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on the search for MH370

Offshore
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(Photo: Royal Australian Navy)

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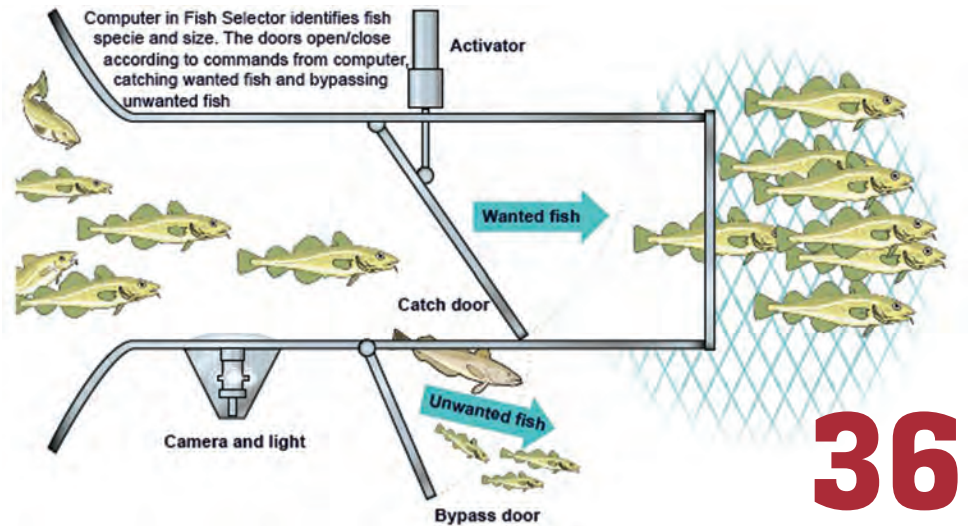

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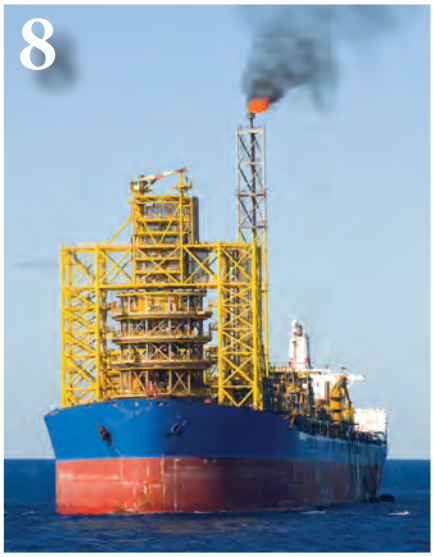

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(Courtesy of Karla DeCamp, Dakota Creek Industries)

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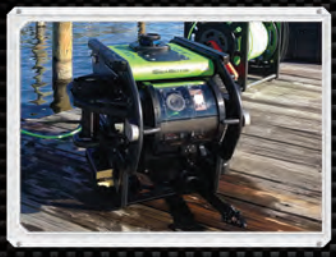

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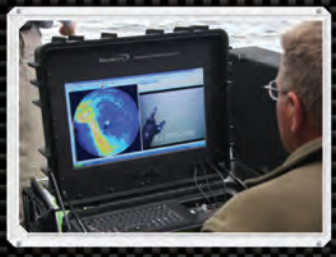

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The loss and mystery surrounding Malaysian Airlines flight 370 is a tragedy indeed, for the 239 presumably lost onboard the Boeing 777, and also for the families that wait onshore for closure. The subsequent search for MH370, which now has exceeded two months – and by many estimates could stretch many more months if not years – has been instrumental in highlighting both the capabilities and the limitations of subsea technology.

In the hunt for MH370, Bluefin Robotics and Phoenix International have taken center stage, and I have seen more general media coverage of Autonomous Underwater Vehicles in the last two months than the last eight years combined. Whether it's waking up in the morning and checking the news on my phone; riding the train and reading the paper; or watching the news from the confines of a treadmill at the gym; that bright yellow AUV was seemingly everywhere.

For this edition we were fortunate for the opportunity to interview **David P. Kelly**, President & CEO, Bluefin Robotics – A Battelle Company, for his insights on the Bluefin Robotics created, Phoenix International owned and operated AUV. Kelly has led Bluefin Robotics for six years, and his company, in tandem with the AUV sector as a whole, has matured and expanded rapidly.

Quantifying that expansion in this edition is **Eduardo Ribeiro** of Douglas-Westwood, who shares with MTR insights and statistics surrounding the history and near term direction of the global AUV market. The information is gleaned from DW's *"AUV Market Forecast – 5th Edition,"* and for those of you who have never perused the DW reports, I highly recommend looking them up as they are comprehensive and insightful.

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Floating Production Systems

The Outlook for New Orders

By Jim McCaul, IMA

Engineering, procurement and construction of floating production units is a small market in terms of number of units – but large in terms of revenue generation. An EPC contract for a production unit can easily exceed $1 billion – and $3 billion for an FPSO has recently been breached. Overall, this is a $20 to 30 billion annual market. But, as described below, the sector is hitting some headwinds that could impact future business opportunities.

Backlog of Planned Floater Projects

243 floating production projects are in various stages of planning as of beginning May. Of these, 57% involve an FPSO, 16% another type oil/gas production floater, 23% liquefaction or regasification floater and 5% storage/offloading floater.

Brazil, Africa and SE Asia are the major locations of floating production projects in the visible planning stage. We are tracking 50 projects in Brazil, 49 in Africa and 46 projects in SEA – 60% of the visible planned floating production projects worldwide.

Around 25% of the projects are at an advanced stage of development. They typically have either entered the FEED phase, pre-qualification of floater contractors has been initiated or bidding/negotiation is in progress. Award of the production floater contract in these projects is likely within the next 2-3 years.

Breakdown of Planned Projects by Type Production System Required
(As of 1 May 2014)

Type System Required	Number of Projects
FPSO	138
OTHER FPS	38
FLNG	31
FSRU	24
FSO	12
Total	243

The remaining 75% of the planned projects are in an early stage of development. Contract awards are more likely in the 3+ year time frame.

Future Business Drivers

The large number of projects at the ready-to-go stage is clearly a positive indicator for future floating production equipment orders. However, timing of the decision to proceed to contracting will be influenced by future underlying market conditions.

Fundamentals driving future orders in the floating production market remain generally positive. World oil and gas demand continues to grow, crude pricing remains in the $100 to $110 range and deepwater drillers are operating at high utilization.

But the sector is hitting competition from shale/tight oil and gas supply, energy companies have been cutting capital spending budgets and deepwater drillers are not quite as bullish as in recent past.

Growing Demand for Oil and Gas

On the positive side, global oil demand has grown at an average rate of 1.4% annually over the past 20 years. With the exception of two years during the global financial meltdown, oil demand has increased year over year during this period.

Growth in oil demand is widely expected to continue over the foreseeable future. The IEA, for example, sees world oil demand in 2035 growing to 101 mb/d, an increase of 11% over today.

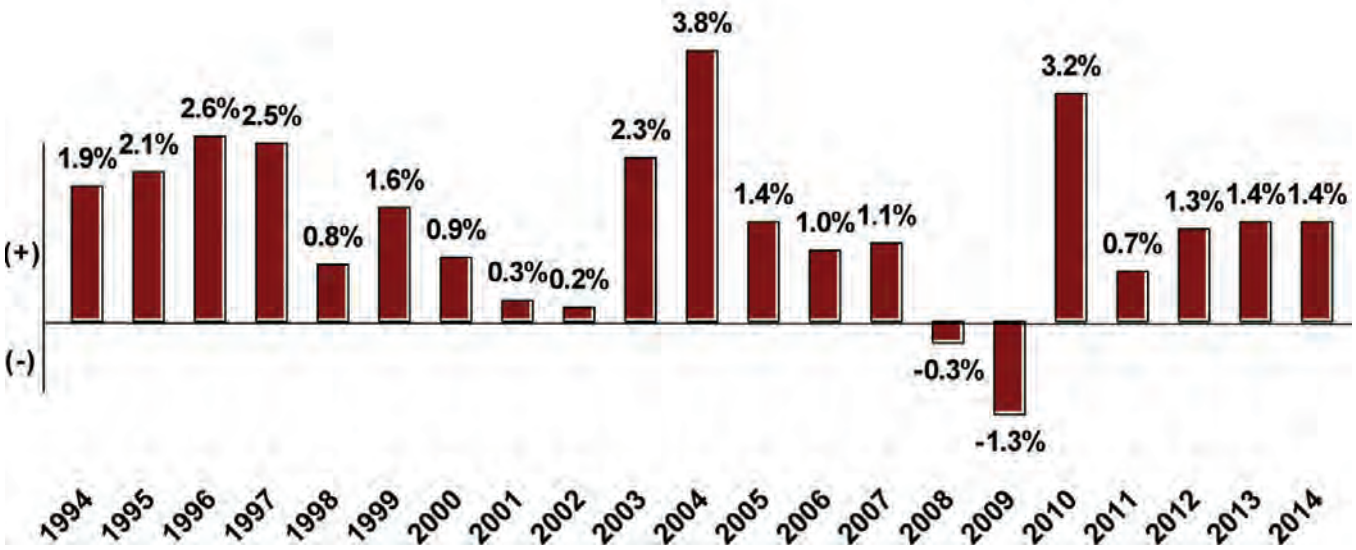
Global natural gas demand is also growing. Gas consumption doubled between 1980 and 2010 and has grown another 13% since. Over the past decade global natural gas consumption declined in only one year – 2009 as a result of the financial crisis.

The EIA sees world gas consumption growing at an annual rate of 1.7% through 2040. ExxonMobil projects a 65% increase in natural gas demand by between 2010 and 2040.

Impact of Unconventional Oil and Gas Supply

But unconventional oil and gas resources are changing the supply landscape. Use of horizontal drilling and hydraulic

Annual Growth in Global Oil Demand
Over Past Two Decades
(% change year over year)

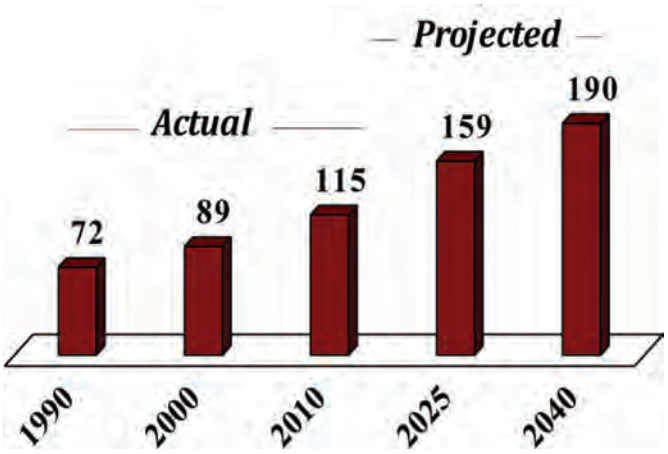


Source: IEA

fracturing to exploit oil and gas resources locked in shale, siltstone and mudstone, as well as production of oil from oil sands, has opened huge new sources of energy supply.

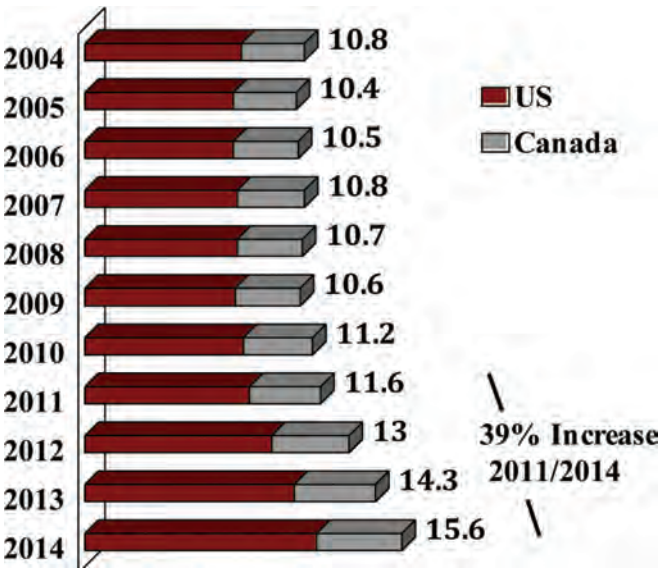
Nowhere is the development of unconventional oil resources more rapidly advancing than in North America. Between 2011/2014 the production of oil in the US and Canada increased 39%, primarily the result of incremental production of shale/tight oil in the US and oil sands resources in Canada. As a result, production of oil in the US and Canada now accounts for 27.6% of non-OPEC oil production – up from 22% in 2011.

Projected Growth in Global Natural Gas Demand
(Quadrillion Btu)



Source: ExxonMobil

Ten Year Trend in US/Canada Oil Production
(millions of barrels/day)



Source: IEA

Development of shale/tight oil resources outside the US has been much slower due to land rights issues, access to drill equipment, environmental opposition to fracking, etc. But the shale/tight oil revolution will undoubtedly spread beyond the US. Opportunities are too big to ignore. The EIA estimates that shale/tight oil resources worldwide total 345 billion barrels – and account for 10 percent of global oil reserves.

The equally spectacular revolution in shale/tight gas production is changing global gas supply and is threatening the dominance of major players in the LNG sector. And like shale/tight oil, the shale/tight gas revolution is centered in North America.

Production of shale/tight gas in the US is projected to grow 52% over the next decade. According to the EIA, shale and tight gas is expected to provide 71% of US natural gas production in 2024, up from 61% today. In 2024 the US is expected to be producing 22.5 TCF of natural gas from shale and tight rock formations – the equivalent of more than three times the current natural gas production of Qatar.

A substantial, though yet unclear, portion of future US gas production will be exported as LNG. BP expects that the US "will become a net LNG exporter from 2016, reaching a total net LNG export volume of 11.2 Bcf/d by 2035." ExxonMobil sees North America shifting "from a net importer to a net exporter of natural gas by 2020 as production outpaces demand."

Like oil, development of shale/tight gas resources outside the US has been much slower due to land rights issues, limited drill equipment, environmental opposition to fracking, etc. But the shale/tight gas revolution will undoubtedly spread beyond the US. As with shale/tight oil, the opportunities are too big to ignore. The EIA estimates that world shale gas resources total 7299 Tcf – 32% of world natural gas resources

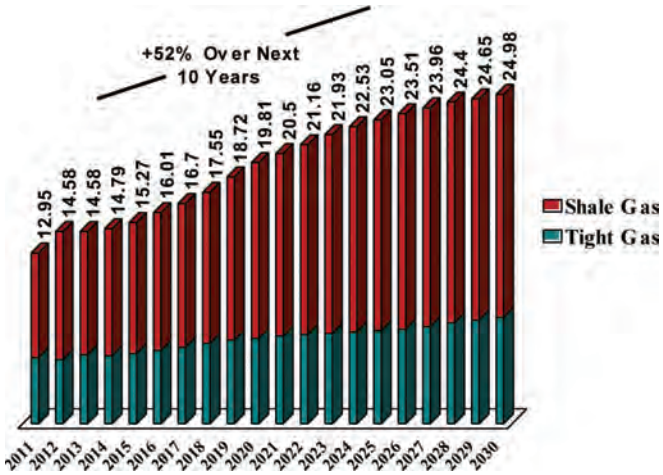
Shale/tight oil and gas development ultimately competes with deepwater for investment resources. These resources are finite – and energy companies will channel their investment resources to the opportunities offering the best financial return. Given the advances taking place in the shale/tight rock sector, it is reasonable to conclude that the shale/tight rock revolution is eroding investment in deepwater projects.

Significantly, the competitive balance is shifting in favor of shale/tight rock. The cost of drilling shale/tight wells is falling – and well productivity is increasing. Meanwhile, technical challenges of ultra-deepwater development, local content barriers and an overheated industrial base are forcing deepwater costs higher.

Energy Company Investment Cutbacks

Many energy companies have recently indicated they plan to reduce capital spending this year. For example:

Projected US Natural Gas Production From Shale and Tight Rock Formations
(Trillions of cubic feet/year)



Source: EIA

- ***ExxonMobil in March said its capital spending for 2014 will be 6% less than last year***
- ***Chevron last December said it will cut 2014 capital spending 5%***
- ***Petrobras in January said capital spending between 2014/18 will total $221 billion, down 9% from spending estimates announced last year***
- ***Statoil in February cut its 2014/16 capital spending plan by 8% from earlier estimates.***
- ***Total in February said it will lower capital spending to $26 billion in 2014, down 7% from $28 billion in 2013.***

While most of these cutbacks are directed at downstream spending, ultimately some of the cuts will migrate to planned upstream investment. There simply will be less money to go around.

