MARINE TECHNOLOGY REPORTER

July 2006
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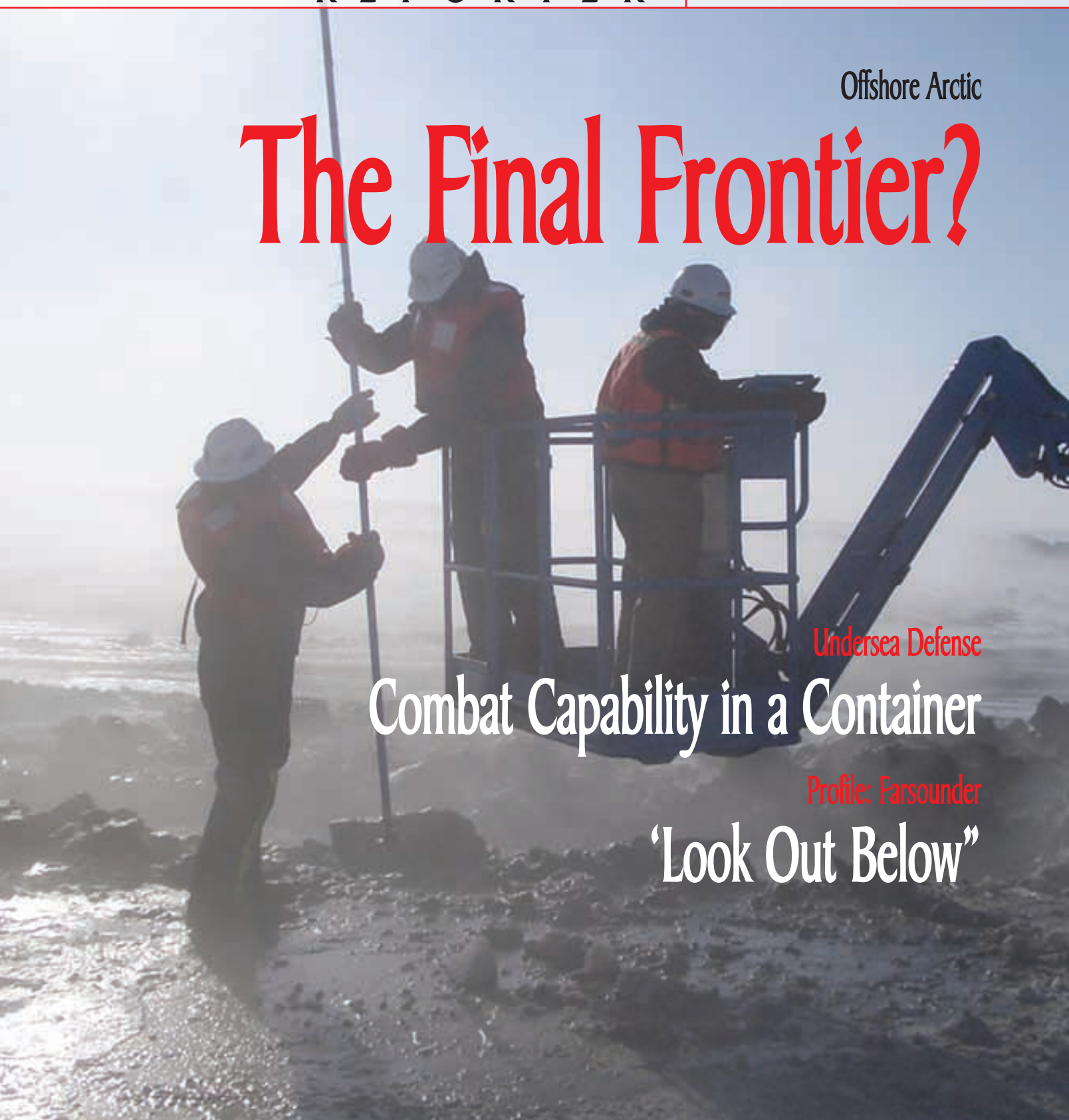
Q&A: Bruce Crager, Intec



Offshore Arctic

The Final Frontier?

Undersea Defense

Combat Capability in a Container

Profile: Farsounder

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July 2006

contents

Marine Technology Reporter • Volume 49 • Number 6

Engineers work on a Remote Minehunting System (RMS) as it sits in its holding bay on board the Navy's newest guided missile destroyer USS Momsen (DDG 92). The Momsen is the first Navy Ship to utilize a working RMS on board. RMS will provide the Strike Group Commander the first ever off-board mine reconnaissance capability from a surface combatant. Story starts on page 20 (U.S. Navy photo)

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MCT Appoints KPMG as Financial Advisers

With Marine Current Turbines' 1MW SeaGen tidal device set to be installed in Northern Ireland's Strangford Lough later this year, and preliminary work underway to develop a commercial tidal farm in U.K. waters within the next three to five years, Marine Current Turbines has appointed KPMG as financial advisers to review all of the company's strategic business options, including an AIM Listing.

Breakthrough for Subsea Compression

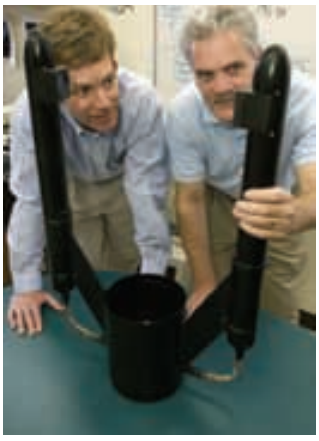
Hydro awarded Aker Kvaerner a contract for the Subsea Compression Pilot for Ormen Lange. This is reportedly a world first for subsea compression. The aim of the project is to evaluate whether a subsea compression station, at approximately 900 m water depth, is a viable alternative to an offshore platform.

Wide-Azimuth, Towed-Streamer Seismic Survey for GOM

WesternGeco said that Shell Exploration will underwrite a major portion of the first exploration multiclient wide-azimuth (WAZ) towed-streamer survey in the Gulf of Mexico. The project covers a minimum of 200 Outer Continental Shelf blocks in the central Gulf of Mexico, about 125 miles off the coast of Louisiana in water depths of 4,400 ft. Seismic data acquisition will begin in mid-July 2006 and conclude as early as December 2006 utilizing a unique design co-developed by WesternGeco and Shell.

WHOI Scientists Share Research Findings

Scientists towing an underwater digital microscope across the Atlantic have found possible missing links to the global nitrogen cycle, which in turn is linked to ocean productivity. In a recent report in the journal Science, researchers from the Woods Hole Oceanographic Institution (WHOI) found abundant colonies of Trichodesmium. The multi-celled, filamentous organism is thought to play a significant role in the input of nitrogen to the upper layers of the tropical and subtropical ocean, nearly half of the Earth's surface. Lead author Cabell Davis, a senior scientist in the WHOI Biology Department, and co-author Dennis McGillicuddy, an associate scientist in the WHOI Applied Ocean Physics and Engineering Department, suggest that nitrogen fixation rates for Trichodesmium may be 2.7 to 5 times higher than previously estimated from traditional sampling.



Dennis McGillicuddy (left) and Cabell Davis check out a VPR.
(Photo by Tom Kleindinst, WHOI)

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editorial

The U.S. Navy's move from the traditional "Blue Water" fleet to an integrated, network-centric, multi-tasking fleet designed to operate nearer to shore — in the Littoral — means that undersea detection and defense capabilities are riding an all-time high. As the U.S. fleet moves closer to shore, the number of potential threats multiplies exponentially, particularly from under the water, and accordingly the U.S. Navy and its industry partners have been working overtime to outfit navy vessels with top-tier technology designed to keep ships and sailors safe. Our navy insider, Edward Lundquist, recently visited Naval Surface Warfare Center in Panama City, Fla., to report on the Navy's effort to modularize undersea combat systems in it's new fleet of ships.

