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2017



SOUNDS OF THE SEA

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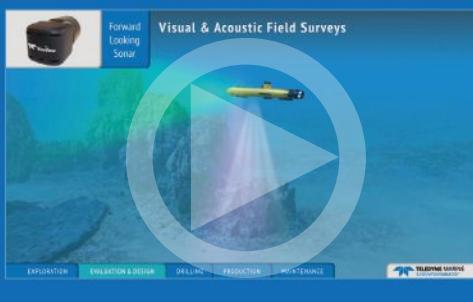


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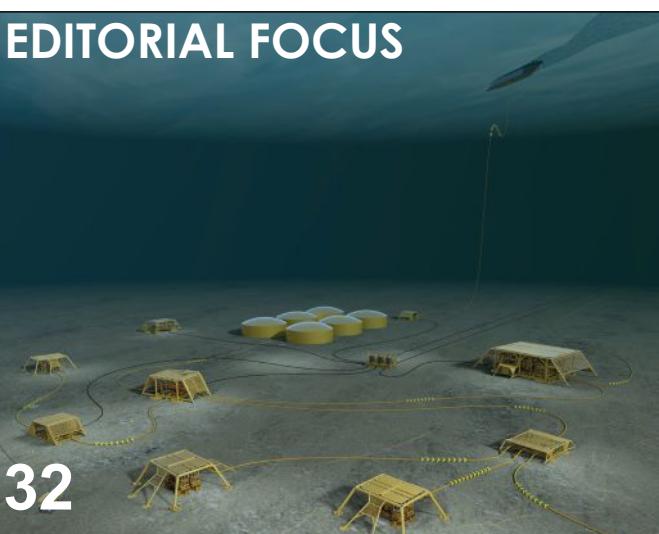
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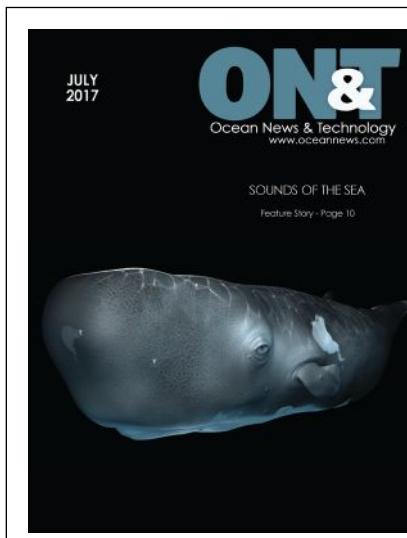
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Animation of a sperm whale.

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Rhonda J. Moniz
Editor, ON&T Magazine

Going Digital: Immersing Readers in the Marine Environment

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Digital editions are easy to distribute and are video and animation friendly. We can insert video clips, interviews, and tutorials as well as audio clips. As we all know more and more people are using mobile devices on an everyday basis. Readers are less passive end-users and expect interaction in their everyday readings. Today's reader is busy commenting, liking and sharing video and sound clips or eye-catching animations.

According to the MPA report from The Association of Magazine Media, statistics show that:

- 91% of adults in America read magazine media. 94% of adults under 35 and 96% of adults under 25 have read magazines in the past six months.
- 80% of total respondents took some form of action after downloading the digital version of a magazine. This action was either visiting the magazine's website, social media sites, or recommended the magazine to someone.
- By 2017 it's predicted that 59% of Internet users will own a tablet.
- The biggest benefit of a digital edition subscription was reported as having access to multiple issues in one device (61%).
- 10% of tablet owners read digital magazines almost everyday. 13% of tablet users read digital magazines at least once per week. 17% of tablets users read digital magazines 1-3 times per month. 40% of tablet users read digital magazines once per month.

Ocean News & Technology is not going completely digital, but we will offer digital issues going forward. This is our first digital-only issue, which gives our readers a taste of what is to come! Beginning with this issue, we will emphasize our digital presence, not just in individual issues, but in all facets of digital media. We hope you enjoy.



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Spotted seal Tunu has been trained to participate in behavioral experiments at UC Santa Cruz. NICHOLAS W. COOPER

Courtesy, Prof. Collin Moore

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UC San Diego Launches Scripps Center for Marine Archaeology

Scripps Institution of Oceanography and the Department of Anthropology have recently joined efforts within the University of California San Diego to launch the Scripps Center for Marine Archaeology (SCMA).

Researchers with the Scripps Center for Marine Archaeology will conduct fieldwork at key underwater and coastal archaeological sites around the world, studying the influence of marine environments on human cultures ([View Video](#) and [Image Gallery](#)).



Photo credit: Scripps Institution of Oceanography.

For more than a century, Scripps Oceanography has been at the forefront of scientific exploration and discovery of the ocean, and for years there has been a demonstrated interest in opening a center focused on marine archaeology," said Scripps director Margaret Leinen. "The center will help advance marine archaeology as a field and, on a larger scale, will help scientists explore ways to better understand and protect our planet—a strategic initiative here at UC San Diego."

"As much as the marine environment influences human culture, it works the other way around, too—cultures influence their environments," said Carol Padden, dean of UC San Diego's Division of Social Sciences. "With social scientists and marine scientists working together in one center, we will be studying the relationship between society and the sea from both angles, increasing our knowledge of the past for a better future."



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The Scripps Center for Marine Archaeology was co-founded by Scripps geophysicist Walter Munk and former Institute of Geophysics and Planetary Physics Green Fellow Damien Leloup, who began his career aboard research vessels Calypso and Alcyone working with Jacques Cousteau. Munk and Leloup raised over \$400,000 in seed donations and secured approval to form the center in September 2015.

Following the groundwork laid out by Munk and Leloup, Scripps oceanographer John Hildebrand and Division of Social Sciences anthropologist Thomas Levy will be the first leaders of the center. SCMA also includes a number of collaborators and scientists from such disciplines as oceanography, marine technology, sedimentology, geomorphology, climate sciences, environmental sciences, anthropology, and archaeology.

"The goal is to integrate the expertise in various UC San Diego departments, like anthropology, with the expertise here at Scripps Institution of Oceanography that focuses on the ocean," said Hildebrand, co-director of SCMA. "By putting these two together, we have a really powerful force for studying both people on land that are using marine resources and also cultural resources that are now submerged."

"It all came together thanks to the vision of Walter Munk—and with his support, we got on a roll," said Levy, co-director of SCMA and director of the Center for Cyber-Archaeology and Sustainability at UC San

Diego's Qualcomm Institute. "It's really essential to do collaborative work between archaeologists and marine scientists. We have the best of both worlds here at UC San Diego, and it couldn't be better."

SCMA differentiates itself from other marine archaeology programs because it won't focus solely on shipwrecks, the domain of nautical archaeology. Rather it will explore human societies in coastal zones and adaptation processes to climate and environmental changes.

The researchers note that over the past 20,000 years there have been significant environmental changes, including warming of the planet and rising sea levels. By understanding the role of the oceans in past human cultural development, the scientists can put the present into a long-term context.

"The seashore that we explore, use, and experience today is not the same as in the past, so we can look at the past to understand and improve our solutions to the present problems that we are facing with climate change," said environmental archaeologist Isabel Rivera-Collazo, an SCMA collaborator.

Rivera-Collazo is a recent joint hire at UC San Diego, where she serves as an assistant professor at both Scripps Oceanography and the Department of Anthropology. Levy and Scripps geophysicist Lisa Tauxe initiated this new cross-campus position, which bridges Scripps and the Division of Social Sciences.



Photo credit: Scripps Institution of Oceanography.

Researchers with the new center will explore underwater sites through the use of traditional diving apparatuses as well as with innovative technologies such as remotely operated vehicles, seabed coring, and various sonars to help detect cultural remains on and beneath the seafloor.

SCMA investigators have already been involved in several expeditions, including Leloup's participation in the international Vietnam Maritime Archaeology Project (VMAP) led by Flinders University Maritime Archaeology Department in the spring of 2016 and a scientific expedition in Greece to study the Late Bronze Age collapse of the Mycenaean civilization led by Levy and Scripps paleobiologist Richard Norris in the summer of 2016.

Over the next two years, the center plans to launch a series of research projects in the eastern Mediterranean, southern Peru, Puerto Rico, Belize, and along the California coast.

Levy, holder of the Norma Kershaw Chair in the Archaeology of Ancient Israel and Neighboring Lands at UC San Diego explains: "One of the reasons we're especially interested in the Old World is because many of the developments of early civilizations occurred there, and it's a really hot area for research."

"There are hidden coastlines all around the world where civilizations and cultures flourished, and so that's the place that we want to sample when we do these studies."

- Thomas Levy, Social Sciences Anthropologist

The Scripps Center for Marine Archaeology envisions serving as the central research hub and institutional platform for students, faculty, and other researchers working on understanding the relationship between people and the sea as well as climate and environments worldwide. The center plans to share its discoveries through a state-of-the-art database and website, publications and peer-reviewed studies, press releases, and possibly through future exhibits at Birch Aquarium at Scripps.

"As we ramp up the Scripps Center for Marine Archaeology, we want to have public participation, and this will include seminars and workshops for people to come and get involved," said Hildebrand.

For more information, visit <http://scma.ucsd.edu/>.

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Researchers Return to Gulf of Mexico to Study Impacts of Oil Spill

The 2010 Deepwater Horizon accident in the Gulf of Mexico resulted in the deaths of 11 oil rig workers and ultimately the largest marine oil spill in history. As this environmental disaster recedes into history, researchers from institutions across the U.S. continue to study its enduring ecological impacts.

One of these research teams will embark on a 12-day expedition in the Gulf on 11 June to investigate the impacts of oil, methane and chemical dispersants on the deep-sea ecosystem—in particular deep-sea corals. Deep-sea corals are ecologically important and provide vital habitat for marine life, including commercially important species like shrimp, crab, and grouper.

The scientists are part of the University of Georgia-led Ecosystem Impacts of Oil and Gas to the Gulf research consortium, one of several research consortia supported by the Gulf of Mexico Research Initiative.

"Large oil and gas injections to an ecosystem, such as that resulting from the Deepwater Horizon accident,

cause both immediate and long-term impacts," said project director Samantha Joye, Athletic Association Professor in UGA's Franklin College of Arts and Sciences. "This upcoming research expedition is a critical component of ECOGIG's long-term monitoring program."

The team will send a remotely operated vehicle to depths of over 1,000 m and use high-resolution cameras mounted to capture hundreds of still images of corals they have been monitoring yearly since shortly after the spill in 2010. These photographic data will be collected and analyzed—along with images from prior expeditions—to document the spill's impacts and improve understanding of the mechanisms that influence coral recovery and survival.

"Continued monitoring is critical," said project co-leader Chuck Fisher of Pennsylvania State University. "After seven years, the 500-year-old corals are still recovering from the effects of the spill and their ultimate fate is still not known. A lot remains to be learned about these amazing and beautiful animals."



Samantha Joye, Athletic Association Professor, UGA's Franklin College of Arts and Sciences.

ECOGIG outreach and communication specialists aboard the ship during the “Jewels of the Gulf: Deepwater Expedition” will connect with the public in a variety of ways. A live ROV camera feed will be accessible throughout the expedition online at ecogig.org. Schoolchildren and summer campers across the United States will interact with scientists on board during live question-and-answer sessions, also in collaboration with Mission Blue, an interactive Facebook Live video hosted by Ocean Allison will be broadcast to a worldwide audience from the Gulf of Mexico. “The outreach component of this expedition is particularly exciting,” said Joye. “Communicating with kids and the public at large about the wonders of the Gulf’s deep-sea ecosys-

tems and the relevance of this research is important.”

Anyone can stay up to date on the research in real time by following along via ECOGIG’s Facebook, Twitter, and Instagram channels. Additional content, including educational videos, podcasts, and a documentary short film will become available after the expedition.

Institutions participating in this expedition include University of Georgia, Pennsylvania State University, Temple University, Lehigh University, and the U.S. Geological Survey.

For more information, visit www.ecogig.org.

Comments Sought on Proposals for Atlantic Geophysical Survey

NOAA Fisheries is seeking public comment on proposals under the Marine Mammal Protection Act that would allow companies that are proposing to conduct geophysical surveys in the Atlantic Ocean using seismic air guns to incidentally, but not intentionally, harass marine mammals.



Atlantic spotted dolphin. Photo credit: NOAA.

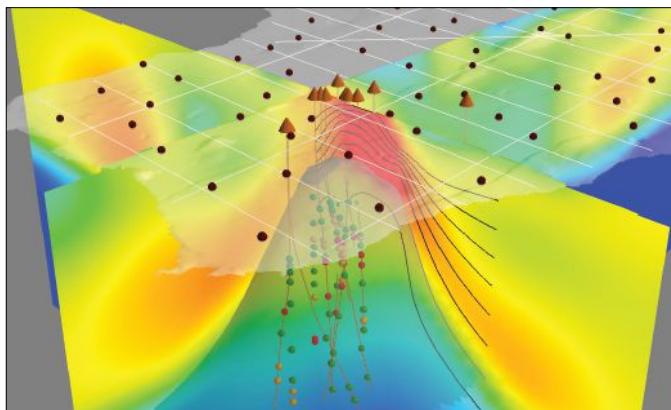
The agency is proposing to issue authorizations that prescribe monitoring, reporting, and mitigation measures to minimize the impacts of the surveys to marine mammals. NOAA Fisheries reviewed five separate requests from companies proposing to conduct geophysical surveys using seismic air gun arrays in the Atlantic Ocean. The Department of the Interior’s Bureau of Ocean Energy Management recently resumed its permitting process for geophysical surveys in the Atlantic Ocean under the Outer Continental Shelf Lands Act, and as a result NOAA Fisheries is now moving forward with the related proposed incidental harassment authorizations.

The proposed authorizations stipulate that any survey op-

eration use mitigation and monitoring measures in order to minimize harm to marine mammals, including:

- Observers on board seismic survey vessels to listen and watch for marine life and alert operators if a protected species comes within a certain distance;
- Operational restrictions designed to eliminate or reduce impacts to sensitive species in their preferred habitats;
- Acoustic monitoring to detect marine mammal vocalizations beneath the ocean surface;
- Gradual increases of seismic activity to alert animals in the area and reduce potential for exposure to intense noise;
- Required shutdowns when certain sensitive species or groups of animals are observed; and
- Survey vessel strike avoidance procedures.

The agency is accepting public comments for 30 days on the proposed authorizations until 7 July. Continuing this process is consistent with the goals of Presidential Executive Order 13795, Implementing an America-First Offshore Energy Strategy, which encourages energy exploration and production that fosters energy security and resilience for Americans while ensuring those activities are safe and environmentally responsible. NOAA Fisheries will use the best available information in considering the requirements of the Marine Mammal Protection Act relating to incidental take during proposed geophysical surveys in this region. The public comment period ensures interested stakeholders are able to provide information for consideration in NOAA Fisheries’ final determinations.



CGG Launches Multi-Physics Imaging

CGG's multi-physics business line has launched its Multi-Physics Imaging group, consolidating its recognized expertise in multi-physics data processing and interpretation, trusted technical consulting services, and specialized commercial software development into a single global team. As a complement to CGG's leading seismic subsurface imaging capabilities, Multi-Physics Imaging helps oil and gas, geothermal, and mining companies around the world gain a more complete understanding of the subsurface by optimizing the value of non-seismic geophysical data in their exploration workflows.

<http://ont.news/2rIYtU0>

Florida Institute of Oceanography Receives New Research Vessel

The R/V W.T. Hogarth—designed and engineered by Boksa Marine Design—was christened and launched on 23 May 2017. The 78-ft coastal class research vessel is the newest addition to the Florida Institute of Oceanography (FIO) fleet and will help continue the efforts of scientific education and discovery of FIO and its member institutions. “It’s an exciting day,” said Boksa Marine Design president, Nick Boksa. “She got her feet wet for the first time and floated perfectly on her lines.”

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MONTH IN REVIEW

BP Announces Major Breakthrough in Seismic Imaging

BP has identified more than 200 million barrels of additional resources at BP's Atlantis field in the deepwater Gulf of Mexico.

<http://ont.news/2r9burD>

Kongsberg Integrated Research Vessel Concept

Kongsberg Maritime and Fassmer Werft signed a contract following BSH's approval of Kongsberg to deliver the newbuild research vessel Atair II.

<http://ont.news/2s4VqX5>

Statoil Establishing a Digital Center of Excellence

Statoil is launching a roadmap with seven specific programs for digitalization in the company towards 2020 as well as a digital center of excellence.

<http://ont.news/2sbwais>

Texas A&M-Corpus Christi Testifies on Artificial Reef Success

Dr. Greg Stunz of the Harte Research Institute (HRI) to testify before Congress about the success of the Texas artificial reef program.

<http://ont.news/2smFH62>

WSU Researchers Find Wealth of Fish at Deep Hawaiian Reef

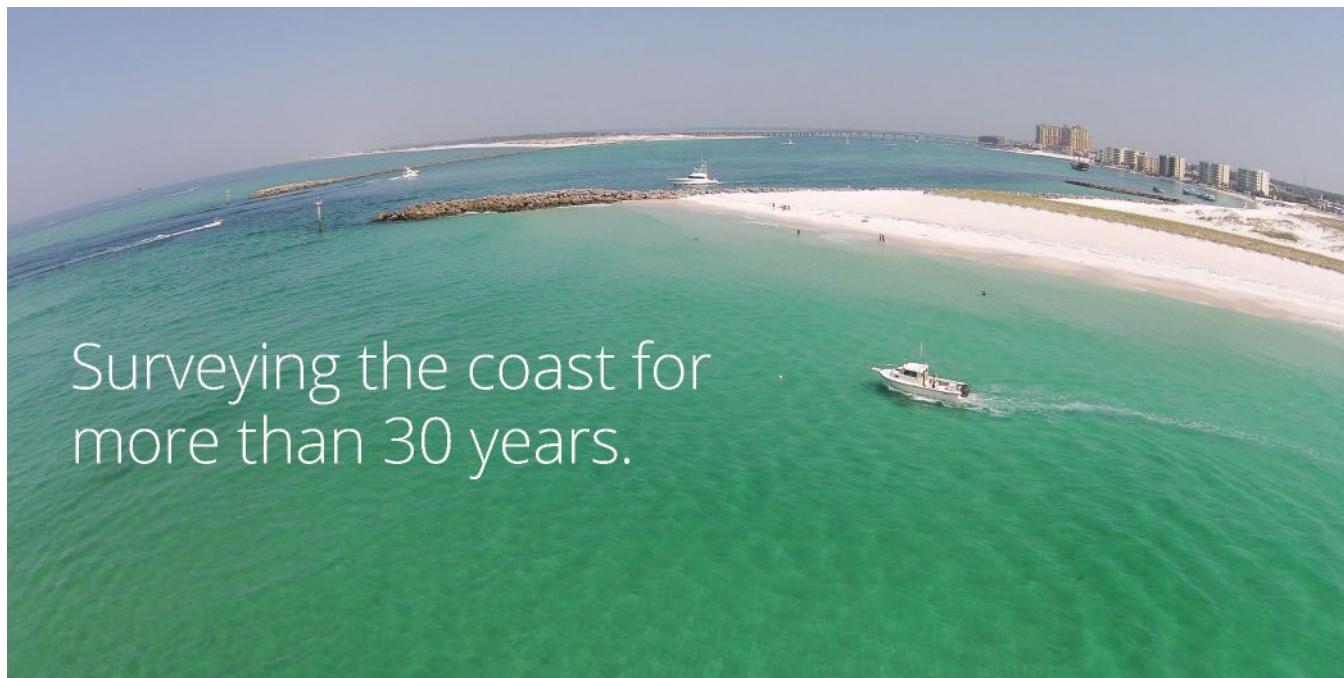
Washington State University marine biologists for the first time have documented a wealth of fish in the vastly underexplored deep coral reefs off Hawaii Island.

<http://ont.news/2smicKk>

MacArtney Supplies SubConn® Connectors for Deep Ocean Research

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Plastic Ocean

A Cleaner Future with Ocean Engineering



Photo credit: The Ocean Cleanup.



As Earth's natural hoarders, the world's five gyres have transformed the oceans' landscape from crystal blue waters to vast fields of plastic dispersed over millions of square kilometers. Over the last decade, the "ocean garbage patches" have brought attention to the plight of our plastic-covered world. But, the challenge of removing human waste from these large, remote zones is enormous, and conventional methods—vessels and nets—would take thousands of years and tens of billions of dollars. Founded in 2013, by the then 18-year-old Boyan Slat, The Ocean Cleanup has been developing innovative technologies as part of a mission to remove plastic from the world's oceans. After raising \$31.5 million in just four years, the latest design of the world's first passive clean-up system, built in collaboration with science and industry experts, has been announced. Now, at a fraction of the time and cost of conventional methods, half of the Great Pacific Garbage Patch could vanish in just five years' time, giving hope to a cleaner future for a delicate and fragile ecosystem already under pressure.

EDITORIAL FOCUS

Located between Hawaii and California, the Great Pacific Garbage Patch is the largest of the five global Garbage Patches. In May 2017, The Ocean Cleanup team unveiled the latest improved design that will enable the start of the extraction of plastic from the Great Pacific Garbage Patch within the next 12 months—two years ahead of schedule.

According to Ocean Conservancy, it has taken 20 years for over 6,000,000 volunteers to remove 116,000,000 lbs (53,000 metric tons) of debris across 211,460 mi of shoreline in 127 nations (1986-2008). According to The Ocean Cleanup, this new technology will remove the equivalent from the Great Pacific Garbage Patch in just two years, collecting 10 times more than all beach clean-ups combined.

In June 2016, they deployed a 100-m long barrier segment in the North Sea, 23 km off the coast of The Netherlands. It was the first time the initial concept was tested, and the pilot led to several fundamental

changes that have been incorporated into the new design revealed this May.