Deepwater Drilling

The pace of activity in the deepwater drilling sector is one of the best predictors of future equipment demand in the floating production sector. The higher the pace of activity in the drill sector, the better the outlook for future floating production project starts. According to Rigzone, drillship utilization in April was 84.8%, semisubmersible rigs 85.7%. This includes utilization of drillships/semis in the competitive inventory. These figures are historically strong and there has been little change in utilization over the past year. But the less-than-positive message that many drillers recently have been giving about anticipated market conditions in deepwater drilling suggests a softening in the drill market is taking place – which is not good news for near term deepwater projects starts.

Overall Outlook

Global oil demand keeps growing, a large number of deepwater discoveries are ready to move to development, oil spot prices have remained above $100 and a rapidly growing fleet of deepwater drill rigs are searching for oil. These are all positive indicators for future production floater orders.

But growth in unconventional oil supply is pressuring future crude prices, energy companies are cutting back on capital expenditures, drillers are reporting market softening and shale/tight oil and gas opportunities are attracting investment resources that otherwise might be used for deepwater projects. These are clearly negative indicators for production floater orders. Time will tell how these positive and negative drivers combine to impact future orders in the sector. But it appears that a dampening impact is already being felt. Since the beginning of this year there have been orders for six production floaters – 4 FPSOs, an FLNG and a production barge. This is roughly in line with the average ordering pace over the past ten years – but in terms of increment to inventory the ordering pace has declined.

The Author

IMA provides market analysis and strategic planning advice in the marine and offshore sectors. Over 40 years we have performed more than 350 business consulting assignments for 170+ clients in 40+ countries. We have assisted numerous shipbuilders, ship repair yards and manufacturers in forming a a plan of action to penetrate the offshore market. Assignments included advice on acquiring an FPSO contractor, forming an alliance to bid for large FPSO contracts, satisfying local content requirements, etc.

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Windwave *Launches Damen FCS 2008*

Windwave Workboats will be the first customer of Damen's Twin Axe Fast Crew Supplier (FCS) 2008. The Twin Axe FCS 2008 is a smaller version of Damen's FCS 2610 which launched in 2011. Based in Penzance, Cornwall, Windwave Workboats has been providing offshore wind farm support and crew transfer services to the renewable energy industry since 2008. This is the company's first Damen vessel.

Windwave Workboats Commercial Director, Peter Scriven, said, "In recent years vessel designs have been pushing what can be achieved within the 24m load line limit. We listen carefully to

(Continued Next Page)

Image: Damen

our clients and understand that bigger is not always better for some of their usage scenarios but they have demands for vessels that require greater performance than anything else currently available on the market.

"The Damen FCS 2610 was a game changer when it was first introduced and kick started the trend for larger boats and is still the preferred large boat option, as can be seen by their demand in the North Sea. Our clients have had a lot of success in using them; however it is too large for some operations. In response, Damen have now developed the FCS 2008 which makes it the obvious choice for our applications."

Arjen van Elk, Damen Sales Manager U.K. & Ireland, said, "Windwave Workboats came to Holland to take the FCS 2008 for sea trials in a rough North Sea. The experienced crew was immediately impressed by the capabilities of the vessel. We are now outfitting a vessel to Windwave Workboats' requirements."

The company wanted to have accommodation on board to overnight in the harbor, so two cabins with three bunks are being installed in the hulls. As well as this, the railing on the foredeck has been changed making the foredeck more spacious. A crane is also being placed on the foredeck. The FCS 2008 can also carry 2 x 10 ft containers, on the stern and bow.

"The 20m version is the perfect boat for near-shore wind farms and ideal for transferring personnel safely, as well as light cargo, said Peter Robert, Damen Business Development Manager Offshore Wind. "With this move the Twin Axe offshore wind range is completed. Damen decided to row against the current in 2011 when we decided to build the bigger 26 m vessel. We saw that there was simply nothing suitable available. Meanwhile, the turbines were getting larger, wind farms were going further offshore, so developers were less interested in the smaller 14-15 m vessels. We started with the large vessels and now others have followed."

The FCS 2008 will officially launch at Seawork International in June. Being built at Damen Shipyards Den Helder, three more vessels are available from stock, the first from end-April.

The Twin Axe FCS 2008 (20 m x 8 m) is an aluminum, high-speed vessel for transferring personnel and light cargo. It has 2 x MTU engines (1930 BHP) giving a speed of 24.5 knots. Classed by Bureau Veritas, the vessel has a capacity for 12 passengers on deck level and spacious accommodation.

The vessel includes 12 passenger seats, a galley and two toilets are on deck level, together with ample storage space. There is internal access from the deck level to the wheelhouse, which has a helmsman's seat, navigation seat and chart table. The two hulls accommodate engine rooms, storage and optional cabins.

www.damen.com


Courtesy of OSD-IMT

OSD Develops Windfarm Vessel Design Range

OSD-IMT, the U.K. division of Offshore Ship Designers (OSD), developed a range of new designs of offshore windfarm service operation vessels (SOVs). The 1,350 dwt IMT972 SOV is powered by two Steerprop SP25 or equal 1900 kWe fixed pitch azimuth propulsion units. There is also an option for fitting two 2.5 MW Voith Turbo main thrusters. Frequency-controlled electric motor-driven CPP thruster units are fitted forward, comprising two tunnel-type bow thrusters and one retractable bow thruster for station-keeping and high-dynamic performance under maneuvering or DP conditions. The IMT972 has a length overall of 72.2m and conforms to the Clean Design classification requirements of DNV for wind-farm service operation vessels. It can provide accommodation for up to 60 persons, including 22 crew, and is able to operate for 30 to 45 days on station, and longer if replenished at sea.

The main features include a heave-compensated turbine platform, and an aluminum access gangway arranged with a telescopic frame which facilitates the transfer of equipment to the platform. A back-up evacuation process is arranged by using the workboat to transfer technicians from the turbine access ladder in an emergency. The vessel has a small pallet lift and conveyor lift system for the loading and transfer of stores and spares, with access to/from a heated underdeck workshop and stores area. A mono-hull workboat is fitted with a heave-compensated single point lift davit for general wind turbine work duties as well as for emergency evacuation of technicians.

The IMT972 has an electro-hydraulic 1-metric-ton SWL motion-compensated folding jib crane fitted on a pedestal on the main deck aft of the access gangway tower. It accesses the wind tower platform when the gangway is stowed and can also work over the stern, deck area or ship's side.

www.offshoreshipdesigners.com

Saving Coral Reefs

Photo: Global Diving & Salvage

One shipwreck at a time

In the summer of 1991, a 121 ft. long Taiwanese long line fishing vessel, the Hui Feng #1, ran aground on an atoll in the middle of the Pacific. With a footprint of just 4.6 sq. mi., Palmyra Atoll forms the most northern vegetated island in the Northern Line Islands, lying some 1,000 miles south of Honolulu. The atoll has a long storied past and is now a national monument and wildlife refuge, cooperatively managed by the US Fish & Wildlife Service (USFWS) and The Nature Conservancy.

Palmyra Atoll encompasses some of the last remaining near-pristine reef environments, boasting an intact marine predator-dominated marine ecosystem where species' richness and diversity abound, with more than 176 species of hard coral and 418 species of reef fish. Through monitoring of the reefs, a slow and insidious destruction was identified by the Hui Feng #1 and the other wrecks deteriorating on Palmyra and Kingman Reef, a non-vegetated wildlife refuge reef located 35 miles to the northwest of Palmyra.

At Palmyra the problem lay in a native marine organism called corallimorph that was effectively smothering the corals surrounding the wreck. Researchers have made observations over several years that showed the spread of the organism progressively increasing due to the leaching of iron into the environment as the wreck corroded serving as a fertilizer of sorts. At Kingman the problem was not corallimorph, but an invasive form of algae feeding off nutrients released from the dissolving wreckage of a burned fishing vessel.

In September of 2012, the U.S. Fish & Wildlife Service's issued an RFP for the removal of the two wrecks from Palmyra Atoll and Kingman Reef. Global Diving & Salvage, Inc. reached out to Curtin Maritime to collaborate. Several factors were fundamental in the planning process: the safety of personnel and equipment, followed closely by mitigating the potential of further damage to the extremely delicate living coral and reef structure.

Working together a plan was developed to remove the wreckage from the inner-tidal areas. Flat deck scows were designed and built with shallow draft to transit the debris across the coral reef areas to the main barge that provided logistical support and housing for the project.

In total, the combined crew of 12 worked 79 days with 880 hours spent underwater to cut, rig and remove over 970,000 pounds of steel and debris, as well as 605 gallons of hydrocarbons. Susan White, the USFWS's project leader for the removal effort, said the debris was "the equivalent of 67 large elephants or 31 city buses and was removed to protect some of the world's most pristine coral reefs."

One step closer to refloating

Costa Concordia

Operations to install the first of the 19 sponsons to be positioned for the refloating of the Concordia wreck concluded on Monday, April 28 after 2.5 days of work, according to the Concordia wreck removal project informative website. The sponson S13, noted as the biggest in weight and size, is now positioned on the starboard side at about 11m in depth from the artificial seabed on which the Concordia rests since the parbuckling completed in September.

The sponson reached Giglio Island via barge and was unloaded and placed into the water through rotating crane of pontoon Conquest.

It was then completely filled with water so that it could be submerged and connected through a sophisticated automatic system of the chains that keep it anchored to the wreck.

Technicians next partially emptied the sponson to make it lighter and give it the buoyancy needed to keep the chains tensioned.

Before refloating, another 14 sponsons need to be positioned on the starboard side and four on the port side of the Concordia.

Photo courtesy the Parbuckling Project

Sponsons will be completely emptied to provide the buoyancy needed to refloat the Concordia and prepare it for transportation.

www.theparbucklingproject.com

David Kelly, President & CEO, Bluefin Robotics on the hunt for

MH370

When Malaysian Airlines flight 370 disappeared on March 8, 2014 with 239 souls aboard, so began an aviation disaster and mystery. While a collaborative effort continues to hunt for clues in some of the world's most remote, hostile and uncharted ocean environments, the subsea industry – and more specifically the AUV sector – has garnered international headlines, as Phoenix International, under contract to the U.S. Navy, has deployed its Bluefin 21 Artemis AUV in the search. Last month MTR caught up with Bluefin CEO David Kelly for his take on the search and the implications of the bright media light being shined on the AUV industry.

By Greg Trauthwein

Before we talk about the current search, can you give us some insight on Bluefin, specifically how the company is still the same and different from the time you took the helm in 2008.

I think Bluefin has the same 'go get it done attitude' with a heightened focus on flexible products that meet the client's needs for defense, commercial and oceanographic research markets. What's different is, the market and the demand has matured and grown, and in step with that, Bluefin has grown. When I joined we were in a building in Cambridge with roughly 60 people in the company. Today, we are more than 200 employees including Seebyte personnel. We've sold vehicles around the globe including products to commercial offshore clients and 16 navies, so it is a much more mature organization with a broader product line and activities in more areas of the undersea robotics space.

The hunt for flight MH370 has brought a bright light on Bluefin, and in fact the entire AUV sector. Tell us about it.

Without a doubt this is the most intense media attention that Bluefin has received in its 15 plus year history. We've been involved with other important jobs including the hunt for the Earhart wreckage and several others. However, the mystery surrounding this flight has heightened the attention on the search.

Can you tell me about the vehicle operating in the hunt for the aircraft.

Let me give you a little background before I directly answer your question. The 21-inch diameter

David Kelly, President & CEO
Bluefin Robotics – A Battelle Company

was the original AUV form factor of the early Odyssey platform that spun out of the Sea Grant lab in the early 90's. It had an open propeller and control fins, a different pressure vessel approach and basic sensors. Today, the Bluefin vehicles don't look anything like the Odyssey, The Bluefin-21 platform is our most mature platform, the one we built the most systems on, we have been refining the core technology for almost two decades.

The particular vehicle used in the Indian Ocean for the search is owned and operated by Phoenix International, Holdings, Inc. of Largo, Maryland. About three years ago, it was a Bluefin-owned asset we were using to upgrade the overall design to its next generation to address commercial survey operations. Back in 2012, Phoenix was looking for a system that could be deployed in just a few months. We sold them the asset with a plan to extend its depth rating from 1500 meters to 4500 meters. They used the Bluefin-21 in the search for Amelia Earhart's plane, completed that job and returned the vehicle for the upgrades. Once it was back in their hands, they went out on a search and recovery job for the Navy. Last year, it returned again for additional acoustic communication upgrades. Bluefin and Phoenix had been in Hawaii with the system for extended deep testing for just a few weeks before the team got the call for the MH370 search. They mobilized to Australia almost immediately. It was kind of serendipitous we had just been working the vehicle at those depths just prior, and then it was mobilized.

Are there more vehicles like this operating in the field today?

We have multiple 4500 meter vehicles in the field, all sold to commercial clients. Phoenix has a military contract for the MH370 search, but from our perspective this is a commercial client since the vehicle was not purchased under government funding. The drive to design a system to a 4500 meter depth rating was from commercial needs, not military needs. We do have several vehicles out there with oceanographic research and other commercial clients. This was an internal development for commercial needs, and the depth rating, if you think about it, was for the Pre Salt fields off of Brazil.

Lets discuss the proliferation of AUVs in the offshore market. Specifically, where to you see the market today?

The first generation technology autonomous vehicles are built on is proven and trusted. The vehicles go out, collect data and come back. Overall the use of AUVs in the offshore oil and gas industry is still in its infancy. There is still some work to be done to integrate them as safe and accepted assets in active offshore oil and gas production fields. So we are working with industry partners to evaluate where advanced undersea robotics can be applied within the oil and gas sector, and the alternative energy industry. You could probably draw an analogy between the adoption and proliferation of work-class ROVs 20 years ago.

Getting back to the hunt for flight MH370, how did it come about that the Bluefin AUV was involved?

The AUV is owned by Phoenix International that has a contract with the U.S. Navy, Supervisor of Salvage. Bluefin learned about the possible use of the system the weekend before it was mobilized, when Phoenix called us and said that this might happen. So we started a discussion on how to provide a expanded set of spare parts suitable for high op tempo

(U.S. Navy photo by Mass Communication Specialist 1st Class Peter D. Blair/Released)

The Bluefin 21, Artemis autonomous underwater vehicle (AUV) is hoisted back aboard the Royal Australian Navy Australian Defense Vessel (ADV) Ocean Shield after successful buoyancy testing. Joint Task Force 658 is supporting Operation Southern Indian Ocean, searching for the missing Malaysia Airlines Boeing 777.

jobs in remote locations. If they had to do an extended deployment 1000 miles off of Australia, they wanted to know everything that they would need. We worked with them to identify the equipment that they had, and what it could be augmented with and when it was mobilized we got them what they needed.

As we noted at the outset, the media spotlight has indeed been bright on Bluefin. What are the pro's?

The recent media coverage has given us the opportunity to offer the public a better understanding of what the subsea robotics industry can do in the ocean. The ocean is not that well explored, particularly because it is such a harsh environment to work in. There have been some great points made about the limitation of working at immense depths, communications and operational issues when deployed far from land and the limitations of the sensor technology.

And have there been any drawbacks?

While shining a light on our industry is great, we have to remember that there are 239 people missing. It is important to respect this is a tragedy, and we are cautious of being appropriate to the situation. People are waiting for answers so we feel an obligation to explain to them what our equipment can and can't do. We don't want to oversell our technology and beat our chests unnecessarily. We're just proud and honored to be asked to help, and if our technology can help to find answers, that is great.

So (at press time) the vehicle has conducted multiple missions 1,000 miles from land in uncharted seas. What has been the feedback from Phoenix?

The Phoenix folks are experts in operating equipment subsea. They completed all of our training courses and we are confident in their ability to handle the Bluefin for the search effort. Since they were going to be in an unknown environment with limited bandwidth availability to the ship, we sent one of our marine operation engineers to augment the team. Bluefin vehicles have a lot of capability and their performance can be optimized for performance given the environment. It was more efficient for us to send someone to work with their team onsite instead of providing support from land in a different time zone.

It's not uncommon for us to work with our customers, reviewing data back from a dive and providing feedback to adjust

the systems for unique conditions and objectives. When your are 1000 miles off the coast of Australia the most efficient way to do that was to augment their team.