Greg Trauthwein
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Companies & People with editorial mention in this edition

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on the Cover

As steam rises above the water in a sea ice slot, a work crew prepares to survey the Oooguruk flowline test trench in the Beaufort Sea offshore Alaska. In March this year, INTEC Engineering assisted Pioneer Natural Resources Alaska, Inc., operator of the Oooguruk Field, in completing two 300-foot long test trenches-one near shore and one close to the gravel island drill site-to understand soil performance during trenching. INTEC completed detailed engineering of the Pioneer production pipeline system in winter 2006. The pipeline bundle installation completes in April 2007, with start-up planned for early 2008. (Story starts on page 30)

the Authors

Maggie Linskey Merrill is the founding editor and publisher of *Marine Technology Reporter*. She has 20 years experience communicating marine science, technology, environmental and engineering news and information. She has held positions at the Woods Hole Oceanographic Institution, Massachusetts Institute of Technology, HA Perry Foundation and Sea Data Corporation. In 1993 she founded *MTR* and the Marine and Oceanographic Technology Network (MOTN). **(Story on page 26)**

Edward Lundquist is a senior science advisor and naval analyst with Alion Science and Technology, Washington, D.C. A retired U.S. Navy captain, he currently supports the Navy's Surface Warfare Directorate.
(Story on page 20)

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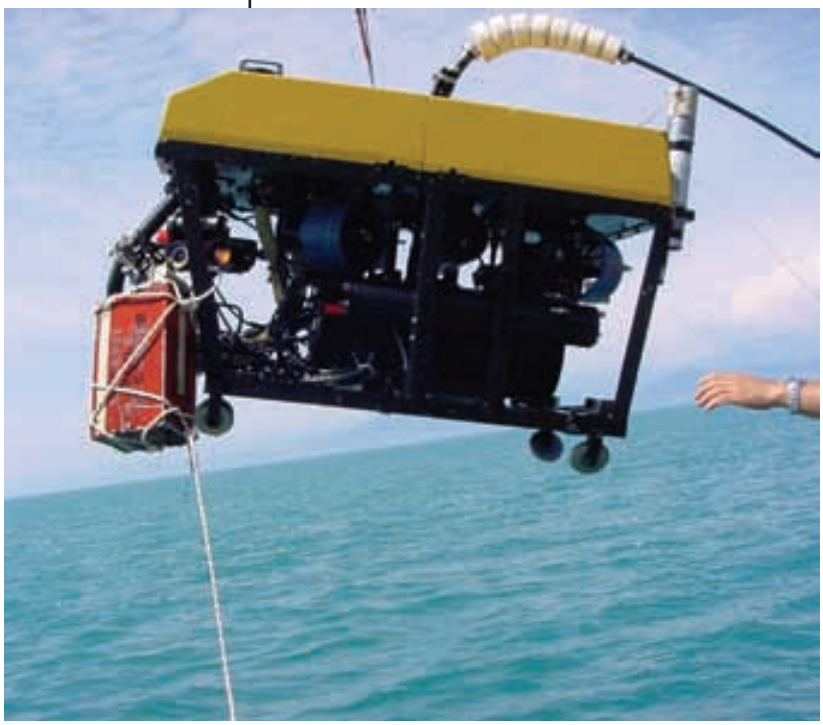
Sonardyne Helps in Flight Recorder Recovery



Sonardyne International was called-upon in a race to recover the flight recorders from a crashed Airbus A320. The Armavia airliner was lost with 113 lives on a flight between Yerevan and Sochi on the Black Sea coast at the beginning of May. It disappeared into water over 2,000 ft. deep where the vital "black box" flight recorders proved impossible to locate visually.

Strong currents and heavy sediment had quickly covered the wreckage removing all traces of the flight recorders. The Russian State Scientific Center, YMG (Yuzhmoregeologiya) had the job of locating the flight recorders and consequently turned to Sonardyne. Sonardyne supplied a ROV-Homer which enables underwater vehicles to home into the signals transmitted from beacons attached to divers, seabed equipment, or in this particular case, flight data recorders.

The device was rushed to the Black Sea where it was fitted to the search team's own RT-1000 ROV, which had been designed and built by YMG.

The light work/observation class vehicle is rated to 1,000 m and was equipped with three video-cameras, six lights and a hydraulic manipulator. The ROV Homer system consists of an ROV mounted range and direction unit and PC control software.

With the Sonardyne ROV-Homer fitted to the Russian-built ROV, the first black box was found quickly on the first day as its approximate location was already known.

The second black box was recovered the next day despite being buried in sediment without any traces being visible on the seabed. Recovery took place the day after enabling the entire operation to be completed in four days and within the deadline.

New WHOI Deep-Sea Hybrid Vehicle Gets a Mythical Name

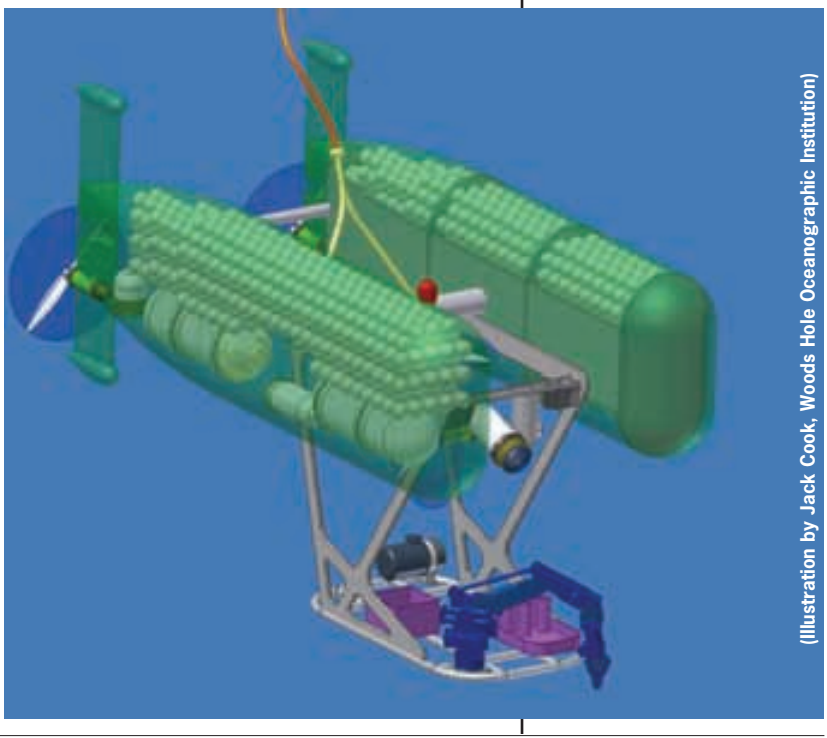
Nereus — a mythical god with a fish tail and a man's torso — was chosen June 25 as the name of a new deep-sea vehicle under construction at the Woods Hole Oceanographic Institution (WHOI).

The vehicle, known until now as the Hybrid Remotely Operated Vehicle, or HROV, will be able to work in the deepest parts of the ocean, from 6,500 m to 11,000 m (21,500 ft. to 36,000 ft.), a depth currently unreachable for routine ocean research. Scientists also plan to use it to explore remote, difficult-to-reach areas, including under the Arctic ice cap.

Engineers and ship's crew will transform Nereus from a free-swimming vehicle for wide-area ocean surveys to a vehicle tethered by a cable to a surface ship for close-up investigation and sampling of seafloor rocks and organisms. The transformation will take six to eight hours and happen on the ship's deck. The $5m, battery-operated vehicle will be the first ever designed to transform from a guided, tethered robot to a free-swimming vehicle. The vehicle is scheduled for sea trials in early 2007, and scientists plan to use it for research later that year at Challenger Deep near Guam, the deepest spot in the world's oceans.