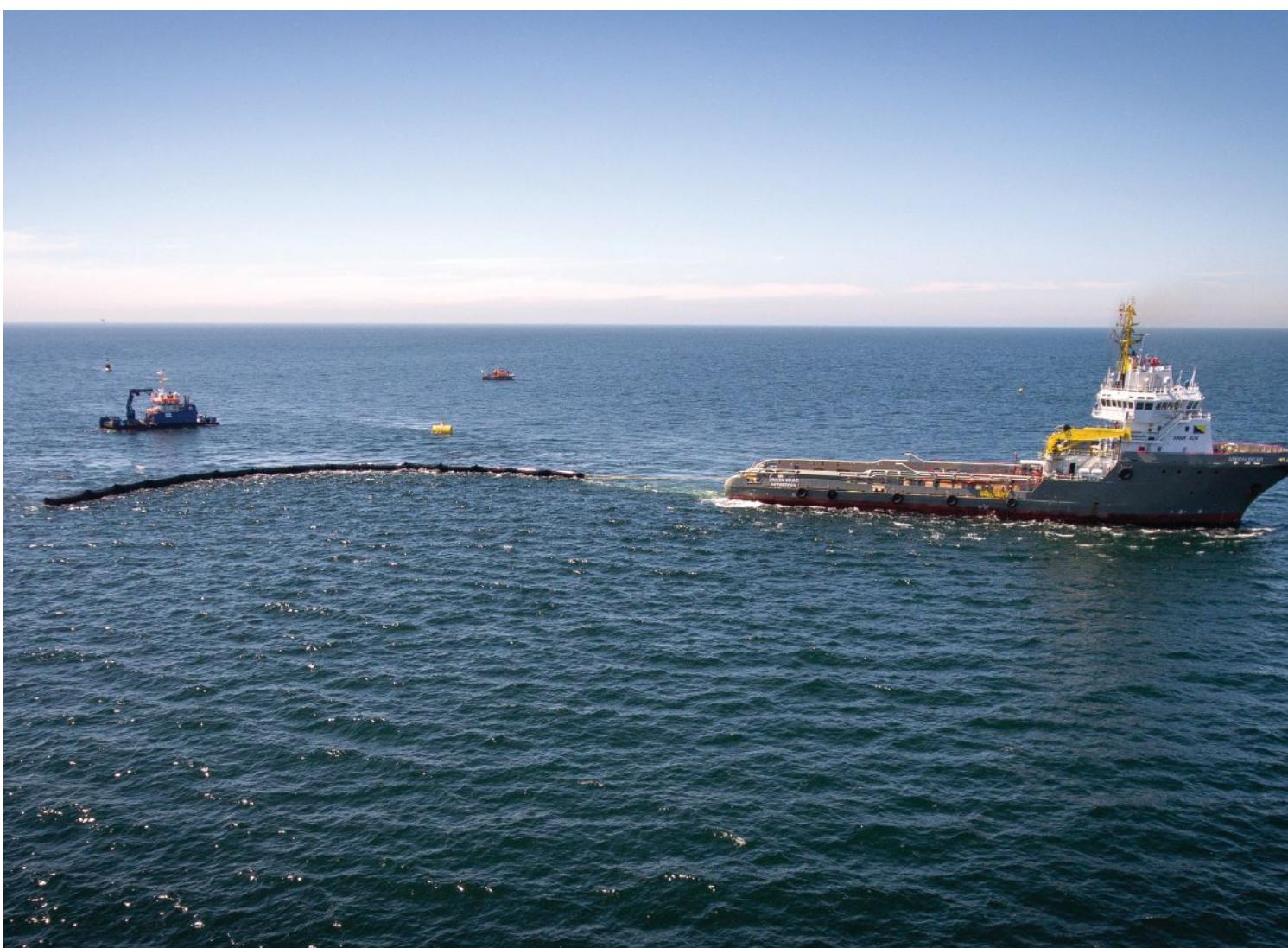
A representative of The Ocean Cleanup explains: “The system is in constant flux. The engineers continually test to ‘poke holes’ in the design and are constantly changing components such as materials, connections between the elements, and dimensions. But, the biggest visible change is the switch from a moored to a free-floating system. The idea came from experience in offshore engineering and deep-sea mooring—we knew that the more static a system needs to be, the higher the costs involved. We learned that changing the design has many advantages—along with reduced cost, there is a higher plastic capture efficiency and lower pressure on the barrier from wind, waves, and currents. We also knew that if we want to catch plastic, we need to act like plastic.”

Researching the forces of the mooring system in the water column, engineers came up with the idea to use

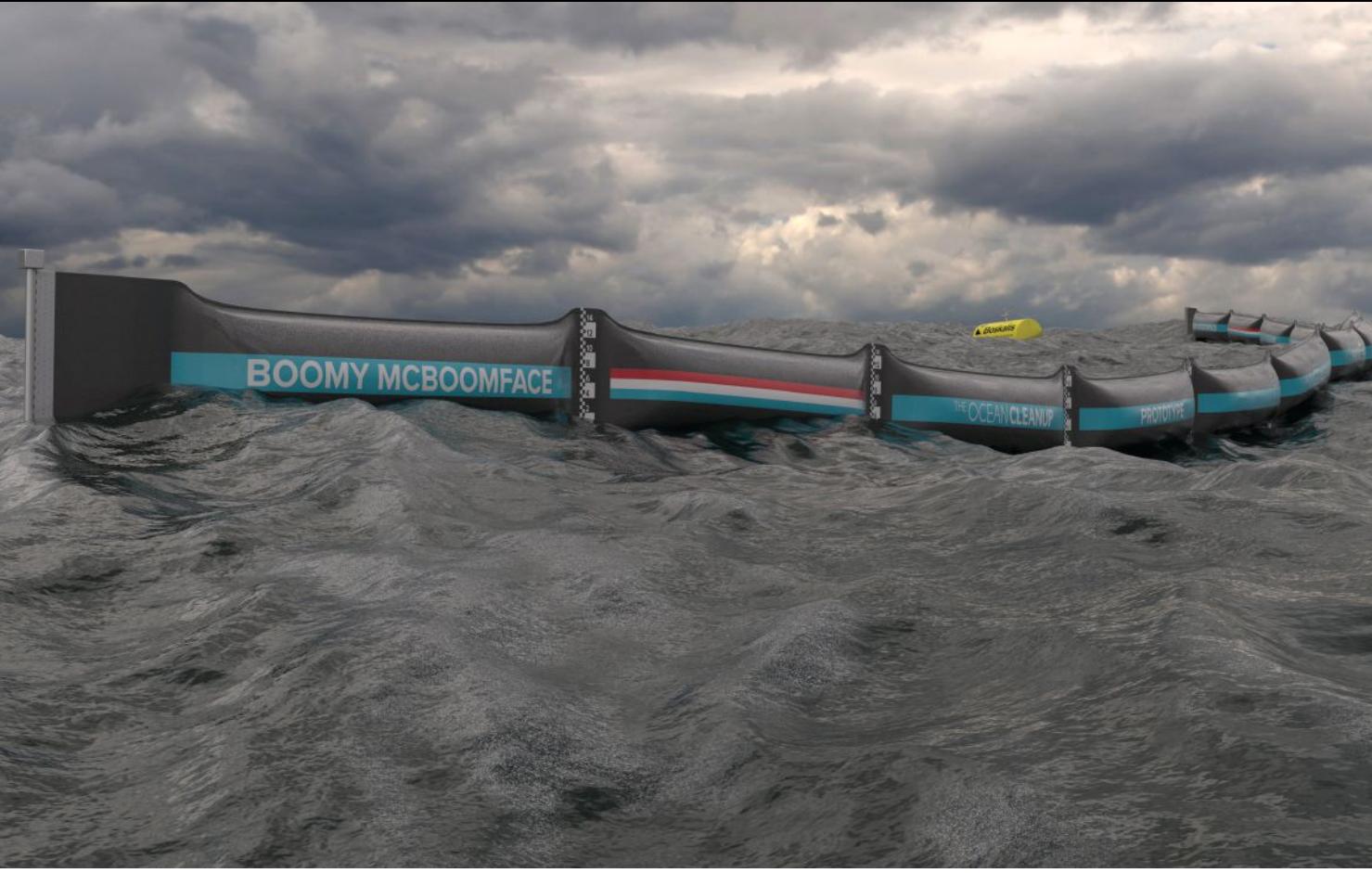
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Installation of the North Sea prototype, 23 June 2016. Photo credit: The Ocean Cleanup.



North Sea prototype. Photo credit: Erwin Zwart/The Ocean Cleanup.

the diminishing current speeds at deeper levels to the technology's advantage. This provided an opportunity to slow down the system versus the ocean's surface using sea anchors. By using sea anchors, the boom moves slower than the plastic while on the same route, increasing the capture efficiency.

The new design revealed this year includes a U-shape floater 1 to 2 km in length—a huge reduction in size from the original that stretched across 100 km. The floater will be a continuous hard-walled pipe made from high-density polyethylene (HDPE), an extremely durable and recyclable material. Instead of using nets, a solid screen will catch the sub-surface debris and allow sea life to pass underneath. The plastic will accumulate in the center of the U-shape floater, allowing vessels to easily collect and transport the debris back to land for recycling.

"From the North Sea prototype, we learned about the dynamic behavior of a barrier system in the open sea as well as the assembly, installation, and operation of such a system. We now believe the newest solution is a much more robust and efficient way of cleaning the oceans. It will not be perfect yet, but it will be a good starting point in the process of testing and improving the system in the Pacific."

By late 2017, The Ocean Cleanup aims to launch the first operational pilot system in Pacific waters. The upcoming pilot will represent the most significant milestone to the world's first ever full-scale clean-up of marine plastic pollution. The team will continue to address design challenges and further optimize the system over the coming months.

"The project is full of engineering challenges. Since we changed to the mobile system, we now face substantially fewer forces on the system compared to when it was static. But, the ocean is still a harsh environment, and the system remains large. It will be subject to constant wear and tear by water, currents, and sun exposure. So, all the parts and the connections holding the parts together need to be durable. For that reason, we also continuously try to keep the design as simple as possible, built up from as few parts and moving connections as we can. Besides this, the system, of course, needs to capture plastic efficiently. By reviewing all the options and continuing our testing, we can make the operation successful and bring the world a step closer to a less polluted ocean."

The Ocean Cleanup will also be researching environmental impact. By conducting field studies, they hope to reveal any unexpected effects on

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Ghost net aboard the Mega Expedition mothership R/V Ocean Starr. Photo credit: The Ocean Cleanup.



A selection of large objects observed in the Great Pacific Garbage Patch during the aerial expedition. Photo credit: The Ocean Cleanup.

include the accumulation of plankton, the “FAD” (Fish Aggregation Device) effect, and the interference with migration pathways of, for example, tuna and whales. As part of this research, an Environmental Impact Assessment Board has been established comprising internationally renowned professors.

A Cleaner Future for the World’s Oceans

After the pilot, the first fully operational clean-up system will be deployed in the Great Pacific Garbage Patch within the next 12 months. More systems will be gradually added, until reaching full-scale deployment by 2020.

“We will not be able to get every last gram of plastic out of the Great Pacific Garbage Patch, but calculations show we can remove 50% in just five years from deployment of our system. An 80% to 90% reduction should be possible by 2050. And, if the technology we are building is combined with source reduction initiatives, an even more significant drop of floating marine litter in the convergence zones of the oceans can be reached.”

As humanity begins its journey to reverse our damage on an already pressured ecosystem, it cannot be achieved without the support of science and industry. By developing innovative technologies to lessen the presence of human waste, the oceans’ natural landscape can slowly return along with the benefits that a healthier ecosystem offers.

“Taking care of the world’s ocean garbage problem is one of the largest environmental challenges humankind faces today. Millions of tons of plastic have entered the oceans, damaging ecosystems and entering the food chain. Although it is essential to prevent more plastic from entering the oceans, the plastic that’s already trapped in the oceans currents will not go away by itself. Although most of the plastic is large debris, UV radiation will break it down into smaller particles—particles that are much more dangerous to our environment. If we wait another few decades before we act, the number of microplastics will increase 50 times. By then, we would be in even more trouble.”

Aquaterra Sea Swift Platform Installed and Operating in Egypt

In a move that will open new opportunities for future cooperation in the region, Aquaterra Energy has designed, fabricated and installed a new Sea Swift platform for PICO Petroleum Integrated Services, the lead contractor for Amal Petroleum Company's (AMAPETCO) Amal field in the Gulf of Suez, offshore Egypt.

The Sea Swift is a Conductor Supported Platform (CSP) and is installed in 23 m water depth. It included a 385-

tonne topside featuring a helideck and emergency accommodation with provision for six ,form involved designing process, piping, electrical, instrumentation, control system, and technical safety scopes of work. The project also included the design of the new sub-sea production pipelines to the Amal-A platform. The project, which took 18 months from design to installation, involved building a bridge link to the neighbouring Amal-B platform and reconfiguring the topside pipework to create a new and improved production profile.



George Morrison, managing director of Aquaterra Energy, said: "The Sea Swift platform is an ideal solution for shallow-water field developments as it can be delivered from concept to completion quickly. This project will bring AMAPETCO significant cost and efficiency savings. Aquaterra also designed the new subsea production pipelines to the Amal-A platform. We are extremely proud to be working closely with PICO Petroleum Integrated Services, the independent Egyptian integrated services provider, to deliver this flagship project from design to delivery."

The Sea Swift platform is a modular system that unites the advantages of a platform with the rig-run benefits of a subsea development. Several Sea Swifts are currently in operation globally in shallow-water



locations in Asia Pacific and West Africa. The field-proven technology helps customers achieve reduced platform costs, lower installation and intervention costs, and simplified project management. It can also rapidly increase production from platforms constrained by existing slots, enabling wells to be drilled, completed with dry trees, and installed before the arrival of the main processing platform.

"The deployment of CSPs is increasing due to growing demand for modularised wellhead platforms which can be built and installed in smaller, discreet packages across a number of fabrication yards," added George Morrison. "The bespoke design also negates the need for diver or ROV involvement and any hot work which mitigates inherent risk and scheduling barriers, while cutting incremental costs. In addition, it can also potentially increase local content if this is an economic or political driver for the project."

Shady Kabel, managing director of PICO Petroleum Integrated Services, added: "Aquaterra Energy has designed, fabricated, and installed the Sea Swift platform in this shallow water field efficiently. The benefits of the CSP have contributed to invaluable project management expertise, which allows production from Amal-C to begin with confidence."

Active for nearly 40 years in the Egyptian petroleum industry, PICO Petroleum Integrated Services (a member of the independent Egyptian PICO Energy Services Group) is a leading Integrated Services provider in Egypt, North America, and Mexico. The PICO Energy Services Group delivers integrated technical solutions across the offshore and onshore oil and gas supply chain.

The Amal field is operated by AMAPETCO for its shareholders, The Egyptian General Petroleum Company, and Cheiron Amal Petroleum Corporation in Egypt's Gulf of Suez.

For more information, visit www.aquatteraenergy.com.

The Sea Swift was installed in 23 m water depth and, from design to installation, took 18 months to complete.

BP Starts Production from Quad 204 Project, West of Shetland

BP, on behalf of co-venturers Shell and Siccar Point Energy, announces first oil from the redeveloped Schiehallion Area, following completion of the multi-billion-pound Quad 204 project in the region west of Shetland, offshore UK.

Schiehallion and the adjacent Loyal fields were first developed in the mid-1990s and have produced nearly 400 million barrels of oil since production started in 1998. With the fields' redevelopment through the Quad 204 project, BP and co-venturers expect to unlock a further estimated 450 million barrels of resources, extending the life of the fields out to 2035 and beyond. Production from the project is expected to ramp up through the remainder of 2017 to a plateau level of 130,000 barrels of oil per day.

The project has included the construction and installation of the world's largest harsh water floating, production, storage, and offloading (FPSO) vessel - the 'Glen Lyon' - a major upgrade and replacement of subsea facilities and a continuous drilling program of up to 20 new wells to enable the full development of the reserves.

BP is planning to double its UK North Sea production to 200,000 barrels of oil equivalent a day (boe/d) by 2020 and sustain a material business in the region for several decades. Production from the new Clair Ridge major project is expected next year. Over the next 18 months, BP plans to participate in up to five exploration wells in the UK in addition to drilling approximately 50 development wells over the next 3 to 4 years.

Quad 204 is the third of seven Upstream major projects

BP expects to bring online in 2017, following the earlier start-ups of the Trinidad onshore compression project and the Taurus/Libra development of the West Nile Delta project in Egypt. New projects starting up through 2016 and 2017 are expected to deliver 500,000 boe/d net new production capacity for BP by the end of this year. With further projects beginning production through to the end of the decade, BP expects approximately 800,000 boe/d production from new projects by 2020.

Bob Dudley, BP Group chief executive, said, "The start of production from Quad 204—one of the largest recent investments in the UK—is an important milestone for BP, marking a return to growth for our North Sea business. As one of the series of important, higher-margin major projects that are now steadily coming on line for BP, it also underpins our expectation for growing production and cash flows from our Upstream business over the coming few years."

Mark Thomas, regional president for BP's North Sea business, said, "In safely delivering first oil from the Quad 204 project, we have succeeded in one of the largest-ever UK mid-life offshore redevelopments. BP has developed a strong track record of finding, developing, and operating big offshore oil resources west of Shetland - we have and will continue to use the latest technology to maximize recovery from the Schiehallion Area."

Since the Quad 204 project was sanctioned in 2011, over £2 billion of contracts have been awarded to UK companies.

For more information, visit www.bp.com.



Goliath Sets Sail to China for First Offshore Wind Project

DEME and COSCO Shipping, the largest shipping company in the world, are partnering in a unique joint venture to develop offshore wind energy in China. DEME's DP2 jack-up vessel Goliath will be deployed for the first offshore wind projects to be set up by the joint venture.

Goliath was loaded aboard COSCO's semi-submersible heavy-lift vessel *Kang Sheng Kou* in the port of Vlissingen. The vessel is setting course to COSCO's shipyard near Shanghai for some last modifications before embarking on the installation of the first offshore wind projects off the eastern coast of China.

The development of offshore wind energy is in line with the Chinese climate vision and strategy for the development of renewable energy, which are incorporated in the 13th five-year plan issued by China's central government for social and economic development. China targets a significant increase in the installed capacity of offshore wind energy by 2020.

Alain Bernard, director and CEO DEME Group, said, "With our extensive know-how in developing, building, and maintaining offshore wind farms, DEME can support COSCO Shipping's offshore wind ambitions to become a significant player in this market segment. As a pioneering company in offshore renewable energy, this is an excellent opportunity for export of DEME's experience gained on projects in Europe and our home market in Belgium."

Recently, DEME and COSCO Shipping also officially inaugurated the joint venture office in Guangzhou in China.

For more information, visit www.deme-group.com.





Carbon Trust-led JIP Selects Partners on Floating Wind Challenges

The studies have been commissioned through a joint industry project (JIP) between the Scottish Government and eight industry partners, including DONG Energy, ENGIE, Eolfi, E.ON, innogy, Kyuden Mirai Energy, Statoil, and Vattenfall. This marks the second phase of the JIP, which earlier in the year produced a review of the policy and regulatory needs for the sector. Three projects will be delivered under the second phase of the JIP, focusing on challenges for large-scale commercial deployments. Through a competitive tender process, the Carbon Trust and the industry partners have selected leading experts in each field to deliver the work, bringing expertise from sectors such as offshore wind, marine renewables, and offshore oil and gas.

<http://ont.news/2raJxvd>

Saipem and Eni Sign Offshore Drilling Contracts worth \$230 Million

Saipem and Eni have signed a 15-month contract commencing mid-2019 for offshore drilling activity in Mozambique, utilizing the drillship Saipem 12000 and including options for up to a maximum of 45 months, not included in the contract value. In addition to this contract, which will allow the company to participate in the development of the Coral field, Saipem has been awarded other offshore drilling contracts. The activities related to the other acquisitions will be executed in the Mediterranean and Black Seas and will utilize cutting-edge vessels from the company's fleet. The total value of these new contracts is \$230 million.

<http://ont.news/2riteAx>



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Australia's First Offshore Wind Farm Proposed for Gippsland

Australians are welcoming plans for the establishment of Australia's first offshore wind farm with up to 250 wind turbines within a 574-sq. km area off Gippsland, Victoria. The wind farm would deliver around 8,000 GW of electricity per year, approximately 18% of Victoria's power usage or enough to power 1.2 million homes. Victoria-based Offshore Energy has been working with the Victorian and Commonwealth Governments to progress the proposal to a formal feasibility assessment of the project called "Star of the South." If successful, the project would generate investment of around \$8 billion, create 12,000 jobs during the construction phase, and 300 ongoing operational and maintenance jobs.

<http://ont.news/2suaQVn>

BP and Reliance Industries to Expand Partnership

Reliance Industries Limited (RIL) and BP have announced that they are moving forward to develop already-discovered deep-water gas fields, bringing new gas production for India. The two companies have agreed to deepen and expand their partnership to work jointly throughout India's energy sector. Gas produced over the life of these three new projects could generate up to \$20 billion in import substitution (at current imported LNG prices) and employment for up to 20,000 skilled laborers during the construction period over the next 5 years.

<http://ont.news/2rz0Qu8>



MONTH IN REVIEW

Business Network for Offshore Wind on U.S. Withdrawal from Paris Accord

Business Network for Offshore Wind has issued a statement on the Trump Administration's decision to withdraw from the Paris climate accord.

<http://ont.news/2skJykn>

BP Trinidad & Tobago Discovers Gas Offshore Trinidad

BP Trinidad & Tobago (bpTT) announces that it has made two significant gas discoveries with the Savannah and Macadamia exploration wells, offshore Trinidad.

<http://ont.news/2rb3rGH>

Deepwater Production Begins at Newest FPSO in Santos Basin, Offshore Brazil

Royal Dutch Shell plc, through its subsidiary BG E&P Brasil Ltda. (Shell) and consortium partners in Lula South, announce that deepwater production has started.

<http://ont.news/2s2EmPu>

LOC Group Focuses on Offshore Renewables

LOC Group announces the creation of LOC Renewables, a focused team of consultants to bring the Group's capabilities to the offshore renewable energy sector.

<http://ont.news/2rirvwa>

Surge in Sales for Valeport's Tide Gauge Equipment

Sales of Valeport's tide gauge instrumentation rose 22% over the same period in 2016 and are significantly ahead of forecast.

<http://ont.news/2s38aeA>

Add Energy Awarded £1 Million Contract with BP in Egypt

Add Energy has been awarded a maintenance build contract worth more than £1 million with BP for work on West Nile Delta.