So can you summarize the support that Bluefin has provided?

The support we provided during the search effort is in line with what you would expect from a manufacturer with a global fleet of AUVs. The first thing was to provide some additional spare parts to support extended operations. Second, we provided advice on ways to operate the vehicle given the unknown bathymetry and conditions. Clearly this benefitted the search when the bathymetry turned out to be incorrect and deeper than the system's 4500 meter depth rating. So the question came back from Phoenix: 'can we extend the operating range?'

We analyzed the engineering data and we provided guidance to Phoenix and the Navy to the depth we thought that they could extend operations to at a reasonable risk and of being successful.

Essentially the question was "we have a vehicle out there, there are depths beyond its depth rating, can we press it?" We've gotten this same question on every vehicle we have ever built. We gave them guidance that they could run it down to 5000 meters, which they have done successfully.

While we realize the mission to find MH370 is still in the beginning and to date rather short in duration, but can you give us any "lessons learned" or walkaways at this point?

We are pleased with the performance of the vehicle to date; we have a single vehicle out there running back-to-back missions. There are some things that we see can be evolved given this type of mission, but overall I'm pretty happy with the production of that vehicle.

Bluefin Robotics – A Battelle Company

As the AUV market has matured and grown, so has Bluefin Robotics - A Battelle Company. Today the company employs nearly 200, and has moved into a state-of-the-art facility.

An looking at the bigger picture implications given the high profile coverage of the mission?

I think it is a positive in that it is broad exposure for not just this product but the technology to the general public. From an industry perspective, there has been a consistent response that this is not about our vehicle versus a different vendor's vehicle, it's about 'this is the capability of the industry, understand the difficulties of working in this environment, trying to explain the challenges of these operations and the technology. In general it has been a positive to show what can be done. At the same time it shows to the public that this is going to take awhile, it is going to require patience and tenacity, it is going to look tedious to those on the outside not accustomed to these sorts of things.

And here is the toughest question of all: How would you grade the mass media's coverage of your technology, your industry?

In general, the media coverage has been fair and balanced. The challenge is trying to explain the technology so that it is easy to digest for the media and the public. The biggest misconception was to not have them refer to these vehicles as drones. Current gen unmanned aerial vehicles fundamentally have an operator full time in the loop flying the vehicle, and if that link breaks, it is 'bye bye plane.' So the idea that the AUV is really autonomous — reporting its status, and maintaining its mission, tracking itself in the environment, turning sensors on and off, for the most part by itself, was the toughest concept to get reporters to understand as the difference between current gen air vehicles and current gen AUVs.

David P. Kelly is the President and CEO of Bluefin Robotics a wholly-owned subsidiary of Battelle. He is responsible for the strategic direction and operational execution of the business. David is a senior member of the IEEE, a member of ACM, and a registered professional engineer in the State of Texas. David holds a B.S. in Electrical Engineering from Worcester Polytechnic Institute, an M.S. in Computer Science from the University of Texas at Dallas, and an MBA from Southern Methodist University.

A Pivotal Year for AUVs
in the Oil & Gas Sector

By Eduardo Ribeiro, Douglas-Westwood

AUVs are on their way. With vast scope for their application, autonomous underwater vehicles are finally gaining pace in the commercial sector. The technology, which has its origins in military activities such as mine counter-measure and rapid environmental assessment (MC & REA), also has a strong presence in research activities, from research mapping to environmental sensing. In fact, the military and research sectors have strong links which enable collaboration and, therefore, some units can be used across the sectors. The two sectors currently form 97% of AUV demand. However, Douglas-Westwood's Word AUV Market Report 2014-2018 forecasts an annual growth of 36% in the commercial sector, predominantly driven by deepwater oil & gas activities, expanding the share of the total market from 3% in 2014 to 8% in 2018.

AUV Overview

AUVs have no umbilical connecting them to a host support vessel (as opposed to remotely controlled vehicles [ROVs]) as they have the advantage of carrying both on-board power and the computer capability to travel a pre-set path through the water, using a combination of internal and external posi¬tioning sources as well as sensors that give direction, depth, altitude and speed. AUVs, however, do not provide real time data such as video. They are used by civilian researchers and academics, commercial survey and inspection companies and by the world's militaries to either provide information about the seabed, identify objects on the seabed or in the water column, or to provide a means of observing physical, chemical and biological processes. AUVs can be used to survey an area in a regular pattern or to follow a linear feature such as a pipeline.

The benefits of AUVs, compared to ROVs, manned vessels and towed vehicles also include operability in a wide variety of water depths and where surface vessels cannot be used due to surface restrictions/obstruc-tions. They have a wide range of deployment options ranging from manual to dedicated vessels; and can help reduce threats to personnel by increasing either the distance between hazard and operator, or by performing reconnaissance in advance of manned operations.

The most recent use of an AUV unit with wide media coverage is the Bluefin 21 in the search for the missing MH370 flight from Kuala Lumpur to Beijing in March 2014. This vehicle carries multiple sensors and payloads, and battery with endurance of up to 25 hours (at 3 knots), reaching 4,500m deep it is providing data which creates a 3D map of the area. The attempt follows the successful U.S. mission in 2011, which used three REMUS 6000s in search of the Air France 447, downed in 2009 when flying from Rio de Janeiro to Paris. The REMUS vehicles, which have an endurance of up to 22 hours reaching 6,000 meters water depth, were the main tool used to spot the plane's flight recorders in waters almost 4,000 meters deep.

Key Developments

There are some key developments which should enable strong commercial uptake from 2014. These include sensors,

REMUS 600 is one example of technical advances in the AUV sector.

(Photo Courtesy Hydroid)

battery endurance and positioning. Multiple sensors form a key component and continue to increase in data quality and resolution. Endurance is also under constant development, with rechargeable batteries powering the majority of AUVs now in use, while non-rechargeable batteries offer greater endurance, but at a significant cost. A small number of AUVs use fuel cells, but their use is not widespread due to concerns with the stor¬age and disposal of the chemicals. Even small AUVs typically now have quoted endurance of more than 10 hours, with larger vehicles in the 50-70 hour range. High endurance is central, as it enables AUVs to offer vast reduction in time lost in operations, in addition to the time saving when turning from one survey line to another when compared to a survey vessel towing sensors in deep water.

The particular application of the AUV and the performance of the navigation system payload that it carries will drive the level of accuracy required in the positioning of the vehicle whilst it is underwater and unable to benefit from GPS updates. This is crucial for hydrographical activities to comply with the International Hydrographic Organization (IHO) requirements. Civil hydrography, which includes oil & gas, is to emerge as an application in 2014. High-end navigation solutions are based around units that measure the motion of the vehicle in three dimensions, as well as being able to receive positioning updates from external sources such as vessel-based tracking systems, which are often supplemented by tracking the AUV's movement relative to the seabed using the Doppler shift of an acoustic signal.

Unmanned launch and recovery is a goal of many developers as that phase of operations is perhaps the riskiest for the personnel involved. The launch and recovery requirement and methodology for AUVs vary. Smaller units are routinely deployed from the beach or small craft, whereas larger vehicles require the use of either a vessel's deck crane or a dedicated launch and recovery system. This is an area in which many operators think there should be further improvements.

Future developments also include Hybrid Underwater Localization System (HULS), which enables data and imagery collection in real-time via a fiber-optic link, Large Diameter/Displacement AUV (LDUUV) to provide ultra-long endurance capability using fuel cells, and a number of military developments such as use on the Littoral Combat Ship (LCS), Remote Multi-Mission Vehicle (RMMV), SEAL Delivery System (SDS) and Surface MCM (SMCM) known as the "Shark".

Commercial Applications: Drivers and Markets

The stage is set. The oil & gas industry is historically conser-

vative when adopting new technologies, however, the above developments will act as enablers for commercialization, with 2014 expected to be a pivotal year. Growing energy demand globally, mainly driven by GDP growth in developing countries, will be met by supply from increasingly deep waters, as 'easy-to-reach' reserves mature.

Mature offshore and fields and remote areas represent higher capital expenditure (Capex) per barrel, while oil prices are stabilizing. The result is that oil & gas companies are striving for the most cost effective solutions. AUVs are widely accepted to be cost effective, as opposed to vessel-based systems, and have proved to be an optimum solution in harsh environments (deepwater and under-ice).

Although shallow water exploration & production E&P will remain dominant during the next five years, most commercial demand for AUVs is expected to come from deepwater in the 'golden triangle', of Brazil, Gulf of Mexico (GoM) and West Africa. Deepwater Capex is expected to double over the next five years, with $260 billion to be invested as the market continues to recover from the global economic downturn. Meanwhile, growth in maintenance markets is a key indicator for Life of Field Inspection (LoFI) and pipeline inspection, while offshore drilling is expected to boost oil & gas site survey activities, the main commercial application of AUVs, accounting for almost a third of commercial demand. To a lesser extent, AUVs are also expected to increase utilization rates in shallow waters.

With increasing regulations and costs, LoFI is a long-term goal for deepwater and remote production facilities inspection, run by unmanned or hybrid (AUV-ROV) vehicles. The application is still in pre-commercial stages, but has a great potential to demand a number of units for installations in Angola, Nigeria, Brazil, South Asia, North Sea, and US GoM, as LoFI using AUVs are more applicable in deepwaters. Site Surveys, which take place on the seabed where the new installation is planned, will also drive demand again in oil & gas deepwater activities in the Americas and Asia, while Africa should be the largest market demanding 47% of the units in 2018.

AUV activity also takes place in renewable (wind, wave and tidal) sites, especially wind energy in Europe, which accounted for over 90% of global cumulative capacity in 2012. The UK is the largest national market with above 3,000 MW installed, and offers potential for use of AUVs for cable route survey and inspections. Overall, AUV applications in renewables sites are still emerging, but investment in offshore renewable energy in Europe and Asia suggests a strong growth opportunity in the future.

Commercial, Military and Research markets account for 97% of global AUV demand in 2014. However, the commercial sector is expected to show exponential growth, more than tripling demand from 2014 to 2018. The total number of units across all sectors is expected to exceed 800 by 2018, an increase from approximately 600 in 2014.

An overview of the demand by region is as follows:

- **Africa** - Main activity will be site survey in the presalt area in Angola and Nigeria.
- **Asia** - Military demand will come from China, research in Japan and deepwater O&G in India, Indonesia and Malaysia.
- **Australasia** - Healthy demand for pipeline route survey and environmental sensing.
- **Latin America** - Strong commercial growth driven by deepwater oil & gas expenditure in Brazil.
- **North America** - The largest region, driven by the military sector. Research applications are also strong, while Gulf of Mexico oil & gas will increase demand for inspections and civil hydrography.
- **Middle East** - More applicable for low-logistics activities and potentially rig moves, pipeline surveys and inspections.
- **Eastern Europe** - Healthy demand in activities such as environmental sensing and hydrography.
- **Western Europe** - Large military sector, but proportionally larger for research activities.

North America will overall remain the leading region in the next five years, demanding most AUV units. However, other regions will become more active in all sectors, which should mean a decrease in the proportion of active units for the region, mainly driven by military activities in developing economies, such as China and Brazil, increasingly investing in their navies.

Conclusions

Douglas-Westwood forecast that the military sector will remain the largest AUV market in the next five years, driven by military investment from the developing economies. However, the sector is likely to direct less investment into AUV R&D, while commercially-driven developments grow. The ocean research sector will also remain strong with increasing attention to topics around environmental issues, resulting in a growing demand for data from environmental sensing and research mapping, including from deepwater and the arctic. As AUV technology matures in such applications, it should enable continued growth in those areas that are unsuitable for conventional access methods.

For the commercial sector, 2014 could be a turning point in AUV market uptake. The commercial use of AUVs has seen only moderate growth in recent years. However, the technology has evolved and while oil & gas operators remain risk averse, opportunities in the commercial sector could increase, enabled by developments in areas such as battery endurance, navigation systems, tracking systems, vehicle stability, data and imagery.

Barriers may be primarily in launch and recovery systems for larger units and data transmission, as AUVs do not offer real-time data. However, these areas should be progressively

addressed by developments such as unmanned launch and recovery systems, hybrid vehicles and docking stations for in-water charging and improved through-water data transmission.

The increased economic challenges of deepwater oil & gas developments lead to a desire to introduce cost-effective approaches. AUVs have proved to be an optimum cost-effective solution for surveys and inspections, as opposed to the higher costs of vessel-based activities. Factors include operation and time costs, and reducing direct human involvement in activities in high risk environments. Douglas-Westwood expects further increases in AUV use in deep waters and under-ice as an alternative to ROVs. AUVs are still considered an emerging technology and require more uptake and investment before posing a significant substitution risk for surface vessels and ROVs. However, 2014 is expected to represent the first year of significant growth which should allow the technology to be the industry eyes in the deepest waters.

The Author

Eduardo Ribeiro (MSc), Researcher and author of the DW's World AUV Market Forecast 2014-2018, has been involved in high level projects and advisory work for oilfield service companies and the public sector, undertaking market modelling and analysis; specialising in offshore deepwater market E&P activities.

The Report

DW's 5th edition of the AUV Market Forecast covers all key commercial themes relevant to players across the value chain in all AUV sectors:

- Technology review – description of current technology and ongoing developments;
- Competitive landscape – for manufacturers and operators, including their main activities;
- Key drivers – identification and discussion of key underlying drivers and their influence on the global AUV market by sector;
- Regional forecasts – analysis of AUV de¬mand development from 2014 to 2018;
- Sector forecasts – demand for AUV units segmented by commercial, military & research sectors, including recent activities and drivers for each activity and region.

www.douglas-westwood.com/shop/shop-infopage.php?longref=1326#.U0_IjfldWrI

Energy *from the Ocean*

By Samir Shiban

As did many readers of this article, I grew up in a coastal community, with the relaxing sounds of waves rolling over the rocks and on the seashore helping me drift to sleep at night. While soothing, the oceans also generate enormous amounts energy, still largely untapped.

Used car and truck tires are plentiful and cheap, and they also have excellent water and mechanical resistance properties. Is there a way that recycled tires can be utilized in the conversion of wave energy to cheap electricity? I believe so.

As the world continues to burn fossil fuel, supplies will begin to run low. At the same time, the supply of discarded tires grows higher, piles that present a significant fire risk and form a breeding ground for mosquitos. While there has been a movement to ween ourselves from fossil fuels, wind and thermal energy are still relatively costly sources.

In 2008, the author began to build a 1/20th scaled model of a floating platform to help harness wave energy. The idea comes from the common paddle used to propel a boat forward. If we could position a paddle (Figure 1) in the path of the wave and maintain it in that approximate position relative to the fluctuating water level; would it then be possible to have the wave move the paddle? A structure needed to be built to hold the paddle in place.