NEREUS: Sea god called by Homer "Old Man of the Sea," noted for his wisdom, gift of prophecy, and ability to change his shape. He was the son of Pontus, a personification of the sea, and Gaea, the Earth goddess. The Nereids (water nymphs) were his daughters by the Oceanid Doris, and he lived with them in the depths of the sea, particularly the Aegean.

Source: In Encyclopædia Britannica. Retrieved July 10, 2006, from Encyclopædia Britannica Premium Service: http://www.britannica.com/eb/article?tocId=9055314



(Illustration by Jack Cook, Woods Hole Oceanographic Institution)

NOAA, VT Halter Celebrate New Vessels

VT Halter Marine Inc. and the National Oceanic and Atmospheric Administration recently celebrated construction milestones for two new vessels at the Moss Point, Miss., shipyard. A traditional keel laying ceremony was conducted for NOAA ship Pisces, which was preceded by the initial cutting of steel for the fourth and final vessel in the series. The sister ships will join NOAA ships Oscar Dyson and Henry B. Bigelow, which were also built by VT Halter Marine.

Annette Nevin Shelby, wife of U.S. Senator Richard Shelby, was the sponsor of Pisces, and attended the ceremony as the keel-laying authenticator. With assistance from a shipyard welder, Shelby engraved her name on the keel plate, which will be incorporated into the ship during construction. On the same day, construction of the fourth new fisheries survey vessel began with the ceremonial cutting of steel.

A team of five seventh-grade students and their teacher from Sacred Heart School in Southaven, Miss., won the "Name NOAA's New Ship" contest with the name "Pisces."

Main Particulars

Owner	NOAA
Mission	Fisheries Survey
Length	208 ft. (63.6 m)
Beam	49 ft. (15 m)
Depth	28 ft. (8.65 m)
Maximum Draft	19 ft. (5.9 m)
Main Propulsion	
Model	DHT 900 Z73 FD4 SCO/60H
Manufacturer	Ansaldo/Siemens
HP@RPM	3,016 hp/ 2,250 kW @ 134 rpm
Ship's Service Power	
Model	Two 3512/ Two 3508
Manufacturer	Caterpillar
KW	Two @ 1,360 KW/ Two @ 910 KW
Propellers	Rolls Royce
Diameter	4.3 m
Pitch	4.15 m
Number of blades	Five
Propeller material	NAB
Steering system	Rolls Royce
Speed	14 Knots
Hull Construction	Steel Hull/Aluminum Deckhouse
Crew Capacity	39
Passenger Capacity	N/A
Electronics / Navigation Equipment	Seacoast Electronics
Fuel	350 mt
Ballast	375 mt
Fresh Water	36 mt
Trawling System	Rapp Hydema
Gantry and Side Frame	Huber Stern
Centerboard Handling System	National Oilwell
Bowthruster	Elliot White Gill
Classification	ABS - A1, AMS, ACCU, DPS-1, and Ice Class
COUSCG Subchapter	USOLAS
Delivery Date	January 2008

The contest was open to NOAA employees in the region and to middle schools in Mississippi. The winning team produced an essay that supported their selection of a ship name. The students, their teacher and principal attended the keel laying ceremony as guests of NOAA.

Pisces, to be homeported in Pascagoula, Miss., will support NOAA research.

The 208-ft. ships are being built to meet the requirements of NOAA Fisheries Service as well as tough acoustic quieting standards set by the International Council for Exploration of the Seas, a European-based organization that has developed a set of standards to optimize fisheries research. NOAA fishery ships have highly specialized capabilities, such as performing hydroacoustic surveys of fish, bottom and midwater trawls, and running physical and biological-oceanographic sampling during a single deployment.

Once operational, the new fisheries survey vessels will be operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations, composed of civilians and commissioned officers of the NOAA Corps, one of the nation's seven uniformed services.

This Month in Navy History

July 4, 1842 - First test of electrically operated underwater torpedo sinks gunboat Boxer

July 17, 1858 - U.S. sloop Niagara departs Queenstown, Ireland, to assist in laying first trans-Atlantic telegraph cable.

July 18, 1973 - Task Force 78, Mine Countermeasures Force, departs waters of North Vietnam after completing their minesweeping operations of 1,992 tow hours for the cost of $20,394,000.

July 20, 1964 - Four Navy divers enter Project SEALAB I capsule moored 192 feet on the ocean floor off Bermuda for 11 day experiment.

July 22, 1964 - Four Navy Divers (LCDR Robert Thompson, MC; Gunners Mate First Class Lester Anderson, Chief Quartermaster Robert A. Barth, and Chief Hospital Corpsman Sanders Manning) submerge in Sealab I for 10 days at a depth of 192 feet, 39 miles off Hamilton, Bermuda. They surfaced on 31 July 1964.

July 23, 1958 - USS Nautilus (SSN-571) departs Pearl Harbor for first submerged transit of North Pole.

July 31, 1874 - Commissioning of USS Intrepid, first U.S. warship equipped with torpedoes.

Fugro Geos Installs New Tech on Stella

Fugro GEOS implemented new technology on Stella, the Bonga SPM (Single Point Mooring) Buoy - the largest in the world. The project, offshore Nigeria, has recently seen the installation by Fugro GEOS of an real-time meteorological, oceanographic (metocean) and upgraded tension monitoring system. Powered by integrated solar power systems, and with telemetry and remote data display units, the system is designed to allow data to be monitored and displayed in real-time for use by approaching tankers. "In this project we made the first use of surface-recoverable ADCP (Acoustic Doppler Current Profiler) deployment frames; cross-turntable real-time radio modem links for all anchor tension and current profile data; a downward looking ADCP on an SPM; and an H-ADCP (Horizontal ADCP) deployed on a rotating turntable to acquire near-surface current speed and direction, all corrected for turntable heading," said Michael Quinnell, Fugro GEOS Seasystems Manager.

"This new technology enabled us to undertake and complete the most comprehensive real-time metocean and tension monitoring system of its kind installed on an oil offloading SPM /CALM (Catenary Anchor Leg Mooring) buoy.

The system was designed to acquire a large quantity of raw, high frequency metocean and tension data to allow detailed future investigations of metocean conditions (e.g. squall monitoring, wave steepness), and SPM movement (e.g. tanker mooring hawser 'snagging', SPM heave, pitch, roll and anchor chain tensions).

Navy Orders Full Sonar Production

On June 29, the U.S. Navy continued steaming toward a littoral posture with a $45m order for a helicopter-based sonar system with improved shallow-water capabilities. Raytheon will build six AN/AQS-22 ALFS (Airborne Low Frequency Sonar) systems for the Navy's new MH-60R helicopter under the contract which advances the program into full production, with initial deployment to the fleet later this year. The MH-60R is designed to fly from aircraft carriers and other ships and ferret out subs using the sonar system, which is lowered into the water on a 2,500-ft. cable. The Navy has one operational MH-60R squadron flying out of San Diego. Hunting submarines will be one of the new copter's tasks, and the AN/AQS-22 is designed with greater overall range and improved performance in the coastal littoral waters where the U.S. military anticipates it will be operating in coming decades. Submarines, including diesel-electric boats that run particularly quietly beneath the surface, are seen as threats to carrier battle groups and amphibious task forces operating close to the shoreline. (Source: UPI)

Sunken Sub Appears to be USS Lagarto

Navy divers completed six days of diving operations June 16 on wreckage in the Gulf of Thailand believed to be that of the lost World War II submarine USS Lagarto (SS 371). The divers' observations appear to confirm the discovery made in May 2005 by British wreck diver Jamie MacLeod.

"Without a doubt, it's a U.S. submarine, a Balao-class," said U.S. 7th Fleet Diving Officer, Cmdr. Tony San Jose.