<http://ont.news/2rnCnTj>

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Deepwater Downturn Leads to Challenging Marine Construction Market

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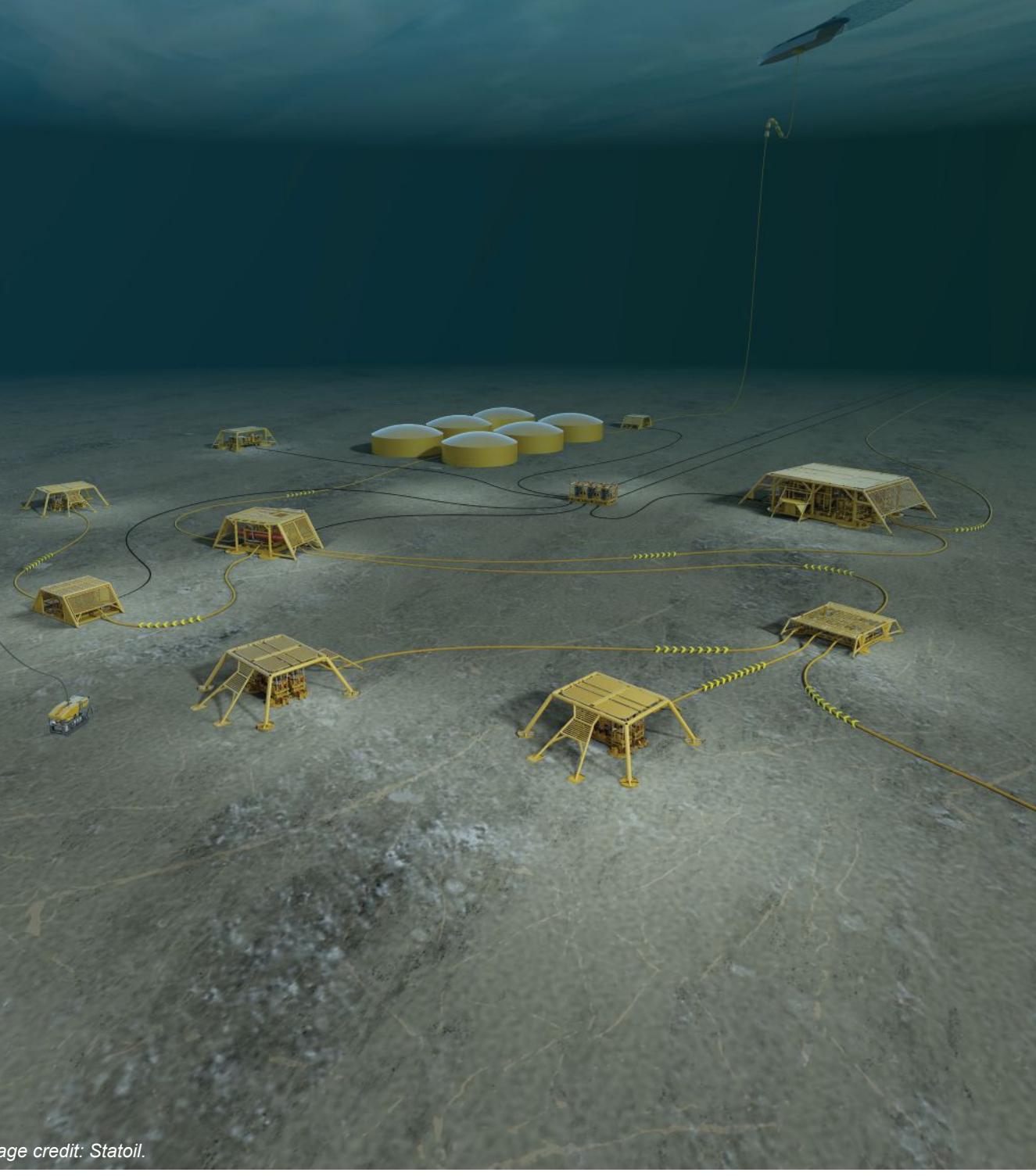


Image credit: Statoil.

New Oil Price Effects

The Upstream Supply Chain group at Wood Mackenzie has been closely following the repercussions of the past two years of depressed deepwater activity on operators, suppliers, and contractors. Ongoing adverse market conditions have incentivized operators to explore ways of making their prospective investments viable in the new oil price environment. As such, the industry is experiencing muted tender activity for deepwater installation services, which has left marine contractors dependent on their strong backlog that are now nearly exhausted (Figure 1). Decreased deepwater demand coupled with the increased supply of vessels in the offshore subsea construction market segment have led to lower utilization rates in a deteriorating market, even with contractors divesting and stacking assets.

The downturn has severely affected several subsea vessel contractors who have been forced into Chapter 11 bankruptcy, including the most recent filing of Emas Chiyoda Subsea. Cecon ASA, Ceona, Harkand, and Reef Subsea are all marine contracting companies who have filed for bankruptcy, and many of which have been dissolved. The Ceona Amazon was recently acquired by McDermott for an estimated \$52 million, which is a drastic discount compared to the \$350 million it cost to build in 2014. The diminishing backlogs of marine contractors led to reduced day rates in 2016 for deepwater installation assets—and as tender activity remains uncertain and at low levels, we expect these rates to fall even further in 2017.

Preferred Operator Relationships

Top tier contractors such as Technip, Saipem, and Subsea 7 have formed critical alliances and built preferred contractor relationships with operators, which has strengthened their

business during the ongoing downturn (Figure 2). Each of the three contractors has partnered or merged with a subsea equipment supplier, giving them the ability to design, develop, and provide integrated subsea development solutions. Technip and FMC Technologies have merged to form TechnipFMC, Subsea 7 and OneSubsea have partnered and formed a global alliance, and Saipem has partnered with Aker Solutions. As these contractors are working on the development of integrated SPS and SURF services, they have the opportunity through collaboration and the elimination of bottlenecks to establish better, more cost-effective ways to work together and with operators. There will be significant potential for integrated projects moving forward in the new lower for longer price environment.

There are many factors that drive operator's contracting strategies, including project location, complexity, and vessel preference; however, preferred contractor relationships play a large role. Based on the number of pipeline and umbilical project installation awards, Subsea 7 is the market share leader with 38% of the contracts from 2010 to 2017. Technip follows close behind with 36%. If you were to look at the same top 10 operators in Figure 2 but from a kilometre-of-pipeline-installed perspective, this graph would look different, with Allseas and Saipem having a larger share of the pie, given that a significant portion of their project portfolio includes installation of long export lines. Although operators now have the opportunity to contract one integrated contractor for subsea development solutions, these key relationships will still prove to be valuable when operators are considering project dynamics. We saw an example of this with ExxonMobil's Liza development where TechnipFMC was chosen for the subsea equipment supplier and Saipem as the installation contractor (Saipem is historically their preferred installation contractor).

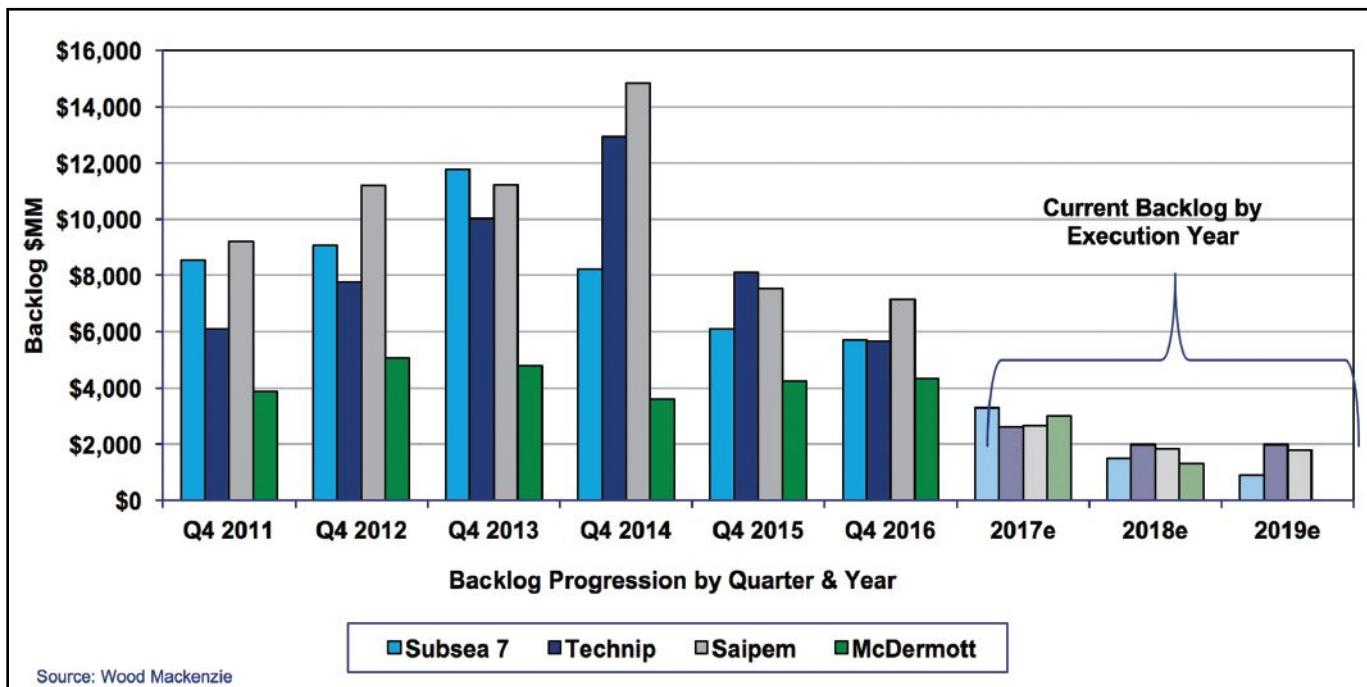


Figure 1. Tier One Marine Contractor Backlogs Q4 2011-2019e.

EDITORIAL FOCUS

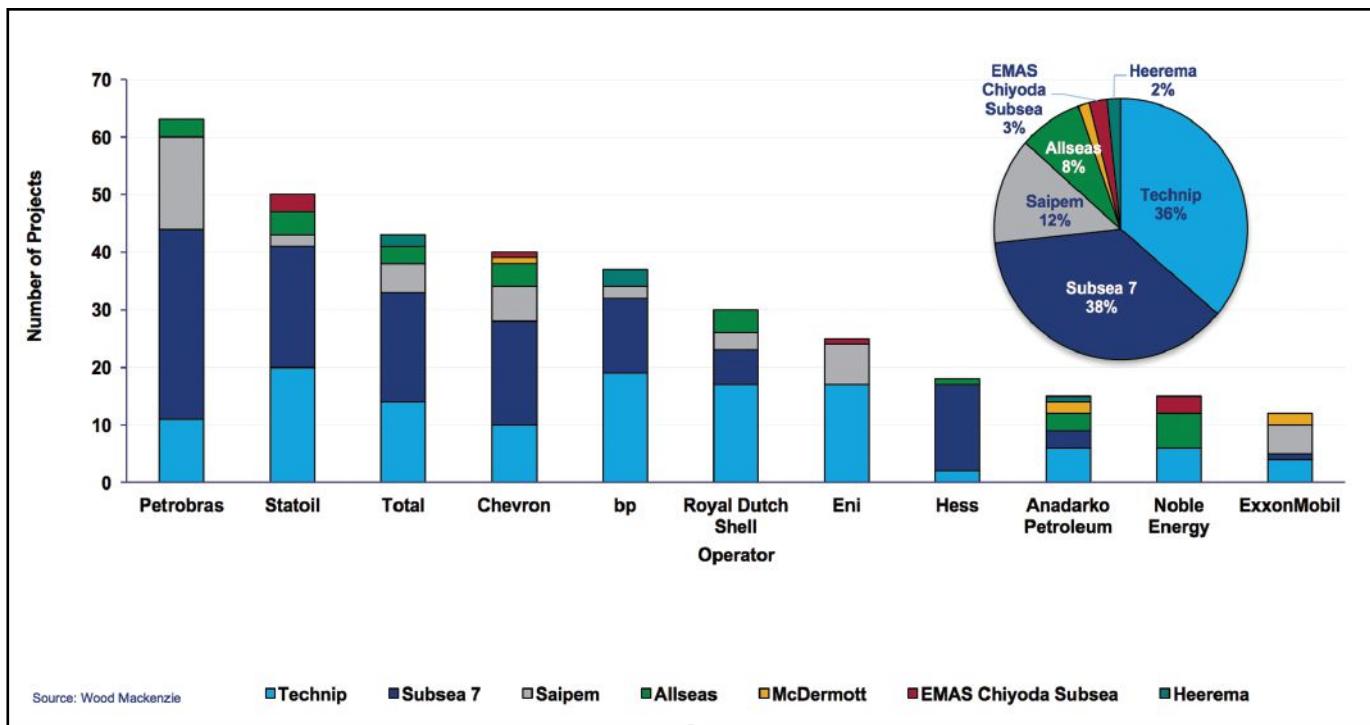
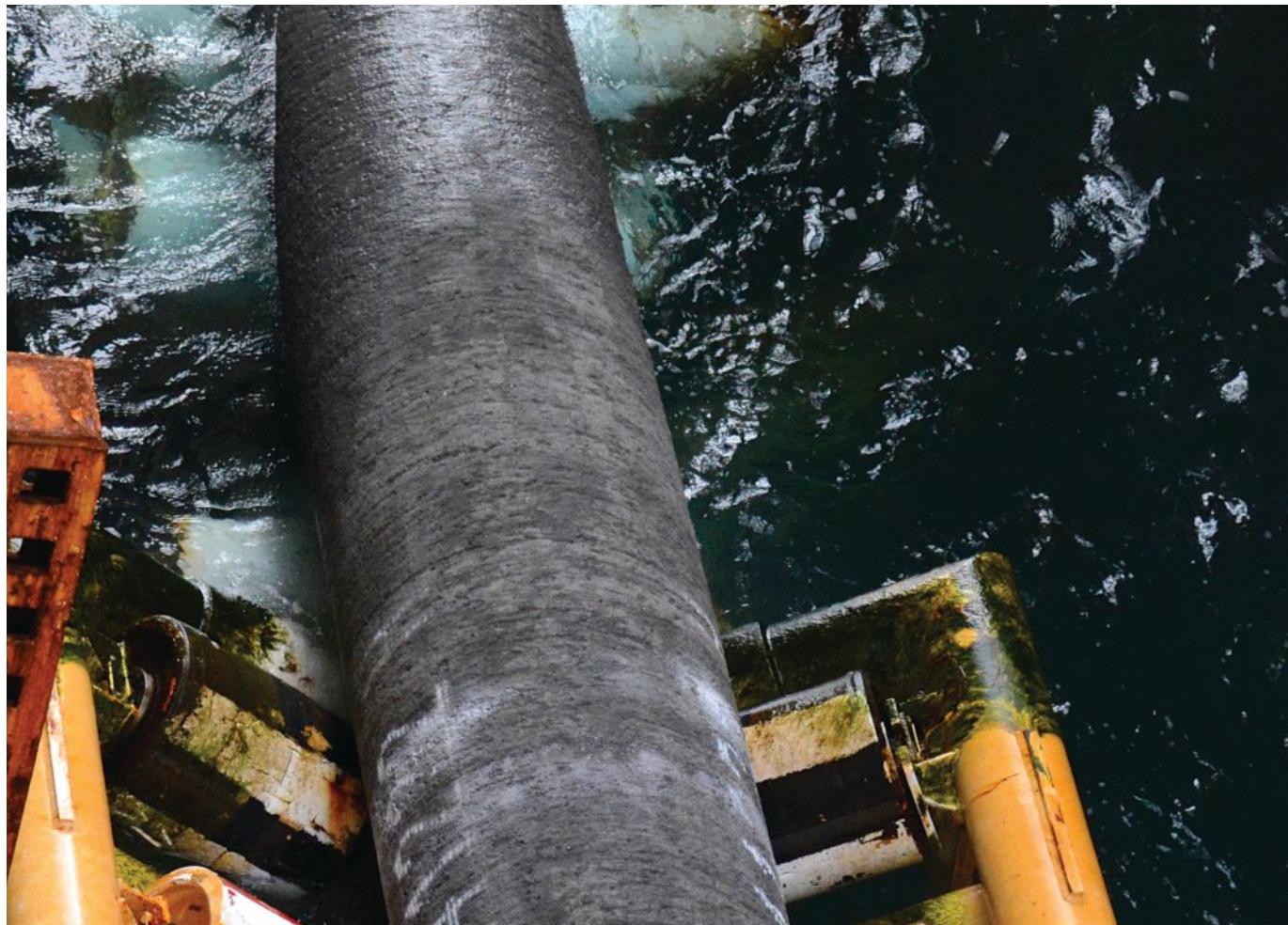


Figure 2. Top 11 Operators Preferred Supplier Relationships – Project Award Count 2010-2017.

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Solitaire pipe-laying vessel. Photo credit: Eva Sleire, Statoil.

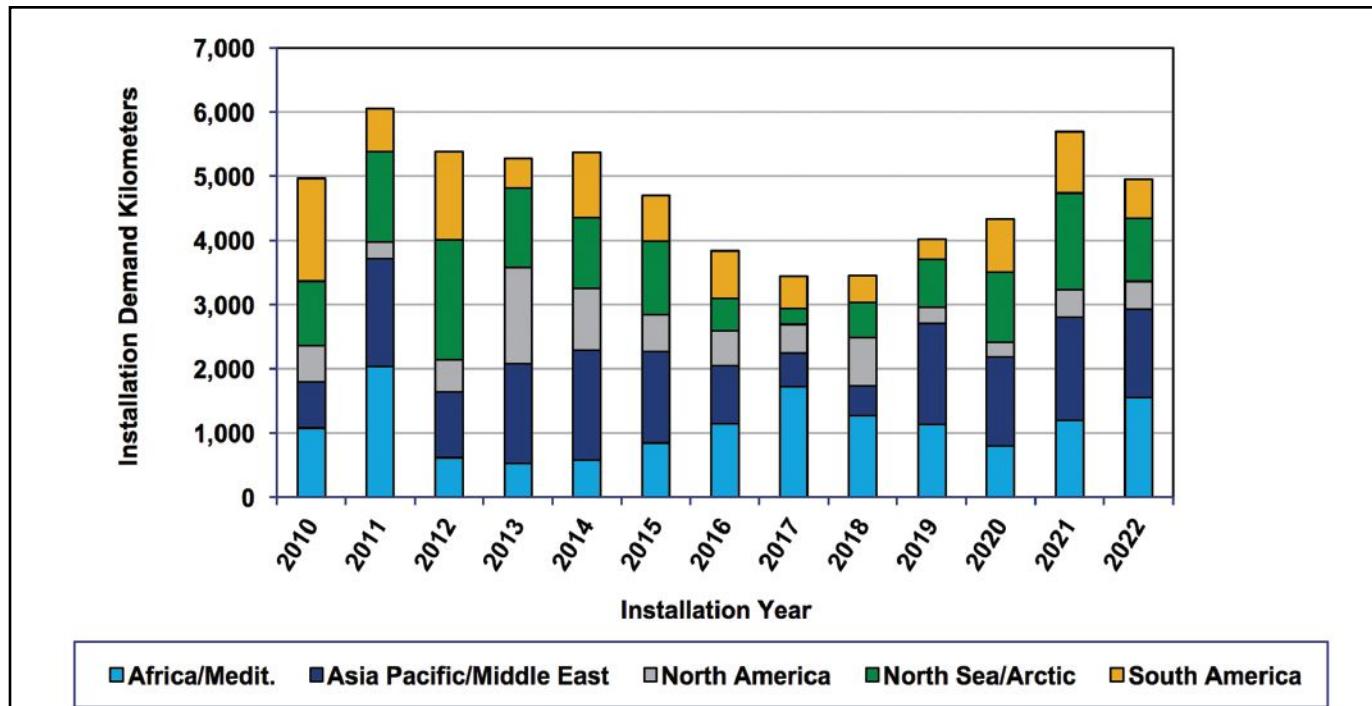


Figure 3. Regional Marine Construction Demand in Kilometres, 2010-2022.

Marine Contracting Demand Forecast

Despite the harsh market conditions, African installation activity has increased from historical levels with planned installation activities for Total's Kaombo Phase 1, BP's Shah Deniz Phase 2, and the Turkstream Pipeline Project occurring in 2017. Installation in offshore Egypt is expected to increase relative to history on the heels of Eni's Zohr and BP's West Nile Delta Phase 2, among others. The Turkstream Pipeline will provide a drastic increase in demand for the region, with Allseas performing installation services for the two pipeline strings representing about 930 km each. The region has attracted many of the industry's high-end installation assets, including Technip's Global 1200 and Deep Blue, Saipem's FDS and Castorone, Heerema's Balder, and several others.

Global trunkline and export installation activity will provide upswing for the forecast period, with awarded installations of Gazprom's Turkstream Pipeline Project in the Black Sea, Total's Kaombo Phase 1 in Angola, BP's Shah Deniz Phase 2 in the Caspian, BP's Trans Adriatic Pipeline in the Adriatic, Petrobras' Rota Marica Pipeline Project in Brazil, Gazprom's Nord Stream 2 in the Baltic Sea, and CFE's Sur De Texas Tuxpan transmission line in Mexico which is contributing to North America's demand in 2018.

Global installation demand will account for over 40,700 installation demand days forecasted for 2017 to 2022, with Africa, Asia, and South America being the largest contributors to demand for all OD categories (Figure 3). Although a great portion of installation demand is driven by new project development, there is also opportunity in IMR (inspection, maintenance, and repair) demand,

which encompasses a large variety of work on existing fields, ranging from visual inspection, testing, and the repair or replacement of components and pipeline infrastructure. The global subsea market has grown significantly over the past decade, leading to a growing installation base now exceeding 4,000 flowing subsea wells with accompanying pipeline infrastructure, providing opportunity for life of field activities. While operators navigate this new price environment and practice high levels of spending and discipline, IMR and workover activities can be economically beneficial and pay a return through increased production though market conditions remain challenging and timing of new awards to market remains uncertain.

While a slightly more optimistic outlook on deepwater FIDs in the coming years are a positive leading indicator for subsequent marine contracting, 2017 will likely mark the beginning of the trough for installation demand. Operators are working to increase efficiencies in their projects while suppliers and contractors work together to provide cost-saving subsea solutions. This collaborative effort within marine construction and across deepwater will be a significant driver to how strong we move out of this downturn into the next upcycle.