In the context of wave energy conversion, the concept of using recycled tires to produce electricity may be an innovative approach. Conditions for the structure (shown in Figure 2) and the overall project strive to meet the following requirements:

1. Economically feasible
2. Ensure livelihood of people who depend on the ocean
3. Respect the ocean
4. Do no harm to creatures in the ocean
5. Allow water to flow relatively unrestricted
6. Be heavy enough to be stable in the water
7. Strong enough to protect the moving blades and survive
8. Have sufficient buoyancy force
9. Minimal risk of sinking or being destroyed by the ocean

A cubical module measuring 20 cubic feet made of welded 18 inch diam. aluminum tubes and fitted with recycled tires (Figure 2). The tubes are individually sealed and the tires are filled with water resistant foam. An axle is suspended in the center of the cube and supported by stainless steel roller bearings. A turbine is formed by welding four backward large

Figure 1

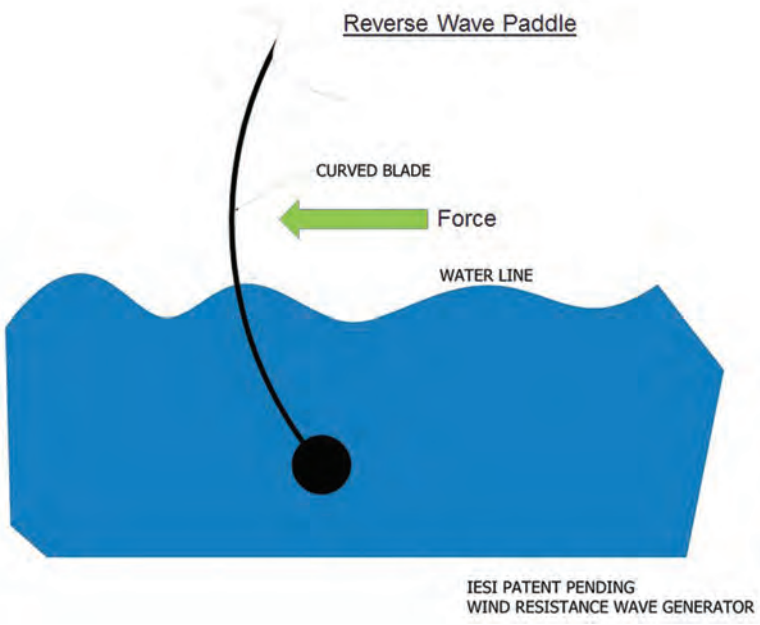


Figure 2

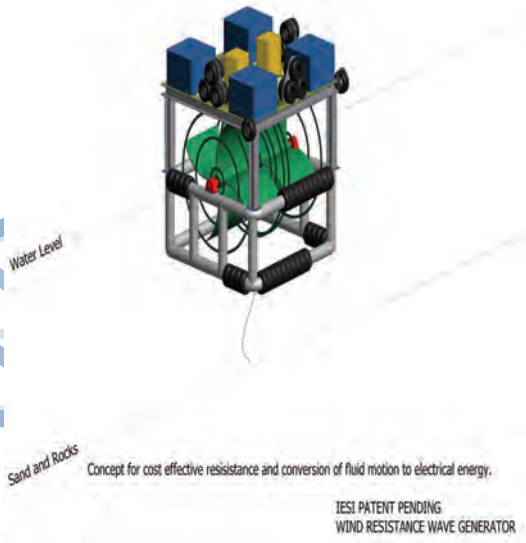
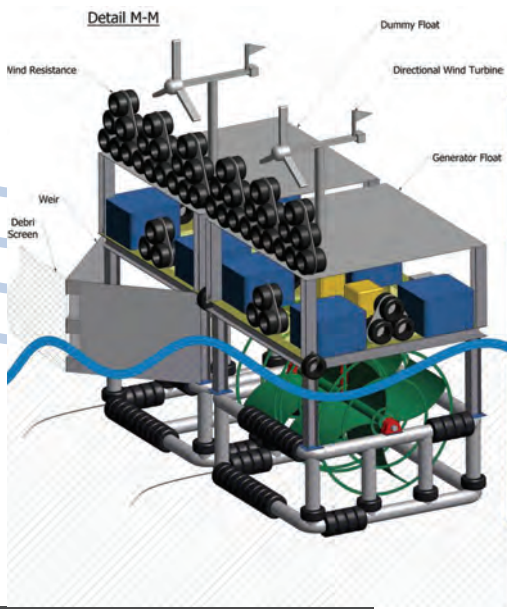


Figure 3

Figure 4



blades to the axle called "reverse wave paddles." The paddles are moved by the waves going forward towards the shore and possibly during the return undercurrent wave cycle. A large gear is rotated slowly around at the speed of the waves and the rotation is conveyed to a gearbox mounted on a platform above water level. The gearbox is connected to an electrical generator to produce electricity for use on the float and with large scale deployment, cables can carry electricity to the shore.

The configuration described above can be easily and inexpensively built. The author maintains that the structure has minimal risk of sinking because each component is a floatation device. It is designed to be reliable in the water because it is mostly synthetic rubber and aluminum construction. The combination of sealed aluminum tubes and water resistant foam filled used tires (Figure 3) is compatible with salt water, inexpensive, and has high mechanical resistance. The sealed tubes and foam filled tires together provide strong buoyancy force. Four stabilizer water tanks are mounted on four corners of the float to adjust the position of the rotating blades relative to the water level. When heavy weights are added water can be released from the tanks to return float to desired position. Alternating modules are used to direct and increase wave energy into the active modules. Modules are connected together via stainless steel short chains, leaving some flexibility to float relative to each other. When several modules are connected they form a continuous multifunctional platform. Wind turbines and other structures can be mounted on the upper deck of the platform (Figure 4).

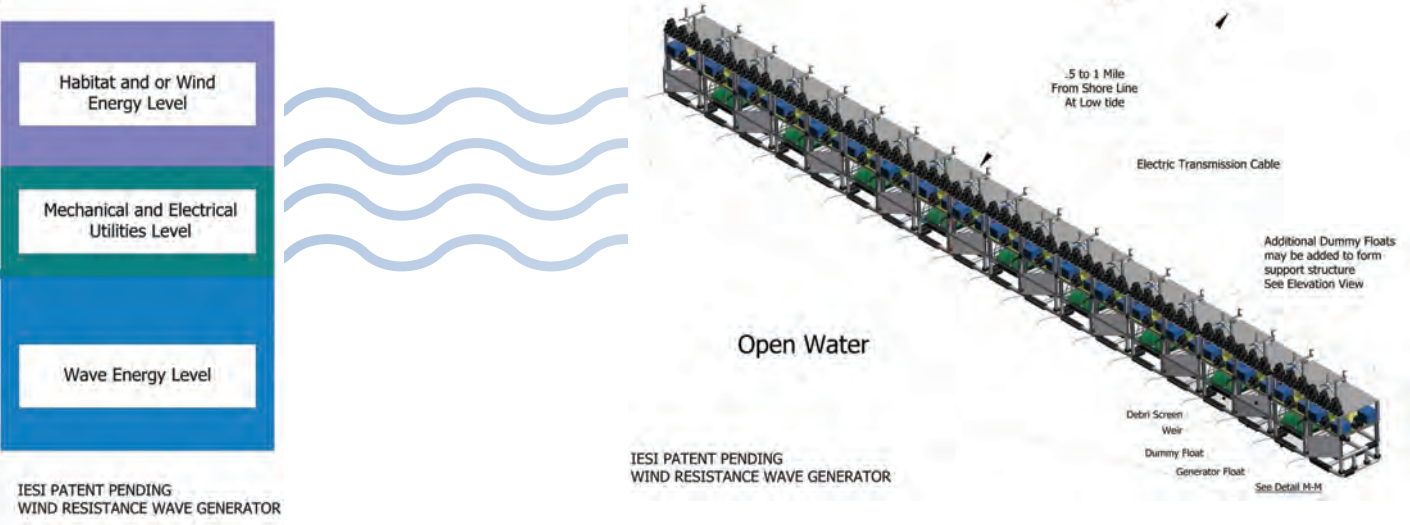
For test purposes, nine units should be deployed to evaluate all parameters of the modules including functionality, reliability, efficiency, anchoring, cost, maintenance, survivability, effect on sea life and other factors. Because material costs are competitive, construction of nearly identical units can provide economy of scale, and because of the versatility and the flexibility of the platform; cost of electricity from wave and wind energy can be extremely competitive.

Wind turbines can be installed on the top deck, as ocean winds are a valuable and reliable source of clean energy. Offshore coastal areas with high wind potential may be able to utilize the large surface areas of the platform to separate the wind storms form the warm ocean surface water on which they feed.

The ideal location is a function of several factors:

- Close to islands or near-shore communities which depend on fossil fuel for generating electricity
- Away from areas normally used for recreation
- Close to areas with established electrical transmission lines
- At a distance from shore where surface waves and undercurrent could be utilized.
- In locations not frequently used for fishing, crabbing and other related activities
- In areas with minimal interference with marine traffic.

Figure 5



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Offshore Wind A/S

MHI, Vestas JV gets Underway

In early May operations got underway at MHI Vestas Offshore Wind A/S, a new company dedicated to offshore wind turbine business jointly established by Mitsubishi Heavy Industries, Ltd. (MHI) and Vestas Wind Systems A/S (Vestas) of Denmark. The new joint-venture company (JV) consolidates the offshore wind power systems operations newly separated off from MHI and Vestas.

"Vestas has entered offshore wind turbine market already in the 1990's and has been taking a firm foothold in the market," said a spokesperson at MHI. "Vestas is a world leading manufacturer in onshore wind turbine and boasts a second position in offshore wind turbine."

"MHI determined it to be suitable timing to establish the JV now based on a number of factors, such as the contemplated launching of 8MW wind turbine into the market," continued the spokesperson at MHI.

MHI Vestas Offshore Wind is ready to perform a complete roster of functions relating to offshore wind turbines: from development, design, procurement and manufacture to marketing and after-sale servicing. Initially the JV will conduct business around Vestas' current 3-MW V112, a gear-type wind turbine, and a newly developed 8 MW V164.

The new company is headquartered in Aarhus, Denmark. Capitalization has initially been set at approximately $198m, with MHI Holding Denmark ApS (MHD), an MHI group company in Denmark, and Vestas having equal ownership shares. In 2016 a call option will be exercised and the ownership ratios are planned to shift to MHD 51% and Vestas 49%. Going forward MHD is also scheduled to receive a maximum of $181.7m (amount equivalent to approximately 40% of MHD's capital) in capital investment, in the form of preferred shares, from the Japan Bank for International Cooperation (JBIC).

"The Offshore wind turbine market is in positive trend and is expected to grow up for the long term period since a number of governments in the EU, especially the UK and Germany generally promote and provide support for installation of offshore wind as low carbon energy," said the spokesperson at MHI.

"Based on the trend of several European government's policies, the large sized offshore wind market will be launched from within coming five years. EU based competitors are also in developing over 6MW class large wind turbines."

MHI Vestas Offshore Wind's founding Chairman of the Board of Directors is Masafumi Wani, Chairman of Mitsubishi Heavy Industries Europe, Ltd. Vice Chairman of the Board is Vestas CEO Anders Runevad. The new company launches with 380 employees.

"Within the coming five years, we see that main market will be still in Europe, but we also will pay attention to possible business opportunities in other markets," said the spokesperson at MHI.

Presently the most vibrant markets for offshore wind turbines are the North Sea coastal countries, particularly the UK and Germany, and robust growth in this region is expected to continue going forward. In response, manufacturers of wind turbines today are developing large-scale models and have launched proactive initiatives to attract orders. MHI Vestas Offshore Wind, bringing together the superlative technological capabilities and abundant experience of its two parent partners, looks to be a winner in the fierce competition in this field.

Photo: MHI

Profile of the New Joint Venture

Company name:	MHI Vestas Offshore Wind A/S
Business scope:	Development, design, procurement, manufacture, marketing and after-sale servicing of offshore wind turbines
Establishment:	April 1, 2014
Head office:	Aarhus, Denmark
Capitalization:	approximately 144 million euros
Officers:	
Chairman of the Board of Directors:	Masafumi Wani (MHI)
Vice Chairman of the Board of Directors:	Anders Runevad (Vestas)
CEO (Chief Executive Officer):	Jens Tommerup (Vestas)
Co-CEO:	Jin Kato (MHI)
CFO (Chief Financial Officer):	Takao Arai (MHI)
CSO (Chief Sales Officer):	Uffe Vinther-Schou(Vestas)
COO (Chief Operations Officer):	Flemming Ougaard (Vestas)
CSO (Chief Strategy Officer):	Masato Yamada (MHI)
CTO (Chief Technical Officer):	Torben Hvid Larsen (Vestas)
Deputy CTO:	Masahide Umaya (MHI)
Employees:	380

Fisheries Technology for Resource Management

By Kira Coley, Snorri Guðmundsson & Sigmar Guðbjörnsson

The U.K. alone has 6,400 fishing vessels, with total landings of fish catch equating to $1.3 billion (627,000 tons) in 2012 (1). Despite warnings of a slowdown in the marine catch in the 1970s and 80s, the fishing industry increased fishing efforts with more powerful boats as well as superior technology, allowing the tracking of fish populations with sonar devices and larger nets to increase catch size. In addition, the international commercial fishing industry is double the size necessary to meet current requirements, and overcapacity is now a global norm. The European Union itself is in 40% overcapacity, resulting in fierce competition and difficulties in mitigating impacts with higher percentages found around the globe (2).

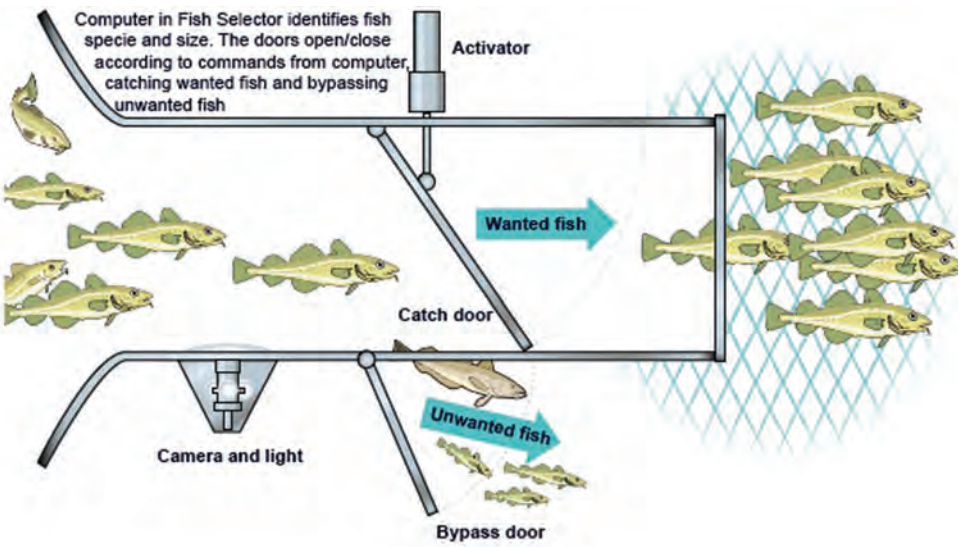
The Problem

Although overexploitation of fishing resources is the main issue, wasteful practices which resort in by-catch or discard is an area necessitating much focus by resource management schemes. By-catch has long been recognized as a widespread issue, with around 25% of total catch being discarded back into the sea dead due to little or no commercial value (3). This equates to approximately 27 million tons, the equivalent of 600 fully-laden Titanics (4).

The impact of by-catch to the ocean ecosystems is not only colossal but often irreversible (5). The different types of commercial fishing practices result in variations of species and quantities being killed as by-catch: nets kill cetaceans, longline fishing kills birds and bottom trawling devastates marine ecosystems (5).

oShrimp fisheries are renowned to be inefficient and ecologically damaging, with often more than 80% of a catch comprising marine species other than shrimp which gets discarded (5). Bottom-trawling and beam-trawling, removes up to 20% of the seafloor fauna and flora in a single trawl, in addition to by-catch of commercially unattractive animals (5).

By-catch occurs due to fishing gears inability to adequately select target species, the problem worsened by economic pressures resulting from overexploitation (3). A large majority of by-catch is discarded due to fishing quotas minimizing landings (size of catch) and when regulatory restrictions prohibit retention of particular attributes (size, species, sex) (3, 5). Therefore, some by-catch occurs in commercial fisheries, however, higher rates are found in fisheries with less selective fishing methods and practices. Mitigating the environmental impact of commercial fishing by avoiding, minimizing and compensating for adverse effects, is fundamental for fisheries management authorities worldwide (6). The complex interplay of ecological, economic, and social considerations has often resulted in by-catch management being reactive, confrontational and costly (6). Some by-catch species, including fish, reptiles, birds and mammals, may be threatened with extinction (3). Even Tuna fisheries, which in the past had high dolphin by-catch levels, are still responsible for the deaths of an estimated one million sharks annually (5). Around the U.K., evidence of the growing scale of by-catch is washed up on beaches around the south west of England and northern France annually in the form of dolphin and porpoise corpses.



Progresses in technology for impact reduction has not been as quickly established as technologies designed to increase overall catch. Although modifications to fishing gear or practices have offered an effective means of reducing by-catch, such as turtle exclusion devices and Pingers, these devices need continual monitoring and in many cases it has been difficult to demonstrate success (3, 6). Therefore effective use of these devices depends on overcoming gear handling constraints and the short-term economic losses often associated with their use (3).

The Solution

The Icelandic high technology company Star-Oddi has developed revolutionary equipment that filters out the majority of unwanted by-catch, (up to 75% of the by-catch). The Fish Selector, which is an equipment that automatically separates the fish while still in the trawl, means that discarding of fish by fishing companies could be a thing of the past.

The aims of using Fish Selector are to increase the value of the catch, avoid discard of fish and increase fishing efficiency by helping with decision making for the skipper of selecting a fishing area. In addition to benefitting the commercial fisheries companies the marine research institutes may find scientific value in using the equipment in their studies.

The Fish Selector is placed in front of the cod-end and as the fish swim through the device it is pre-programmed to select fish by specific size and species so those that are not intended for landing, are sorted out and directed away through a bypass gate. Collected information is wirelessly monitored in real-time in the bridge on the quantity of fish caught, as well as quantity bypassed. Other data can be collected such as depth, temperature and inclination.