San Jose and his fellow divers reported identifying twin 5-in. gun mounts both forward and aft, a feature believed to be unique to Lagarto. They also reported finding serial numbers and the word "Manitowoc" engraved on the submarine's propeller. Lagarto was one of 28 submarines built in Manitowoc, Wis. The operations were conducted from the rescue and salvage ship USS Salvor (ARS 52) with embarked divers from Mobile Diving and Salvage Unit (MDSU) 1, based in Pearl Harbor, Hawaii. The Japan-based mine countermeasures ship USS Patriot (MCM 7) assisted by first pinpointing the location of the wreckage

Aker Yards to Build ROV Vessel

Aker Yards entered into a contract with Olympic Shipping AS, for the building of an ROV Vessel worth approximately $64m. The vessel is an Aker ROV 02 CD, designed by Aker Yards Project, with delivery scheduled for April 2008. It will be 106 m long with a 21 m beam. The accommodation facilities will have capacity of 100 persons. The vessel is also according to DNV`s Ice C class. It is specially designed and equipped for Subsea operation duties with a high focus on good sea-keeping abilities and excellent station keeping performances. The vessel will be environmentally friendly with focus on low fuel consumption and precautions with DNV`s Clean Design requirements incorporated in the design. The vessel will be equipped with a 200-ton subsea crane.

with its SQQ-32 sonar and remotely-operated Mine Neutralization Vehicle. The mission to positively identify Lagarto was carried out as part of the Thailand phase of the exercise Cooperation Afloat Readiness and Training, or CARAT. A Royal Thai Navy liaison officer was embarked aboard Salvor to assist during the mission. San Jose said that the diving operations were very challenging because of short bottom times, strong currents and limited visibility. Due to the depths involved, the dives had to be conducted with mixed gas.

Researchers Document Underwater Eruption

A team of Japanese and U.S. researchers said an unmanned probe got within feet of a violent underwater eruption in the Pacific Ocean, returning with footage of seismic activity under the sea.

The footage, released by the Japan Agency for Marine-Earth Science and Technology, showed gray ash and volcanic rock spewing from the summit of the underwater NW Rota-1 volcano as it erupted in October. The joint Japan-U.S. research team also collected sediment samples, team leader Yoshihiko Tamura said. The Hyper Dolphin probe went as close as 7-10 feet from the eruption. The video captures a lava flow streaming down the side of the volcano, 1,800 ft. underwater in the Mariana Arc volcanic chain. (www.forbes.com)

Buoy Tender for Malaysia

The Marine Department of Malyasia took delivery of the 40 x 10-m buoy tender Permata from the NGV Tech Shipyard near Port Kelang. With a raised foc'sle and low midships deck the vessel is equipped for servicing navigational aides. A large crane mounted forward will be used to deploy and retrieve the buoys. A shallow two meter draft combined with a pair of electrically powered spuds located on the stern quarters can be used to create a stable working platform in shallower harbor areas.

A pair of keel-cooled Cummins KTA50 M2 engines, each rated for 1,875 hp (1,398 kW) @ 1,950 rpm, supplied by Scott and English (Malaysia) provide main propulsion power for the vessel. Large deck mounted cooling fans pump ample air to the engine room. The engines turn fixed pitch open propellers through ZF W7000 gears. Accommodation is provided for a crew of 17.

Tankage includes about 42,000 liters of fuel and about 23,000 liters of potable water.

Software Aids Ship Recovery

Ocean Technology Foundation historian Peter Reaveley spent more than 30 years researching the battle between Bonhomme Richard and Serapis, using everything from eyewitness and literary accounts of both the battle and damage to the ship found in archives and libraries all over the world.

Using these accounts, as well as wind, weather and tidal data from the time, OTF created a computer simulation to hopefully pinpoint the location where Bonhomme Richard is located. Still, explained project manager Melissa Ryan, the data they're using is almost as old as the U.S. itself.

They're hoping that merging history, science and technology will give them an edge.

The software they used to select their search area, Ryan said, is the same software that the U.S. Coast Guard uses to find drifting vessels or, say, cargo containers that have fallen off ships. On July 17, researchers will take to the North Sea in a specially outfitted catamaran equipped with a side-scan sonar and magnetometer to map the ocean floor. Information, will be gathered over a three-week period by a team of up to eight people both on the ship and ashore in England.

Ryan said that if the foundation is able to come up with an additional $150,000, they can spend another three weeks searching. In addition to funding, weather is also a concern. Ryan said there's only a two-month period in the North Sea in which the seas are calm enough for them to search for the ship. Once the data is collected and collated, they can determine what objects are worth a further look. When they return next year, they will use remotely operated vehicles to visually inspect the objects, and if their science, history and technology worked right - and if luck is on their side - they'll find the Bonhomme Richard. (Source: Stars and Stripes)

Canadian Navy Loses Practice Torpedo

The Canadian Navy reportedly lost a practice torpedo. The 3-m torpedo, containing no warhead or explosives, reportedly sank unexpectedly in January after it was launched from a military frigate near Victoria. The frigate spent three hours looking for the practice torpedo, known as a

"hottorp" for Honeywell Operational Training Torpedo, the name given by the original manufacturer. A spokesman for the navy said the device, about one-third of a meter in diameter, remains missing in action. (Source: www.canada.com)

Navy Oceanography Participates in National Archives Program

The Naval Meteorology and Oceanography Command (NMOC) joined the National Archives and Records Administration (NARA) to establish one of the agency's first electronic data storage operations. Rear Adm. Timothy McGee, NMOC commander, and Dr. Kenneth Thibodeau, Director of NARA's Electronic Records Archive (ERA) Program, signed the agreement on May 25. "I am delighted be to a part of this exciting new project to preserve our nation's history and make it more accessible to future generations," McGee said.

The command through the Naval Oceanographic Office (NAVOCEANO), its largest subordinate, will manage and operate an electronic data repository that NARA will establish with the Naval Oceanographic Office at its Stennis Space Center headquarters. The Stennis repository will be a part of NARA's ERA Program. The agreement is expected to start a process between NMOC and NARA to provision advanced facilities, secure large-scale storage and computing, and accompanying services for the ERA Program.

Westplast Seismic Survey Boat

Westplast AS based in Leinøy, Norway, recently delivered to PGS Geophysical a new 9.5-m Seismic Survey boat for world-wide surveying duties. Designed by Westplast AS and Sundal Engineering AS the GRP hull is designed to provide a smooth and stable ride. The transom has been designed with a recess to incorporate the water jets and engine exhaust system.

Fitted with twin UltraJet 305HT waterjets coupled to Yanmar 340 hp 6LYA-STP engines, the boat achieved 30 knots during North Sea trials and a bollard pull of 2.6 ton at 3,000 rpm. This is the first of two boats that are being considered by PGS Geophysical for their new fleet of survey craft. Electronics include a Seiwa Mk III, black box ecosounder 50/200 khz, black box radar and 20-in. screen, Navman 7200 VHF, UHF, Autopilot ComNav 1440 and Compasspoint G2 GPS system.

The craft has a towing force of 2,600 kg, a cable lifter of 20 kg, a 1,500 kg main winch and a secondary winch on the bow. The Twin UltraJet 305HT jets produce thrust for a top speed of 30 knots so has the abili-

ty to get to survey sites quickly. The UltraJet control system, which is connected to the electronically driven helmsman's seat, gives fingertip control and precise maneuverability at all speeds.

Main Particulars

Builder	Westplast AS, Norway.
Designers	Westplast AS/Sundal Engineering AS
Customer	PGS Geophysical
Length, o.a.	31.2 ft. (9.5 m)
Breadth, o.a.	11.2 ft. (3.4 m)
Depth	2.3 ft. (0.7m)
Weight	7.1 tons
Main ngines	Twin Yanmar 340 hp 6LYA-STP
Waterjets	Twin Ultrajet 305 HT
Gearbox	Twin Disc MG5050, ratio 1,53:1.
VHF, UHF	Navman
Autopilot	ComNav 1440

South Africa Claims Vast Tracts of Sea Floor

South Africa is about to get bigger. The country's borders are likely to be enlarged to include an unclaimed million square km - of ocean floor. In terms of the United Nations Law of the Sea Convention, South Africa is in the process of claiming between 300 000 and 1.4-million square km - some 25% to 115% of its current 1.2-million square km of land - of underwater territory off the country's mainland and around the Prince Edward and Marion group of Antarctic islands. South Africa's fishing, natural gas, diamond-mining and pharmaceutical industries are likely to be the first to benefit from the initiative, which is being managed by the Petroleum Agency of South Africa (Pasa).