The analysis and insight provided in this piece are from our recently launched global upstream supply chain research team. Through acquisitions of Infield Systems and the Quest Offshore data & subscriptions business, Wood Mackenzie has created a strong, industry-leading foundation on which to build the comprehensive suite of upstream supply chain solutions and costs.



BETTER THAN NEW

Seanic's Engineered Solutions Group recently completed the refurbishment and upgrade of several Vertical Collet Connector Running Tools which were showing their age after 15 years of offshore service. Each structure weighed almost 20 kips and stood over 16-ft tall. Because they

interface with a vast number of subsea structures fitted with proprietary connections, it was important that the restoration of the mature hardware met current industry standards and that the refurbishment was to a level of quality equal to or greater than like-new condition.



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Deeper Towing Easy with DDW-1 Deep Dive Wing

One of the problems encountered when towing oceanographic instruments is the cable length required to get the equipment to the optimal depth. A typical ratio of cable length to tow depth is 4 to 1, which means 400 ft of cable is needed to tow at a depth of 100 ft.

Increase the tow speed, and even more cable is needed. To overcome this problem, a downrigger weight or depressor wing is commonly used. The advantage of the wing is that it operates on the principle of hydrodynamic depression rather than just weight to overcome the limitation of conventional downrigger systems.

When using a wing, the ratio of cable length to tow depth is cut in half which means the equipment can be towed at a depth of 100 ft using only 200 ft of cable. Advantages of using a wing are no big piles of cable on the boat deck, cost savings from buying shorter cables, and elimination of the need for a large, expensive cable-handling system.

In the past, many of these depressors were custom made to fit specific equipment. This meant the wings were expensive and had limited applications. JW Fishers saw the solution as a universal wing that could be used with any type of equipment and developed the DDW-1 deep dive wing. Now, universities, salvage companies, government agencies, and military units worldwide are using this wing to tow a variety of oceanographic equipment, including side-scan sonars, magnetometers, metal detectors, video systems, hydrophones, and more.

One company successfully using the DDW-1 is ADEDE in Belgium. They employ a team of highly specialized professionals equipped with the latest hardware available to locate and recover subsea unexploded ordnance (UXO) as well as conduct geophysical and archaeological surveys. A recent project involved the archaeological survey and search for UXO prior to installation of a windfarm off the coast of Germany. The area was extensively mined by both the Germans and Allies during the first and second World Wars. In WWII, the Allies had a bomber route running over the area, making it highly likely the space contained aerial bombs, unexploded anti-aircraft shells, and crash sites. Extensive side-scan and magnetometer surveys of the area were conducted, and the DDW-1 made it easier to tow the equipment at the required depth, reported geophysical surveyor Alexander Cattrysse.

The National Institute of Aquatic Resources is part of the Technical University of Denmark and is known as DTU Aqua. Their mission is to conduct research, provide information, educate, and contribute innovation to the field of aquatic resources management. DTU Aqua scientists strive to find the best approach to utilize the country's aquatic resources in a way that is ecologically sound and sustainable. They conduct research in a variety of areas, including oceanogra-



phy, ecosystem dynamics, fisheries management, and aquaculture. They employ many different types of observation technology in these operations. One tool is a towed hydrophone that can be used to gather data on the seabed and the acoustic sounds emitted by various marine creatures. To tow their array at greater depths with less cable, Fishers DDW-1 is being used, reports senior researcher Bjarne Stage.

Mikel Inc. is a high-tech company that does contract work for the U.S. Navy Undersea Warfare Center in Newport, Rhode Island. They are actively engaged in the research, design, development, and manufacture of advanced technology products, systems, and services for the Navy. Recently, the company acquired a DDW-1 deep dive wing to tow an experimental sonar array in deepwater testing in the Caribbean.

Over the past 30 years, Netherlands-based DUC Diving has grown from an inshore commercial diving company to a fully functional marine contractor and offshore construction services provider that operates globally. The company has diversified across a broad spectrum of industrial sectors, completing projects in offshore renewable energy, oil and gas construction, submarine cable installations, and salvage. To assist in these operations, DUC purchased a JW Fisher side-scan sonar and DDW-1 deep dive wing. "We are very pleased with the sonar's performance and support of Fishers team," says DUC Diving owner Henk Kapitein.

For more information, visit www.jwfishers.com.



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ATLAS North America Taking Orders for their Newest Side Scan Sonar

The newest and most advanced side scan sonar for AUVs is now proven and operational. Atlas North America's Scout Mk II Side Scan Sonar, the latest addition to the Marine Sonic Technology product line of sonars, is ready to satisfy the most stringent customer demands for high-resolution underwater imagery.

The Scout Mk II is the next evolutionary step in sonar technological advancement. It's the smallest, lightest, least power consuming and, yet quite possibly, the best value in a side scan sonar on the market today. This compact configuration returns precious payload space to the AUV designers while still rendering underwater images of up to 0.4 cm of resolution. The Scout Mk II includes transducers customized for each AUV, in frequencies from 300 to 1,800 kHz, single or simultaneous dual frequency sonar, an efficient mounting interface, and a 600-m depth rating as standard. It can be custom built to satisfy the deepest water-depth requirements. The Scout Mk II covers the spectrum.

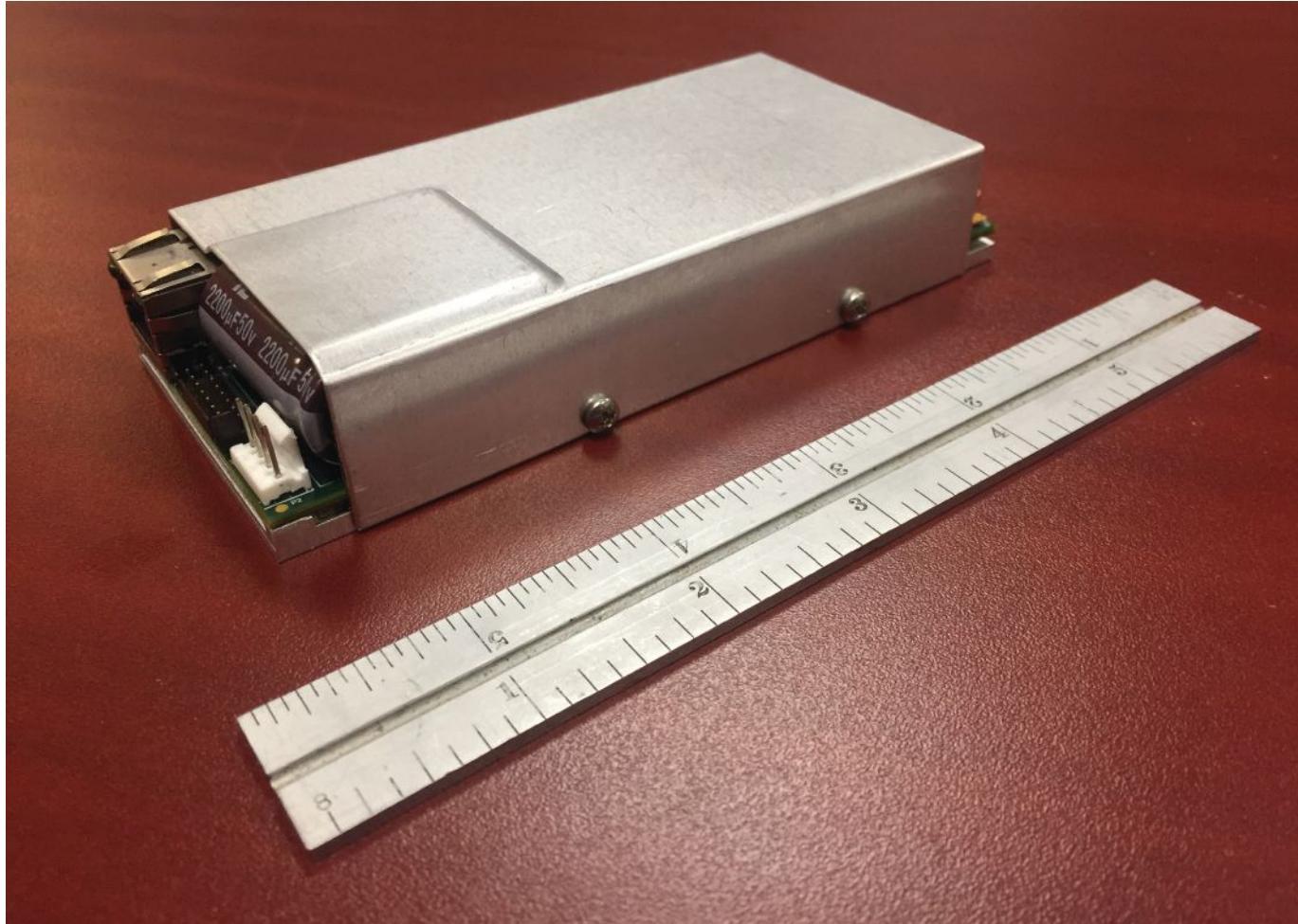
"The Scout Mk II leverages the compact design of the Scout Lite sonar and offers a modular, versatile, and

affordable sonar which, with its small size, is easy to integrate into any AUV," said Sergio Diehl, president of ATLAS North America.

The Scout Mk II is a great addition to the Marine Sonic Technology product line of sonars, which are known for superb quality, ease of use, and are specifically designed for today's challenging environment. The Scout MK II is an advanced side scan sonar for all AUV applications, but particularly well-suited to the new emerging micro AUV market. It will be available in towed sonar systems soon.

ATLAS North America is a wholly owned subsidiary of ATLAS ELEKTRONIK GmbH of Bremen, Germany and serves the U.S. market with a specific focus on naval mine countermeasures and high-resolution imaging sonars for defense, first responders, and commercial use. ATLAS North America is located in Yorktown, Virginia, and is an industry leader in towed and AUV side scan sonar products.

For more information, visit www.na.atlas-elektronik.com/company-info/.



MacArtney Outfits Brand New Multipurpose Vessel

MacArtney's French subsidiary has supplied and installed a complete multibeam echo-sounder system and high-speed winch designed and engineered for optimal durability for the newly built state-of-the-art rescue vessel Sirius, operated by VLOOT dab. The Sirius is 45 m long, almost 11 m wide, and can reach a speed of 13 knots. Intended for combating disasters at sea, Sirius was designed with maximum attention to sustainability aspects. In consequence, superior-quality equipment was required in order for the vessel to fulfil the demands made on its functionality.

The scope of supply for Sirius features a multibeam echo sounder system comprising a high-resolution multibeam echo sounder, Kongsberg EM 2040 Dual RX, which is a wide-band HD shallow-water multi-beam echo sounder optimal for any high-resolution mapping and inspection application. The scope also includes an inertial sensor, Kongsberg Seapath 300, developed specifically for hydrographic and other high-precision applications. Seapath 300 combines inertial technology with GPS satellite signals. Sirius is also equipped with sound velocity sensors, Valeport Midas SVX2, for profiling and Valeport miniSVS for surface measurement. Both sensors include digital time of flight sound velocity, and the SVX2 also acquires CTD profiling.



The scope also covers a QPS QINSy hydrographic data acquisition, navigation, and processing software package and MacArtney's CORMAC Q2 winch intended to tow the side scan sonar.

Supported by their suppliers and the Socarenam shipyard, MacArtney France were in charge of and conducted all the testing procedures, resulting in the equipment having been successfully accepted. The high-quality of integration allows to reach a speed of 13 knots while keeping a high level of bathymetry quality.

Featuring superior acoustic quality and high accuracy, this multibeam echo sounder system enables easy and quick downloading and sharing of data relevant to Sirius and her functions. In addition, the multifunctionality of the vessel complies with the strictest environmental standards and regulations.

MacArtney France employs a strong and experienced team of engineers, sales professionals, and technicians supporting the entire range of MacArtney underwater technology systems and products. Their expertise ranges from subsea connectors and cables through hydrographic, sonar, and telemetry systems to complete ROV launch and recovery systems and oceanographic instrumentation packages.

For more information, visit www.macartney.com.





Little Mothership Solves Big Decommissioning Problem

An ingenious idea from Saab Seaeye customer Stinger Technology has found a way to penetrate the labyrinth inside offshore production tanks in search of environmental contaminates prior to decommissioning. They managed to squeeze a unique underwater robotic systems configuration loaded with sampling technology through a 150-cm square hatch to search the tank's internal maze of baffles and navigate along 25.5-cm diameter pipe-runs of curves and bends. Stinger's idea turned the already compact Saab Seaeye Falcon into a "mother ship" from which is launched an even smaller fly-out VideoRay and tiny fly-out Stinger Nano. The Norwegian company dubbed the trio, Mother, Daughter, and Little Sister.

<http://ont.news/2rjFqkD>

New DNV GL Guidance puts Submarine Pipelines Safely to Bed

Depending on the interaction between the pipe and soil, submarine pipelines—both exposed and buried—may be subject to severe displacements and impaired pipeline integrity. Soil characterization and pipe-soil interaction assessment are therefore important parts of any pipeline project. DNV GL now launches a new recommended practice (RP), DNVGL-RP-F114 "Pipe-soil interaction for submarine pipelines," solely dedicated to the interaction between the pipeline and the soil.

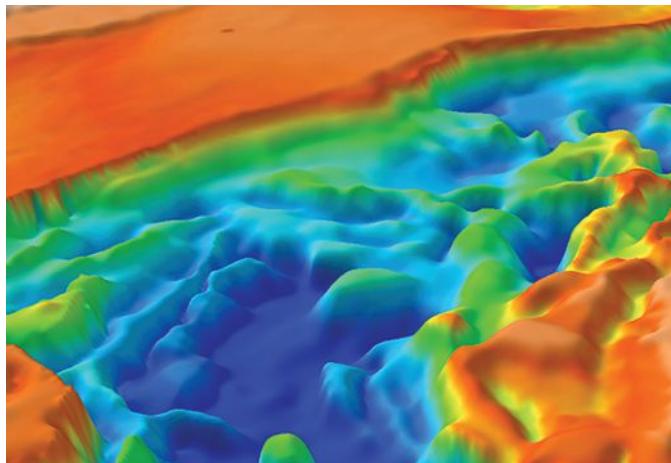
<http://ont.news/2rnKolw>



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Frogtech Geoscience Releases North Atlantic Regional SEEBASE® Study

Frogtech Geoscience released a new comprehensive regional study of basement architecture in the North Sea and the North Atlantic conjugate margins of Norway, Greenland, UK, and Ireland. The unique North Atlantic Regional SEEBASE® Study and GIS model visualizes basement topography at the geologically complex Baltica-Avalonia-Laurentia collisional triple junction. The basement-focused analysis overcomes the challenge of interpreting basement beneath basalt and/or salt on seismic data, showing that the deepest North Atlantic depocentres are floored by shallow mantle below hyperextended crust.

<http://ont.news/2rjq13J>

Ultra-Compact New Pathfinder Doppler Velocity Log from Teledyne

Recently unveiled at the Ocean Business conference in Southampton and OTC in Houston, Teledyne RD Instruments announced the official launch of its ultra-compact 600-kHz Pathfinder Doppler Velocity Log (DVL) that provides precision on-board navigation for subsea and surface vehicles in a small footprint for the latest generation of small AUVs, ROVs and USVs. The Pathfinder has immediately drawn intense interest and orders from vehicle manufacturers and users from around the globe. Derived from TRDI's long-standing, highly reliable DVL technology, the Pathfinder delivers proven technology at a price point, size, and weight ideally suited for a wide array of applications and budgets.

<http://ont.news/2skX7QZ>



MONTH IN REVIEW

Trelleborg Develops Standardized Buoyancy Module System

Trelleborg's offshore operation recently developed a new Standardized Buoyancy Module system to reduce lead times for customers.

<http://ont.news/2sgJ7ad>

Ocean Infinity Purchases Two Additional USVs from ASV Global

Ocean Infinity has purchased two unmanned surface vehicles (USVs) from ASV Global that will be used as auxiliary rapid response vehicles.

<http://ont.news/2rjOHZZ>

Oceaneering Inks 10-Year ROV Service Contract in Canada

Oceaneering has entered into an agreement, expected to extend into 2026, with a major international oil and gas company to provide ROV services and equipment.

<http://ont.news/2rjSmap>

Great Depths of Opportunities in India for UK Firms

UK subsea companies showcased their technology and expertise to senior officials from Oil and Natural Gas Corporation (ONGC) on a recent trade mission to South Asia.

<http://ont.news/2s3zxO>

Bibby Offshore Awarded Significant Contract with TAQA

Bibby Offshore has been awarded a significant contract with TAQA for subsea construction works in the Eider field, located 184 km northeast of Shetland.

<http://ont.news/2suyWiV>

Newton Labs Introduces the PL4000UW Underwater Laser Scanner

Newton Labs has introduced the PL4000UW, specifically designed for capturing high-resolution metrology data deployed on ROV and AUV submersibles.

<http://ont.news/2rjMuOj>

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DMU30 Precision MEMS IMU

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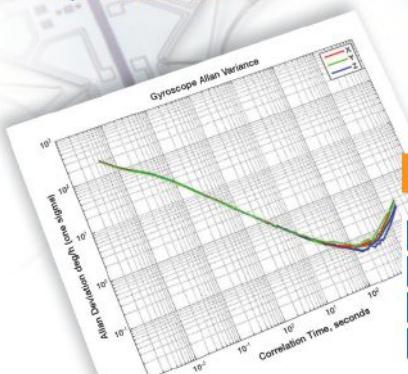
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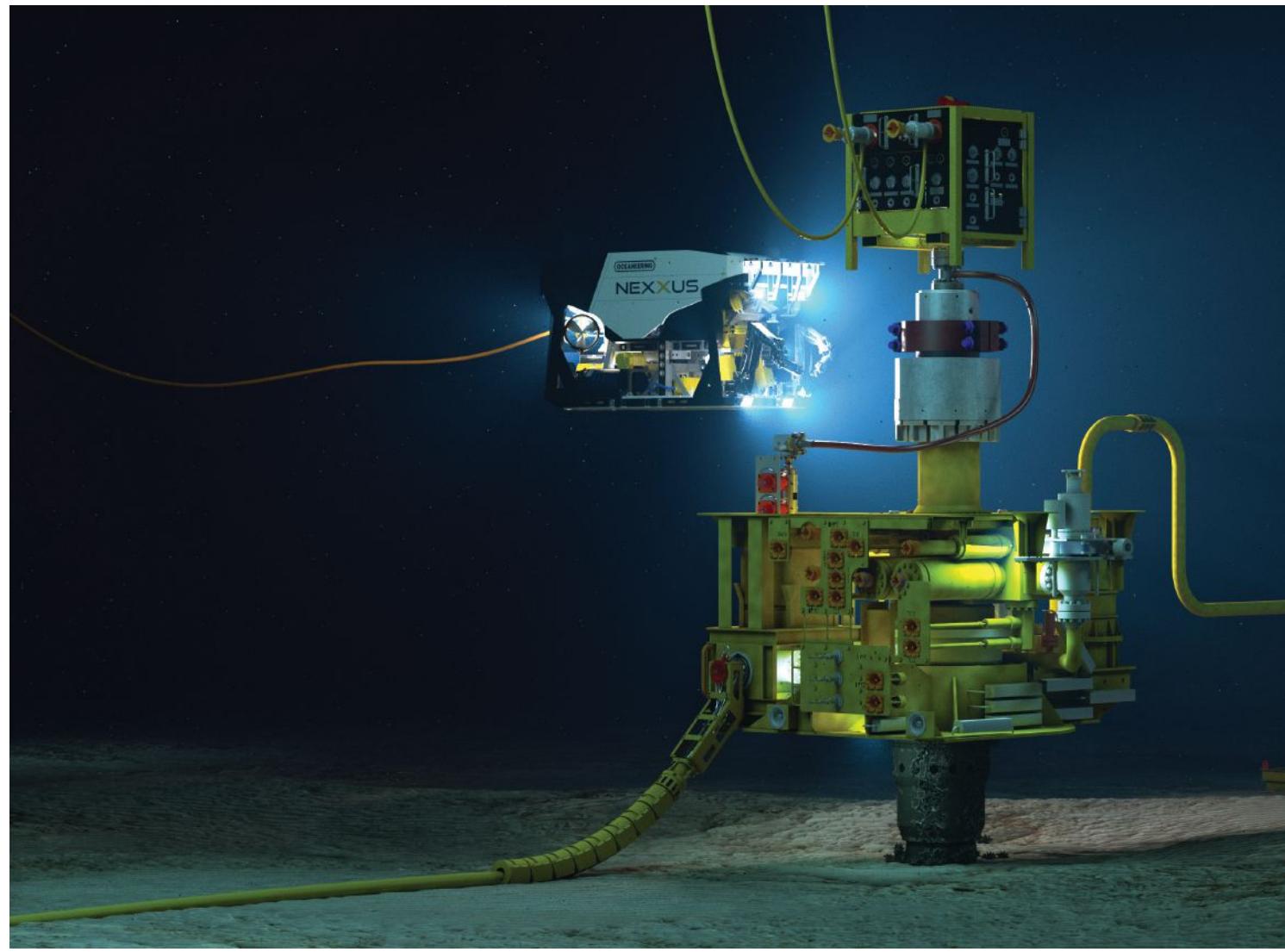


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Video Plays Increasingly Important Role in Offshore Oilfield Operations

By: Timothy Gallagher, Oceaneering Business Development Manager, Global Data Solutions



Downloading data-rich content is simple with OMV. For example, this still image was captured quickly and easily from an Oceaneering Sub-

The ability to stream video in real time to, from, and within remote oilfields has grown in importance for energy companies, government agencies, and many other organizations. The more they rely on these data, the more these organizations struggle with determining solutions for backhauling and archiving rapidly growing data volumes and also finding the right video segments or images from among hours of files. The latest solutions solve these challenges and enable geographically dispersed stakeholders to more effectively observe and collaborate on a combination of subsea and topside operations.