Data on how many fish are caught and how many are released is automatically stored and sent in real time onboard the vessel. Collected information on quantity of caught fish and bypassed fish can be viewed wirelessly by the crew. The data gives insight into the quality of the fishing ground so the skipper can quickly and better estimate if fishing should continue or if movement to a different

area would be beneficial. The emphasis on responsible and sustainable fisheries has been increasing. Fishing companies using the Fish Selector can help in delivering the message to consumers that the company is making its contribution to sustainable fisheries by releasing threatened species.

Field Testing

In December 2010 the Fish Selector was tested on the research ship Drofn. It operated very well on its first sea trial. Since then, focus has been on reducing the size of the equipment which will give the fishermen the following advantages:

- *Takes less deck space*
- *Smaller volume and weight decreases hazards associated with having bulky equipment on deck*
- *Fishermen can more easily move the equipment around and the smaller device is then carried by two operatives*
- *Smaller volume and lower weight will make it easier to take the device onto smaller ships, increasing the market potential*

First Prize Innovation Award for the Fish Selector

Star-Oddi won first prize for the most innovative technology for the fishing industry at the Icelandic Fisheries Conference. The conference was held for the fourth time in November 2013. People from fishing companies, state officials and scientists attend this conference. The goal of the award is to encourage creative thinking and innovation in the fisheries sector.

About Star-Oddi

Star-Oddi (Iceland) develops research equipment for increasing the knowledge on marine life and underwater environments. Star-Oddi specializes in the design and manufacture of scientific equipment, mainly miniature data loggers containing microelectronics and sensors for monitoring behavioral and environmental parameters such as salinity, temperature, depth, tilt angle and more. The miniature self-contained loggers are used for behavioural studies of fish as well as on moorings and nets.

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Fishing companies using the Fish Selector can help in delivering the message to consumers that the company is making its contribution to sustainable fisheries.

References

(1) Overview of the UK fishing Industry (2013). Retrieved from Marine Management Organization website: www.marinemanagement.org.uk/fisheries/statistics/annual.htm

(2) World Fisheries: Declines, Potential and Human Reliance (April, 2006). Retrieved from the University of Michigan website: www.globalchange.umich.edu/globalchange2/current/lectures/fisheries/fisheries.html

(3) Cook, R. (2003). The Magnitude and Impact of By-catch Mortality by Fishing Gear. In M. Sinclair & G. Valdimarsson (Eds.), FAO. Responsible Fisheries in the Marine Ecosystem.

(4) Threat 1: Overfishing (n.d.). Retrieved from Save Our Seas Foundation website: saveourseas.com/threats/overfishing

(5) Bycatch – wasteful and destructive fishing (n.d.). Retrieved from Greenpeace website: www.greenpeace.org.uk/oceans/problems/bycatch-wasteful-and-destructive-fishing

(6) Kirby, S.K., Ward, P. (2014). Standards for the effective management of fisheries bycatch. Marine Policy, 44, 419-426

AGOR 27 Comes to Life as the R/V Neil Armstrong

By Kathleen Gleaves

On March 29, the Ocean Class Auxiliary General Oceanographic Research (AGOR) vessel hull number 27 started its official life as the R/V Neil Armstrong, the first research vessel named after a space explorer. Carol Armstrong, the widow of the famed astronaut, performed the christening duties during a brief sunbreak on a windy and rainy Pacific Northwest afternoon.

The number of illustrious speakers highlighted the rich diversity of agencies involved in the design, construction and operation of the vessel. Dick Nelson, President of Dakota Creek Industries (DCI), the construction shipyard, spoke first followed by Chris Chuhran, VP of Guido Perla and Associates, Inc. (GPA), the Seattle-based Naval Architecture and Marine Engineering firm that partnered with DCI for the de-

Images above (left to right): Carol Armstrong, wife of the ship's namesake, astronaut Neil Armstrong, broke the traditional bottle of champagne on the ship's hull while Armstrong's grand-daughter Kali cheers. Portrait of the dignitaries assembled for the christening of the R/V Neil Armstrong. Guests from the US Navy, NOAA, NASA, Woods Hole, Dakota Creek Industries and Guido Perla Associates were on the dais along with members of the Armstrong family.

Courtesy of Karla DeCamp, Dakota Creek Industries

sign and build project. Chuhran said even though the keel was laid in June 2012, the entire process had actually taken several years from its earliest idea phase to today's ceremony. The final detail design evolved over many months with frequent reviews by NAVSEA, the Office of Naval Research (ONR), the National Science Foundation (NSF) and the University National Oceanographic Laboratory System (UNOLS). On several occasions, DCI hosted review meetings attended by more than 40 people.

Rear Admiral Jonathan White, USN, said the R/V Neil Armstrong would help the Navy and the United States "…know the ocean better than anyone else," much like Armstrong's trip to the moon helped us know the lunar world.

Chief of Naval Research, Rear Admiral Mathew Klunder, declared it a "magnificent vessel" that was "made and designed for the future."

Dr. Susan Avery, President and Director of Woods Hole Oceanographic Institution (WHOI) assured Mrs. Armstrong that her "husband's legacy lives on in his namesake ship." She described the ship as a "high-tech marvel" that is expected to perform its 40-year mission with distinction. The R/V Neil Armstrong will replace the R/V Knorr, in service since 1968, one year before Armstrong's walk on the moon. The R/V Knorr, AGOR-15, is retiring after logging over one million miles in service to the Navy and WHOI.

Guests at DCI's Transit Shed ceremony had only a short time to admire the sleek lines of the ship before tugs, taking advantage of the high tide, moved her back to the shipyard for completion of the interior systems. Commissioning and finish work should be completed by August, followed by sea trials, after which the ship will then spend an additional six months in the Puget Sound area training the crews and adjusting the equipment before she heads for her new home port at WHOI in Massachusetts.

Initial vessel construction for the two-ship, $145-million-dollar project is funded by NAVSEA who will retain ownership of the vessel. Scientists from WHOI and around the world will be the primary users conducting year-round research in the North Atlantic and Arctic Oceans. WHOI will contribute $350,000 a year for maintenance and operation of the vessel.

Dr. Avery praised the modern design and ample computer lab space available on the R/V Neil Armstrong allowing scientists to analyze collected data in real time. She explained that the National Science Foundation (NSF) handles the complicated process of coordinating and scheduling research time on the ship. Pre-vetted, endorsed, and funded projects are scheduled based on multiple factors; minimizing transit time, maximizing science time, matching and timing schedules, and the number of days needed onboard. "Scheduling ship time in an integrated, inter-disciplinary way is a big planning effort," said Dr. Avery. Research will include mapping of the seafloor, launching of buoys, ROVs and other equipment, studying how currents affect acoustic signatures, microbial content of the northern waters, discovering how climate change and sea level rise are impacting the North Atlantic, and how the ocean in turn impacts climate changes. The focus will be on the entire ecosystem. The physics, biology and chemistry of the high latitude oceans will fall within the Neil Armstrong's mission area.

Design Team

GPA was hired by DCI to provide a Basic Design during the Phase I NAVSEA design competition. When the team's design was awarded the build contract in October 2011, GPA's engineers and Naval Architects went to work on the detail design and production engineering. GPA collaborated with Siemens Marine for the propulsion and automation systems. Siemens will be designing, engineering and commissioning the diesel electric and automation system.

GPA and DCI have partnered on projects in the past ranging from a Navy Sea Jet, an Advanced Electric Ship Demonstrator, to fire boats, ferries, tugs and trawlers. Both companies have worked on multiple Navy projects independently as well.

Shipyard

Dakota Creek Industries (DCI), located in Anacortes, Washington since 1975, began construction on AGOR 27 in mid-2012. The Navy exercised its option for a second vessel in February 2012, and the shipyard began shifting its workload around to fit the second vessel into the schedule. Hollie Anthonysz, DCI Program Manager of vessel construction, said the shipyard's first experience as the sole source on a military ship was positive and they are looking forward to the launch of the second ship.

DCI is a Puget Sound shipbuilding and repair facility specializing in steel and aluminum vessels up to 450 ft. and 275 tons. Located in the deep waters of the Guemes channel, it offers a protected harbor with easy access to Pacific waters. Its facility includes a Syncrolift ship lift and a dry dock.

Design Specifications

The vessels were designed for global operations in support of national security interests in the marine field, and other national oceanographic scientific endeavors. The ships are 238 ft in length overall, have a sustained speed of 12 knotts, can stay at sea for a minimum of 40 days, and travel over 11,000 nautical miles without refueling. In addition, they have the most modern scientific laboratory facilities and workshops afloat, high-tech computer and oceanographic equipment, and hotel facilities to support 24 scientists and a crew of 20. They are built to ABS Under 90 Meter rules, and will be certified as A1, Circle E, AMS, ACCU, NIBS, Ice Class D0 and UWILD. The design is also compliant with 46CFR Subchapter U (Oceanographic Vessels).

Working deck space is a premium in oceanographic work. The AGOR vessels have 2,557 sq. ft. of clear deck space with 1,873 sq ft of that space on the open aft deck. Design speci-

Clear deck space is vital to the mission of any research vessel. The R/V Neil Armstrong has ample space for storing and deploying oceanographic equipment.

Courtesy of Guido Perla and Associates, Seattle, Washington

Photo courtesy of Gary McGrath, WHOI

fications included being fully operational in Sea State 4 and able to handle dynamic positioning relative to a fixed position in Sea State 5 with a 35-knot wind and 2-knot current.

Additionally, the ship had to be as operationally quiet as possible. A great deal of ocean research involves listening. Excessive ship noise would negate that effort. GPA's unique hull design meets the Bubble Sweepdown performance requirement of the original specifications by diverting bubbles away from the sensitive sonar area. Model tank tests performed in Poland confirmed the Phase 1 design efforts met the Navy's exacting standards. Completing the noise dampening goal, designers chose systems, defined equipment locations and designed special installation methods with acoustics as a priority.

Equipment

DCI has teamed with a multitude of local, national and international vendors to outfit the ship with the best equipment available, meeting the various needs and requirements of the scientists for a quiet, efficient, fully integrated and highly resilient blue-water platform from which they can perform their experiments and studies.

Over the next two months, Siemens will be installing their new Blue system. This advanced, multi-drive, low-voltage system manages the speed of various AC propulsion motors controlling the propellers, stern thruster and bow thruster. The system provides enhanced reliability with multiple failsafe features, lower maintenance costs, increased efficiency, and increased operational ease for the crew. Reduced fuel consumption results in lower greenhouse gas emissions. Siemens is also supplying the majority of the electrical switchgear, the ACCU automation, and condition-based monitoring system.

The vessel uses four vibration-isolated Cummins QSK38-DM main generators providing a maximum of 3952 kW integrated electric power for all functions of the ship, including propulsion. The integrated diesel-electric plant allows for multiple generator configurations, ensuring the diesel engines operate at peak efficiency at all times.

A unique feature of the electric propulsion will be a "combinator" style control function integrating management of motor speed and propeller pitch on the Hundested-supplied Controllable Pitch Propellers.

Although fairly common in controllable pitch systems with direct drive diesels, use of the combinator control is unusual in variable-speed electric drive systems. The combinator increases operational flexibility by allowing the operator to set the propeller at its most efficient setting across a range of operations including heavy towing and cruising.

Design specifications were stringent for deck cranes and winches. They needed the capacity to load equipment weighing more than 20,000 pounds including the deployment of ROVs, buoys and other heavy equipment. The stern frame required a minimum of 12-foot inboard and outboard reach. As designed, the frame provides 15 feet of clearance above the deck and 27 feet of clear space between the block attachment points, all while maintaining a Dynamic Safe Working Load of 30,000 pounds through the full range of motion. Allied Marine supplied the stern frame along with the portable TK4-30 portable crane and the TK 70-70 aft-deck Main Crane. They

The ship as it was moved into the water at Dakota Creek Industries shipyard in Anacortes, Washington.

also supplied the Motion Compensated CTD Handling System and the Starboard Side Handling Device, both of which extend to the waterline for improved safety and load control.

Seattle based Markey Machinery supplied two electric-motor driven CAST-6-125 Hydrographic Winches, and the DETW-9-11 Traction Winch, both with AC Variable Frequency Drives System and electric motors for precise control.

Kongsberg Maritime, a 200-year-old Norwegian company, produces a full line of specialty SONARS used in scientific research, fisheries, and oil exploration. For Phase III of the project, Kongsberg will supply advanced SONAR systems. Although specifics are not confirmed at this time, projected equipment includes deep water and mid-water Multi-beam units, a HiPAP Gantry with a Sonardyne single beam survey system, and a SONAR Synchronization System. A Sub-bottom Profiler SONAR is expected as well. Additional equipment plans include a Transducer Array, a Mid-water Echo Sounder, and three Current Profilers operating at different frequencies, all are scheduled for installation in Phase III, subject to change as the project progresses.

AGOR 28, the second vessel in the Armstrong Class, will be named R/V Sally Ride in honor of the first female astronaut and the youngest person to go into space. The R/V Sally Ride will be operated by Scripps Institution of Oceanography, University of California, San Diego, where Ms. Ride was a faculty member before becoming an astronaut. The second vessel will mirror the basic ship equipment with some variations in the scientific outfitting. The christening date for the Sally Ride is scheduled for later this summer.

ELearning

Oil Majors Increasingly Employ eLearning Tools

The practice in oil & gas eLearning in the U.S is growing rapidly, with many oil companies now using eLearning as part of its competence management programs. Several oil giants in the U.S. such as Shell, Exxon and Chevron are keen on competence-based management, because it is an effective way for managers to ensure their workers are capable of making the workplace decisions. Although companies have focused on competences for some time, the practice is growing in eLearning, and more companies are making formal attempts to tie eLearning to competence management.

Because the oil and gas business is so competitive, senior executives realize that knowledge, and the application of knowledge, is key to business success. Oil and Gas executives therefore tend to see learning as a strategic priority. And because the major oil companies have a variety of proprietary processes and technologies that require bespoke learning solutions, it often commissions third-party vendors, such as British company, Maritime Training & Competence Solutions (MTCS Ltd.), to develop bespoke content. Both Shell, Exxon and Chevron use competence management within learning and training, and this process plays a role in defining the need for eLearning content.

MTCS Ltd. is currently working with Team Trident, a private staffing firm based in Houston, Texas, with a niche focus on skilled trades for the offshore energy industry, to ensure Team Trident customers have excellent competence certification opportunities available to them.

"After Macondo, the U.S authorities have been emphasizing the skills and experience expected from personnel in the Gulf of Mexico," said Rod Long, Team Trident, Houston. "This is being handed down by the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) through its Safety and Environmental Management Systems (SEMS) requirements and is a very good thing for our industry.

Team Trident is working with MTCS to clarify what skills

MTCS assessor.

Rod Long, Team Trident, Houston

Richard Warburton, MD, MTCS Ltd.

and experience should be expected and how it should be demonstrated in our sector by using the MTCS, IMCA aligned, competence material. With competence certification, it will ensure Team Trident can connect great technical personnel with great employment opportunities on land and offshore. Finally, because many of the personnel Team Trident selects are prior military, they are very used to proving they are competent at their trade prior to advancement to the next level so they accept the MTCS competence scheme readily."

Providing a full IMCA-aligned Competence Scheme Management service, MTCS Ltd. ensure personnel are demonstrating competence in the offshore workplace. In addition, MTCS Ltd. provide a spectrum of operational, technical and supervisory training, with the majority of their courses focussing on subsea technology, remotely operated vehicles, as used in the oil and gas industry and in Renewables

"The oil and gas industry is a global, highly competitive, and knowledge-intensive business with a high demand for eLearning and the use of competence management in eLearning continues to be popular," said Richard Warburton, Managing Director for MTCS Ltd. "The global nature of the oil and gas industry also creates demand for network-based tools, such as eLearning, that can deal with highly distributed workforces. No matter where in the U.S, or indeed the rest of the world they are, candidates can use distance learning methods (eLearning) most appropriate to their needs, whether it is through the internet or the office intranet."

www.mtcs.info

Product Spotlight

Remote Control Boats

A remote control boat equipped with a SonTek M9 Acoustic Doppler Profiler (ADP) was employed with HydroSurveyor software to create a 3D map of a damaged (and still submerged) flood barrier, following serious damage that took place last December. Data from the survey enabled the Environment Agency to act swiftly and effectively to repair the damage and thereby protect local industry and residents.