Bisso Marine Salvages Survey Vessel

Bisso Marine completed the salvage of a 480-ton survey vessel that purportedly sank after striking a platform which was toppled following Hurricane Rita. The vessel sank in 148-ft. of water in the South Marsh Island area and was found upside down lying per-

pendicular across an 18-in. gas pipeline. During the first phase of the salvage operation, Bisso's salvage team used the 400 ft. DP2 DSV Pertinacia to conduct the initial salvage survey, recover remaining fuel, lube oil and dirty oil as well as place the salvage bundle rigging. Once on location the salvage team rigged the D/B Lili Bisso to the pre-placed salvage bundles. The vessel was lifted upside down, rather than first being uprighted, to mitigate the risk of pipeline damage during a righting attempt.

Monitoring Survey of Deepwater Reefs

Several deepwater reefs have been discovered off Florida in recent years, and very little is known about these reefs because exploration has been limited. Harbor Branch Oceanographic Institution scientists are hoping to change that. A Harbor Branch team used the Johnson-Sea-Link II submersible, sub-deployed time-lapse video and listening devices, and towed nets to perform the first comprehensive survey. The survey focused on the Miami Terrace, a 65-km long platform that runs from South Miami to Boca Raton about 15 miles offshore in depths from 650 to 2,000 ft. (200 to 600 m).

In addition to using the submersible to collect information about the reefs, the team also placed video and acoustic monitoring equipment at study sites for longer-term monitoring. Time-lapse video recordings will allow them to assess differences in the abundance and behavior of animals during the day and at night.

ONS Set for Stavanger

Leading figures from the oil industry, international organizations and government will head the bill in a diversified conference at ONS 2006, scheduled to take place in Stavanger, Norway from August 22-25, 2006. Top speakers include Claude Mandil from the International Energy Agency, Exxon Mobil's Rex W Tillerson, Helge Lund of Statoil and Norwegian premier Jens Stoltenberg.

Chaired by Siv S Oftedal of Statoil, the conference committee has worked to create a program which addresses the ONS 2006 theme of bridging the energy gap. "This has become a solid and highly-interesting schedule in terms of geopolitics and technology," says Kjell Ursin-Smith, managing director of the ONS Foundation. "It will also make a valuable contribution to the recruitment of young people to the Norwegian oil industry, which has become a key concern of this business. "ONS is known for helping to set the world's energy agenda, and I'm sure we'll be doing that again with the 2006 program. It exudes strength, knowledge and focus on the future."

The conference will be opened on Tuesday, August 22, by Crown Prince Haakon, the third generation of Norway's Royal Family to perform this ceremony at ONS since the show started in 1974. Following a speech by Stoltenberg on Norwegian oil policy, the theme of bridging the energy gap will be addressed by Mandil, Tillerson and Lund from their respective perspectives.

ONS 2006 Exhibition Hours
Aug. 22 - Aug. 24: 9 a.m. - 5:30 p.m.
Friday, August 25: 9 a.m. - 3 p.m.
For more information: www.ons.no

A morning session on Wednesday, August 23, will focus on new and alternative resources, with an afternoon session devoted to managing resources to add reserves. Contributions from Malcolm Wicks, the U.K. minister of state for energy, Odd Roger Enoksen, the Norwegian minister of petroleum and energy, and Andreas Piebalgs, EU commissioner for energy, give the morning programme the character of a European "mini-summit."

Both the afternoon session and the morning session on Thursday, August 24, which addresses access to acreage and resources, will be more technical in character. Top executives from leading technology companies will focus in this part of the programme on exploration, research and development, and increased utilization of existing resources.

The ONS innovation awards are due to be announced for the first time at a lunchtime event on August 23. Enoksen will make the presentations together with jury chair Rolf Wiborg. Health, safety and the environment

have always been high on the ONS agenda, and a lunch on this topic is being staged for the second time in cooperation with the Petroleum Safety Authority Norway (PSA). In addition to speeches by Bjarne Håkon Hanssen, Norway's minister of labor and social affairs, and Paul Boateng, British High Commissioner to South Africa, this meeting will witness the presentation of the first PSA award for HSE excellence. ONS is continuing its commitment to highlighting young people in the industry, and its successful Young Professional Company Award again gives tomorrow's leaders a place in the program. Teams from Det Norske Veritas, Hydro, the Norwegian Petroleum Directorate and Aker Kvaerner will provide linking reflections at various points in the conference.

Q&a

Q&A with Bruce Crager, CEO, Intec Engineering

MTR: How did you become involved in the maritime field?

CRAGER: I became involved in the maritime field as an ocean engineer at Texas A&M. I was a co-op student and spent 12 months in various areas working for Otis Engineering, which Halliburton later acquired. I spent eight months of this time offshore and confirmed that this was an area where I wanted to be involved. I initially started in the drilling industry and was exposed to the design of rigs. I also was very involved with offshore production operations during my time at Oceaneering, when I started and managed a group that focused on floating production systems.

MTR: Describe your management philosophy?

CRAGER: My management philosophy is a "coaching" style. I believe in working in a democratic manner with my management team, where my job is to lead this team while empowering them to do their jobs. I believe my success over the years has been the result of managing some very motivated and intelligent people. Our successes resulted from working together as a strong management team.

MTR: What are the three of the most significant changes that have occurred in the last five years?

CRAGER:

a. The oil and gas boom market has used up most of the existing tonnage, and industry has fewer vessels available today for drilling or for conversion to floating production than in the past.

b. The continued phasing out of tankers due to OPA 90 has significantly changed the market for hulls that could be converted to floating production/storage offloading systems (FPSOs). Most FPSO providers also are focusing on units with double hulls to accommodate regional requirements. As a result, even single-hull vessels coming out of tanker service may not be used for FPSO conversion.

c. The continued need for trained personnel, exacerbated by the high median age of our industry, is a challenge across the oil and gas sector. This dilemma also impacts the maritime industry, and trained personnel will become more and more difficult to locate.

MTR: How has the industry changed from when you began your career?

CRAGER: When I began my career in 1975, floating production systems did not exist, industry had installed only a small number of subsea wells and drilling rigs were limited to approximately 4,500 ft. of water. We now have almost 200 floating production systems, more than 2,000 subsea wells and rigs that drill in more than 10,000 ft. of water. These technology strides are dramatic. That is, industry's continued drive for innovation to support the exploration and development of new reservoirs-that are increasingly remote and challenging-has elevated and extended technology performance. A critical component of this success is the understanding and value of lessons learned; thus carrying industry forward as demand increases exponentially, particularly among emerging regional markets, such as Southeast Asia, Russia, China, Eastern Europe, West Africa and Latin America.

MTR: What investments is INTEC making today that are intended for the long-term health of the company?

CRAGER: INTEC's greatest asset is its people, making our primary investment employee career development, knowledge retention and technology development. This effort supports the company's engineering and technology-driven initiatives and systems that serve our clients' needs for safe, reliable developments. INTEC believes in providing sustainable career growth through on-site project training and mentoring and lunch-and-learn sessions. The result is that we're able to push the technology envelope while providing expert training and hands-on exposure to frontier projects. We also invest in processes and systems for knowledge-sharing among the company's var-

ious operations worldwide. Our investments further include geographic diversification to support increasing deepwater and offshore arctic development opportunities.

MTR: How have industry demands significantly affected the product and service offerings of INTEC?

