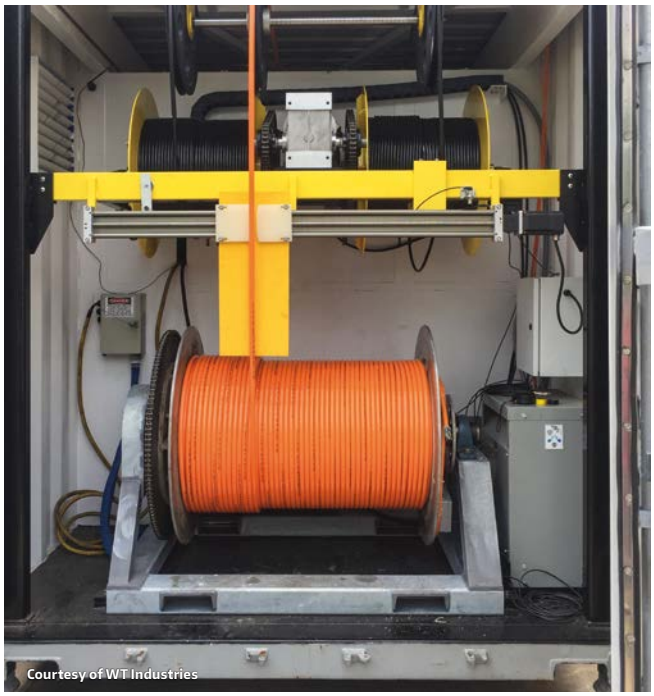
The plug and play Contain-a-LARS system reduces all major ROV operations cost drivers such as mobilization, personnel, and downtime.

The current Observation Class Contain-a-LARS complete unit weighs less than 10 tonnes, which is a single non permit truck to dock, single pick mobilization onto the vessel. Compareble systems require a separate truck for a controls van and second truck for LARS, which could also need permits due to being oversized. Being gravity based, it makes installation on offshore installations simple; on vessels the unit can be sea-fastened using standard twistlocks.

The elimination of the traditional TMS rotary sliprings has resulted in increased reliability; the system has fewer connections and becomes more simplified. Any tether retermination required can be completed very efficiently, especially compared to a garage-style TMS where it could take up to a whole 12 hour shift offshore.

With a traditional LARS it takes at least two people to launch and recover the ROV. One has to man the winch and the other has to stabilize the ROV / TMS while landing. The Contain-a-LARS launch frame incorporates alignment recepticals to stabilize the launch and recovery of the ROV which can easily be done with only one person.

The Contain-a-LARS system is also all electric eliminating the possibility of oil discharges. It's also very energy efficient with the largest motor being only 5 HP compared to typicall minimum 25 HP HPU for a typical hydraulic A-Frame LARS.


Courtesy of WT Industries


Courtesy of WT Industries

To put the theory in practice, Doug Trail has built a prototype working model of the Contain-a-LARS system for electric observation class ROV's, housed within the high cube 20'x8' container. The system currently has a refurbished Apache ROV installed, but it is pretty universal and capable of accepting any free swimming ROV up to the size of a Saab Seaeye Cougar. This innovative system is currently on offshore trials in the Gulf of Mexico. Soon it will be available for lease to any interested ROV operator keen on reducing their cost base with the reduction of weight, footprint and potentially vessel size when performing observation and inspection work in these difficult market conditions.

The North Sea Market is currently seeking to go to platform based vs. vessel based inspections and the new Contain-a-LARS is ideally suited for this. WT Industries is in latter stages of putting together an agreement to manufacture the Contain-a-LARS system with a prominent UK LARS manufacturer to full DNV or Lloyds certification to address this much safer and economical way to perform inspections.

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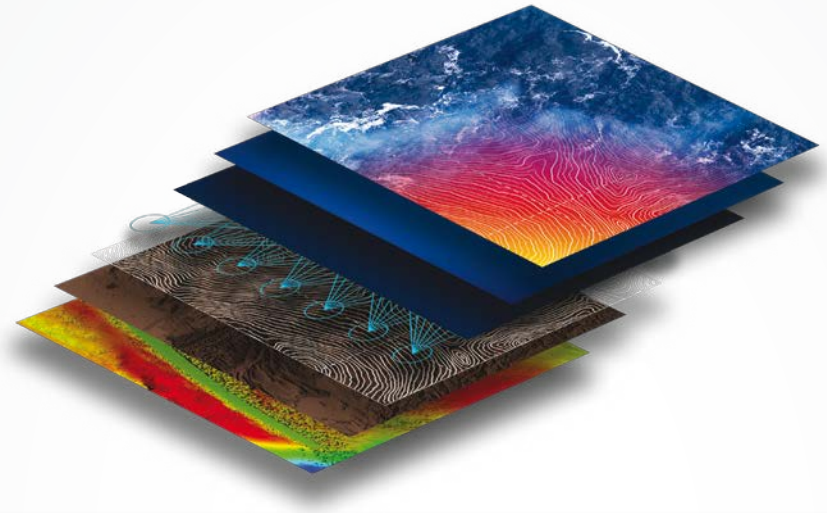

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FEMALE AMERICAN STUDENTS EXPLORE FUTURE OF ROBOTICS

Female marine-study students are showing a particular interest in electric underwater robotics says Northwestern Michigan College, the first in America to offer a Bachelor of Science in Maritime Technology.

Both practical and operational management experience is offered by the course. (Courtesy of Northwestern)

Taking the Falcon offshore allows students to explore the potential of underwater robotic systems in a practical environment. (Courtesy of Northwestern)

This chimes with studies by America's National Science Foundation who report that more women are becoming involved in all areas of water science.

Saab Seaeye, makers of the college's new Falcon e-robotic vehicle, agree. They too find increased interest in women wanting to follow a career in electric underwater robotics.

Ali Roy is a systems engineer at Saab Seaeye where many female engineers and technicians work in departments throughout the company.

"We also have an increasing number of female students coming to us for work experience," she says. "It's gratifying to see young female engineers excelling here at Seaeye, and as a designer it's great that the college is using our robotic system to teach a new generation of female marine professionals."