Extreme weather conditions and the highest tide for 150 years resulted in serious damage to a flood bank at Seal Sands near Billingham in the North East of England. A large hole, approximately 60 to 80m across, was scoured from the barrier and enormous quantities of seawater flooded into an area of marshland, which is an important wildlife habitat.

However, this area is also adjacent to a number of high value industrial assets, so this breach in the flood defenses represented a serious threat. Initially, military helicopters were recruited to help drop boulders into the hole, but it soon became clear that greater volumes were required so a temporary road was quickly constructed along the barrier so that fill material could be delivered by truck.

Unfortunately, the extent of the damage to the submerged flood bank was not visible, even at low tide, so it was necessary to be able to survey the damage in order to be able to calculate the type and volume of material that would be necessary for the repair operation.

Traditionally, such surveys would have been conducted manually from boats using gauging poles, but the Environment Agency now employs remote control boats that have a range of 200m, so operators are able to remain on the bank.

The M9 ADP on-board the remote controlled ARC-Boat is a 5-beam depth sounding and velocity profiling device that scans the bed as the boat is guided across the water's surface. Recorded data are analyzed in real-time by the SonTek HydroSurveyor software to produce accurate depth and velocity measurements in addition to 3-D maps of the water body. The Agency's Chris Train said, "The operation of the ARC-Boat was a great success; we were able to conduct a complete survey during about one hour of slack water at the top of the tide. As it happened, this was undertaken at night, but we attached navigation lights to the ARC boat, so the timing was of no consequence.

"The HydroSurveyor software created a superb map of the damage and demonstrated that the hole was significantly deeper than we had anticipated, so this data was essential in helping us to plan the remediation work.

"The main advantages of the ARC-Boat/HydroSurveyor system are the speed with which a survey is undertaken, the quality of the data, and improved safety because it is not necessary for staff to work on the water."

The ARC Boat and (inset), navigating the ARC Boat.

WFS seatooth S100

WFS delivered wireless communication systems to Baker Hughes. WFS supplied a seatooth S100 system for wireless datalogging during pipeline pre-commissioning on a project in the South China Sea at water depth of 1000m. The transmitter comprised a seatooth S100 connected to a hydrotest skid and the receiver comprised a seatooth S100 mounted on the ROV. Both units were bi-directional and no configuration was required; the system was ready to plug in and deliver serial communications wirelessly between the test skid and the ROV. Hydratest data was downloaded at high speed despite the high levels of salinity and turbidity. This enabled data to be collected quickly and safely, freeing up the ROV to undertake other tasks.

www.wfs-tech.com

Modem Field Evaluation Program

At OI '14 Sonardyne International announced it is inviting qualifying academic establishments and research institutions to apply to participate in a Field Evaluation Program for its new family of acoustic modems, uComm. Applicants with an upcoming, short-term ocean science project that would benefit from an underwater modem, are invited to submit details to Sonardyne. If selected, the UK-based company will provide a pair of uComm modems on loan for the project's duration. On display at OI, uComm is a simple to use underwater modem that when deployed, intelligently senses its environment and adapts its configuration to ensure data is transferred in each direction as fast, as reliably and as energy efficiently as possible. uComm can be used in pairs with a single subsea unit communicating with a topside unit, or multiple subsea units reporting to a single topside unit. Subsea and topside units are identical and can be configured in either role. uComm's extensive feature list, together with attractive pricing, is expected to generate considerable interest.

www.sonardyne.com

Axis Launches New Security Camera

The AXIS Q60-S PTZ Dome Network Cameras in nitrogen-pressurized stainless steel casings are suited for surveillance and remote monitoring applications in marine, mining, oil and gas environments. The rust-free cameras can resist the corrosive effect of sea water and cleaning chemicals, and withstand high-pressure steam cleaning. Pressurized nitrogen prevents internal condensation. Axis Communications launched three outdoor-ready, marine-grade stainless steel cameras that enable 360° coverage of wide areas in resolutions up to HDTV 1080p and great zoomed-in detail with up to 36x optical zoom. AXIS Q60-S cameras, with SAE 316L stainless steel and a nylon clear dome cover, can operate in -30°C to 50°C (-22°F to 122°F). They have IP66, IP6K9K, NEMA 4X and MIL-STD-810G 509.5 approvals, ensuring protection against dust, rain, high pressure/steam jet cleaning, snow, ice and salt fog. The cameras come with a multi-connector cable and a media converter switch that allows for network connection using standard network or fiber optic cables. The switch also enables the cameras to connect to external alarm devices via two configurable input/output ports and to 12 V power. Stainless steel mounting accessories are sold separately.

www.axis.com

Photo: Axis

Teledyne Blueview Launches ProMapper Software

Teledyne BlueView released its ProMapper software package, an intuitive geomosaicking program that places 2D forward looking sonar (FLS) imagery over an aerial image or a nautical chart. By combining a GPS and compass with a standard BlueView 2D sonar, ProMapper users will significantly increase their sonar's usability and value in the field, as well as post mission. For the first time, BlueView's customer's can track area coverage and create area sonar maps during their search and/or survey operations. ProMapper is the first application extension (AppEx) for BlueView's 2D sonar.

www.blueview.com

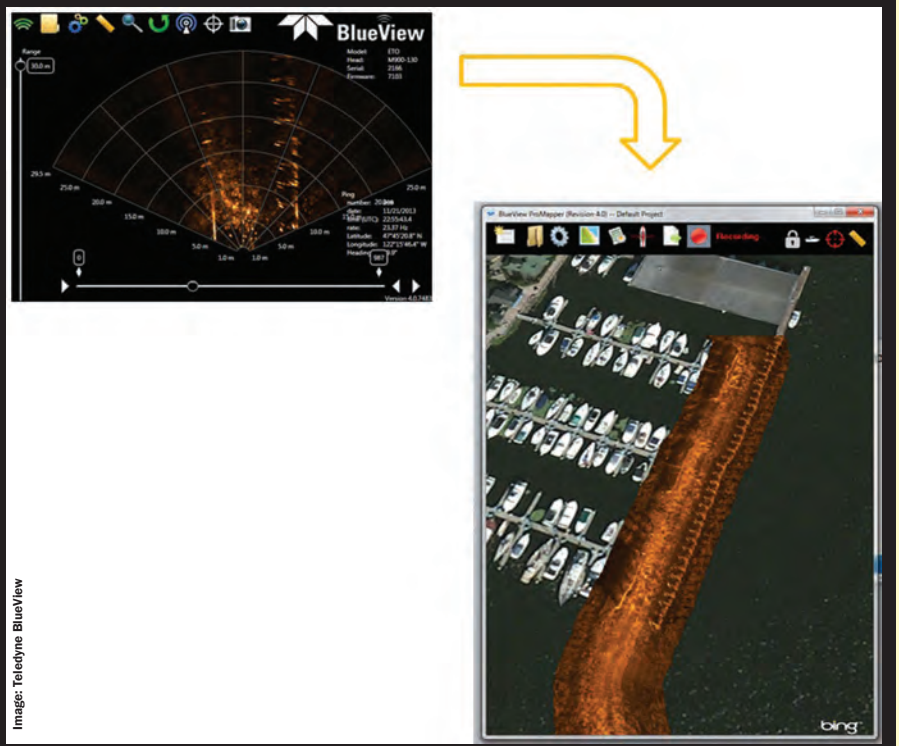


Image: Teledyne BlueView

Bowtech: New Tooling Camera Range

Photo: Bowtech

Bowtech Products released the sixth generation of its color and monochrome tooling cameras with 720 TV lines with improved light sensitivity. As part of Bowtech's continual product improvement strategy, the monochrome LCC-700 has been superseded by the LCC-720 and the color L3C-650 is superseded by the L3C-720. These higher resolution cameras are manufactured in a Titanium housing with Sapphire glass ports and are rated for use to 4,000m ocean depth (with a 6,000m option).

www.bowtech.co.uk

iXBlue: New GAPS USBL

iXBlue launched the fourth-generation GAPS, which constitutes a significant enhancement to its USBL acoustic positioning product family.

www.ixblue.com

Ifremer Receives Scientific Multibeam

Delegates from the French Research Institute for Exploration of the Sea (Ifremer) visited the Kongsberg Maritime Subsea headquarters in Horten, Norway late December 2013 for the Factory Acceptance Test of its second Simrad ME70 scientific multibeam echosounder. Ifremer acquired the multibeam echo sounder – the Simrad ME70 delivered as part of the mid-life refit of the L'Europe Research Vessel – to strengthen its work in the Mediterranean Sea. Sea trials on the refit vessel are planned for March 2014.

The delivery completes the already installed Simrad EK60 scientific single beam echosounder system to create a standardized package that combines quantitative single beam and multibeam systems for vessels that carry out biological surveys. Ifremer has also chosen the ME70 bathymetric module, enabling the ME70 to perform seabed mapping according to international standards while at the same time doing ecosystem surveys of the water column.

The Simrad ME70 has a built in calibration functionality in the software, made possible because the ME70 utilizes split beams in all beams. A calibration sphere with known target strength is used to calibrate the entire system, allowing the user to obtain absolute backscatter values from ecosystem components such as plankton, fish or bottom habitat. Calibrated backscatter data are also relevant for bottom classification, as backscatter levels can be compared on the same scale.

Also the Simrad ME70 offers its fully populated element array in both alongship and athwartship direction. A total of 800 individual elements in the transducer are used to form up to 45 split beams spread out in a fan in the athwartship direction. As individual beams are formed in both transmission and reception, two way side lobe suppression give side lobe levels lower than -35 dB. Coupled with Frequency Rotated Directional Transmission (FRDT), where operating frequency is shifted between the beams to avoid interleakage, the ME70 is designed to allow the user to measure weak targets close to strong ones, which is essential when your goal is to map the entire marine ecosystem.

"The ME70 has added another dimension to our biological surveys on board the R/V Thalassa as it addresses some of the physical shortcomings of quantitative single beam echo sounders such as low resolution and sampling volume. It has been many years since we started using the ME70 on Thalassa, but we have now come to a point where we standardize the combination of quantitative multibeam and multifrequency single beam systems on board our vessels that carry out biological survey and research," adds Laurent Berger, fishery acoustician at Ifremer.

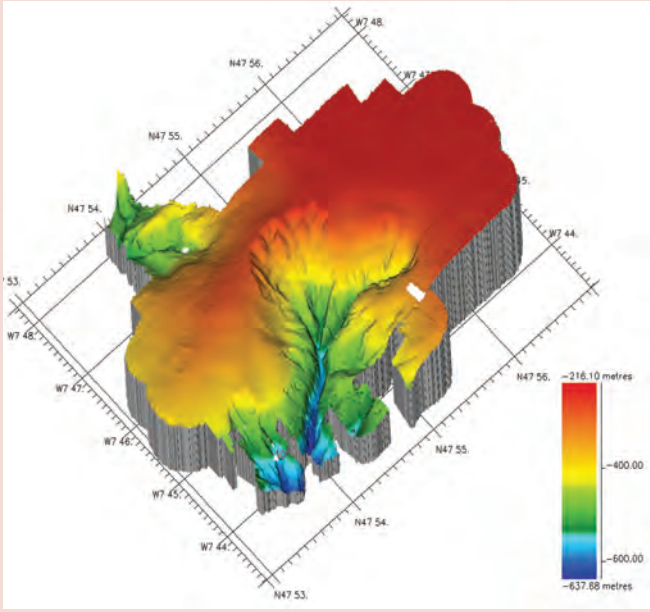


Image: EIVA

EIVA Opens
New Webshop

EIVA announces a new webshop, in which it is possible to purchase a wide range of products directly online with credit card or per invoice. Both EIVA's own solutions and that of the companies which it represents, can be found in the webshop.

"Naturally, many of our products are rather complex and require dialogue with the customer prior to purchase. However, we also offer many standard products where the possibility of placing an order instantly is the main priority. This applies to standard products such as spare parts and cables," said EIVA CEO Jeppe Nielsen.

Many of EIVA's customers are freelancers to whom purchases via credit cards are much preferred to invoices. This is especially relevant in connection with software training courses offered by EIVA. Seats for these can also be purchased via eiva.com, ensuring a fast and simple purchase process.

The webshop is supplemented by a product listing of all products in the EIVA portfolio, that is, a list including those that are not for sale online.

www.eiva.com

MacArtney
Ice Core Drilling Winch for BAS

The MacArtney Group announced the supply of an ice core drilling winch solution to British Antarctic Survey (BAS). The winch will be used to deploy the new BAS Rapid Access Isotope Drill (RAID) which is able to complete a complete 600 m drilling cycle in one week, before being redeployed at the next drilling location. The drill will collect ice chippings, which can be used for isotope analysis and climate profiling, and leave an access hole to allow deployment of a temperature sensing cable. Both types of investigation and analysis will be used to identify good sites to find old ice. So far, shallow BAS drills have reached ice aging between 150,000 and 350,000 years of age, while the oldest ice that has currently been investigated is 800,000 years old. BAS hopes that with the new drill, the organization will find sites with ice as old as 1.5 million years. Operation of the drill system will take place in difficult and demanding East Antarctica sites that are likely to be both cold (-25˚C to -35˚C) and high (>3000 m above sea level). First, due to the remote location of the drill sites, the MacArtney BAS ice core drilling winch needs to be transportable by a standard Twin Otter turboprop aircraft which also needs to carry the RAID drill system, a generator, fuel, tents, supplies and the four person scientist crew. With this in mind, the entire winch system, including a demountable cable sheave pole and the integrated sledge, is made from aluminum and designed to be light and compact.

www.macartney.com

Obenour

Olender

Morozov

Jenkins

Obenour Joins Horizon Marine

Horizon Marine, Inc., an oceanographic services company specializing in environmental and operational marine data collection and analysis around the world, continues to expand with the recent hire of Kelsey Obenour. This follows the opening of the Brazilian office in Rio and doubling of space at the Offshore Division in Richmond, Texas, to accommodate two oceanographers, drifting buoy production and a new laboratory for underwater gliders.

Obenour graduated from Valparaiso University with a B.S. in Meteorology and Geography and a minor in Mathematics. Following her undergraduate studies, Obenour received her M.S. in physical oceanography from the University of Rhode Island – Graduate School of Oceanography. For her thesis, Obenour used 30 years of sea surface temperature (SST) AVHRR Pathfinder satellite data to analyze ocean fronts on global and regional scales to observe decadal and global climate trends since 1982.

NOIA Elects Rynd, Taylor

The National Ocean Industries Association (NOIA) Board of Directors elected John T. Rynd as Chairman of NOIA and Cindy B. Taylor as Vice Chair of NOIA for the upcoming 2014-2015 term. Rynd and Taylor assumed their positions at the recent NOIA Annual Meeting. Since 2008, Rynd has been the Chief Executive Officer and President, Hercules Offshore, Inc., a publicly traded global provider of offshore contract drilling and liftboat services headquartered in Houston, Texas. He also serves on the company's board of directors, and served as NOIA Vice Chairman for the 2013 -2014 term. Taylor has been President and CEO of Oil States International, Inc., since 2007. She also serves on the company's board of directors. Oil States International is a publicly traded diversified oilfield services company, also based in Houston.

AML Appoints Olender Director of Engineering

Olender earned his PhD in Mechanical Engineering from the University of Victoria, after which he worked for several years designing instruments and sensors in the forestry sector for FP Innovations. Olender joined AML in October of 2011, and after two and a half years as Mechanical Designer of AML's oceanographic instrumentation, he now takes the helm of the entire Engineering team.

Morozov Earns IEEE Senior Member Status

Teledyne Marine Systems said that Andrey K. Morozov, Senior Scientist at Teledyne MarineSystems has been elevated to the grade of Senior Member of the IEEE. Senior Member is the highest professional grade of the IEEE for which a member may apply. The member status requires experience and reflects professional accomplishment and maturity. Only seven percent of the 431,000 members of the IEEE have achieved this level.

Decom North Sea Appoints New Chief Executive

The Board of Directors at Decom North Sea (DNS), the offshore oil and gas decommissioning forum, announced the appointment of Nigel Jenkins as its new chief executive to lead the organization as it further strengthens its position as the representative body for the decommissioning industry. Jenkins will take up the post on July 1, 2014, and replaces Brian Nixon, who is retiring. Jenkins' previous roles include board leadership positions with AMEC and AECOM and most recently as board director with KDC Contractors, which has a long and successful track record of working on decommissioning projects on and offshore. He also served as a director with DNS from 2011 to 2013.