CRAGER: Industry's various mergers and acquisitions over the last few years have led to fewer but larger clients and shifts in engineering approaches for capital projects. In some cases, these changes have resulted in more opportunities for INTEC to grow its full-scope engineering capability, beginning with conceptual and front-end detailed engineering through to detailed design work and construction management. INTEC also sees more opportunities for its services as an owner's engineer, particularly among national oil companies (NOCs), which require a full spectrum of engineering and project management services. Acting as an owner's engineer, we're able to create a complete field development solution while gaining increased efficiencies for an operator. In general, frontier projects increasingly demand integrated services from engineering through to construction. INTEC teams with construction contractors to provide such services. Industry's serious shortage of skilled personnel combined with an increasing demand for integrated services, however, could limit the company's ability to grow. Large- to medium-sized specialty engineering companies like INTEC now compete with manpower providers and independent consultants that once were employees of engineering service companies.

Separately, increased oil and gas development projects in areas such as West Africa, Brazil, the Mediterranean, Australia and Malaysia find INTEC well-placed geographically, with operating and project offices around the world.

MTR: How does the continued trend of new ship construction evolving in the Far East, particularly China, affect your business?

CRAGER: We see China as a potential area of growth, and we are evaluating our strategy for it. Our Malaysian and Australian operations have developed significant FPSO/FSO design and construction capabilities over the last few years. We believe these floater designs will facilitate continued growth for our Asia-Pacific business.

MTR: What do you consider the top priorities - project wise - for your company in the coming 12 to 24 months?

CRAGER: Deepwater field development and marine pipeline projects; Arctic projects; LNG projects; Deepwater hybrid risers; FPSO, FSO, FLNG, FSRU; Long-distance subsea tie-backs; and High-pressure/high-temperature (HP/HT) projects

MTR: Briefly describe your outlook for the business in 2006 and beyond?

CRAGER: Barring an unforeseen shock, we envision sustained demand that will put continuing pressure on increased production of oil and gas. The upside may be limited by the industry operating at nearly full capacity. That is, the industry has only so may drill rigs, installation vessels, reservoir engineers and technical staff to progress developments. These industry constraints will dampen significant year-on-year growth in the numbers of offshore projects.

The cost of technical personnel will rise as competition increases between operators, contractors and equipment suppliers for scarce resources. National oil companies also are demanding increasing levels of local content, causing difficulties in staffing major projects in remote locations. Rising costs for raw materials and equipment will further impact development of projects. Also note: projects that were marginal at $30 oil are likely to remain marginal at $50 oil due to cost increases.

High political risk in some oil and gas provinces, including parts of the Middle East and West Africa, will continue to cause operators to balance their portfolios and investments, driving development activity toward locations-such as the U.S. Gulf of Mexico-that enjoy more predictable and acceptable political and fiscal risks.

While perhaps located in increasingly challenging frontiers-such as the offshore arctic and deeper waters-and more expensive to develop, operators likely will pursue exploration and development in regions less impacted by political unrest.

(Continued on page 57)

LCS Mission Packages Being Assembled, Tested at Panama City

Combat Capabili

by Edward Lundquist

The U.S. Navy has two different Littoral Combat Ship (LCS) seaframes currently under construction, while concurrently assembling the combat systems packages. Unlike multi-mission combatants, the focused-mission LCS will feature reconfigurable, modular mission packages to counter access-denial threats — mines, submarines or small, fast attack boats — in the littoral. The first mission packages for mine warfare are now being assembled and tested at the Naval Surface Warfare Center in Panama City, Fla.

"We're bringing a large number of individual systems primarily focused on unmanned platforms - unmanned underwater vehicles, unmanned surface vehicles, [and] unmanned air vehicles - in which we've integrated sensors and weapon systems. And we have put them together in a modularized fashion to put into the mission bays of the seaframe," says Capt. Walt Wright, program manager for LCS Mission Modules, Program Executive Officer for Littoral and Mine Warfare.

Lockheed Martin is building LCS 1, named Freedom, a semi-planing monohull design at Marinette Marine in Marinette, Wisc. General Dynamics is building LCS 2, named Independence, a trimaran at Austal USA in Mobile, Ala. Each ship, which will be more than 4,000 tons loaded, will have a core crew of just 40 people, and each mission package will bring a crew of 15 people. A mission package includes the systems, modules and crew. There will also be an aviation detachment of 20 people for a total of 75 crew per ship.

NSWC Panama City is designing, developing and integrating the modules for the mine warfare (MIW) mission package. The antisubmarine warfare (ASW) package is being created by Space and Naval Warfare Systems Command (SPAWAR) San Diego and Naval Undersea Systems Center Newport, R.I. The surface warfare (SUW) mission package is being developed by Naval Surface Warfare Center Dahlgren, Va.

There are significant challenges integrating the components of a combat system with any new ship. With LCS, the challenge is multiplied because there are essentially three different interchangeable mission packages, two different combat systems, and two different seaframes.

"We are creating the first of the three mission packages for LCS," says Jose Velez, a systems engineer and the LCS customer advocate at NSWC Panama City. Velez said NSWC Panama City is also the certifying authority for all of the mission packages. "We certify that the mission packages are ready. We check the interfaces, validate the communications and verify everything works the way it's supposed to and that they are ready for fleet use."

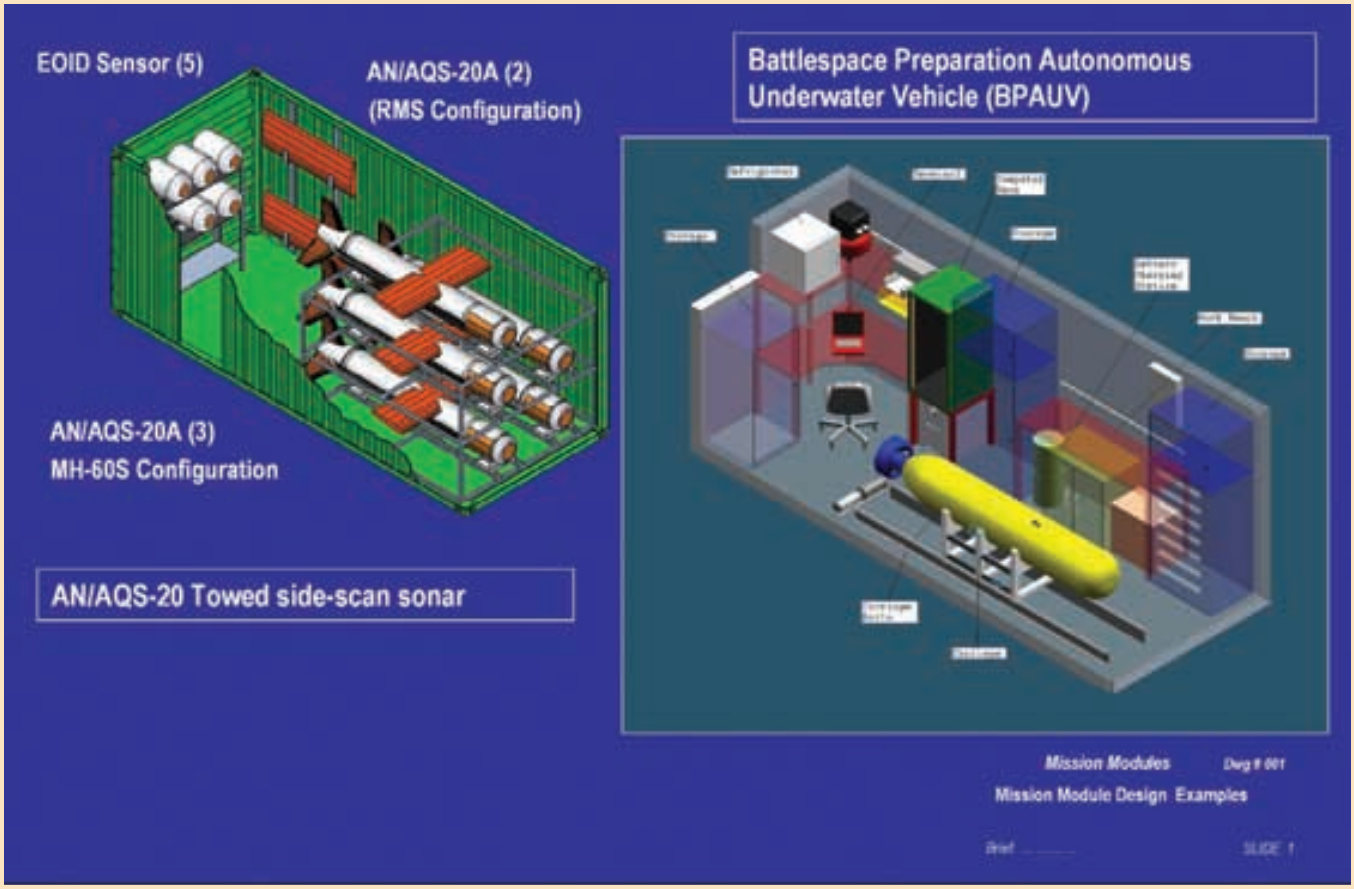
The seaframe has the basic combat management system (CMS) with the computing environment and post mission analysis tools for each of the mission packages. The mission packages can be changed quickly to give the ship a different mission. Each of the two ship designs, while very different, had to meet requirements for weight, volume, power, storage, and physical and computer interfaces, along with speed, draft and inherent self-defense