Among the most powerful early examples of the considerable value of subsea video were the live images delivered in 2010 from the Deepwater Horizon oil rig atop the Gulf of Mexico's Macondo exploration well. This live stream was transmitted continuously for more than three months from approximately 5,000 ft (1,524 m) below sea level and viewed by 20 million people each day. It influenced everything from crisis response and management to how policy and public opinion were formed during and following the incident.



sea Hydraulic Well Stimulation solution video.

Oceaneering delivered that live feed from a land-based location, demonstrating the cost and efficiency benefits of remote video monitoring for around-the-clock incident response management. Since then, video technology has continued to improve, and video data are being used for an expanding range of applications. Offshore video communication is now commonly used to optimize drilling operations and can also be used to extend exploration to deeper waters and more remote regions. It also enables collaboration between onshore and offshore personnel so they can improve decision making, preempt problems, or troubleshoot crises. Video can also provide a critical real-time look at all vessel, dock-side, and remotely operated vehicle (ROV) operations in addition to drills and incident response activities.

Today, cameras are used throughout the oilfield for applications ranging from general closed-circuit television (CCTV) surveillance to process monitoring. They can be installed on multiple "observation" ROVs that surround larger ROVs and provide an enhanced operational perspective. Live video is also used topside to monitor equipment on rigs and support vessels. Video is also frequently streamed from refineries or from load operations at docks and ports. Providing access to these live video feeds reduces the number of phone calls that must be made in order to confirm, for instance, that a crane is working, that necessary material is on the deck, or that operations are proceeding as intended.

Video is also used to monitor pressure gauges and other instruments, as organizations augment raw instrumentation data with the output of both fixed and moveable cameras. Fixed cameras can remain focused on a single gauge, while moveable cameras can pan in and out to provide views of different gauges in a given area on the drill deck.

Additionally, video can be used to support photogrammetry services in which images are used to create maps, drawings, measurements, or 3D models of what is being observed. There are other emerging purposes for video, including converting the video delivered by ROVs to digital point-cloud data that can be used to facilitate remote piloting.

Video also can be extremely useful in the aftermath of severe offshore weather events. The ability to remotely assess storm damage reduces the expense and risk of using flyovers to ensure, for instance, that a helipad is intact, clear of debris, and accessible. If damage is seen, the organization can make all necessary repair plans and bring the correct replacement parts and equipment on the next flight.

Today's solutions encompass a variety of specialized video capture, storage, and integration tools. They also require enterprise-class networking, archival storage technology, and service-provisioning capabilities tailored to the unique needs of remote deployments in extremely harsh and variable conditions. Video

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archiving is a particularly important piece and must include encoding and video media management, with support for tagging, indexing, and geospatial integration to simplify video retrieval and analysis. Each of these solution elements must be optimized for operation in extremely harsh and variable conditions.

Deploying a Solution

The solution starts with explosion-proof deck video cameras that should be hardened for the most rugged environments and include full pan-tilt-zoom (PTZ) capabilities, low-light technology, Internet protocol (IP) networking, and support for multiple compression formats. Solutions for subsea lighting are particularly important in order to optimize video image quality. The latest solutions take advantage of advances in LED lighting that significantly improve image resolution and reliability.

As stated earlier, live video streaming is becoming more and more commonplace. Once the video is acquired, technology is needed for streaming and transport. Solutions must be capable of supporting high volumes of feeds—as an example, Oceaneering typically carries between 200 and 250 live subsea video feeds simultaneously from its ROVs. In one project, there were 29 ROVs in the water at any given time, each with up to six cameras that were collectively delivering more than 100 live video feeds to the customer. There are already bandwidth challenges at these feed volumes, and these challenges will only intensify as video files move beyond standard-definition (SD) to high-definition (HD) and even 3D formats.

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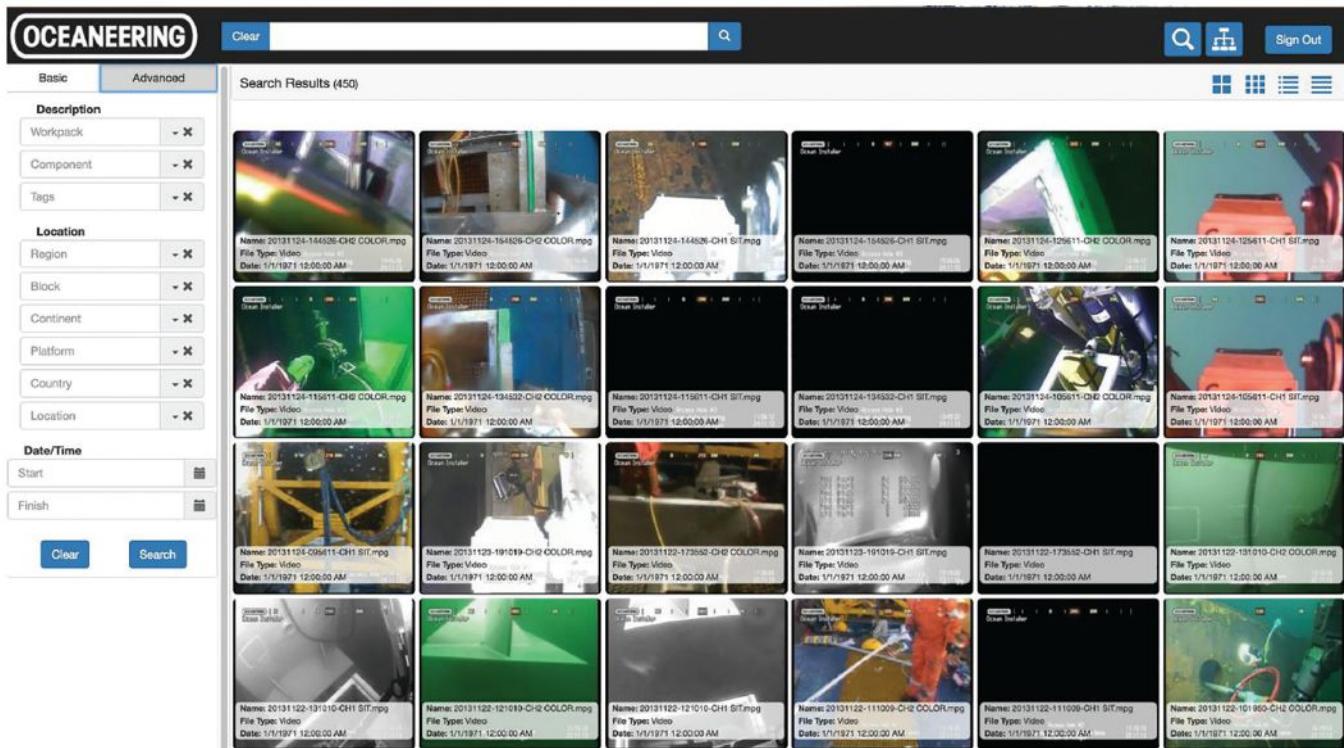
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Roughly 30% of this video is viewed on mobile devices, and getting it to users on the platform of their choice requires the use of high-performance H265 video compression technology. This doubles image resolution as compared to earlier formats at the same 50 kilobit-per-second (Kbps) stream speed that is typical of the offshore environment.

Video transport requires a robust enterprise-class network. Whereas consumer video service providers enable millions of viewers to watch thousands of videos, an offshore video communications infrastructure is designed to enable, say, 100 users to access upward of one million videos. The wireless networking infrastructure is virtually the same for both systems, however, and the offshore version must operate in one of the world's most unforgiving environments, enabling video distribution from ship to ship, from rigs and ships to shore, and from rig to rig, while also supporting other demanding voice and data communications requirements.

For instance, subsea tools, such as rotary brushes used for equipment cleaning, are continuously monitored via a combination of video and other data sources. Video is used to observe effectiveness, while the other data facilitate ongoing analysis. Ultrasonic testing (UT) tools also continuously transmit data, and digital radiography tools can generate as much as 50 megabytes of data per hour. Meanwhile, other tools are used around the clock for real-time monitoring of critical assets, such as blowout preventers, that must be observed continuously and repositioned as necessary.



Standardized view of video search results.

The bandwidth budget must also include videoconferencing, which is increasingly used between rigs, platforms, vessels, and onshore headquarters. The average bandwidth usage for an oil rig is approximately 2 megabytes per second (Mbps).

All infrastructure elements that are required to support video, data, and telemetry transmission must be transported long distances to remote offshore locations. The most effective approach is to configure this infrastructure onto a portable skid that can be dropped onto the back deck of a rig or vessel. Today's skids can be configured to include all necessary voice, video, and data communications capabilities. Several networking implementation options are available, including point-to-point, vessel-to-vessel, multi-point field, and vessel Wi-Fi. Vessel-to-vessel mesh networking capabilities are also available, enabling a rig and multiple vessels to transmit video, data, and telemetry and to share bandwidth.

Once the video capture, streaming, and transport elements are in place, the next step is to develop a solution for archiving, retrieving, and analyzing. Organizations must be able to access drilling footage from any location at any time, so they can decide on the best solutions to day-to-day problems or questions. Today's video management solutions are integrated with inspection overlay and video tagging systems; these systems provide support for video analytics and automatic anomaly tagging and feature standard or customized viewing capabilities.

A typical project might generate 1 to 2 terabytes of data each day, making storage a challenge. As file sizes grow with the move to HD, 3D, and high-resolution video compression formats, archival data volumes can overwhelm enterprise storage resources. Complicating the picture, storage on physical media can make sharing, retrieval, and analysis extremely challenging. For these reasons, the industry is moving to more convenient and secure cloud-based storage models.

Video tagging and indexing are also important for simplifying retrieval. Today's solutions deliver full digital video recorder (DVR) functionality and take advantage of geospatial integration to improve convenience. Users can tag interest areas to analyze later and search by comments, tags, or timestamps. They can also attach documents or pictures via metadata content management and use thumbnails to browse and index the entire video timeline, thus cutting the time needed to identify areas of interest. Playback modes, including fast and slow forwarding and rewinding, enable users to quickly get to a section, pause and review it, and then return to the live feed. It is also possible to extract and deliver a short section to someone's desktop without having to download the entire file.

Video retrieval convenience is further improved through geospatial integration. The coordinates for video source locations are automatically inserted into the stream via key length value (KLV), enabling users to request, for instance, that the system show them all of the video in

the Gulf of Mexico. Users can then click on an individual ROV in that area and issue a "follow" instruction. Another application for geographic video tagging is to automatically bring up inspection images from a specific pipeline segment as part of an asset integrity program.

Some operators have laid transponders on the vessel floor so that information about their subsea projects can be gathered from the seabed. Larger ROVs have an internal inertial map system that is used to calculate the ROV's location.

The final step in deploying an offshore video solution is to set up the necessary voice and data communications services, including a very small aperture terminal (VSAT), along with radio, cellular voice and data communications, CCTV, ROV-to-CCTV broadcasting, and Wi-Fi. Capacity can be increased for operations needing additional bandwidth by adding services, including long-term evolution (LTE) communications and subsea fiber integration to connect subsea equipment together and back to shore. For vessel-to-shore communications, standard maritime satellite communications services now support data rates of 512 Kbps, and the industry is moving to a 1-Mbps bandwidth standard.

In order for the entire oilfield to communicate in real time, it is necessary to move to optical subsea communications. Previously, ROVs could only gather data from subsea equipment by moving to locations in the field where they could download via acoustic or optical communications. Likewise, they could only send data to the surface in batches via the fiber embedded in their umbilical cables. As the industry solidifies interoperability standards for optical communication modems that can work over distances of 492 ft (150 m) or more, there will be the opportunity for the entire field to communicate in real time.

Other Support

Offshore operators should also consider the benefits of outsourcing any or all of their video requirements to information technology (IT) and communications systems support teams. Highly skilled personnel can operate wherever they are needed, whether on the rig or aboard supporting inspection, maintenance, and repair (IMR) vessels. These teams can be dispatched to install and maintain all communications and data infrastructure throughout the oilfield, and they include senior-level network engineers who can handle physical installation and also travel with the operation as required.

Video has become a standard tool for optimizing offshore operations. While it can be difficult to implement all necessary capture, streaming, transport, storage, and communications elements in the harsh and variable offshore oilfield environment, today's solutions overcome these hurdles and can be supported by skilled technicians who know how to install, operate, and maintain the industry's increasingly sophisticated offshore video communications infrastructure.

Global Marine Group Reports Busy Spring with Subsea Cable Projects

The Global Marine Group (GMG), a market leader in offshore engineering, is reporting a successful first five months of 2017 and what they expect will be a strong outlook for the rest of the year. All key assets from the GMG fleet are currently mobilized, either supporting maintenance zone agreements around the world or on installation, maintenance, or repair contracts.

"As we head into the summer months, we are extremely pleased about our robust activity level, which we feel is a reflection of our high performance standards, reputation, and strong relationships across the industry," said Ian Douglas, CEO of the Global Marine Group. "We are consistently mobilizing quickly to deliver high-quality, on-time, and on-budget solutions to all our customers, which demands experience, proven know-how, and the resources to get things right first time. We believe we have the personnel, vessels, and technology to meet these demands."

CWind, the group's offshore power-focused business, has its 18-strong fleet of Crew Transfer Vessels (CTVs) and another eight chartered vessels busy supporting clients on key wind farms across the UK and Europe with a variety of subsea and topside solutions. In February of this year, it was announced that CWind would incorporate the resources and power cable capabilities of its parent company, GMG, to expand the breadth of services it offers to wind farm owners and developers. In addition to completing major scopes of work at the Godewind

Offshore Wind Farm using a DPS-2 vessel, CWind has also recently utilized a key asset in the GMG fleet, C.S. Sovereign, to complete back-to-back power cable repairs.

First, CWind finished the successful repair of a vital power cable that reconnected the Isles of Scilly to mainland electricity and then another repair commission in the North Sea. CS Recorder, a recent addition to the group's fleet, has just completed remedial burial work on the CIEG (Channel Islands Electricity Grid) power cable between Guernsey and Jersey. The project benefitted from the mobilization and deployment of another of the group's assets, the Q1000 jet-trenching ROV, which offers 1,000 hp of total installed and variable jetting power. The Q1000 is ideal for trenching pipelines, umbilicals and cables to a burial depth of 3 m at a speed of up to 400 m per hour. CS Recorder will shortly begin work on another installation project.

Further afield, the group's telecoms-focused business, Global Marine, who has installed over 300,000 km or 21% of all subsea cable across the world, has the Networker and her crew currently primed for a fiber optic cable installation project between Karimun and Batam in Malaysia. The Networker is the first purpose-built, cable-working barge in South east Asia, and one of the largest vessels of her kind, ideally designed to deliver projects in shallow waters and narrow corridors.

For more information, visit www.globalmarine.co.uk.



Southern Cross NEXT Cable Making Pacific Connections



Southern Cross Cable Network is helping the Pacific community achieve its connectivity vision, with signed interest in the Southern Cross NEXT system now confirmed with four Pacific Island operators and discussions with several other large-scale customers underway.

The initial Southern Cross NEXT build will be a high-capacity express route, providing data center connectivity between Sydney, Auckland, and Los Angeles, and is on target for completion during 2019. The system is planned to have an initial capacity of more than 60 Tb, adding to the existing 20-Tb capability of the current Southern Cross systems. Given its design and route, it will be the lowest latency path to the United States by some considerable margin and will provide immediate benefit to customers with additional route diversity.

Southern Cross Cables president and CEO, Anthony Briscoe, said, "Given both Southern Cross' and my personal history in supporting telecommunications connectivity in the Pacific, it is very gratifying that we have the potential to help further boost island economic growth through cable connectivity to support the vision of the Pacific community. Their commitment to the project and support of the solution proposed is strong enough that financial commitment has been achieved for the marine surveys to be committed to in all the interested party jurisdictions."

"We continue to have talks with several Pacific Island representatives, and while Southern Cross is not looking to specifically build a new system interconnecting the

Pacific Islands, we remain committed to discussion on how we can assist in facilitating the onward connectivity of systems from the islands to the rest of the world in a convenient and cost-effective way, where it is practical to do so and does not impact the progress of the Southern Cross NEXT project. The Tui-Samoa project and recent Manatua announcement are excellent examples of the Pacific community working together, and Southern Cross remains committed to ensuring that any onward connectivity via the existing and Southern Cross NEXT systems helps support and underpin the telecommunications vision of those communities."

Dean Veverka, vice president networks for Southern Cross Cables, said, "With approximately 45% of the 12,500-km route between Sydney and Los Angeles now surveyed, we continue to undertake route refinements and optimizations to minimize overall route length and latency while navigating around seafloor obstacles and unstable terrain."

"For these four nations, this project increases their ability to stay connected in a world that relies on connectivity by linking them into a larger network, thereby facilitating them to stay always on despite their remote locations. Yet perhaps of greater importance is the new wave of capacity and speed that will be available to them, which puts each nation arguably on par with their bigger route partners when it comes to bandwidth availability, speed, and latency."

For more information, visit www.southerncrosscables.com.

COMMUNICATION & SUBSEA CABLES



Docomo Pacific Starts Marine Lay of ATISA Cable in the Mariana Islands

Docomo Pacific announced the start of the marine lay for its ATISA submarine fiber-optic cable system connecting Guam, Saipan, Tinian, and Rota in the Mariana Islands. On 11 May, Docomo Pacific hosted a landing ceremony for ATISA at Aquarius Beach, Saipan. Members of Docomo Pacific's leadership team were joined by island dignitaries and business leaders for the event. Similar landing ceremonies will take place in Tinian and Rota later this month. Following the marine lay, Docomo Pacific's team will conduct end-to-end testing of the cable system before ATISA is ready for full service in the Marianas by August.

<http://ont.news/2rnZzpO>

Inmarsat, IMSO Collaborate on Maritime Safety in Vanuatu

Inmarsat has made available five Fleet One units to a pilot initiative that aims to bring change to the way ships connecting island communities in the Pacific archipelago of Vanuatu communicate. The International Maritime Organization (IMO)-endorsed capacity-building pilot program is the result of co-operation between the International Mobile Satellite Organization (IMSO) and the Government of Vanuatu under the leadership of the Ambassador of Vanuatu to the IMO.

<http://ont.news/2rXQbb4>



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MONTH IN REVIEW

Cobham Delivers 50,000th SAILOR FleetBroadband Terminal

Cobham SATCOM marked a milestone for its Inmarsat FleetBroadband hardware portfolio with delivery of the 50,000th SAILOR FleetBroadband terminal.

<http://ont.news/2skKKn9>

TE SubCom Awarded South Pacific Marine Management Agreement

TE SubCom has been awarded the South Pacific Marine Maintenance Agreement, a five-year service agreement between SubCom and 14 cable operators.

<http://ont.news/2s7Sc34>

IOX, ASN to Build Indian Ocean Cable

IOX Cable Ltd and Alcatel Submarine Networks (ASN), part of Nokia, have signed a turnkey agreement for the deployment of the IOX Cable System.

<http://ont.news/2rXR6YZ>

Hawaiki Manufacturing Nears Completion

Hawaiki Submarine Cable LP and TE SubCom announced that new milestones have been reached in the manufacturing of Hawaiki, a transpacific cable system.

<http://ont.news/2sprdTI>

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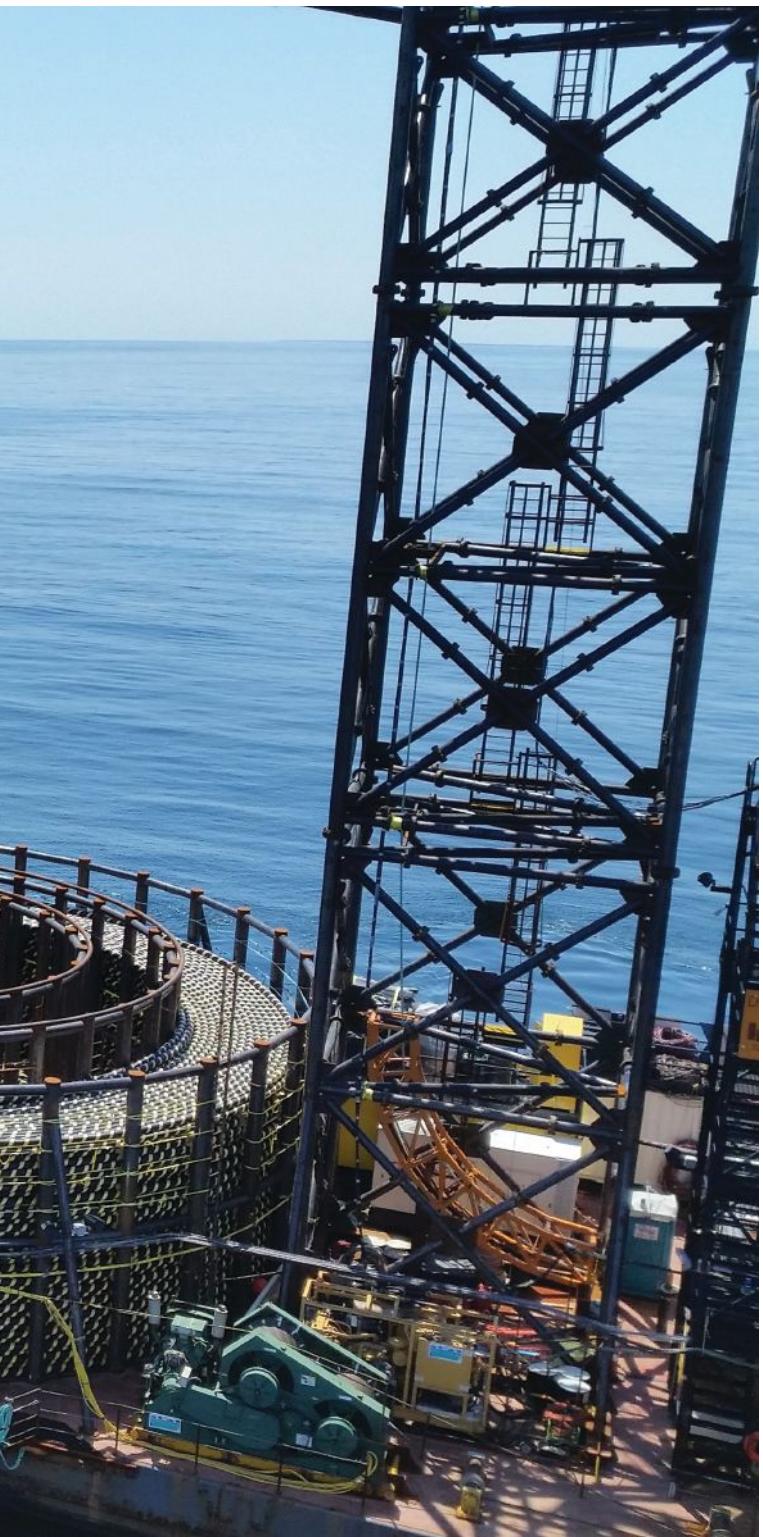
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Subsea Cable Installation for the Block Island Wind Farm



Few people know or understand what was involved in the recent effort to connect the five 6-MW wind turbines off Block Island Wind Farm (BIWF) to the Mainland power grid, which required approximately 28 mi of subsea cable installation. Preparations for the subsea cable installation started in August 2015, and cable installation activities were completed in August 2016.