Harkand Names Brown to GOM Team

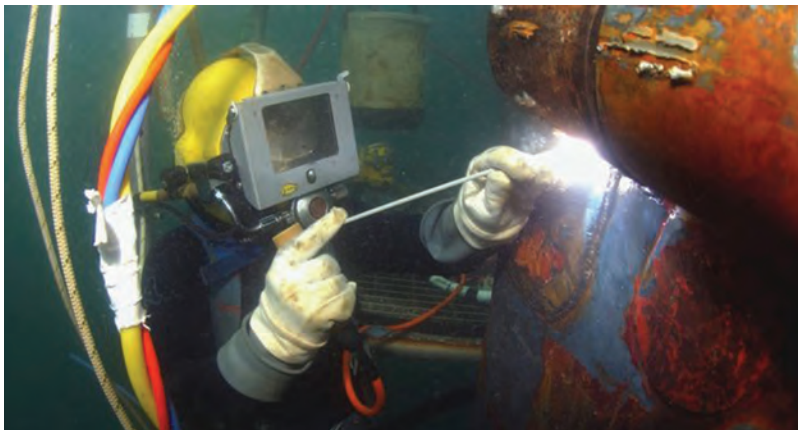
Global inspection, repair, maintenance (IRM) and light construction company Harkand appointed Mike Brown as general manager of diving services in North America. A U.S. Navy veteran, Brown has considerable experience of commercial diving in the offshore oil and gas sector having held number of senior positions in a career spanning more than 35 years.

He was most recently working with Chet Morrison Contractors as general manager of the offshore construction division. Prior to CMC, he worked as vice president and general manager with EPIC Divers & Marine Contractors, a subsidiary of Tetra Technologies; and worked across 36

Brown

Ntnl. Hyperbaric Center

Harkand Names Brown to GOM Team



countries in five continents. A past president of the Association of Diving Contractors International (ADCI), Brown is currently serving as co-vice-chairman of the International Association of Oil & Gas Producers Commercial Diving subcommittee, and is the offshore diving representative for the National Offshore Safety Advisory Committee (NOSAC) in U.S.

Tesla Offshore Marks 10th Year

Tesla Offshore LLC, a survey service provider offering comprehensive Geophysical, Geoscience, Marine Construction and Marine Salvage support in offshore waters around the world, is celebrating its 10th year in business. In 2014, Tesla Offshore has also achieved a benchmark in its strategic plan for growth marked by the launch of its Tesla Bluefin-21 AUV program.

"2014 marks a decade of exceptional growth for Tesla Offshore, while maintaining consistently high standards of excellence in customer service," said Randall P. Bergeron, President and CEO of Tesla Offshore LLC. Tesla Offshore was established in 2004 by Bergeron, Rick Clemmons, Donald Spicer, C.D. Schempf and Richard Habiak, though the company's core leadership has worked together since 1976.

SEACON (europe) Ltd. Wins Queen's Award

SEACON (europe) Ltd, part of the SEA CON Group was named winners of a Queen's Award for International Trade, one of the highest accolades available. The SEA CON Group are engaged in underwater connector technology and provide a range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the oil & gas, defense, oceanographic and environmental markets. The company has seen its exports in the European market grow from just over $1.7 million in 2010 to over $4.4 million in 2012 and global sales rise from $15.4 million to over $21.3 million in the same period.

Ecoshield Wins Award

Subsea Industries, a Hydrex company, announced that its Ecoshield coating system, which offers protection from cavitation and corrosion/erosion damage for ship hulls, rudders and ship underwater running gear, has been recognized with an industry award. The 2014 Innovation in Ship Operations Award was accepted for Subsea Industries by David Phillips, Hydrex Group Communications Executive at an awards dinner in London on April 14, 2014. Boud Van Rompay, Founder of Hydrex and Subsea Industries and the developer of Ecoshield said, "We are delighted to receive this prestigious award. We know that the judges are highly expert and discriminating and we take the award as a very valuable acknowledgement for our achievement with Ecoshield. It is a simple solution that puts an end to cavitation and corrosion damage which has plagued the shipping industry for more than a century."

National Hyperbaric Center Open in Singapore

The National Hyperbaric Center is opening an office in Singapore to provide subsea-related training, consulting, diving/ROV technical support and senior industry personnel for specialist projects. The new facility will be based in Loyang, close to the airport. Sandy Harper, NHC AssociateDirector, said, "The new Center will reinforce NHC's commitment to provide world class subsea training and services which will help to improve safety in the Diving Industry. Our commitment to Singapore has strategic significance, allowing us to deliver our services in a region that has recently lacked choice."

Ocean Sonics Announces New Partnerships

Ocean Sonics Ltd. announced the appointment of two new distributors to its network to increase awareness and sales of the icListen Smart Hydrophone in both Japan and Singapore. Tokyo-based

SHOSHIN Corporation will leverage its sales and marketing experience, and distribution capabilities within Japan to establish Ocean Sonics as the preferred provider of Digital Hydrophones. Sea and Land Technologies (SALT), headquartered in Singapore, will supply, distribute and support the technology of the icListen products in the ASEAN countries. The company already handles product ranges from many leading marine equipment companies making them ideal partners for Ocean Sonics and its range of acoustics products for the marine industry.

UTEC Announces Equipment Investment

UTEC Geomarine, part of the UTEC Group, announced the purchase of a comprehensively instrumented DB-240 metocean buoy as part of a construction support soliton monitoring project in the region. The equipment has been manufactured by Planet Ocean and is an upgraded version of the basic buoy model which comes with 12 x 20W solar panels and two rechargeable batteries. In addition, the company has also purchased a 150kHz QuarterMaster ADCP manufactured by Teledyne RDI. It is rated to 1,500m water depth and can measure current profiles spanning 300m of the water column.

Teledyne RDI ADCPs to Support China Project

Teledyne RD Instruments (RDI) has been selected by the Chinese Academy of Science's Institute of Oceanology in Qingdao to provide their Acoustic Doppler Current Profilers (ADCPs) in support of the Western Pacific Ocean System project. WPOS is a five-year research project that commences in April 2014. The project includes the deployment of five research vessels, a remotely operated submersible and an array of subsurface moorings off the eastern coasts of the Philippines and Indonesia. These resources will be utilized to examine the deep ocean and its connection to climate change and coastal environments.

Six arrays, comprised of a total of 29 moorings, will be central to this program. Each mooring will be outfitted with Teledyne RDI's 75 kHz Long Ranger ADCPs, as well as a series of additional Workhorse ADCPs ranging from 150 to 600 kHz. The ADCPs will be utilized to monitor ocean currents at depths of between 400 and 6,000 m, including the powerful Kuroshio current, which runs northeast through the East China Sea. Teledyne RDI's 38 kHz Ocean Surveyor (OS) ADCP will also be used to collect detailed, deep-water current profiling data while their research vessel is underway. Teledyne RDI worked closely with its local representative, Laurel Technologies, as well as scientists and members of the WPOS program to provide a comprehensive solution to meet the project's specific long-term needs.

Svenska kraftnät Awards MMT Cable Survey Work

MMT has been awarded the contract for the Själland cable survey between Denmark and Sweden by Svenska kraftnät. Svenska kraftnät and its Danish counterpart Energinet.dk are the transmission system owners and operators of a 400 kV High Voltage AC cable system across the Öresund, between Sweden and Denmark. The cable system will be exchanged due to its technical lifetime. MMT has recently been awarded the contract for a cable route survey, with the purpose of investigating and verifying the feasibility of the new submarine cable route. This marine cable route survey covers geophysical information such as bathymetry, surface geology and sub-bottom conditions. MMT will also perform a geotechnical investigation, cable tracking and identification of cable crossings. The offshore operations will be performed from MMT´s survey and ROV vessel Icebeam and the coastal surveys from the survey vessel Seabeam. The operations will start in spring 2014.

MacArtney Steps up Its Presence in Offshore Asia

MacArtney Group said it has a growing presence in all Asian markets for underwater technology. Over the next few months, MacArtney Singapore is focused on growing its staff, implementing a major expansion of stock and workshop facilities and opening a dedicated slip ring repair and service center.

The MacArtney Singapore operations will be streamlined to provide direct local access to global MacArtney support for all Asian and Asia Pacific markets. With Steen Frejo at the helm as Managing Director, the MacArtney Singapore area of operation has expanded to encompass the entire Asian and Asia Pacific region including major markets such China, Japan, South Korea, Taiwan and support for MacArtney's Australia based office.

In addition, MacArtney Singapore will actively manage the coordination of the entire Asian representative network. Empowered by local market expertise and access to clients, these MacArtney representatives comprise an invaluable asset to the regional success of MacArtney products and systems.

To local offshore oil and gas, marine renewable energy, oceanographic and defence industries, the expansion of MacArtney Singapore will mean shorter lead times and better local service for underwater technology systems and products. "The expansion of MacArtney Singapore will definitely bring us much closer to our Asian customers than what has been possible so far," Frejo said. "What started as a one-man regional sales outpost, has now become a fully fledged MacArtney location with local access to global support."

Portuguese Navy Orders Sonar System Upgrades

General Dynamics Canada is installing an adjunct processing system on three VASCO DA GAMA-class frigates of the Portuguese Navy. Designed by General Dynamics Canada, the ECLIPSE adjunct processor provides the in-service AN/SQS-510 sonar systems with enhanced operational capability to detect submarines and torpedoes.

The ECLIPSE processing system will work in parallel with the AN/SQS-510, leveraging the data collected from the existing sonar system. The addition of the ECLIPSE processing system will significantly improve the ability to detect and characterize echoes and sounds transmitted through the water to determine location and physical characteristics of potential threats. The AN/SQS-510 medium-frequency hull-mounted sonar is currently in service on all 12 Royal Canadian Navy HALIFAX-class patrol frigates and three IROQUOIS-class destroyers. The system is also in use in ships of the Portuguese and Bulgarian navies.

Seatronics Invests in ROV Tooling Rental Market

Seatronics, an Acteon company, has invested more than $1.5 million in the latest technologies, sensors and tools available from Tritech International Ltd, a Moog Inc. company. Many of the products will enhance the ROV tooling capabilities, which are available through recently acquired Acteon Company, J2 Subsea.

www.seadiscovery.com

HYPACK Hydrographic Training Event

HYPACK, Inc. announced the dates for its HYPACK 2015 Hydrographic Training Event. The event will be held January 5-8, 2015 at The Hyatt Regency in San Antonio, Texas. According to HYPACK, the three-day training will cover all aspects of single beam and multibeam hydrographic surveying and dredge management using HYPACK, HYSWEEP and DREDGEPACK packages. Twenty-five exhibitors from the industry's hardware manufacturers, equipment resellers and service providers will be on hand.

Nortek to Host Northern Europe User Conference

Nortek is hosting the 2014 Northern European User Conference, June 26-28, for oceanographers and ocean engineers. The organizer promises strong focus on networking, knowledge exchange and hands-on experience with equipment among colleagues and collaborators gathered at Dutch isle. Nortek BV, Nortek UK and Terra4 will host the 2014 Northern European User Conference in collaboration in late June. Organizers offer two days of user presentations, hands-on demonstrations, technical discussions, latest development news, and networking opportunities. Managing Director at Nortek B.V., Sicco Kamminga, is responsible for organizing the event. Nortek recently launched its new Signature55, which makes use of Nortek's AD2CP technology and Nortek Piezo's transducers to extend Nortek's current profiling range capabilities to a thousand meters. The same platform is also used in the new Signature1000 and Signature500, which are especially suited for studies of turbulence, while fulfilling standard current profiling needs.

FlexTech Signs Deal with Ocean Installer

Flexible pipe specialist FlexTech has signed a contract for flexible pipe in-

Teledyne RESON Academy Debuts

Teledyne RESON announced a new training course program called the Teledyne RESON Academy, which includes open style training at global strategic locations and new training courses. "We regularly hold courses for our customers, but now also offer open style training courses so that individual customers can also sign up," said Pim Kuus, Teledyne RESON's Global Training Manager. "We have also designed new training courses targeted to the specific demands of the market place."

The course offerings include industry standard two-day SeaBat training target at surveyors or engineers, SeaBat AUV training, and PDS2000 multibeam or dredge software training. Beside these standard courses, the company offers bespoke trainings.

One of the anticipated courses is the comprehensive training course that covers the full hydrographic workflow from mobilization, data acquisition to data processing and deliverables. This course is offered with the customer's preferred hydrographic software packages. The training courses are available for all experience levels and are given in various languages or through interpreters.

www.teledyne-reson.com

stallation with Ocean Installer. FlexTech will deliver the detailed design of a flexible pipe installation spread as well as installation analysis and project support to Ocean Installer, a subsea contractor specializing in subsea installation and engineering and construction services. The project will take place offshore Norway during the summer of 2015. FlexTech will also provide engineering support during the fabrication of the equipment, and the subsequent offshore campaign.

Seatronics Orders Saturn System

Seatronics placed an order with Teledyne TSS for 12 of the new Saturn 30 Subsea Attitude and Heading Reference Systems (AHRS) that were launched at Oceanology International in London. Seatronics has also taken options on another 38-units, which takes the total projected purchase to 50 systems.

The new Saturn systems are available in two versions with surface and subsea models for each. The Saturn 10 systems are designed to support the offshore construction, ROV, surface navigation and multibeam survey sectors where reliability, competitive pricing and performance are essential. The Saturn 30 is designed as a solid-state attitude and heading reference system (AHRS) for primary surface and subsea navigation. It is a compact and highly reliable unit which makes it ideal for all sizes of vessel and especially for smaller craft such as fast ferries, yachts and small patrol craft where space is at a premium.

Access Ocean Observatories for Trials and Research

An opportunity is coming up for small and medium enterprises and marine research organizations to apply for access to a network of European ocean observatories to "road test" equipment and to conduct scientific research. As part of the Transnational Access (TNA) package, the Fixed-point Open Ocean Observatories Network (FixO3) project is offering organizations access to one shallow water test site and 14 ocean observatories located in the polar regions of the Antarctic and Arctic, the Atlantic Ocean and Mediterranean Sea, to conduct trials and scientific research.

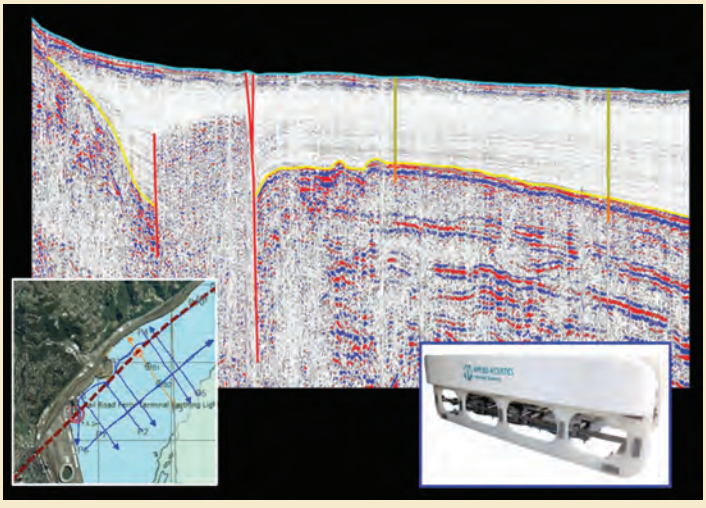
Successful TNA applicants will be given access to their chosen observatory and receive full scientific and technological support – all free of charge. The first call for applications for Transnational Access (TNA) to these observatories will be made in mid-June and will close before the end of July. Potential applicants should check the TNA website (**http://www.fixo3.eu/tna/calls-and-procedures/first-call**) for the announcement, and for further details see the FixO3 website (**http://www.fixo3.eu**).

US Deploys 3 Offshore Wind Energy Projects

The U.S. Energy Department announced the selection of three offshore wind demonstrations to receive up to $47 million each over the next four years to deploy grid-connected systems in federal and state waters by 2017. These projects – located off the coast of New Jersey, Oregon and Virginia – will help speed the deployment of more efficient off-

Triton Imaging, Applied Acoustics Ink OEM Agreement

Triton Imaging, Inc. and Applied Acoustic Engineering Ltd. announced that they have signed an OEM agreement under which Applied Acoustics will offer Triton ISIS Offshore-SB data acquisition and Perspective-SB processing and interpretation software bundled with Applied Acoustic sub-bottom profiling hardware. With this arrangement, Applied Acoustics' customers will have the advantage of using the proven Triton topside software to acquire high-resolution seismic data from the Applied Acoustic sparker/boomer systems. The Perspective-SB software will give these users the tools they need for the accurate processing, display and interpretation of these data in a broad range of applications where an accurate understanding of sub surface geology is critical.



shore wind power technologies.