Hans VanSumeren, Director of the Great Lakes Water Studies Institute at the college has found that female students have a growing interest in the underwater world with a particular enthusiasm for underwater robotics.

"Our female students have a keen interest in the expanding role of electric underwater robotics and the Falcon has been a vital element of their studies," he declares.

Students involved in marine studies come from universities and colleges across America for the opportunity to interact with the real underwater world – including operating the Saab Seaeye Falcon underwater robotic vehicle.

Students benefit from first-hand experience by piloting the Falcon under International Marine Contractors Association guidelines.

The College has two research vessels from which students can deploy the Falcon in support of their studies and research projects. (Courtesy of Northwestern)


Students get first hand experience piloting the Falcon under International Marine Contractors Association guidelines. (Courtesy of Northwestern)

Hans VanSumeren chose the Falcon because, "It is highly reliable and never breaks down," and says the Falcon is, "the most widely used ROV in the industry and therefore the one students are most likely to come across in their working life."

ELECTRIC E-ROBOTICS SEEN AS FUTURE IN UNDERWATER SYSTEMS

Mounting interest worldwide in electric e-robotics comes as advances in electric systems technology brings wide-ranging savings to operational costs across a vast range of demanding tasks.

Growth potential in the American market for smart electric robotics has seen Saab Seaeye, the world's largest manufacturer of e-robotic underwater systems, further expand its operations in Houston.

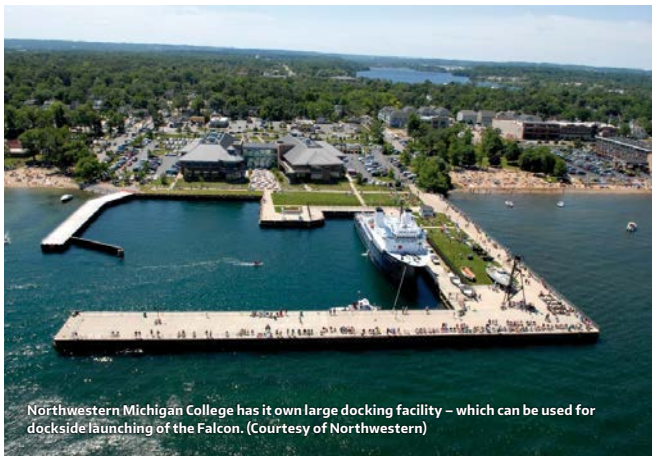
Driving the rapid expansion of e-robotics is advances in miniaturisation and other technological developments that make the newest generation of vehicles smaller, smarter and more intelligent.

They can undertake a wider range of tasks, whilst also mastering turbulent waters, and stay on station much longer than other systems.

Operators worldwide report that their smaller size and lower overall cost can bring cost savings of up to 40% over comparable hydraulic systems.

Saab Seaeye believe electric is the future for all underwater systems, as rapidly advancing technology, innovation and operational methods open up an all-electric underwater world with the power to undertake virtually any tasks, including those currently performed exclusively by hydraulic systems. Already electric systems are out-performing most of the largest hydraulic systems with considerable savings in costs.

The Bachelor of Science in Maritime Technology at Northwestern Michigan College provides an interdisciplinary education in targeted areas of marine technology. The curriculum is a blend of several technical competencies common to the marine industry.



Northwestern Michigan College has it own large docking facility – which can be used for dockside launching of the Falcon. (Courtesy of Northwestern)

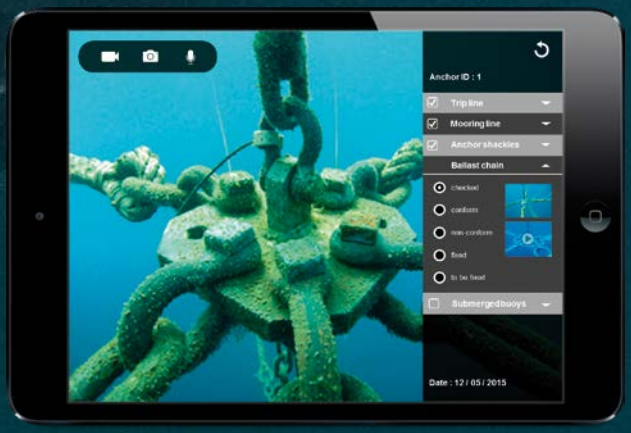
Alf Roy, Systems Engineer at Saab Seaeye, standing alongside another much larger robotic vehicle she helped design: the Leopard, the most powerful of its class in the world. (Courtesy of Saab Seaeye)

SEADRONE INC. INTRODUCES INSPECTOR 2.0

DOUBLING DOWN ON AQUACULTURE INSPECTION

Bay area based robotics startup, SeaDrone Inc., announces the launch of Inspector 2.0, the latest innovation in underwater robotics.

Courtesy of SeaDrone



Courtesy of SeaDrone

Courtesy of SeaDrone

Inspector 1.0 was launched at TechCrunch Disrupt 2016 and was the first sub-6 kg underwater vehicle capable of tackling1.5 knot ocean currents using its omnidirectional drag design and high thruster to weight ratio.

Since the pre-order launch at TechCrunch, SeaDrone have sold hundreds of units of Inspector 1.0 units all over the world with primary markets being Japan, Chile, Norway, with aquaculture as the primary use case.

Based on customer feedback, SeaDrone is doubling down on investment with the Inspector 2.0. The company are continuing to improve their product and are developing autonomous capabilities on the vehicle that will allow SeaDrone to scan a farm net and automatically determine tears.

SeaDrone are seeking additional distribution partners to help take the SeaDrone platform to the next level.