Kokosing Industrial's Durocher Marine Division successfully installed the power distribution subsea cables for the BIWF, which included four inter-array cables connecting the five wind turbines, a 6-mi export cable delivering power to Block Island, Rhode Island, and a 22-mi transmission cable connecting Block Island to the mainland, terminating at Scarborough Beach, Rhode Island.

An ocean-going deck barge with a dynamic positioning (DP) system was mobilized for the cable installation. The dynamic positioning system controlled six 500-Hp thrusters and provided precise control of the lay speed, tow tensions, and route. As the cable was uncoiled from a storage tank, it passed through a gantry and a series of linear cable machines. It was then deployed off the stern of the cable lay barge and into the water. The cable descended through the water column into a jet sled that buried the power cable up to 6 ft below the seabed in water depths of 130 ft. The jet sled used surface-supplied water forced through nozzles on the embedment tooth to fluidize a trench for the cable. The jet sled was towed by the DP barge burying the cable the entire route.

Seabed sediments in the Block Island Sound varied between dense sand, clay, cobble, and boulder remnants from the previous glaciation period. The variability of seabed sediments created challenges for the installation.

Minimum operating water depths for the DP system near shore required floating the cable ends from the installation barge into the shore landings. The critical landing on Block Island required the jet sled to be pulled onto the beach and into a cofferdam that helped provide adequate burial of the cable through the surf zone. With the help of an auxiliary barge and land winch, the jet sled was pulled into shore without using the cable lay barge. Divers removed the floatation bags, allowing the cable to sink towards the jet sled as it was winched ashore.

The project also required offshore installation of the wind turbine structures through J-tubes. Prior to cable installation, a bend restrictor was installed into the cable J-tubes and a winch pull-in assembly was installed on the top of the jacket. Once the cable was laid and buried to the structure, it was cut to the desired length and connected to the winch system on the tower. The winch system pulled the cable up the J-tube and into the jacket for termination in the vault room. This was repeated at each of the five wind turbine locations.

For more information on this project, contact Mark Henrikson at mhenrikson@durocher.biz or visit www.kokosingindustrial.com/markets/marine.

Naval Oceanography Demonstrates Capabilities in the Gulf of Mexico

For several months, Naval Meteorology and Oceanography Commands (NAVMETOCCOM) have been conducting operations in the Gulf of Mexico in support of its Unmanned Systems Operational Demonstration, 31 May to 1 June.

Operations and observations collected during the demonstration will be integrated on a unique common operational picture at the Combat Readiness Training Center-Battlefield Airmen Center in Gulfport.

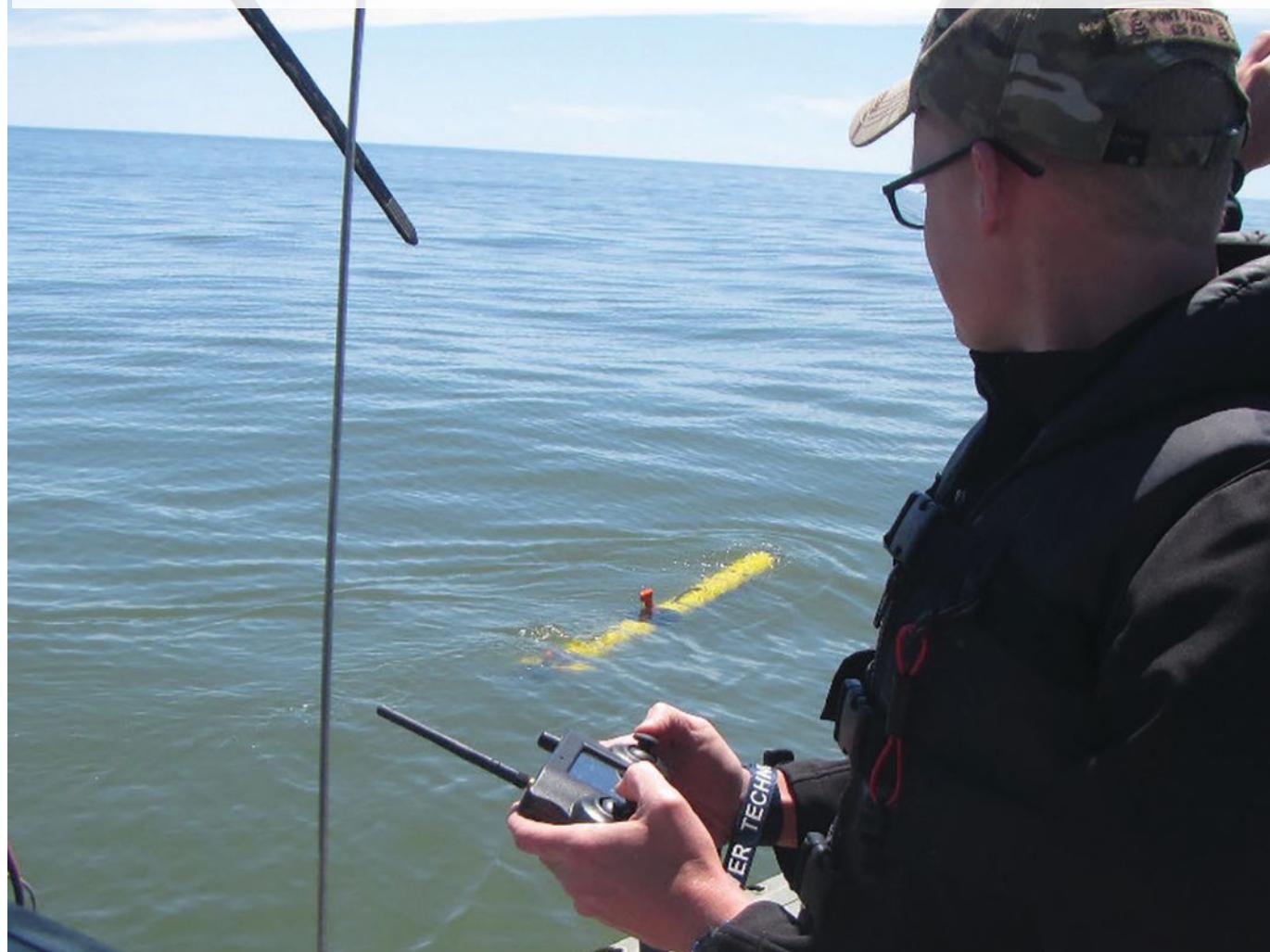
"The Mississippi Gulf Coast is extremely suited to nearly all the mission types the Navy addresses," said Rear Adm. Tim Gallaudet, commander, NAVMETOCCOM and oceanographer of the Navy. "When it came to choosing a place to host the first ever unmanned systems operational demonstration, the answer was easy—it was right in our backyard.

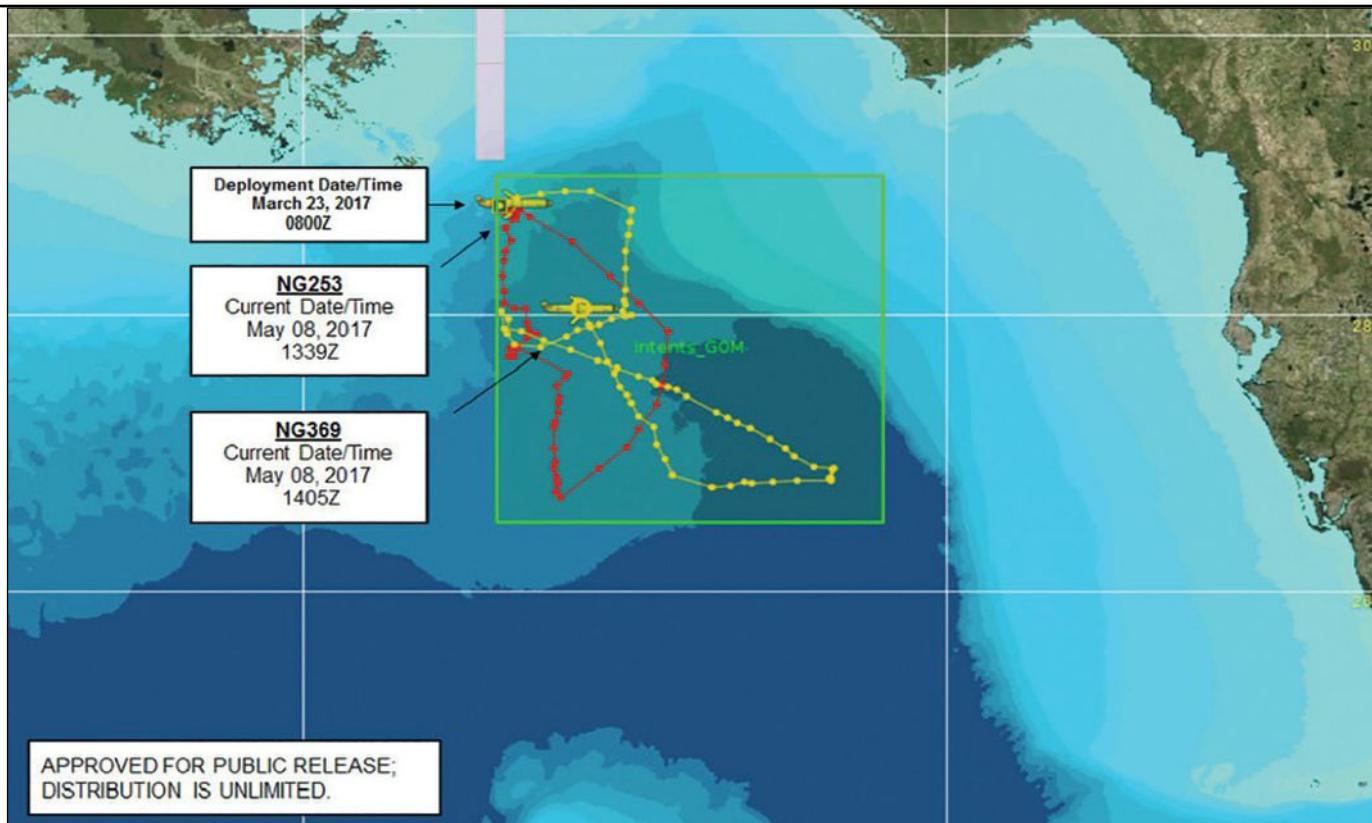
Our coastline includes riverine, shallow and deep water, barrier islands, harbors, and beaches that can be used to simulate missions."

Led by Rear Adm. Gallaudet, the event is providing Naval Oceanography an opportunity to demonstrate existing unmanned systems capabilities; highlight local infrastructure that can be used for additional unmanned systems operations; and explore collaborative opportunities between Navy, industry, and academia in support of national defense.

To simulate Navy missions for the demonstration and test unmanned systems capabilities, Fleet mission areas such as humanitarian assistance/disaster relief (HA/DR); sea control; theater anti-submarine warfare; intelligence, surveillance, and reconnaissance, and more were planned.

Fleet survey team survey technician AG2 Jesse Osborne operates an Iver3 unmanned system via radio frequency remote during compass calibration mission in the Gulf of Mexico in preparation for bathymetric data collection in support of Naval Oceanography Unmanned Systems Operational Demonstration Humanitarian Assistance/Disaster Relief support scenario.





Two gliders were deployed from USNS Maury in the Gulf of Mexico in March in support of Naval Oceanography Unmanned Systems Operational Demonstration. The map details their tracking data as of 8 May 2017. Gliders are autonomous underwater vehicles used to collect a variety of oceanographic data to better understand the ocean environment.

HA/DR was a multi-command demonstration that combined nearshore data collection capabilities near Cat Island and Gulfport Harbor to identify hazards to navigation and provide clear transit and anchorages for incoming support vessels. Personnel deployed Iver 3s and REMUS 100s, which are unmanned systems that collect bathymetry and side-scan sonar data. The data were then consolidated and processed to provide water depths, hazards to navigation, and tactical recommendation products.

The HA/DR lead Lt. Cmdr. Jessica Garrett said, "Natural disasters can drastically change the coastal landscape and infrastructure. The Mississippi Gulf Coast is definitely not a stranger to that. Deployed Naval Oceanography teams can quickly and efficiently provide environmental updates to the HA/DR commander, expediting relief efforts."

Another exercise employed unmanned systems that communicated with each other to deliver the most accurate and up-to-date environmental assessments. Naval Oceanography tested the use of a littoral battlespace-sensing mission van as a forward operating base (FOB) to maintain contact with multiple unmanned systems that were deployed from USNS Maury in the Gulf of Mexico. The two unmanned systems can collect bathymetry and communicate position back to the FOB.

While these are just two examples, support for the operational demonstration has been ongoing

for months as various Navy commands collaborated with industry and academia to complete exercises in the Gulf of Mexico. The Naval Oceanographic Office worked with the U.S. Air Force 53rd Weather Reconnaissance Squadron "Hurricane Hunters" to deploy profiling floats and drifters to measure conductivity, temperature, and depth and ocean currents. Woods Hole Oceanographic Institution used specially equipped ocean gliders to test advanced techniques in support of anti-submarine warfare. Naval Oceanography also partnered with the University of Southern Mississippi, National Oceanic and Atmospheric Administration, and many other Navy commands to produce the nation's first Unmanned Maritime Systems Certification program.

COMNAVMETOCOM Deputy Commander and technical director Dr. Bill Burnett said, "To be able to share what we do right here at home and put all the knowledge gathered into a common operational picture is very exciting for us. Our community should know that there are people working hard every day in support of our nation's defense from right here at Stennis."

COMNAVMETOCOM directs and oversees more than 2,500 globally distributed military and civilian personnel who collect, process, and exploit environmental information to assist Fleet and Joint Commanders in all warfare areas to make better decisions faster than the adversary.

For more information, visit www.navy.mil.



Future USS Gerald R. Ford Aircraft Carrier Delivered to the Navy

The U.S. Navy accepted delivery of the future USS Gerald R. Ford (CVN 78) aircraft carrier, the lead ship of its class and the first new-design aircraft carrier delivered to the Navy since 1975, following the ship's successful completion of acceptance trials 26 May. The future USS Gerald R. Ford honors the 38th president of the United States and pays tribute to his lifetime of service to the nation in the Navy and in the U.S. government.

<http://ont.news/2reUEZ6>

Damen Consolidates Commitment to Australian Shipbuilding

Damen Shipyards Group recently visited Adelaide to further consolidate its partnership with ASC Shipbuilding and Forgacs Marine and Defence (Forgacs) (ASC Forgacs Shipbuilding) to build 12 Offshore Patrol Vessels (OPVs) for the Australian Navy and to explore domestic and export opportunities for both the commercial and naval markets. Mr. Roland Briene, Damen's area director Asia Pacific, also highlighted two important milestones for Damen in Australia: the 5th anniversary of Damen's Australian company, Damen Services Brisbane, and the intention to establish a second long-term service hub in support of the SEA 1180 program.

<http://ont.news/2reVUq4>



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Ocean News & Technology

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MONTH IN REVIEW

2G Robotics Supplies Technology to Norwegian Navy

2G Robotics will supply AUV-based laser scanning, still imaging, and illumination solutions for HUGIN AUVs to be delivered to the Royal Norwegian Navy.

<http://ont.news/2s7joP8>

USS Detroit Completes Final Contract Trials, Exercises Major Systems

Freedom-class littoral combat ship USS Detroit (LCS 7) completed final contract trials (FCT) during a five-day evaluation period beginning 10 May.

<http://ont.news/2s7HvUq>

Kongsberg Supplies Digital IP CCTV System for RCN Fleet Supply Vessel

Kongsberg Maritime camera systems group has delivered a large network IP CCTV system for the new RCN Auxiliary Naval Replenishment Ship.

<http://ont.news/2qXgePJ>

Future USS Omaha (LCS 12) Completes Acceptance Trials

The future USS Omaha (LCS 12) successfully conducted its acceptance trials after completing a series of graded in-port and underway demonstrations.

<http://ont.news/2tiYDPQ>

Navy, Marines Spotlight the Future of Amphibious, Autonomous Warfare

Ship-to-Shore Maneuver Exploration and Experimentation Advanced Naval Technology Exercise (S2ME2 ANTX) 2017 demos augmented reality.

<http://ont.news/2tiWp33>

Gabrielle Giffords (LCS 10) Begins Sailaway

The newest littoral combat ship, the future USS Gabrielle Giffords, departed from Mobile, 8 May, beginning her journey to her commissioning site in Galveston.

<http://ont.news/2tiypwU>

July 2017

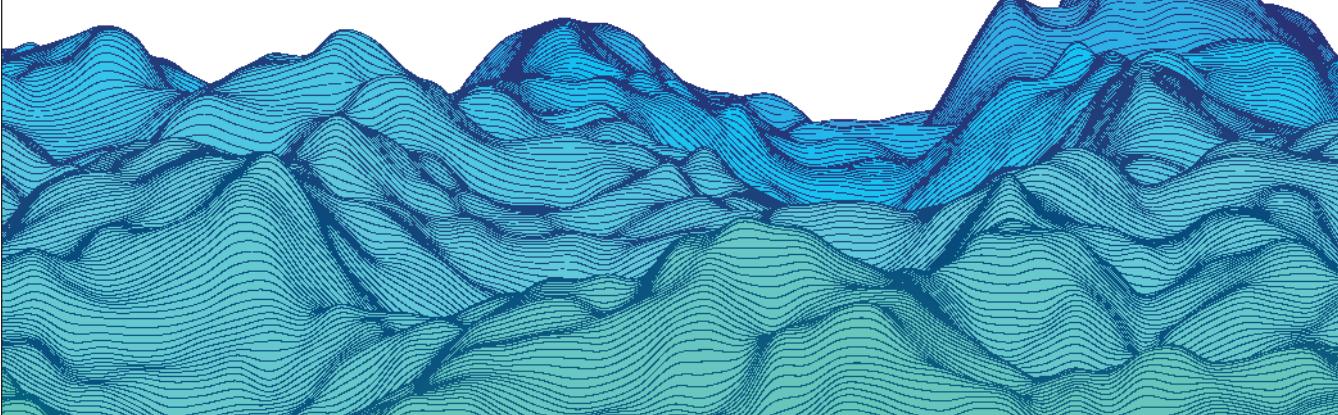
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A scalable, cloud-based platform for data management, mapping, and visualization, EDGS_{online} 2.0 is a simple yet sophisticated solution designed and built by GeoFac Systems Inc. The web-accessible application provides a spatial framework for secure user access to data and information, whether in geospatial, tabular, document, or image format. Unique and innovative videospatial tools now provide a powerful way to capture data from digital video and render that information in GIS for spatial analysis.

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Will OPEC's Decision Help Lead to Offshore Recovery?

OPEC leadership, with the support of 10 non-OPEC oil exporters led by Russia, announced on 25 May that it would extend the 1.2 million barrel a day production cut agreement entered into at the start of 2017 for an additional nine months, or until the end of the first quarter of 2018. While the decision was embraced by Wall Street, commodity markets revolted. As a result, crude oil futures—both West Texas Intermediate and Brent—fell approximately 5% on the decision announcement.

The following day, Wall Street analysts and oil traders assessed the language of the decision and put a more positive spin on the outlook, lifting oil futures by more than they lost the prior day. In fact, WTI closed within pennies of hitting \$50 a barrel, up more than \$1. However, the intervening weekend brought news of Libya's oil output rising, meaning increased exports that reversed Friday's more optimistic outlook. The first two days of the new week saw WTI futures fall approximately 1% the first day and 3% the second. The storyline continued to be Libya's production increase, which was unexpected and returned the word "glut" to the lexicon for describing the oil market's health. Adding to that concern was growing skepticism over the willingness of OPEC members to adhere to their production cut targets. The commodity markets rendered judgement on oil prices, and it wasn't optimistic.

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On Wall Street, the tone was different. Analysts claimed the OPEC/non-OPEC extension assured an undersupplied oil market by mid-year that would cause global oil inventories to fall to their five-year average by the end of the

year. Different analysts developed different timeframes, with some targeting the fourth quarter of 2017, while others speculated it might not occur until the first half of 2018. But all of them were optimistic that the trend was in place—it was only a matter of time before oil prices shot up.

The analysts holding to later balancing dates were quick to suggest that the seasonal oil demand increase that occurs during the summer and fall could easily drive oil prices to \$70 a barrel or higher, significantly improving energy company profitability and their share prices. That would be a welcome change since energy stocks, which led the market in 2016, have declined this year. The Standard & Poor's Energy Sector topped all sectors in 2016 with a 28.01% gain, only to be in last place by losing 6.53% through May 2017.

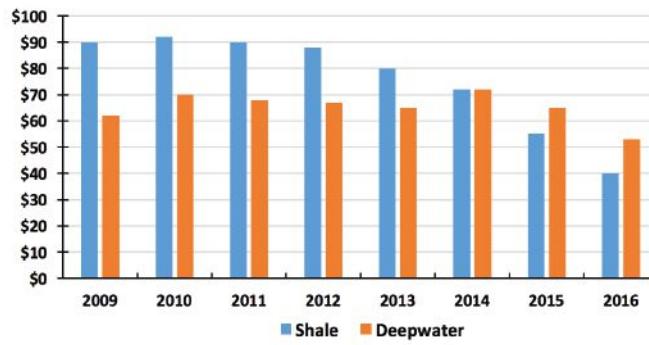
While the stock market and commodity exchanges were providing different reactions to the OPEC decision, oil industry executives remained focused on revamping their businesses to profit in a "lower for longer" environment. This has been an especially challenging issue for the oilfield service companies who provide the equipment, manpower, and technology necessary for finding and developing new hydrocarbon supplies.