The three projects selected today are aimed at deploying offshore wind installations in U.S. waters by 2017:

• **Fishermen's Energy** will install five 5-MW direct-drive wind turbines approximately three miles off the coast of Atlantic City, NJ. This project will use a U.S.-developed twisted jacket foundation that is designed to be simpler and less expensive to manufacture and install. Fishermen's project will act as a laboratory for researchers to learn about offshore wind and investigate interactions between turbines.

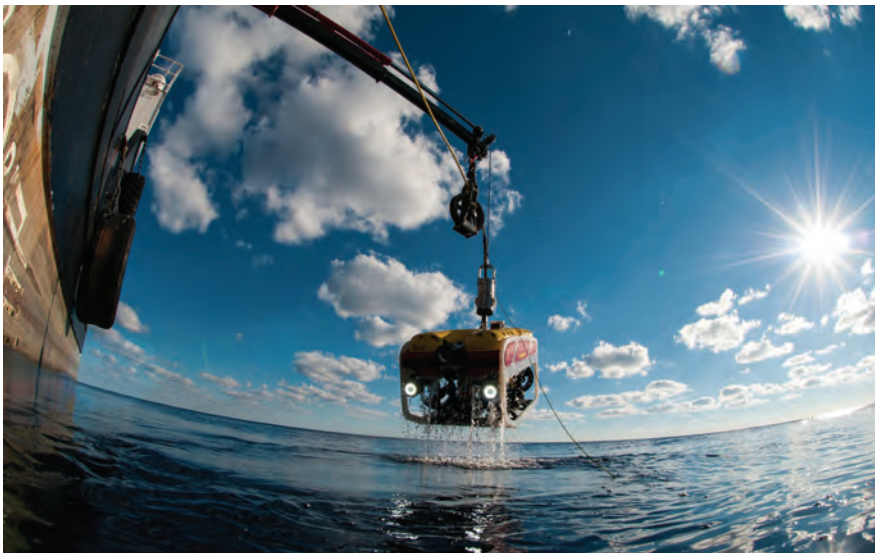
• **Principle Power** will install five 6-MW direct-drive wind turbines approximately 18 miles off the coast of Coos Bay, Oregon. The U.S.-developed WindFloat semi-submersible floating foundation will be installed in water more than 1,000 ft. deep, demonstrating an innovative solution for deep water wind turbine projects and lowering costs by simplifying installation and eliminating the need for highly specialized ships.

• **Dominion Virginia Power** will install two 6-MW direct-drive wind turbines 26 miles off the coast of Virginia Beach, using a U.S.-designed twisted jacket foundation. Dominion's project will demonstrate installation, operation and maintenance methods for wind turbines located far from shore. Additionally, the Dominion project will install and test a hurricane-resilient design to ensure that offshore wind facilities placed in hurricane-prone U.S. waters are reliable, safe, and cost-effective.

Meridian Adds Two Saab Seaeye ROVs

Meridian Ocean Services added two Saab Seaeye Lynx ROVs to its Falcon fleet to undertake a wider range of deeper inspection tasks at short notice. The company has already won a niche in the market for undertaking fast response assignments in the offshore fields of America, Trinidad and Mexico.

Nat Spencer, Meridian's Principal and Director of Business Development, explains that the Lynx, with its TMS and enhanced operating features, will expand the company's range of inspection roles in deeper platform work, around buoys, artificial reefs and for cleaning and diver support. He said the Falcons are already deployed on a range of these tasks, which include monitoring fish populations around artificial reefs created by rigs. Here the Falcons film and record the effect on local fish when invasive species are introduced that follow rigs when moved from one location to another.



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AAE-1 Cable System Comes into Force

The AAE-1 Consortium, owners of the Asia-Africa-Europe-1 submarine cable spanning approximately 25,000 km connecting Asia, Middle East, Africa and Europe; and TE SubCom, a TE Connectivity Ltd. company and an industry pioneer in undersea communications technology, announced that the contract for the majority of segments of the AAE-1 system has come into force. AAE-1 will link Asia, the Middle East, Africa and Europe with low latency, high capacity transmission. Each trunk fiber-pair in AAE-1 segments supplied by TE SubCom has a cross-sectional capacity of minimum 80 x 100Gbps and each branch is implemented with optical add/drop multiplexing (OADM) nodes containing TE SubCom's industry leading OADM wavelength re-use technology. When completed, the AAE-1 system will connect landings in Hong Kong SAR, (China), Vietnam, Cambodia, Kuala Kurau (Malaysia), Satun (Thailand), Mumbai (India), Karachi (Pakistan), Al Bustan (Oman), Fujairah (UAE), Doha (Qatar), Aden (Yemen), Djibouti, Jeddah (Kingdom of Saudi Arabia), Zafarana and Abu Talat (Egypt), Chania (Greece), Marseille (France), plus other landings under development.

AAE-1 will deploy 100Gbps technology with wavelength add/drop branching units along the lowest latency route with design capacity of over 40 terabits. AAE-1 is one of the largest cable systems launched and will stimulate an exponential business growth in participating countries by providing robust, reliable and lowest latency connectivity.

UDT 2014 Set for Liverpool

June 10-12, 2014-05-02

"UDT is a key event for us in this year's exhibition calendar, drawing together global customers and suppliers involved in undersea defence technologies," said Iain Kennedy, Strategy Director at QinetiQ. "The opportunity to network and arrange multiple meetings in one place is extremely valuable to us."

His thoughts were echoed by Richard Morgan, Managing Director at DSG Technology: "UDT is an excellent event, focused and well organized … UDT is always the first event in our diary and we look forward to another successful exhibition and conference this year.". Similarly Jan Gogstad Thorsen, Marketing Manager Submarine Systems at Kongsberg Defense & Aerospace AS had nothing but praise for the show:"We have always considered the event to be the right place for promotion of all our underwater products. The combination of the Conference and the Exhibition has shown to be a good way of attracting the right people from the worldwide underwater community."

The strength of these testimonials is part of the reason why Undersea Defence Technology (UDT) will celebrate its 26th anniversary from June 10-12, 2014, at the ACC Liverpool. The underwater defence and security event has traditionally brought together senior military officials, preeminent academics and key industry decision makers to focus upon innovative developments in the undersea sector. 2014 is set to build upon this unique pedigree as the event welcomes a significant number of first-time exhibitors and takes part in the International Festival for Business.

This year's cohort of new exhibitors includes, but is not limited to; Analox, ASCA, Copper Alloys Ltd, Drumgrange, Fugro, Holland Hydraulics, QinetiQ, Seatechrim and Sensor Technology Ltd. They will join long-term supporters of the show such as; Atlas Electronik, Babcock International Group, BAE Systems, Bartington Instruments, Cassidian Optronics, DCNS, EdgeTech, INDAL Technologies, Kongsberg Defence Systems, Lockheed Martin, Saab Dynamics and many more. Consequently the exhibition floor will feature a comprehensive display of thought-leading concepts and technologies.

An example of the innovation on display will be present at the Cassidian Optronics stand.

This year the company will showcase a number of products from its marine product portfolio, including some of its latest periscope and optronic mast systems (OMS). The company will exhibit examples from its two periscope families – the SERO 250 and the SERO 400; its latest innovation, the OMS 200, will also be on display. The product uses newly developed passive sensors to improve surveillance capabilities. The optronic mast also features optimised stealth characteristics on account of its integrated and compact design. Consequently the OMS 200 provides a single system with which to carry out the attack and reconnaissance tasks previously assigned to separate systems.

Meanwhile EdgeTech will showcase recent advances within its smaller-sized AUV system portfolio. Alongside a number of other products, the company will field the 2205 AUV-based sonar system.

The 2205's classification frequency of 1,600 kHz is capable of producing images of photographic quality, making MLO target classification trouble-free. It also requires a relatively low operational power input; drastically reducing the mass of electronics compared to legacy systems, whilst compressing the size of transducers. The result is a system that costs less to operate in the long-run, requires less maintenance relative to other products and offers rapid sensor integration.

RTsys will showcase its AS3I Analog Surface Ship Sonar Improvement, which improves current sonar performances and usability without the need to replace the Hull Mounted and/or Variable Depth Sonar, whilst Teledyne RD Instruments will launch two new Doppler Velocity Log (DVL) product lines – Pathfinder and Pioneer.

"In conjunction with the exhibition, UDT's engaging conference program will provide the annual symposium for the undersea defence community," said Event Director Anna Campagnoli. "This year's overall conference theme of Autonomy has been specifically chosen to explore the advances in autonomous and semi-autonomous operations of both manned submarines and unmanned platforms; reflecting the most recent technological developments to affect underwater operations and improve cost-effectiveness".

"The event will attract high-caliber stakeholders associated with the undersea community. Philip Dunne MP, Minister for Defense Equipment, Support and Technology, will be giving this year's keynote address and his presence symbolises the fact that the U.K. Government has delivered an unprecedented level of support for UDT 2014. Consequently I have no doubt that this year will be the most successful edition of the event to date".

UDT 2014 takes place from June 10-12, 2014, at the ACC Liverpool.

https://www.udt-global.com

UDT 2014 Exhibitor List

Company Name	Stand #
ACSA - Alcen Group	A51
Aish Technologies Ltd	C14
Ametek SCP Inc	A65
Analox	D11
Applied Acoustic Engineering Ltd, UK	D54
Atlas Elektronik UK Ltd	A30
Babcock International Group	A40
BAE Systems	A52
Bartington Instruments Ltd	A55
Blueprint Subsea	D20
BMT Defence Services	C54
CASSIDIAN OPTRONICS GmbH	A34
COFI	A1
Copper Alloys Limited	C12
DCNS	B20
DGA	D48
Divex Ltd	B1
Drumgrange Ltd	A70
DSG Technology AS	D21
DSIT Solutions Ltd	C34
EdgeTech	A25
EvoLogics GmbH	C40
FSSL Robotic Technologies	D14
Hale Hamilton	B71
Holland Composites BV	C22
Holland Hydraulics	C10
Imtech Marine Netherlands	C60
Indal Technologies	B3
James Fisher Defence Sweden AB	B1
KONGSBERG	C61
L-3 CALZONI	D55
Lockheed Martin	A43

Company Name	Stand #
MacTaggart Scott and Co Ltd	C71
Marine Innovation Centre with Plymouth University	B19
MEDAV GmbH	D44
Mikel Inc	A61
Morgan Technical Ceramics	A19
Norbit US Ltd	C10
QinetiQ	A2
Rolls-Royce	A11
Rotinor Gmbh	C44
RTsys	D23
Saab Dynamics AB	A50
SAB Georg Schuenemann	C50
SEA(Group) Ltd	A15
SeaBotix	C73
SEATECHRIM	C26
SeeByte	C30
Sensor Technology Ltd	D13
Shipham Valves	A71
Subsalve USA Corporation	B12
Survitec Group Ltd	D58
Systems Sunlight S A	A32
Teledyne Gavia	D32
Teledyne RD Instruments	D32
TNO Defence, Safety and Security	C60
TODS Defence Ltd	C28
Trelleborg AEM	B2
Truflo Marine	B70
UDT 2015	
Ultra Electronics Sonar Systems	B60
Valeport	C20
VideoRay LLC	D30

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21	Evans Capacitor Co.	www.evanscap.com/deepwater_products.html	(401) 435-3555
C3	EvoLogics GmbH	www.evologics.de	49 30 4679 862 0
19	Fischer Connectors SA	www.fischerconnectors.com	41 21 800 95 95
C4	Forum Energy Technologies	www.f-e-t.com/subsea	Please visit us online
3	Geometrics Inc.	www.geometrics.com	(408) 954-0522
11	Hydroid	www.hydroid.com	(508) 563-6565
37	Hydro-Lek Ltd	www.hydro-lek.com	+44 (0) 118 9736903
39	JW Fishers Mfg Inc.	www.jwfishers.com	(508) 822-7330
25	Kraken Sonar Systems, Inc.	www.krakensonar.com	Please visit us online
1	Louisiana Cat	www.LouisianaCat.com	(866) 843-7440
45	Mar Inc/Ohmsett	www.ohmsett.com/mtr.html	(732) 866-7183
15	Marine Sonic Technology, Ltd.	www.marinesonic.com	(804) 693-9602
7	OCEANS 2014 MTS/IEEE	www.oceans14mtsieeestjohns.org	Please visit us online
38	OceanServer Technology, Inc.	www.ocean-server.com	(508) 678-0550
27	Pacific Crest	www.PacificCrest.com/marine	Please visit us online
17	RBR	www.rbr-global.com	Please visit us online
29	SBG Systems	www.sbg-systems.com	Please visit us online
5	SeaBotix Inc.	www.SeaBotix.com	(619) 450-4000
9	Seacon Europe LTD	www.seaconworldwide.com	011 44 149 365 2733
49	Seco Seals, Inc.	www.secoseals.com	(714) 546-3478
11	Shark Marine Technologies Inc	www.sharkmarine.com	(905) 687-6672
43	Specialty Devices, Inc.	www.specialtydevices.com	(972) 429-7240
43	Subsalve USA Corporation	www.subsalve.com	(401) 884-8801
47	Teledyne Blueview	www.blueview.com	(206) 545-7260
23	Teledyne Marine Interconnect Solutions	www.teledynemis.com	Please visit us online
35	Teledyne Marine Systems	www.teledynemarinesystems.com	Please visit us online
27	Trimble	www.Trimble.com/BD982	Please visit us online
13	Valeport Limited	www.valeport.co.uk	44(0) 1803869292
C2	VideoRay LLC	www.videoray.com	(610) 458-3000

MARINE TECHNOLOGY REPORTER

2014 Editorial Calendar

ISSUE	EDITORIAL	BONUS DISTRIBUTION	AD CLOSE
JANUARY/ FEBRUARY	**Subsea Vehicles: UUVs** **Market:** Harsh Environment Systems: Arctic Ops **Tech:** Scientific Deck Machinery **Product:** Training Resources	**Arctic Technology Conference** Feb. 10-12, Houston **Subsea Tieback** March 4-6, San Antonio	January 21
MARCH	**Instrumentation: Measurement, Process & Analysis** **Market:** Oceanology Intl '14 Technology Spotlight **Tech:** Umbilicals, Cables, Connectors & Power Supply **Product:** Sonar Systems & Seafloor Mapping	**Oceanology International** March 11-13, London	February 18
APRIL	**Offshore Energy** **Market:** Seismic Vessels & Systems **Tech:** Deepwater Positioning, Mooring & Anchoring **Product:** Subsea Pipeline Survey & Inspection	**Offshore Technology Conference** May 5-8, Houston **AUVSI 2014** May 12-15, Orlando	March 27
MAY	**AUV Operations** **Market:** Offshore Renewable Energy: Wind, Wave & Tide **Tech:** Salvage & Recovery **Product:** Remote Sensing & Environmental Monitoring	**Energy Ocean International** June 3-5, Atlantic City	April 24
JUNE	**Hydrographic Survey** **Market:** Comms, Telemetry & Data Processing **Tech:** GPS, Gyro Compasses & MEMS Motion Tracking **Product:** Underwater Imaging: Lights, Cameras, Sonar		May 27
JULY/ AUGUST	**MTR100** Annual Listing of 100 Leading Subsea Companies **Special Report:** Oceans 2014 Preview **Region Focus:** Newfoundland and Labrador, Canada		July 21
SEPTEMBER	**Ocean Observation: Gliders, Buoys & Sub-Surface Networks** **Market:** Research Vessels **Tech:** ROV Tech: Workclass to Micro Systems **Product:** Geospacial Software Systems for Hydrography	**Oceans 2014** Sept. 14-19, St. John's, Newfoundland and Labrador, Canada	August 21
OCTOBER	**Subsea Defense** **Market:** Oil Spill Monitoring & Tracking **Tech:** Seafloor Engineering & Remote Operations **Product:** Fiber Optic and Electrical Connectors	**Clean Gulf** Dec. 2-4, San Antonio	September 25
NOVEMBER/ DECEMBER	**Fresh Water Monitoring & Senors** **Market:** Subea Engineering & Construction **Tech:** Offshore Inspection, Maintenance & Repair (IMR) **Product:** Commercial Diving: Lights, Cameras, Helmets	**Underwater Intervention 2015** New Orleans	November 26

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