SEADRONE

Courtesy of SeaDrone

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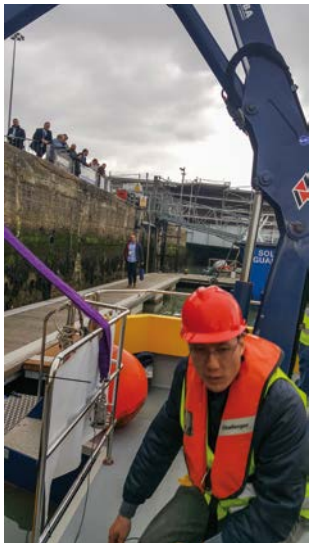
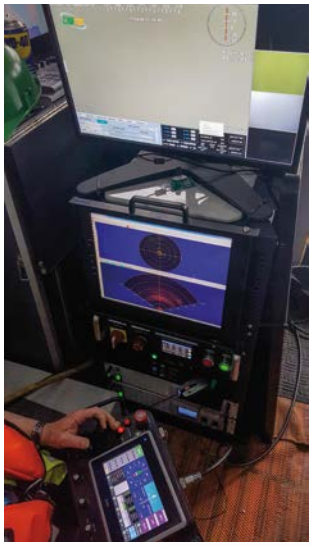
THE DWTEK I-90 ROV DEMO AT OCEAN BUSINESS

At Ocean Business 2017 in Southampton, UK DWTek demonstrated its new Investigator I-90 type ROV to the oceanic market. ROV Planet attended the demo to take a closer look at the full capabilities of this new ROV.



As the first marine equipment manufacturer and supplier in Taiwan, DWTEK has devoted its full effort to the enhancement of the subsea industry since 2008. Until now they have been focusing on the development of ROV related components, including subsea connectors, propulsion systems, cameras, LED lights, and navigation sensors. They also recently developed their own Investigator ROV design. This is a company that started from zero to achieve 90% self-manufacturing capabilities. The major key components are designed and manufactured on-site. This achievement involved integrating expert R&D teamwork with academic support and partnership.

The fundamental design concept behind the I-90 ROV is the creation of an expandable vehicle which is both functional and versatile. This extraordinary expanding capability allows the operator to customize a fully functioning ROV for specific applications. This highly adaptable vehicle design allows for the installation of a wide range of different payloads and equipment. The payload of the I-90 is rated from 300M to 1000M through the selection of buoyancy blocks. DWTEK offers a conformal buoyancy block kit that allows the payload to be increased by about 15%. It also opens a new page for this class of remote observation vehicle.



THE ROV LAYOUT

The basic configuration of the full I-90 ROV system includes a main console, a deck cable junction box/winch, the ROV vehicle itself, and a command unit. Each of these components is regarded as an independent device. The individual circuit boards in the thrusters and system pods of the I-90 ROV include a comprehensive feedback system. The operator can monitor temperature, voltage, current, and thruster RPM via the on-screen display (OSD) in real time. e-diagnostics of system connections and data streams are displayed via touch panels on both the main console unit and the command unit, which provide instant service checks.

PROPULSION AND THRUSTER DESIGN

DWTEK have developed the DWT6500 series of brushless motor DC thrusters for the I-90 ROV. The advanced circuit design of the miniature motor drivers endures high voltage and operating power. The DW6500 series thruster driver performs delicate motor speed control and sends feedback which includes RPM, voltage, and power. It also includes overload protection in the event of motor failure. Vehicle propulsion deviations

can be tuned by altering the power output settings of each thruster. This function is displayed and set up on the 7" touch panel of the command unit. The DWT6500 thrusters are magnetically coupled and there are no connecting shafts. This makes for extremely low maintenance with high reliability. The design of the 'I' beam support frame holds the nozzle and creates a larger cooling surface, increasing the performance of DWT6500 but with a relatively smaller diameter.

CAMERAS & LIGHTING

The Sea Observer is a full HD camera designed and fabricated at DWTEK. It's a bonus product that increases the value of the I-90 and gives a video image of the highest quality. The image transfer and communications are carried out through an optical fibre linkage to avoid the noise that usually accompanies transmission over long distances. DWTEK also offer up to four additional video channels with high definition cameras allowing the I-90 to avoid blind spots. The standard I-90 has two variable intensity 6900 lumen LED lights with dimming function. Additional lights can be added on request.

The tilt platform is driven by a servo rotator that provides accurate angle adjustment and high loading capability. The tilt platform is very versatile, and a full HD camera is included as part of the standard configuration. Additional lights, lasers, multi-beam sonar, and other cameras can all be mounted on the platform as needed.

NAVIGATION AND AUTO FUNCTION

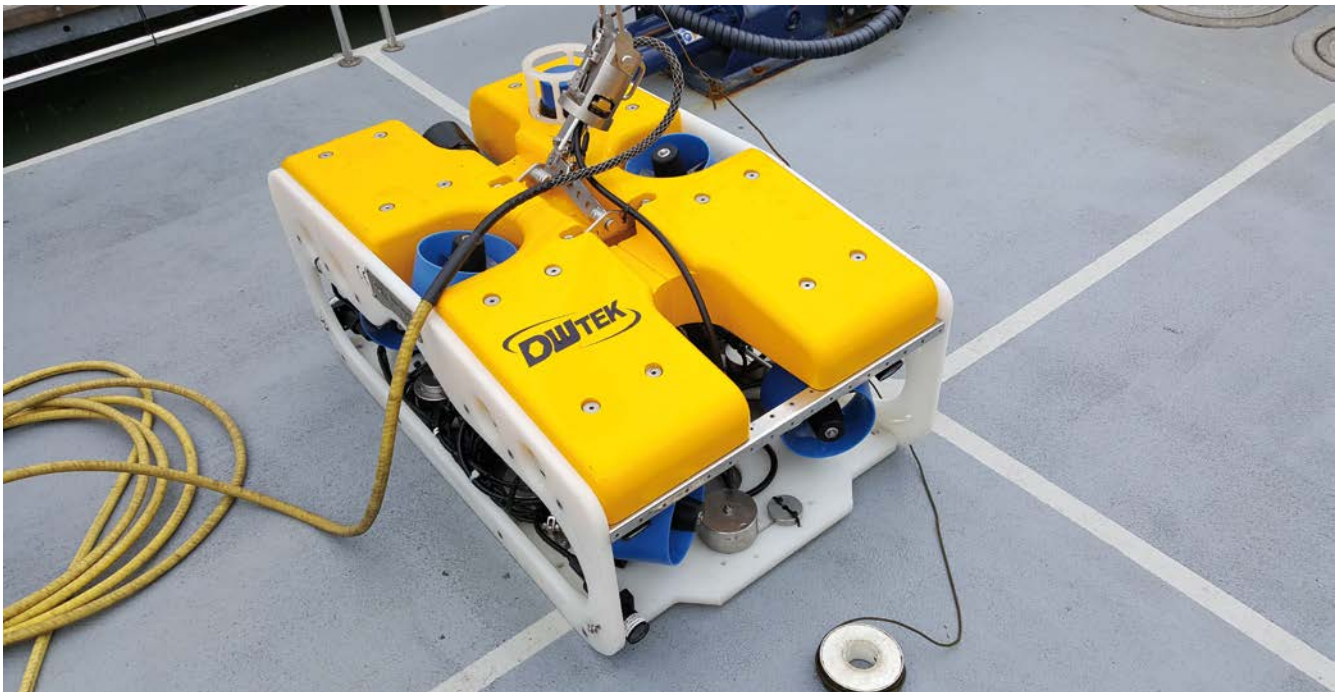
The navigation sensors include a gyro, a compass, a pressure sensor, and a three-axis accelerometer, all of which are housed inside a single aluminium pod. The standard auto pilot functions are Auto Heading, Auto Depth, and Auto Altitude. The pitch and roll status are displayed on the 7" touch panel and on the video overlay of the 22" LCD monitor at the same time.