ty in a Container

Engineers work on a Remote Minehunting System (RMS) as it sits in its holding bay on board the Navy's newest guided missile destroyer USS Momsen (DDG 92). The Momsen is the first Navy Ship to utilize a working RMS on board. RMS will provide the Strike Group Commander the first ever off-board mine reconnaissance capability from a surface combatant.
(U.S. Navy photo)

Author Edward Lundquist examines the AQS-20 towed sonar which is stowed in a specialy adapted container as part of the mine warfare mission package on the Littoral Combat ship at the Naval Surface Warfare Center in Panama City, Fla. Jose Velez, a systems engineer and the LCS customer advocate at NSWC Panama City (center) and Jeff Mott (right), project engineer for the MIW support containers development, look on.

(Navy photo by Rob Cole)



capabilities. The modules can be placed on either seaframe design.

"A mission specialist would be able to operate his or her systems the same way with either ship," Velez said.

The mission packages are modularized 20-ft. ISO-compatible shipping containers made by Sea Box, Inc. The containers are standard size, but strengthened for naval use, with Tyco Unistrut fastening systems installed to secure the equipment to the deck, overhead and bulkhead, according Jeff Mott, project engineer for the MIW support containers development.

The containers have lighting and power receptacles, with interfaces for power (115 VAC, 44VAC and 28VDC) and communications mounted outside the box. They are equipped with white and red lighting (for night vision), handling equipment and diagnostic computers, smoke alarms, fire extinguishers, and phones. Some containers have air conditioning or nitrogen charging equipment.

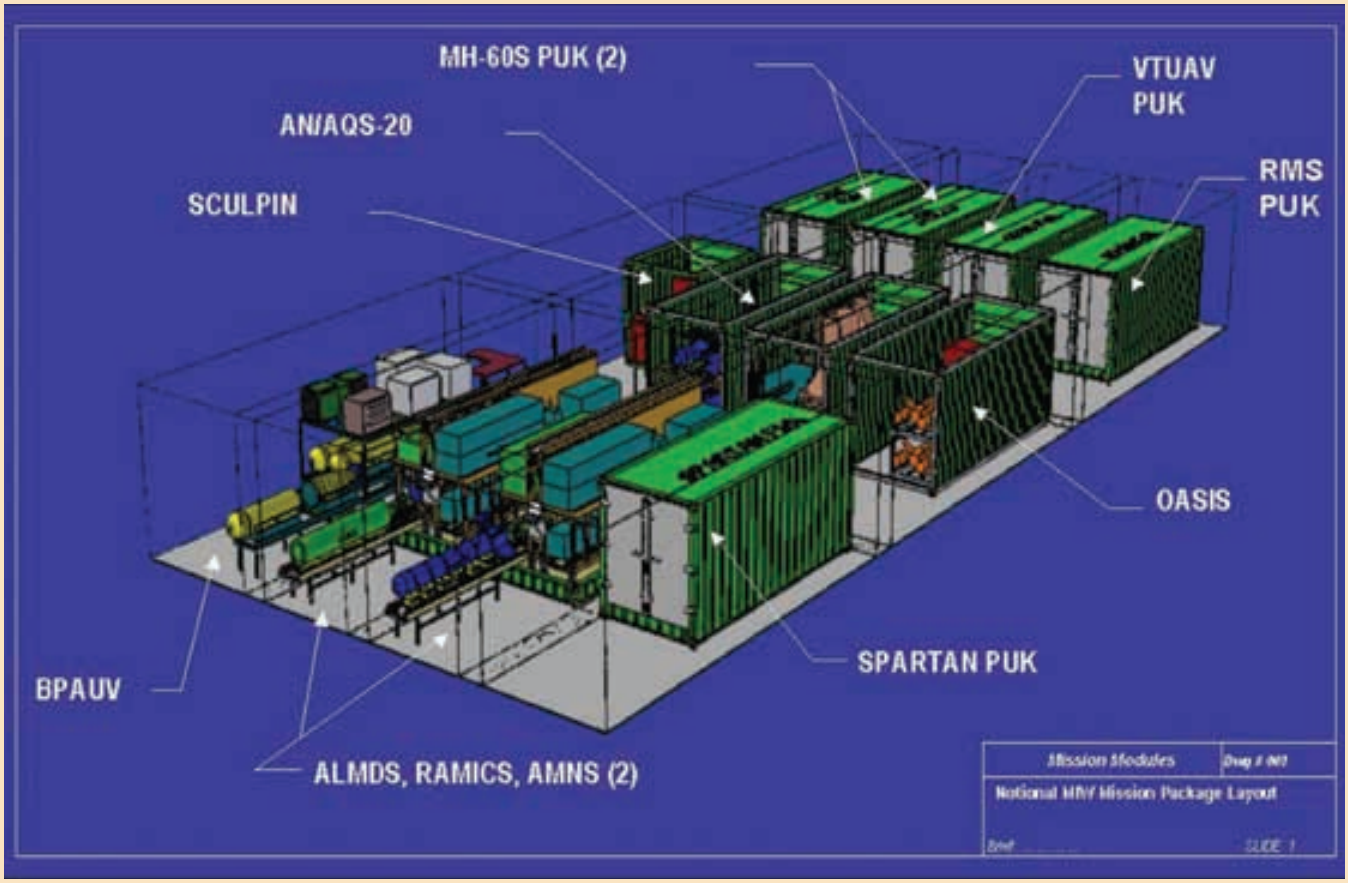
Mine Warfare Mission Modules

The LCS configured for mine warfare can sprint to an area of concern, then deploy offboard systems to look for mines. Its volume search sonars can search a large volume of water to find objects of interest, then it can go back and investigate mine-like objects using Electro-optical identification (EOID) sensors.

LCS carries a helicopter which can employ the AN/AES-1 Airborne Laser Mine Detection System (ALMDS), built by Northrop Grumman Corp. Airborne Ground Surveillance and Battle Management Systems, Melbourne, Fla., a high-area coverage system that detects, classifies, and localizes floating and near-surface moored sea mines using a blue-green laser.

The LCS MIW mission package will have one container that carries four Raytheon AQS-20 variable depth minehunting sonar units. Two of the towed sensors will be configured for employment from the H-60S helicopter, and the other two configured for towing by the Lockheed Martin WLD-1 Remote Minehunting Vehicle (RMV). The towed bodies used with the aircraft have "wings," while the bodies towed by the RMV do not. Each AQS-20 sonar can be used for both volume search mine hunting and for identification, but requires a different sensor head for the two functions. A handling system is installed in the container to change sensor heads on the sonar bodies.