The onshore shale E&P companies have significantly reduced their well break even costs so they can survive and prosper at \$50 a barrel. From break even costs in the low \$90s a barrel a few years ago, by last year they were below \$40. Unfortunately, the offshore sector has

July 2017

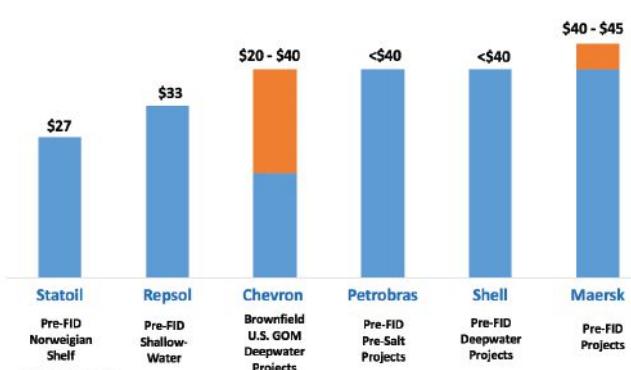
Ocean News & Technology

Shale vs. Deepwater Well Breakeven Prices
\$/bbl



Source: FactSet

Avg. Offshore Breakeven Oil Prices
\$/bbl



Source: Enso Int.



struggled to bring break even costs to levels where the oil companies can prosper. Now, it appears that a handful of major oil companies have gotten their offshore well costs down to levels enabling them to nearly break even at today's oil price. That is an encouraging development.

Recent analyses by oil consultants Wood Mackenzie and Rystad Energy show that for numerous offshore fields, the oil majors have—through standardization and new technologies—reduced well costs below current oil prices. Both oil consultants presented data and examples of offshore fields where well costs are below \$50 a barrel, close to generating profits. With forecasts of higher future oil prices as a result of OPEC's actions, more offshore projects may get the nod to move forward, especially if oil prices move higher.

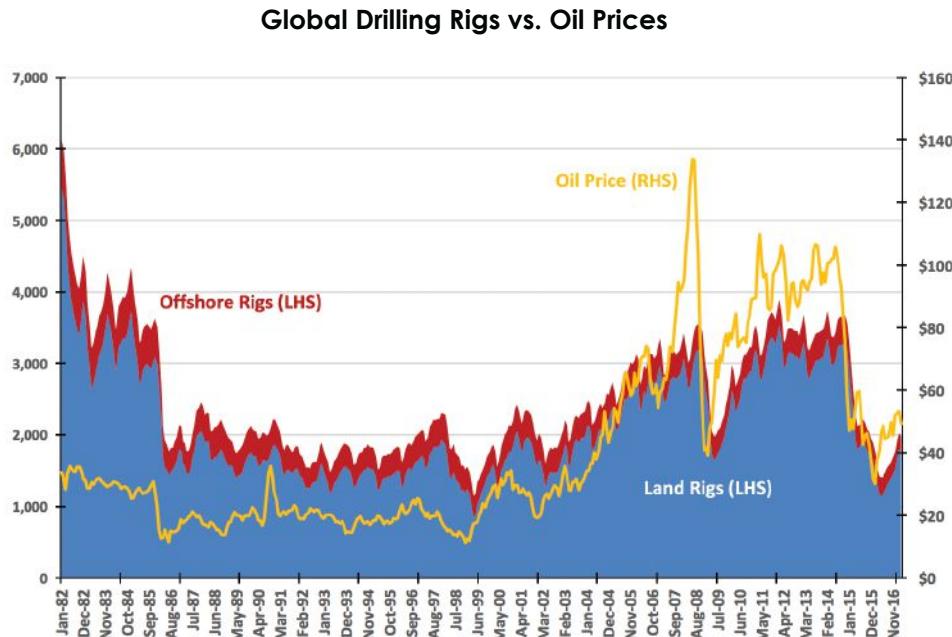
Canadian oil company Husky Oil has just confirmed an FID for its White Rose field off Eastern Canada. This came at the same time the company released its new five-year plan calling for cutting well breakeven costs from C\$33.50 (\$24.85) a barrel today to C\$32 (\$23.76) by 2021. It is likely that more projects will be getting approvals in the future.

With the progress producers are making in reducing their offshore well costs, it is hopeful the offshore drilling industry may begin to recover from the 2014 oil price collapse. To appreciate how much the offshore drilling industry has suffered in the downturn, one need only look at how much offshore rig activity has collapsed

since 2014 after decades of relative stability.

The greatest problem for offshore service companies is the reality that its customers have shifted their capital investment from long-term, expensive deepwater projects to short-cycle, quick payback shale developments. This shift provides producers increased flexibility to ramp their activity up or down depending on shifting oil price outlooks. Drilling and completion technology, combined with efficiency efforts, have promoted this spending shift. The spending shift was hurt by two years of low oil prices, but is rebounding on the back of higher oil prices.

Offshore, the efficiency and technology gains are just beginning to be felt. Their impact will translate into higher offshore drilling and development activity, especially as producers become more comfortable that the cost reductions they have achieved are sustainable. What is difficult to predict is the pace at which these improvements and confidence will drive more offshore work. Historically, when oil industry capital spending shifted its drilling and development focus, it often takes a few years for the changes to be fully reflected in oil company strategies. The offshore sector, while just beginning its recovery, remains the last great frontier for discovering large, long-lived oil and gas deposits that will be critical in meeting the world's future energy needs. Hopefully, now that the recovery corner is being turned, the pace will accelerate, enabling the offshore sector to experience as rapid a recovery as the downturn it suffered over the past two years.



OFFSHORE STATS & DATA

Crude & Natural Gas Spot Prices

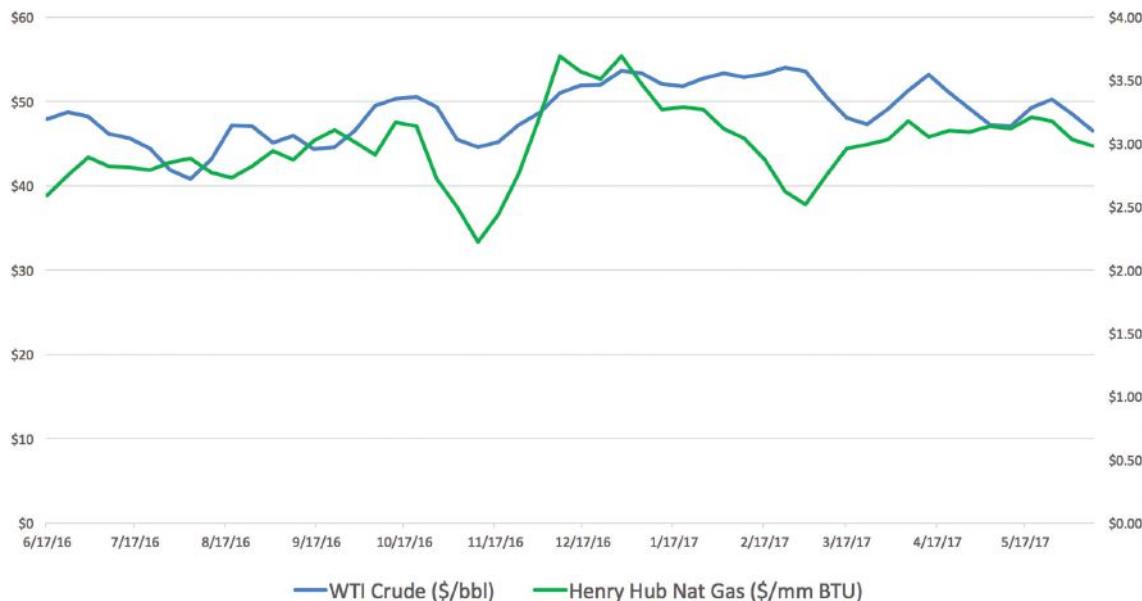
Prices in USD as of June 9, 2017

Crude oil prices are about \$1/bbl lower than one year ago, with WTI closing on 9 June 2017 at \$46.57 and this past week hitting their lowest levels of 2017 based on recent inventory data by EIA. Reinforcing the impact on prices of the global crude supply glut was IEA's Oil Market Report that highlighted higher than expected inventories in the OECD. Based on current supply and demand trends, OPEC predicted that inventories wouldn't "normalize" before Q1 2018. Consistent with that view, several major financial institutions are calling for greater strength in oil market fundamentals over the next year.

Henry Hub natural gas spot prices closed at \$2.98 on 9 June 2017, reflecting a decline of \$0.23 from our last report as global supplies remain strong. The share of U.S. energy supply provided by natural gas continues to grow, primarily at the expense of the more carbon-intensive coal. Low prices in the United States continue to encourage major users to switch, heightening the competitiveness of petrochemical plants currently planned or under construction and, at the same time, supporting the viability of the United States as an exporter of natural gas in the global markets.

Weekly Crude Oil & Gasoline Inventory Changes and Oil Price

Ocean News & Technology
July 2017

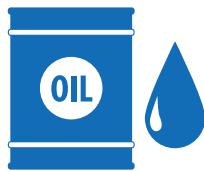


\$46.57

\$47.04 previous month



TRENDING DOWN



Cushing, OK
WTI Spot Price

\$2.98

\$3.12 previous month



TRENDING DOWN



Henry Hub
Spot Price

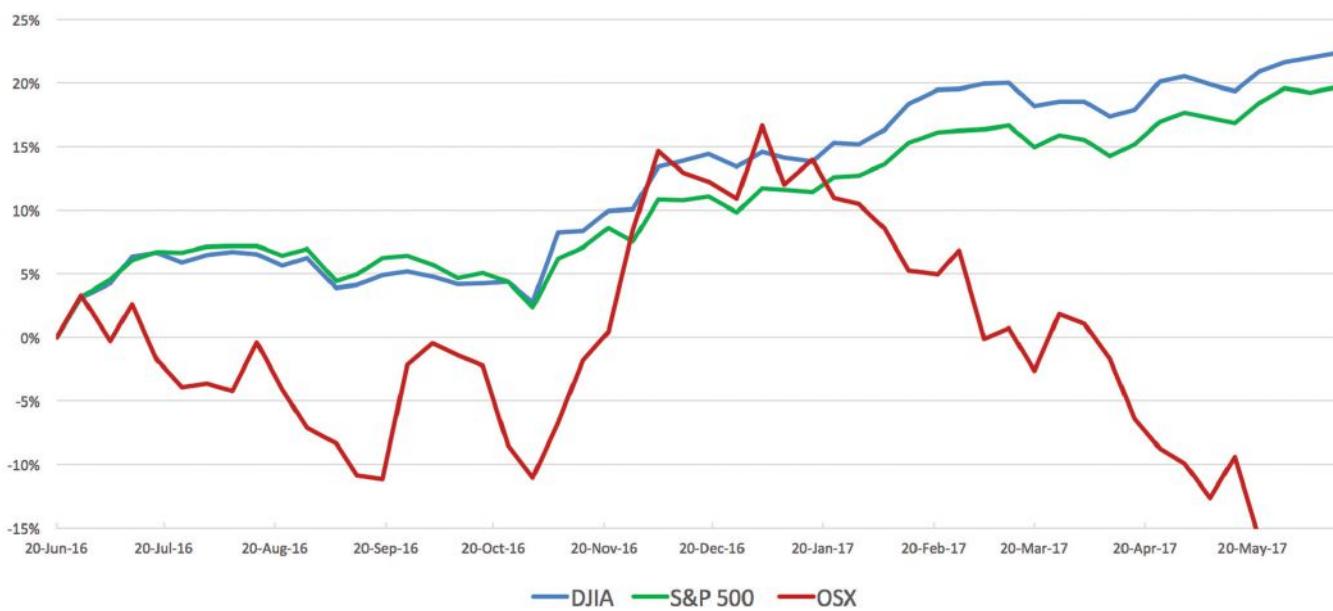
Oil & Gas Industry Trends

Key Equity Indexes

Cumulative Percentage Change as of June 12, 2017

Despite noise from Washington, tragedy in Europe, and brinksmanship in the Middle East, the U.S. equity markets remain relatively strong. Over the last 52 weeks, the DJIA is up 22.35% and the S&P 500 is up 19.68%. In contrast, as shown in the chart below, the woes of the Philadelphia Oilfield Services Index (OSX) continue as that index has dropped 16.46% over last 52 weeks. With oil prices dropping to new lows for 2017, the outlook for offshore-oriented companies remains bleak. The cheap-to-produce onshore fields of Texas, Oklahoma, and even the Bakken region of North Dakota have shown signs of life as production levels and rig counts in those areas have started to rise. Of course, this means more crude filling already bulging storage facilities. So, for now, prices remain low relative to production costs, continuing to put pressure on the companies of the OSX.

Selected Equity Indexes - Cumulative Percentage Change Last 52 Weeks



July 2017

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21,328.47

+523.63 from previous month



TRENDING UP

DJIA

2440.35

+58.62 from previous month



TRENDING UP

S&P 500

141.53

+10.92 from previous month



TRENDING UP

OSX

ON&T

2017 EVENTS

Oceans' 17
Anchorage, AK
September 17-21
www.oceans17mtsieeanchorage.org

Pacific Marine Expo
November 16-18
Seattle, WA
www.pacificmarineexpo.com

Teledyne Marine Technology Workshop
San Diego, CA
October 15-18
www.teledynemarinecom/events/teledyne-marine-technology-workshop-2017

AWEA Offshore Wind
New York City, NY
October 24-25
www.awea.org/events/event.aspx?eventid=50111

LAGCOE
Lafayette, LA
October 24-26
www.lagcoe.com/home-expo

WorkBoat
New Orleans, LA
November 29 – December 1
www.workboatshow.com

Offshore Wind Executive Summit
Houston, TX
August 9-10
www.offshorewindsummit.com/index.html

OilComm
Houston, TX
October 3-5
www.oilcomm.com

MTS Dynamic Positioning
Houston, TX
October 9-11
<http://dynamic-positioning.com>

SPE ATCE
San Antonio, TX
October 9-11
www.spe.org/events/en/2017/conference/17atce/home-1.html

Clean Gulf
Houston, TX
December 5-7
www.cleangulf.org

SPE Offshore Europe
Aberdeen, UK
September 5-8
www.offshore-europe.co.uk

Offshore Energy
Amsterdam
October 9-11
<http://offshore-energy.biz>

WindEurope
Amsterdam
November 28-30
<https://windeurope.org/confex2017>

World Congress of Ocean
Shenzhen, China
November 3-5
www.bitcongress.com/WCo2017/default.asp

ADIPEC
Abu Dhabi, UAE
November 13-16
www.adipec.com

Submarine Networks World
Singapore
September 25-27
www.terrapinn.com/conference/submarine-networks-world/index.stm

Asia Pacific Deep Sea Mining
Singapore
November 9-10
www.asia.deepsea-mining-summit.com

Philippines Marine
Manila, Philippines
July 12-14
<http://philmarine.com>

Maritime & Border Security
Manila, Philippines
October 3-4
www.maritimeandbordersecurityphp.com

2017 EDITORIAL CALENDAR

ON&T

CALENDAR

JANUARY

Editorial: Underwater Navigation; Manned Submersibles Research & Development Services
Product & Services Focus: Multibeam & Side Scan Sonar; Research & Development Services

FEBRUARY

Editorial: Oceanology & Meteorology; Decom & Abandonment
Product & Services Focus: Buoys & Monitoring Instrumentation; Environmental Monitoring/Testing Services

MARCH

Editorial: Subsea Fiber Optic Networks; Maritime Security
Product & Services Focus: Connectors; Cables & Umbilicals; Diver Detection Systems

APRIL

Editorial: Offshore Technology; Ocean Mapping & Survey
Product & Services Focus: Subsea Tools & Manipulators; Batteries; Training/Safety

MAY

Editorial: Autonomous Unmanned Vehicles; Defense & Naval Systems
Product & Services Focus: Tracking & Positioning Systems; Seismic Monitoring; Equipment Leasing/Rental Services

JUNE

Editorial: UW Imaging & Processing; Marine Salvage/UW Archaeology
Product & Services Focus: Magnetometers; Water Dredges & Airlifts; Diving Services

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JULY – Digital Distribution Only

Editorial: Ocean Engineering; Marine Construction
Product & Services Focus: Navigation, Mapping & Signal Processing; Data Processing Services

AUGUST

Editorial: Workclass ROVs; Deepwater; Pipeline/Repair/Maintenance
Product & Services Focus: Cameras, Lights & Imaging Sonars; Oil Spill Clean-Up Services

SEPTEMBER

Editorial: Ocean Observing Systems; Subsea Telecom; Offshore Wind Installation & Maintenance
Product & Services Focus: Water Sampling Equipment; Cable Installation Services

OCTOBER

Editorial: Offshore Communications; Subsea Inspection, Monitoring, Repair & Maintenance
Product & Services Focus: Acoustic Modems, Releases & Transponders; Marine Communications; Survey & Exploration Services

NOVEMBER – Digital Distribution Only

Editorial: Offshore Support, Supply & Emergency Vessels; Deep Sea Mining
Product & Services Focus: Ship Protection Systems; Cranes, Winches & Control Systems; Vessel Charter/Leasing Services

DECEMBER

Editorial: Light Workclass ROVs; Commercial Diving; Year in Review
Product & Services Focus: Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

SHOW DISTRIBUTION

JANUARY

UDT Asia – January 17-18*
Marine Data Infrastructure GCC – January 30-31*
Euromaritime January 31– February 2
GoM Oil Spill & Ecosystems – February 1-9
Oil North America – February 14-16

FEBRUARY

Underwater Intervention – February 21-23
US Hydro – March 20-23*

MARCH

Canadian Underwater Conf & Expo – March 26-28 Ballast Water Management – March 29-30
MCE Deepwater Development – April 3-5
Ocean Business – April 4-6
Telecom Exchange – June 20-21*

APRIL

Int'l Offshore Wind Forum – April 19-21*
OTC – May 1-4
AUVSI XPONENTIAL – May 8-11
IOSC – May 15-18
Deepwater Decomm Workshop – May 23-24*

MAY

UDT – May 30 – June 1
Offshore Wind Energy Europe – June 6-8
Seawork Int'l – June 13-15

JUNE

Teledyne CARIS User Workshop – June 19-22*
TBD

AUGUST

SPE Offshore Europe – September 5-8♦

SEPTEMBER

Oceans 17 – September 17-21
AWEA Offshore Wind – October 24-25♦
WindEurope November 28-30

OCTOBER

Oilcomm – October 3-5
MTS Dynamic Positioning – October 9-11♦
Offshore Energy – October 9-11
Teledyne Marine Technology Workshop – October 15-18
Offshore Well Intervention GoM – November 1-3*♦
Clean Gulf – December 5-7

NOVEMBER – Digital Distribution Only

World's Congress of Ocean – November 3-5*
International Workboat – November 29 – December 1*♦

DECEMBER

TBD

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♦ Pending



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July 2017

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MILESTONES



Alan Wrigley Steps Down as Ocean Signal's Managing Director

The founder of communication and safety at-sea specialist Ocean Signal, Alan Wrigley, has announced that he is stepping down from his role as managing director and is being replaced by Ocean Signal's current senior project manager, Neil Jordan, in a planned transition developed to continue the rapid growth of the business. Wrigley, who has been involved in the marine electronics industry for over 41 years, has steered engineering-led Ocean Signal from a new company with a small portfolio of devices in 2011 to an international brand and world leader in safety beacon technology. It now supplies a range of ground-breaking products to the leisure, commercial, and professional offshore sectors.

<http://ont.news/2tmtGuh>

Proserv to Build New £7M Great Yarmouth Facility

Proserv is preparing for future growth by investing in a new purpose-built technology center for subsea controls and communications in Great Yarmouth that is expected to be completed during March 2018. The move will see around 190 employees consolidate from two sites in the area into the new 65,000-sq. ft Beacon Park site in Gorleston-on-Sea, which will feature modern office, manufacturing, and yard space and provides the flexibility to add an additional 20,000 sq. ft of workshop capacity.

<http://ont.news/2t3ejI0>



July 2017

66

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Offshore Energy attracts a global audience of more than 12,000 offshore energy industry professionals. The three-day event, features an exhibition where over 650 companies will showcase their products and services. The accompanying conference addresses current and future issues in the offshore industry, covering developments in oil & gas, offshore wind and marine energy. See you in Amsterdam!

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Baker Hughes and GE Announce Executive Team Leadership

A new executive team, which has considerable experience, deep expertise, and the ability to drive global impact, will lead Baker Hughes, a General Electric Company, upon closing of their proposed transaction to combine GE's Oil & Gas business with Baker Hughes. The company will have operations in more than 120 countries, approximately 70,000 employees, and dual headquarters in Houston, Texas and London, UK.

<http://ont.news/2soS2qb>

AkzoNobel Join Forces with The Ocean Cleanup

The complete removal of plastic from the world's oceans has moved a step closer after AkzoNobel joined forces with The Ocean Cleanup to help turn the tide on marine pollution. The partnership involves AkzoNobel providing advanced, biocide-free coatings technology for all the devices and equipment used by The Ocean Cleanup for the next five years. It represents a major contribution to the organization's landmark efforts to clear plastic from our oceans. The cleaning is due to begin in the Great Pacific Garbage Patch in the next 12 months.

<http://ont.news/2sb41pf>



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Introducing the New 2017 Ocean Industry Directory

Scheduled for release in January 2017, the updated Ocean Industry Directory provides a dedicated solution for finding product and service providers. Avoid searching multiple, incomplete directories that fail to consolidate ocean industry companies in one place. The comprehensive, easy-to-use Ocean Industry Directory takes the mystery out of corporate listings by distinguishing between manufacturers, sellers, rental agents, and service providers.

Get Listed!

The Ocean Industry Directory is featured in every issue of Ocean News & Technology's print and digital magazines, providing exposure across multiple media channels that is important in a competitive marketplace. In addition, the Ocean Industry Directory is a key component of www.oceannews.com and updated on a monthly basis.

Key Features

If you're interested in becoming a part of the Ocean Industry Directory, consider the benefits of adding your own corporate listing. Key features include:



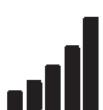
Company Listing

Offers companies the opportunity to list their company name, address, phone number, and website. All listings submitted through the website will be screened by a moderator to ensure that they align with the mission of the Ocean Industry Directory.