CONNECTORS

DWTEK also manufactures all the wet connectors used on the I-90, which is also compatible with most major wet connector suppliers. This allows the operator to approach spare parts and makes maintenance much easier.

MAIN CONSOLE & COMMAND UNIT

The Main Console of the I-90 is equipped with a 22" LCD monitor, programmable power supplies, a power and data management system, and an Integrated Digital Recording System (IDS) as standard. All individual modules are designed to be mounted inside an industry standard 19" rack case, which allows the system to be updated and maintained easily. The main console's electronics automatically detect and display the system's status and health. All the feedback from the vehicle is displayed on the 4.3" touch panel. The powerful Command Unit has a 7" touch panel, and a diagram designed interface compatible with a light work-class ROV handling interface, allowing real-time two-way communication with the ROV.



INTEGRATED DIGITAL RECORDING SYSTEM (IDS)

All video from the vehicle is sent to the main console and recorded by an Integrated Digital-Recording System (IDS). The videos can be displayed on 22" LCD monitor simultaneously. Vehicle feedback information is also integrated and collected by the IDS. The information source displayed can be selected by the operator, or simply turned off for a clean image display. The friendly design of the text and graphics overlay allows for easy selection. The IDS is an Industrial Personal Computer (IPC) based system which is capable of installing several software applications for sensors, in addition to recording information and images from sonar, USBL, CP probe, etc.

The demo took place outside the exhibition hall from one of the boats docking in the harbour. A small audience of curious individuals have gathered to see this new ROV tested in the water.

The ROV was lifted up with a knuckle boom crane and launched overboard into the water. As part of the exercise the experienced crew performed a mock inspection of the harbour wall. The visibility was low due to the murky water conditions in the harbour hence the navigation was assisted with the sonar on board.

The attendees at the demo concluded that DWTEK has manufactured a world class electric ROV that has become a serious contender in the market and is ideal for several types of inspection and observation applications.

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Courtesy of Paul G. Allan

3U TECHNOLOGIES, LLC SUPPORTED VULCAN INC. USS INDIANAPOLIS PROJECT

3U Technologies, LLC (3U) announced today that 3U engineering and management personnel supported Microsoft co-founder and philanthropist Paul G. Allen and his company Vulcan Inc. (Vulcan) during design, manufacture and commissioning of Vulcan's new 6000 m ROV system. This state-of-the-art ROV was used to confirm and document the wreckage of the USS Indianapolis, found at 5500 m (18,000 feet) in the Philippine Sea on August 19, 2017 – 72 years after sinking.


Courtesy of Paul G. Allan

Courtesy of Paul G. Allan


Courtesy of Paul G. Allan


Courtesy of Paul G. Allan

The USS Indianapolis was lost on July 30, 1945, shortly after delivering key components for "Little Boy", the first of two atomic weapons used in WWII, to Tinian Island. The USS Indianapolis was torpedoed by the Japanese submarine I-58 in the Philippine Sea with 1,196 US sailors and Marines aboard. Survivors were left to drift for four long days, enduring shark attacks, dehydration and sea water poisoning before 316 survivors were rescued.

3U was initially contracted by Vulcan in 2012 to investigate 6000 m ROV solutions to extend Mr. Allen's passion for WWII Naval history, exploration and archeology to most of the world's ocean depths. Working under the direction of Robert Kraft, (Vulcan Director of Subsea Operations) 3U personnel sourced, specified and designed all key systems/sub-systems and managed equipment manufacturing, testing and integration from a worldwide supplier base.

The result is a powerful 100 kW (130 Hp equivalent) ROV which is well outfitted for deep ocean exploration. Key features include:

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- Scanning and multi-beam sonar systems
- Multiple high bandwidth data channels (Gigabit Ethernet, Serial Data)
- Dual Titan 4 manipulators (Isolated hydraulic supply)
- 18 kW tooling hydraulic system (Operator adjustable flow & pressure)


Courtesy of Paul G. Allan

"3U Technologies is very proud and honored to have been involved in this project, which hopefully brings some measure of closure to the 19 Indianapolis crew members remaining alive today," stated Carl Barrett, Lead Project Manager from 3U. "At 3U we pride ourselves on our record of successful completion of new and unique technical projects and look forward to further opportunities to support Vulcan's exciting future projects."

"3U Technologies provided unparalleled engineering services and was instrumental in the development and acquisition of arguably one of the most technologically advanced and capable deep diving ROV systems in the world today." commented Vulcan's Robert Kraft.

Courtesy of Paul G. Allan


Courtesy of Paul G. Allan

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BIG WINNERS AT 2017 INTERNATIONAL MATE UNDERWATER COMPETITION

Jill Zande, President, MATE Inspiration for Innovation (MATE II)
Associate Director & Competition Coordinator, MATE Center
Lynn Dohm, Media and Communications Manager, MATE Center

The focus was intense and tension was high during the Marine Advanced Technology Education (MATE) Center's international underwater robotics competition (June 23–25).

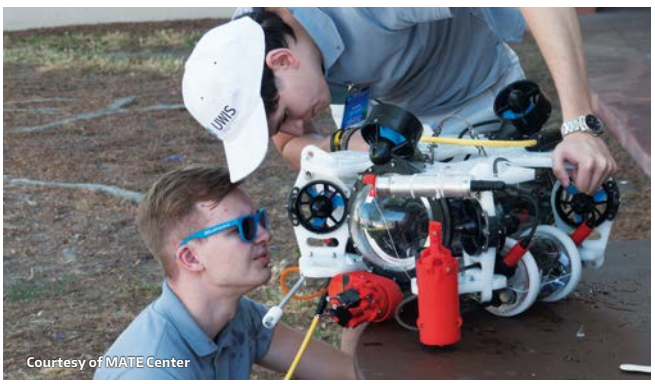
Student groups from around the world competed in this battle of skill and creativity. All-in-all, 65 teams from 17 countries participated, yielding a high level of competition. By the end of the third day, Hong Kong University of Science and Technology (HKUST) and Watsonville Firefighters' Seal Team 1272 (California) each took first in their class, advanced (EXPLORER) and intermediate (RANGER), respectively. This is the first time both teams have won at the international level.

Courtesy of MATE Center

The student teams used their self-designed remotely operated vehicles (ROVs) in and around the Long Beach City College swimming pool. This year's competition highlighted the role ROVs play in securing the health and safety of today's seaports and how they'll impact future port cities. Students operated ROVs in simulated real-life scenarios such as cleaning up contaminated sediment and locating cargo that had fallen off container ships.

Judges from government, education, science, and industry evaluated each team on the ROVs design, construction and performance as well as the teams' ability to communicate what they learned and describe the development of their ROV. The mission complexity and vehicle design determined which class each group competed in (Explorer or Ranger). Other awarded categories included Guts and Glory (won by Dalhousie University from Canada and Eureka Tech Academy from Jordan), Safety Conscious (HKUST and California Academy of Math and Science), and Biggest Bang for the Buck (Garrett College from Maryland and Highlands Intermediate/Pearl City High School from Hawaii).


Courtesy of MATE Center


Courtesy of MATE Center

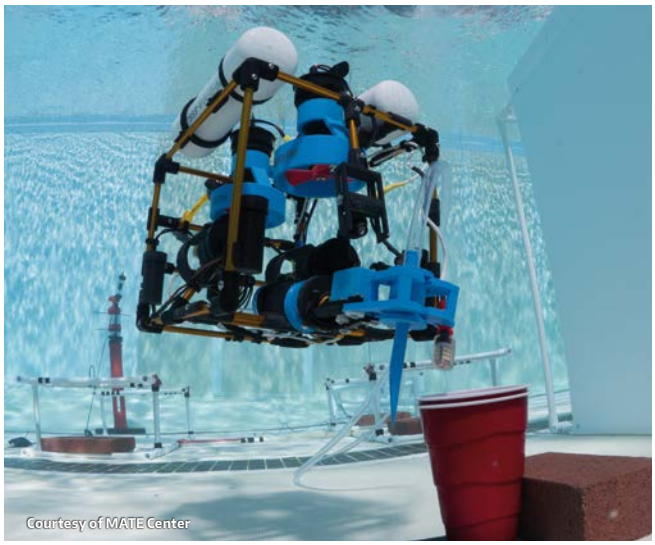

Courtesy of MATE Center


Courtesy of MATE Center


Courtesy of MATE Center

"The students' technical skills and creativity always amaze me and surpass what I could ever imagine," said Jill Zande, president of MATE Inspiration for Innovation (MATE II) and associate director and competition coordinator for MATE Center. "Their hard work and dedication to the project and the innovations they come up with to solve the tasks are inspiring. The teamwork, collaboration and community they create through their participation is so heartening given the world today. I know that our future technical and engineering workforce is in good hands. I look forward to their future accomplishments as they progress in their education and careers."

The student groups will be back in action next summer for the next international competition, June 21–23, in Seattle, Washington.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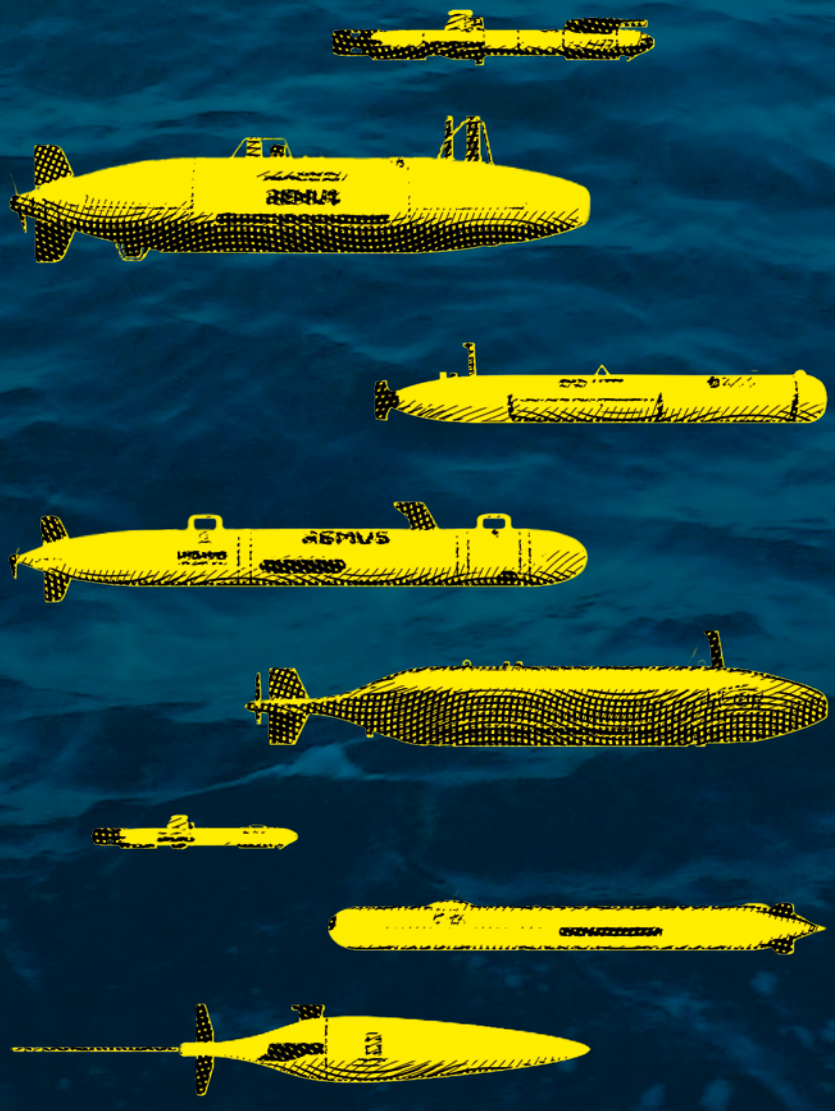