Search by Product or Service

Each listing will be categorized according to the product and or service offered by the company. The directory lists over 200 different oceanographic categories. Users will be able to search the categories listed within the directory to easily find information regarding companies associated with the products and services they are researching.



Sales Contacts

Upgraded listings include additional marketing content as well as sales contacts and emails. Let potential customers know who to reach and how to reach them.

Multiple Participation Levels

The directory offers three tiers of corporate participation. Ranging from free to upgraded, our listings are tailored to fit your company's marketing budget. These directory participation levels include:

	Free Plan Digital Only Listing	Silver Plan \$500 Digital Only Listing	Gold Plan \$950 Digital & Print Listing
Company name, address, phone number, and website	●	●	●
Link to chosen categories for products and services	●	●	●
Corporate Logo		●	●
100-word company introduction		●	●
Sales contact name and email		●	●
One corporate document upload		●	●
Print listing for one category			●

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Rowe Technologies Inc. [RoweTech] specializes in the design and manufacture of underwater acoustic Doppler products and imaging systems for the oceanographic, hydrographic and hydrologic markets. Founded in 2009, Rowe Technologies is a technology-based private company with the main office located in Poway CA, USA. Rowe's ADCP/DVL competitive advantage is single-unit configuration which allows simultaneous current profiling and bottom tracking.

BUOYS

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Website: www.DeepWaterBuoyancy.com
Contact: Dan Cote, Sales Manager



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Since 1977 Subsalve USA has been America's #1 manufacturer of standard and custom flotation devices and we are the innovators in buoyancy and engineered inflatables. Our products include: Professional, Commercial, Standard, Shallow Water, Enclosed Flotation Bags, Cable & Pipeline Floats, Water Load Test Bags, Rapid Recovery & Mark VI/ORCA EOD Systems.

OCEAN INDUSTRY DIRECTORY

CABLES

A-2-SEA SOLUTIONS LTD

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Website: www.a2sea.co.uk
Contact: Ross Taylor



In the past 20 years, A-2-Sea Solutions Ltd has had significant involvement in major submarine cable installations, on behalf of manufacturers, purchasers and installers of sub-sea cable systems – operating worldwide.

From initial beginnings in submarine cable joint design and system maintenance, A-2-Sea are now providing customers with turnkey solutions for short haul cable system installations. Other key business areas include: product design and development, coastal and offshore survey, provision of beach and subsea cable joints, cable system maintenance with a 365/24/7 emergency hotline rapid response service.

In 2016, A-2-Sea Solutions was ranked 13th on the UK Sunday Times SME Export Track 100 league table and 21st on the Fast Track 100.

CORTLAND COMPANY

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Cortland has more than 30 years of manufacturing experience supplying custom-designed electro-optical-mechanical cables. We provide solutions that meet the challenges posed by harsh environments, hydrostatic pressures, and high mechanical stresses.

We manufacture custom EOM cables assemblies for various subsea applications which include CTDs, hydrophones, magnetometer, tow cables, ocean bottom, ROV cables, and other custom application. Our global presence and industry-leading design engineers, manufacturing facilities, and management teams, work together to implement integrated solutions with unsurpassed reliability that support the needs of customers worldwide. Visit us online at cortlandcompany.com

FALMAT CABLE

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For over 50 years, Falmat Cable has been a key supplier and a solution provider to many global OEMs and end users supporting a wide range of marine applications. We design and manufacture high performance cables for use in harsh and demanding environments. Our rugged **Xtreme** cables are known and preferred worldwide for superior reliability and durability in commercial and military projects. We offer XtremeMarine cables with precision coaxial components for use with SD/HD video requirements, wet rated submersible pump cables, miniature fiber optic cables, a comprehensive range of highly engineered ROV Tethers plus our well recognized Xtreme Ethernet cables. Falmat is a Certified ISO9001/AS9100 organization. Visit our web site: www.falmat.com.

SOUTH BAY CABLE CORP

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Website: www.southbaycable.com
Contact: Gary Brown, Sales Manager



Since 1957, South Bay Cable Corp has designed and manufactured specialized electrical, electro-mechanical and electro-optical-mechanical cables for use in demanding marine environments. Cables are designed to meet customer requirements and include tether and umbilical cables for ROVs, tow cables, video inspection, faired cables and a host of other customer specific applications.

CONNECTORS

BIRNS, INC.

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BIRNS, Inc. has been serving the subsea industry since 1954, and is an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connectors, custom cable assemblies and lighting systems. With a NAVSEA PRO-020 certified molding facility, the company leads the industry with sophisticated connector lines, including exceptional electrical, electromechanical, coaxial, electro-coax, optical, electro-optical and electro-opto-mechanical hybrid options. BIRNS provides the industry's highest volume of cost-effective hydrostatic and helium pressure testing, and has a wide range of ABS Product Design Assessment (PDA) certified fiber optic and electrical penetrators. BIRNS also delivers brilliant LED and tungsten-halogen marine, chamber, security and commercial diving lights trusted in the world's most extreme environments.

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Birns Aquamate design and manufacture underwater electrical connectors, cable assemblies, and cable terminations. The company produces a wide range of standard industry connectors such as the 5500 Series, SC, MC, LP, FAWL/FAWM, Rubber Molded, etc. BIRNS Aquamate is the only underwater connector producer that guarantees compatibility with other manufacturers. Birns also specializes in fast turn-around for custom design of special connector solutions. Stocking dealers in the UK, South Africa and Holland as well as dealers in Canada, Germany, Belgium, Norway, China, and Brazil.

SEACON

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The SEACON Group are world leaders in underwater connector technology and provide an extensive and diverse range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the Oceanographic, Defense, Oil and Gas and Environmental markets. With locations in California and Texas, USA, Mexico, Brazil, the United Kingdom and Norway and a worldwide network of agencies and representatives, SEACON is able to supply very quick solutions to any requirements across the globe.

TELEDYNE MARINE INTERCONNECT SOLUTIONS

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TELEDYNE
MARINE INTERCONNECT SOLUTIONS
Everywhereyoulook™

Teledyne Marine Interconnect Solutions integrates the resources of ODI, DGO, Impulse, and Cable Solutions into a single organization that supplies innovative, high-performance solutions for harsh environment interconnect. Solutions for these harsh environments include wet-mate, splash-mate and dry-mate connectors, pressure boundary penetrators, cable assemblies, cable terminations, and custom-engineered encapsulation and molding. TMIS contains a broad portfolio of field-proven, time-tested electrical, optical, and hybrid interconnect capabilities optimized for applications where performance and reliability are imperative. Products are available as stand-alone items, or as complex solutions that integrate technologies into advanced, value-added systems.

DESIGN AND ENGINEERING

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Hydro Leduc is a specialist in the design and manufacture of hydraulic piston pumps, hydraulic motors, hydro pneumatic accumulators, and customized hydraulic components satisfying customer needs with reliable products from a reliable source. As the leader in micro hydraulics, it is feasible to obtain several tons of force from a minimal power source within a restricted space envelope. The techniques of micro hydraulics allow simple solutions to problems that are often beyond the limits of traditional mechanical options. Hydro Leduc's expertise is at your service in varied applications such as oil service tools, oceanographic instrumentation, aeronautics, and any extreme working condition of temperature, pressure, medium, and environment.

EQUIPMENT RENTAL

OKEANUS SCIENCE & TECHNOLOGY, LLC

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Okeanus is the premier rental provider for oceanographic and marine scientific research equipment utilized in nearshore and offshore projects around the world. Focused on providing industry-leading customer service, Okeanus offers advanced, high-quality technology coupled with knowledgeable and experienced staff that can deliver dedicated support regardless of a project's location.

FIBER OPTIC PRODUCT/SERVICES

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Ocean Specialists, Inc. (OSI) is a submarine fiber optic network development company with global project capabilities. OSI works with clients during all project phases of subsea network development, from planning and design to procurement and implementation. Our customers, primarily representing Oil and Gas, Telecommunications and Ocean Observing, recognize the value of fiber optic networks to their field and services solutions, and look to OSI to deliver the skills and experience that developing these networks require.



GYRO COMPASSES

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Kongsberg Seatex is a leading international marine electronics manufacturer specializing in the development and production of precision positioning and motion sensing systems. Our commitment is to provide quality products and solutions for safe navigation and operations at sea in the commercial offshore, maritime, hydrographics and defence industries.

INSURANCE

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ATL specializes in the design/manufacture of custom bladder-type fluid containment systems, including tanks, inflatables, pillows and bellows for surface and subsea. ATL's flexible fluid containers boast unparalleled chemical tolerance, abrasion resistance, and remarkable durability - used with methanol, diesel fuel, gases, ethyleneglycol, hydraulic fluids and chemical cleaning cocktails. Expedited deliveries are also available.

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CSA Ocean Sciences Inc. (CSA) is a marine environmental consulting firm specializing in multidisciplinary projects concerning potential environmental impacts of activities throughout the world. With extensive experience in environmental sciences and technical field operations, CSA is staffed and equipped to offer a complete range of services for projects in offshore, nearshore, estuarine, wetland, and freshwater environments.

MOTION SENSING EQUIPMENT

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NAVIGATION & POSITIONING SYSTEMS

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Advanced Navigation is a privately owned Australian company that specialises in the development and manufacturing of navigation technologies and robotics. The company has a focus on generating products of the highest quality standard, both in terms of hardware and software. Advanced Navigation has specialised expertise across a broad range of fields including sensors, GNSS, inertial navigation, RF technologies, acoustics, robotics, AI and algorithms. Advanced Navigation is an ISO 9001 certified company and maintains a strict quality control system across the two research facilities and three manufacturing facilities that they operate in Australia. Advanced Navigation is a carbon neutral company, offsetting all emissions due to energy use through the planting of trees.

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EvoLogics provides the world's most advanced spread-spectrum underwater communication systems (S2C) with multi-channel data management, networking capability, built-in tracking and positioning functions with USBL. Data loggers, acoustic wake-up module and releasers optionally included. Deployments in offshore platforms (FPSO, ABS), environmental monitoring, defense systems, ROV and AUV operations and more. Applications include simple positioning and sensor information to transmission of underwater photos.

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OCEANOGRAPHIC INSTRUMENTS/SERVICES

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• **Metcean Equipment Leasing:** Acoustic Doppler Current Profiler ADCPs (including StreamPro & RiverRay), Ice Profilers, AZFP, acoustic releases, wave/tide gauges, pingers, satellite beacons, CTD+DO+Tu profilers, DO & turbidity loggers, weather station, cages, flotation, bottom frames.

• **Oceanographic Products:** Ice Profiler IPS5 & shallow water SWIP, Wave Profiler, Acoustic Zooplankton Fish Profiler (AZFP), Acoustic Scintillation Flow Meter (ASFIM), Imagenex scanning sonar logger (IRIS), instrument cages, bottom frames. Custom acoustic products and system integration.

• **Consulting:** Field work, data collection, analyses, numerical modelling, acoustics, remote sensing, oceanographic mooring design and system integration.

• **Manufacturer's Representative:** Teledyne RD Instruments, Teledyne Oceanscience, Teledyne Benthos, WERA Northern Radar.

NKE INSTRUMENTATION

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• Fresh and marine waters multiparameter probes: CTD, dissolved oxygen, turbidity, chlorophyll, Phycocyanin, Phycoerythrin, CDOM, detection of hydrocarbons, pH, Redox

• Dedicated monitoring data loggers and equipment for: sediment transport, underwater systems behavior, marine corrosion, pCO₂ sensor (stand alone or on drifting buoy), density, absolute salinity.

• Intelligent network: environmental parameters (meteorologic and oceanographic), Ecosystems Approach to Fisheries (EAF - Voluntary fishing vessels), Webdata application. Contact: Valérie Le Pen - vlepen@nke.fr or Goulven Prud'homme - gprudhomme@nke.fr

• Provor and Arvor profiling subsurface floats (ARGO project): CTD, dissolved oxygen, BGC, deep; Argos and Iridium transmission.

• Drifting surface buoys with temperature and GPS receiver for Surface velocity project. Contact: Nathalie Le Bris - nlebris@nke.fr or Jérôme Sagot - jsagot@nke.fr

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RBR creates instruments to measure the blue planet. From the ocean abyss to the polar ice caps, our sensors track water parameters – temperature, depth, salinity, dissolved gases, pH, and many others. With design and manufacturing centrally located in Ottawa, Canada, our team works in a fast-paced, dynamic atmosphere to serve customers all over the globe.

ROMOR OCEAN SOLUTIONS
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ROMOR Ocean Solutions provides instrumentation solutions for the geo-physical, oceanographic, defense, security, oil & gas, and renewable energy industries. By partnering with world renowned manufacturers, ROMOR is able to offer technical knowledge, value added services, logistics expertise, and the most reliable instrumentation on the market.

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SEA·BIRD
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Sea-Bird Scientific combines the capabilities of Sea-Bird Electronics, WET Labs, and Satlantic to provide best-of-class sensors and systems for oceanographic research and environmental water quality monitoring of physical and biogeochemical properties. Sea-Bird Scientific is the leader in accurate, stable ocean instruments for measuring conductivity (salinity), temperature, pressure, oxygen, pH, chlorophyll, CDOM, turbidity, beam attenuation, irradiance, radiance, PAR, nitrate, and phosphate. Our CTD profilers, water samplers, moored CT recorders, wave/tide recorders, DO sensors, and optical sensors are used by research institutes, ocean observing programs, government agencies, and navies globally.

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A manufacturer of miniature data loggers with sensors as temperature, depth/pressure, salinity, tilt/acceleration, compass direction/magnetometer, light levels, acoustic receiving/transmitting. The loggers are used for various researches, including oceanography, fishing gear studies, equipment behavioral monitoring and fish tagging. Data is presented in the application software with a time-stamp for each measurement.

ROV SUPPLIES/TOOLS

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ROVSCO is an ROV supply company, focused toward supporting worldwide the needs of work-class ROV operators for any small component or any large equipment. We have extensive experience in this and have been doing it for 31 years. Contact us for (all original brand) consumables, ROV electrical connectors, cable assemblies, hydraulic filters, parts & components. We will respond with a quick response, excellent service and great low prices.

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SMART TELEMETRY

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 E-mail: info@edgetech.com
 Website: www.edgetech.com
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EdgeTech designs, manufactures and sells industry-leading side scan sonars, sub-bottom profilers, bathymetry systems and combined sonar systems. Additionally, the company produces world class underwater actuated and transponding solutions including deep sea acoustic releases, shallow water and long life acoustic releases, transponders, reliable USBL acoustic tracking and positioning systems, and custom-engineered acoustic products.

MARINE SONIC TECHNOLOGY

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 Website: www.marinesonic.com



Marine Sonic Technology builds high quality, high resolution side scan sonar systems.

Located in Yorktown, Virginia, Marine Sonic has been in business for more than 25 years.

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 E-mail: info@saivas.no
 Website: www.saivas.no
 Contact: Gunnar Sagstad



Environmental Sensors & Systems

- STD/CTD, Sound Velocity probes/recorder with optional multi-parameter facilities; Turbidity, Fluorescence, Oxygen etc. The new CTD/STD model SD208 with wireless communication and high accuracy: 0.002 mS/cm, 0.002 °C

- Precision pressure /depth (0.01% accuracy) and temperature sensors/recorders. Applications: hydrographic profilings, installation on ROVs and towed systems, etc. Robust and compact designs are combined with accuracy and "plug and play" compatibility. Output format for sonar equipment, e.g. EM1002, EM3000, SSP, HiPAP and Reson 8125.

SUBSEA FABRICATION

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 Website: www.newindustries.com
 Contact: Bill New



New Industries provides quality fabrication services to the offshore oil & gas and marine industries focusing on large diameter pressure vessels, suction piles, DNV buildings and deepwater subsea production equipment such as jumpers, PLETs, PLEMs and manifolds.

OCEAN INDUSTRY DIRECTORY

SUBSEA TECHNOLOGY

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Kongsberg Maritime is a marine technology company providing innovative solutions for all marine industry sectors including merchant, offshore, subsea, naval and fisheries. The company delivers systems that cover diverse maritime applications. Within subsea, Kongsberg Maritime's sonars, Sub-bottom profilers, multibeam and single beam echo sounders, cameras, positioning and underwater communication & monitoring systems, instruments, software and Marine Robotics are used in survey and inspection operations worldwide. Working closely with customers to develop technology that pushes the limits in subsea applications, Kongsberg Maritime is also dedicated to developing innovative environmental monitoring solutions such as the K-Lander system in addition to cutting-edge Marine Robotic platforms such as the futuristic Eelume vehicle.

SUBSEA TOOLING

SUBSEA AMERICAS

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Subsea Americas (SSA) is a leading provider of rental ROV tooling equipment on a worldwide basis. SSA is a 24 hr. / 7 days a week service provider of a comprehensive range of standard subsea tooling equipment. From torque tools and flying lead orientation tools to 15k isolated hydraulic intensifiers and wire rope cable cutters - SSA can fully support the client's needs with quality service, and reliable equipment at a most competitive cost.

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Ocean News & Technology

UNDERWATER VEHICLES/AUVs

HYDROID, INC. a subsidiary of Kongsberg Maritime

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Located in the U.S. and a subsidiary of Kongsberg Maritime, Hydroid is the world's most trusted manufacturer of advanced Autonomous Underwater Vehicles (AUVs). Our Marine Robotics systems provide innovative and reliable full-picture solutions for the marine research, defense, hydrographic and offshore/energy markets. Our products represent the most advanced, diversified and field-proven family of AUVs and AUV support systems in the world.

Developed by a veteran team of engineers, the innovations of Hydroid and Kongsberg Maritime provide a safe and reliable answer to the challenges that have hampered ocean exploration and security. For more information on REMUS technology, please visit www.hydroid.com.

OCEANSERVER TECHNOLOGY, INC.

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Website: www.iver-auv.com
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OceanServer Technology, Inc. is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs) with over 250 AUVs deployed worldwide. The Iver AUV is an affordable, commercial vehicle used for general survey and sub-surface security work, and serves as a research platform for autonomy, behavioral and sensor development studies at universities and navy research facilities.

UNDERWATER VEHICLES/ROVs

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E-mail: info@oceaneering.com
Website: www.oceaneering.com
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At Oceaneering, we do things differently, creatively, and smarter. As your trusted subsea partner, our unmatched experience and innovative technologies and solutions allow us to adapt and evolve regardless of market conditions. Only by working together will we safely and reliably re-shape the future of the oil and gas industry.

We are connecting what's needed with what's next as the world's largest ROV operator and the leading ROV provider to the oil and gas industry worldwide. We push the limits of ROV intervention and meet new, demanding tooling intervention.

OUTLAND TECHNOLOGY

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Offering the most rugged equipment and unsurpassed customer service, Outland Technology has been the world's leading manufacturer of underwater video, lighting and ROV equipment for over 30 years. We recognize that no two jobs are the same and specialize in products that are customizable for your specific applications.

QSTAR ROV TRAINING & SUBSEA SERVICES

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Website: www.qstar.es & www.rovs.eu



QSTAR was established to offer services for industries that require effective solutions for Subsea projects through the use of our ROV fleet and high Qualified personnel. Our World leading ROV Training Division offers High Quality Training for ROV PILOT TECHNICIANS as a World-Wide ROV Training Establishment Member of the IMCA.

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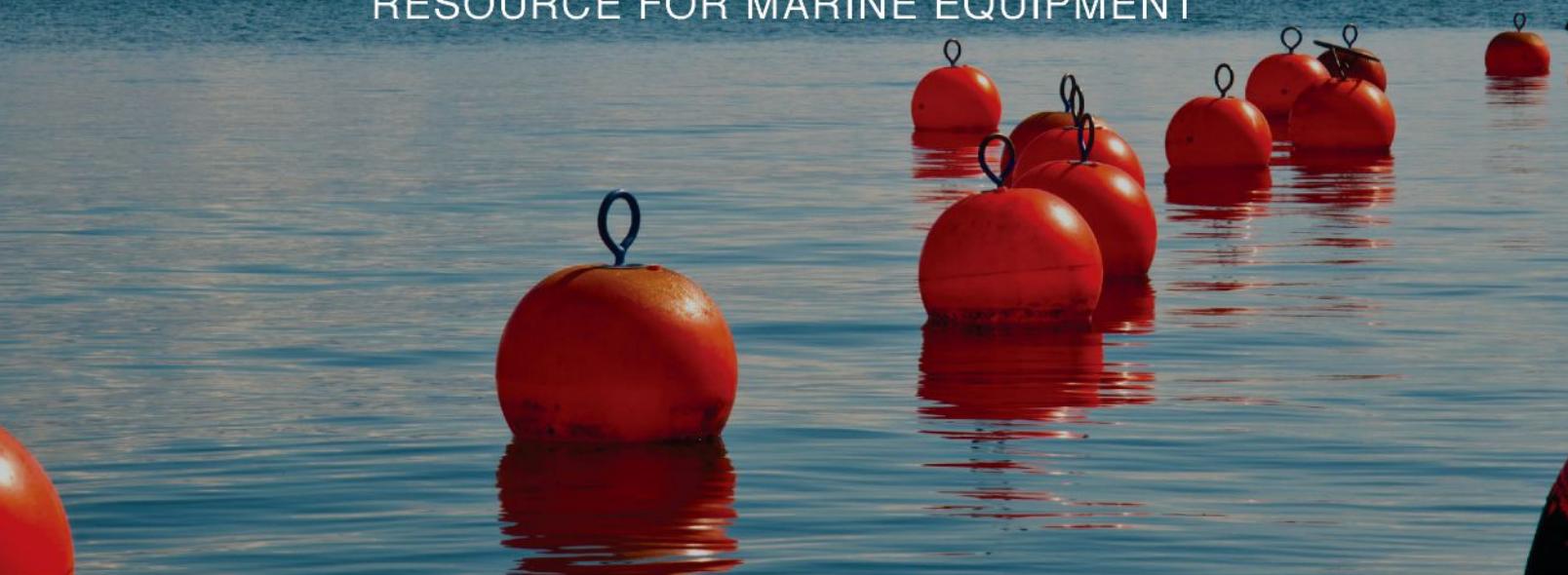
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