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SEISMIC ACQUISITION USING AUTONOMOUS VEHICLES:

A GAME CHANGER FOR THE E&P OIL AND GAS INDUSTRY

Sudhir Pai, Managing Director, Schlumberger Robotics Services

Marine seismic data are normally acquired using towed streamer arrays, ocean-bottom cables (OBC), or ocean-bottom nodes (OBN) where the receivers are in fixed positions on the seafloor. Towed-streamer-acquisition is the predominant method of marine acquisition, because it's highly efficient and easy to implement.

Narrow-azimuth (NAZ) streamer acquisition geometry typically delivers good-quality seismic data (in a non-complex geologic environment) and has a very well-established processing methodology. However, water depth, seafloor topography, or operational constraints – due to in-situ infrastructure and obstructions – can make acquiring data using these methods difficult, and could result in a decrease in operational efficiency. This could result in an increase in acquisition cost, or result in poor or zero data coverage.

An alternative to conventional methods is autonomous marine vehicles (AMVs) (Fig. 1); they are designed with the aim of increasing offshore safety and reducing risk, while delivering a quality service within lower-cost pricing models.

These unmanned vehicles have expanded the scope of offshore operations, and have been instrumental in increasing productivity and safety in marine environments. The vehicle – due to its low profile and manoeuvrability, – can be placed close to obstructions, thus reducing the risk typically involved in operations of this nature.

These vehicles have proven capable of carrying out a wide range of vital ocean-monitoring functions formerly assigned to manned vessels, and provide a viable alternative or supplement to acquiring seismic data.

Fig.1: AMVs are a viable alternative or complement traditional seismic acquisition methods. (Courtesy of Schlumberger)

THE PLATFORMS

To succeed in today's market, oil and gas operators must have accurate measurements, and they must obtain this information in the most cost-effective way. Robotics, automation, autonomous vehicles, and remote monitoring are revolutionising industries worldwide. AMVs offer this technological advantage with an expanding suite of unmanned and remotely operated deployment solutions.

With an AMV, one is able to collect data in previously hard-to-access areas, such as around crowded infrastructure, in shallow water, or in remote or environmentally sensitive areas. Some of the applications are completely autonomous, operating for years entirely on wave power, solar energy, and other forms of environmentally friendly energy.

Automated robotic technology lowers costs by reducing the personnel and equipment needed to operate in remote locations. Employing an AMV also eliminates the expense and risk associated with traditional ship-based data-collection solutions and non-productive time due to poor weather conditions. Operations that were once cost-prohibitive are now economically feasible.

The AMV used for the case studies in this article is a hybrid sea-surface and underwater vehicle that has been proven to enhance exploration and production in marine environments by collecting and delivering real-time measurements in areas formerly too costly or challenging in which to operate. The wave-powered sensor platform enables collection and delivery of data gathered at sea on missions lasting up to a year. The hybrid AMV is a two-part system that consists of a surface float and a submerged glider connected by a high-speed communication umbilical tether (Fig. 2).

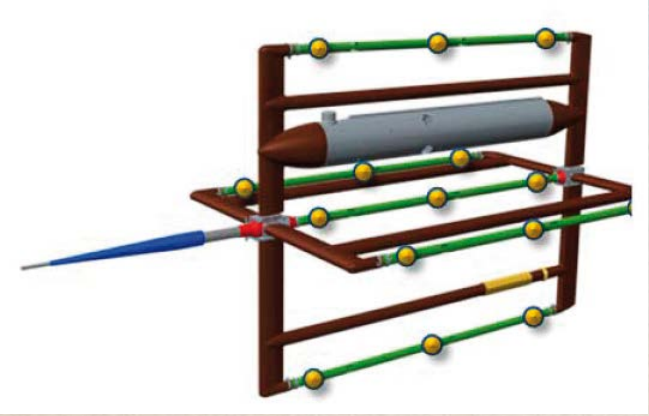

Fig. 2: 3D sensor array used with autonomous marine vehicles for seismic acquisition services. (Courtesy of Schlumberger)

The vehicle's propulsion system is passive and mechanical; it exploits the natural difference in wave motion between the surface float and the submerged glider to convert energy from wave motion into thrust. Articulating fins attached to the submerged glider convert wave energy and generate thrust as they pivot vertically. The vehicle produces forward propulsion independently of wave direction as its float moves up and down with each wave, and the submerged glider tows the float forward.

The AMV is capable of holding station. It can also be programmed to travel directly from one location to another by following a specific route defined by multiple sets of geographic coordinates, or waypoints. The solar energy system on the float recharges the batteries, which power the navigation system, payload electronics, and auxiliary thruster. The vehicle can carry a wide range of sensor payloads for various applications, including seismic data recording.

AMV WITH 3D SENSOR ARRAY: THE GAME CHANGER

For seismic applications, the vehicle is equipped with a 3D sensor array attached by a motion-isolating tow cable (Fig. 3). The 3D sensor array consists of 15 hydrophones (3 in each of the five arms) mounted on a frame approximately 1 m in size. A buoyancy engine just below the top arm ensures that this arm remains on the high side, and that the entire array is oriented and does not rotate on its axis while moving through the water. The 3D sensor array continuously records seismic data as well as array orientation and array depth data. Seismic data are naturally organised in common receiver (3D sensor array) gathers and, typically, the sum of the 15 individual hydrophone measurements per shot point is processed.

Fig. 3: 3D sensor array attached by motion-isolating tow cable. (Courtesy of Schlumberger)

CASE STUDY 1: SEISMIC ACQUISITION FIELD TEST 1, ABU DHABI, UAE

Three AMVs, each towing a 3D sensor array, were deployed during acquisition of an OBC 3D survey in shallow water offshore of Abu Dhabi. The test was conducted from May 13, 2015 to May 21, 2015, to assess the feasibility of seismic acquisition using AMVs equipped with a 3D sensor array. The test included evaluation of safety during deployment and retrieval of the sensor array and vehicle, and evaluation of the vehicle's operational performance: its ability to hold station and contribute to the survey while not interfering with the OBC operation. The test also measured the

system's ability to maintain desired depth, and the accuracy of measurements of pitch and orientation. The quality of the acquired AMV seismic data was compared with the seismic data recorded in the OBC survey.

Water depths across the survey area and in the test vicinity averaged approximately 20 m. Due to the very shallow water depths, towed-streamer acquisition is seldom used in the offshore Abu Dhabi area, limiting the marine seismic acquisition projects to either OBC or OBN methods. The AMV with 3D sensor array is, therefore, ideally suited to operate in this environment, and to provide a viable alternative for off-bottom recording or complement OBC/OBN data acquisition.

CASE STUDY 2: SEISMIC ACQUISITION FIELD TEST 2, GREEN CANYON, GULF OF MEXICO

This field test was conducted in the Green Canyon area of the Gulf of Mexico from July 20, 2016, to August 12, 2016. Seventeen AMVs, each towing a 3D sensor array, were deployed around several platforms while single- and multiple source vessels shot around the AMV spread (Fig. 4). Additionally, 10 AMVs equipped with 3D sensor arrays were positioned 20 km away from a 1 × 3 wide-azimuth coil survey to collect long-offset data.

Fig. 4: Graphic display from navigation management system, showing AMVs arranged in a grid pattern around an obstruction (pink square) to collect data while the source vessel (upper corner) follows a racetrack path around the AMV spread, Green Canyon, Gulf of Mexico. (Courtesy of Schlumberger)

The systems demonstrated excellent station holding capability. Fig. 5 is a data comparison around the platform between the wide azimuth survey (WAZ) conducted by towed streamer with poor data around the obstruction, AMV seismic data (3DSA) with very good infill data, and a merge of the two data types (WAZ + 3DSA).

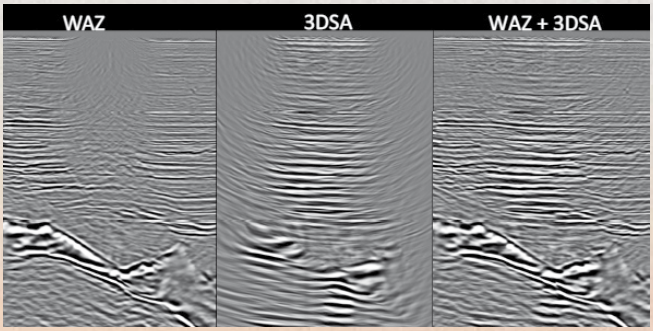

Fig. 5: Data comparison between wide azimuth survey (WAZ), AMV seismic (3DSA), and a merge of the two data types (WAZ + 3DSA), Green Canyon, Gulf of Mexico. (Courtesy of Schlumberger)

RESULTS AND CONCLUSIONS

Both these tests demonstrated the viable application of this technology. In the Abu Dhabi case study, the data from the 3DSA compared exceptionally well with the OBC data. Noise from Scholte waves was much less prominent on the 3DSA data than that on the OBC data. The GOM case study demonstrated the client confidence in allowing this technology within the 500 m exclusion zone for vessels. This now demonstrates an excellent technique to acquire undershoot data very close to obstructions where towed surveys might be impractical. Operationally and from a health, safety, security, and environment (HSSE) perspective, both operations were conducted with very few incidents.

AMVs provide a number of unique capabilities for acquiring seismic data in marine environments. Their low cost compared to conventional vessels allows deploying them in tandem over defined areas to yield comparable results and complete coverage. In the last few years, the oil and gas industry has seen the use of AMVs grow from a level of infancy, which is enabling them to become an essential part of the offshore exploration, and production toolbox.

Sudhir Pai is the Managing Director at Schlumberger Robotics Services, previously called Liquid Robotics Oil and Gas (LROG), a joint venture with Schlumberger. Based in Houston, Texas, he is responsible for the company's worldwide business, setting and executing its vision. In June 2015, he was promoted to the board of LROG. Sudhir has more than 30 years of worldwide oilfield services experience in the Middle East, India, UK and USA, and held a variety of management leadership positions within Schlumberger, including Vice President and General Manager of Completions and General Manager of Schlumberger operations in Mumbai, India.

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DRIX: SAFER STRONGER VERSATILE

As the Unmanned Surface Vehicles (USV) sector continues to grow, iXblue has launched a new multi-purpose craft to provide a cost-efficient solution for our customers in the energy sector. This craft not only offers affordable platforms for a very costly and specialised array of assets, but also widens their existing working domain. With proven offshore navigation capabilities and a top speed for mission reallocation that's unique in its category, DriX has taken the USV's role in the energy industry several steps further.

BORN FROM A LACK OF EXISTING SOLUTIONS

iXblue is an international High Technology company which has been operating in the Oil and Gas industry for decades. A year and a half ago, iXblue's Survey Division was faced with a new challenge: winning a tender using USVs. After a thorough analysis of the existing products, it was determined that there was no solution that could fully meet all the requirements. iXblue therefore realised that an in-house USV development of a USV to match these needs would be pertinent. This was the genesis of DriX.

THE CONCEPTION GUIDELINES

The end result was to expand the existing working domain for specialised vessels. For that, we needed a vehicle that was light, resilient, and high endurance. We also wanted to take advantage of its unmanned nature. That meant that it would be designed by our shipyard, without any reference to a human carrier hull shape.

THE RESULT

DriX is 7.7 metres long, has a draft of 2 metres, and a width of 0.7 metres. Its displacement is 1.4 tons, with an approximate top speed of 15 knots and an endurance of 5 days (this is without economy mode).

DriX consists of a main body, a mast, and a drop keel and gondola. A wave piercer shape keeps slamming to a minimum, even in rough seas. The payload – embedded in a gondola bolted to the drop keel – is in an optimum data gathering environment. It is two metres under the surface – far from the low radiated noises generated from propulsion – and in a bubble free environment. Also, a swift and easy change of payload can be achieved by removing the gondola and bolting a new one at the bottom of the drop keel.

Within the main body, a reliable 37 HP diesel engine (with a proven record of more than 5,000 hours of operations a year) powers a simple propeller. It also houses the payload's electronic cabinets, which are both easily accessible and removable.

Last but not least, DriX is fitted with a small-device towing capability (winch) and a retractable bathymetric probe.

SAFETY AND NAVIGATION

An autopilot is linked to the mast sensors for navigation. It also provides DriX with several interesting features, such as:

- A direct action on the engine (start and stop, also referred to as ECO mode) to 'hover' for a long time with a controlled drift above a given position;
- A 'follow me' function – based on CPA information – to follow a mother ship at a distance never to be overshot (collision avoidance);

Courtesy of iXBlue

- A COLREG navigation system which will either stop the engine or trigger a self-avoidance procedure, which will be calculated in order to bring the 'off mission' time and distance down as low as possible.
- DriX is fitted with all the sensors necessary for COLREG, from optical and IR cameras, to a 360° LIDAR and navigation lights.

THE CONCEPT OF OPERATIONS

The concept of operation is as simple as it gets: with all the various capabilities intrinsic to DriX, it can operate independently, in all kind of weathers and environments, with as few hoisting manoeuvres as possible. DriX's place is at sea, not on a work deck.

DriX broadcasts its information through WiFi or radio waves. An on-board data retrieval plug is also present.

DriX sails in line of sight (LOS) of a mother ship. Meanwhile, a mother ship (specialised vessel or not) can deploy several DriX craft at the same time, each working independently in different locations.

We've designed an internationally patented Launch and Recovery System (LARS) for DriX. Inspired by jet fighters in-flight-refuelling systems and patented internationally, it is fitted with a fuel hose, a lubricant change device, and a data retrieval plug. Basically, thanks to a homing device DriX sails independently in a towed cradle where it is plugged and secured. The drop keel is then safely lifted inside the mast. In turn, the cradle itself can be hoisted on-board if needed.

FORESEEN ENERGY APPLICATIONS

DriX has already garnered strong interest from major companies in the market since its commercial launch in November 2017. There is substantial interest in exploration (seabed mapping, tie back), pre-site installation (automatic beacon calibration with USBL), touchdown monitoring, inspection, METOCEAN, and decommissioning. Because of its third party friendly open architecture, DriX can be deployed for numerous applications.

IN A NUTSHELL

DriX reduces HSE hazard by reducing personnel in the field. Its mission's only limitations are the size of the gondola which can reach an estimated size of 8 square metres, and the size of the payload cabinet located within the main hull. iXblue's Shipyard can accommodate any existing third party equipment in a fitting gondola.

DriX is safe, reliable, fast, durable, and ready for any demanding application in the challenging energy environment.

iXblue

Courtesy of iXBlue

IOSTIA
ADVANCING THE BUSINESS OF OCEAN TECHNOLOGY

THE INTERNATIONAL OCEAN SCIENCE AND TECHNOLOGY INDUSTRY ASSOCIATION LAUNCHES

New industry association IOSTIA to represent companies that explore, and commercially and sustainably utilize the Earth's oceans

(Washington, DC): Filling a needed niche in the oceans science and technology space, a new international industry association was launched to provide programs, services, and a unified voice on Capitol Hill and in the regulatory agencies to companies that sustainably and commercially utilize the oceans.

IOSTIA (IO-sha), the International Ocean Science and Technology Industry Association www.iostia.org is a new 501(c)(6) industry association representing businesses that provide technology and services for sectors such as:

- Renewable ocean energy
- Environmental monitoring protection
- Fisheries and aquaculture
- Marine science
- Maritime security
- Ocean mining
- Marine telecommunications
- Autonomous vehicles
- Offshore wind energy
- Oceanography
- Subsea mining
- Sensors
- Arctic change
- Marine archeology
- Ocean observations
- Hydrography
- Ports and infrastructure
- Diving and manned exploration

IOSTIA's goal is to provide programs and services that create new opportunities and encourage a favorable business environment for science and technology companies that sustainably utilize the oceans. IOSTIA will also develop a serious, substantive, and unified voice in Washington on issues that matter exclusively to ocean science and technology companies.

With nearly 2/3rds of blue-tech companies located outside of North America, this new industry association will also be international in scope and substance; engaging the foreign Embassies located in Washington to assist international companies entering the U.S. market.

"There are tremendous organizations, foundations, and institutes committed to our oceans, and we look forward to working with all them all, but most are not organized as business industry associations, focused on professional networking and pro-active lobbying efforts for the industry aimed at Congress and the Administration. IOSTIA fills that niche," remarked Richard Lawson, president of IOSTIA.

IOSTIA looks forward to professionals in the industry joining IOSTIA. For more information about membership, please visit the IOSTIA website at:

"Often, companies in this industry space are members of various associations; but just like a shoe that doesn't quite fit, their membership experience also doesn't quite fit. For instance, an ocean technology company, with no serious connection with oil and gas, may find itself uncomfortably jammed into a petroleum-related association because it is the closest option. Companies like this shouldn't have to settle. They need an association where the shoe finally fits perfectly. IOSTIA fits that need," continued Lawson.

"We see the organization working on two fronts. One is advancing business opportunities for the members, so we have that 100% focus not only on creating a favourable business environment through advocacy efforts, but also by creating networking opportunities and to present VC opportunities for funding of new technologies."

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DriX is the new Unmanned Surface Vessel for advanced operations in the realms of Ocean Science, Energy, and Defence.

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