The Flight 0 MIW LCS mission package is intended to



have one H-60 helicopter and two RMVs, but the initial LCS will use just one RMV because the system has just entered production and there are limited units available for use. The RMV runs just below the surface with a large snorkel mast antenna for communications relay and a camera and air supply and exhaust for it's 370 horsepower Cummins diesel. The engine provides propulsion as well as 500-plus amps of electric power for the onboard systems and the streamed sensor being towed far behind and below the main unit. The autonomous RMV follows a course of preprogrammed waypoints at transit speeds up to 16 knots, and then streams the AQS-20, which it tows at six to ten knots, depending on the depth of the tow body. The sonar maintains a pre-programmed elevation above the bottom.

"We've taken RMS to sea," says Wright. "It's a very effective mine hunter."

Ed Benner is a logistician at NSWC Panama City who is working on the training requirements for the mission specialists. Much of the initial training for LCS mission specialists will be "factory training" with the original equipment manufacturers, he says. First, the Sailor must be trained to operate an individual system, then to be able to work in the mission command center as a team."

"Because there's no legacy school or no schoolhouse infrastructure set up for a lot of these unmanned systems, you had to pick what was available out of the existing schools and then come up with your own specialized curriculum at the laboratories or at vendor sites to actually do vendor training in a lot of cases," adds Captain Wright.

Passing the test

John Brady, a systems engineer at NSWC Panama City said the Navy is employing new methods to test and certify the mission packages.

Much of the LCS combat capability comes from systems that were originally developed for use with some other platform or for some other purpose. Some of these systems are quite mature and have been thoroughly tested. Others have not been fully tested. "We decide how much risk there is in bringing new, unproven systems into the mission package, and determine if that level of risk is acceptable. We are using a lab-based test environment as well as at-sea testing. So we will end up deploying with some systems that have not been through the full OPEVAL process," says Brady. "That's the new paradigm for the 50-knot Navy."

"We used to wait until a system was completely ready for an operational evaluation, and then we created an elaborate test regime that took six to nine months, maybe longer. After that, we would wait for the analysis and the report of the results. Now we are constantly testing. We test a little, learn a little, and test some more. It's ongoing, and we are incorporating what we learn," Brady says.

The systems being employed on LCS address the full regime of mines at all depths. Some of the systems are in production, some are in low-rate production, and some are engineering development modules (EDMs).

Greg Roberts heads up the Mission Package Development Lab at Panama City where they have replicated the actual operation centers to be found on each of

Modified 20-foot shipping containers will be used for mission packages. The containers will be strengthened, and equipted with handling equipment and fasteners as well as power and communications.

(Navy photo by Rob Cole)

the LCS seaframes. The ruggedized COTS workstations will have the same software packages. The lab enables the flexible development, integration and certification of the initial spiral software packages.

The software packages can be readily adapted as the technology and processing capability matures. "It's rapidly reconfigurable," Roberts says. "We can be certifying 1.0 while we are developing 1.1"

"We're looking at tighter integration if the command and control software for the vehicles, with less legacy software employed where possible," says Sandy Martin, a system engineer at NSWC Panama City.

The RMV, for example, is autonomous, and follows preplanned waypoints. The operator on the LCS can monitor the visual presentation transmitted from the camera on the mast. The vehicle operator works next to the sensor operator. In the future, the two stations might be combined, or one operator might be able to control multiple vehicles. "We want to aim for less and less vehicle control, and only intervene with an autonomous vehicle as needed," Martin says. "LCS has shattered all of the old approaches to shipbuilding," says Martin. "This is the first time we have pulled this many items together that were never designed to work together."

Navy Awards Contract for Third LCS

The U.S. Navy awarded a $197.6 million contract option to a team lead by Lockheed Martin for construction of the third Littoral Combat Ship (LCS). LCS 3 will be the second built by the Lockheed Martin team.

"This contract award is a testament to the strong resolve of both the Navy and industry to get these highly capable ships into the water as quickly as possible," said Rear Adm. Charles Hamilton, the Navy's Program Executive Officer for Ships.

"LCS will introduce unprecedented speed, agility and flexibility into the littoral battlespace. The rapid acquisition of these modular warships sets a new standard for procurement in support of the warfighter."

The Lockheed Martin team will begin construction of LCS 3 in January 2007 at Bollinger Shipyards in Lockport, La., and ship delivery is planned for 2009. It will later be homeported in San Diego, Calif., with the first two ships of the class.

Lockheed Martin Corp.'s Maritime Systems & Sensors unit, Moorestown, NJ, is the prime contractor. Teammates include Bollinger Shipyards, Lockport, LA, ship designer Gibbs & Cox, Arlington, Va., and Marinette Marine, Marinette, Wis., which is currently building LCS 1 Freedom.

Under a separate contract, General Dynamics is currently building LCS 2 Independence, with an option to build a second ship.

FarSounder technology helps to

Look Out Below

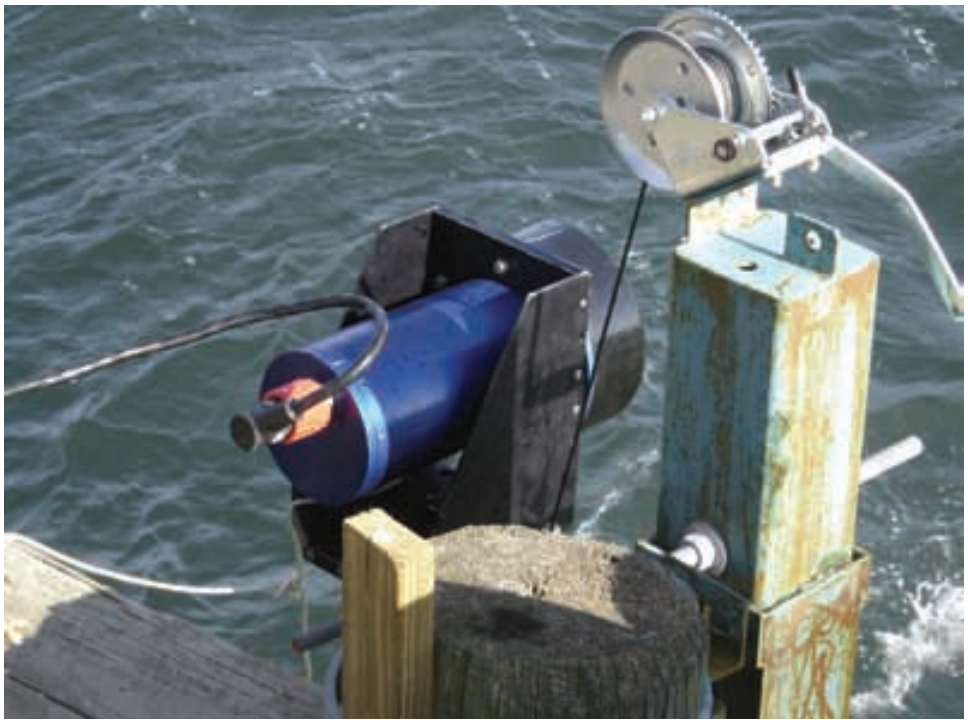
by Maggie L. Merrill

FarSounder, Inc. is a Providence, RI, based technology company incorporated in 2001. FarSounder's underwater acoustic technology provides mariners the ability to "see-ahead," underwater, in 3D, with simultaneous range, bearing and depth information.

The technology is based on research begun at the University of Rhode Island's Department of Ocean Engineering and Ocean Technology Center with assistance from the Naval Undersea Warfare Center. Over the last six years, FarSounder engineers have been developing a range of navigational sonar systems. FarSounder's technology now makes it possible to image rocks, the sea floor, whales and other obstacles underwater similar to the way that radar detects obstacles above water.

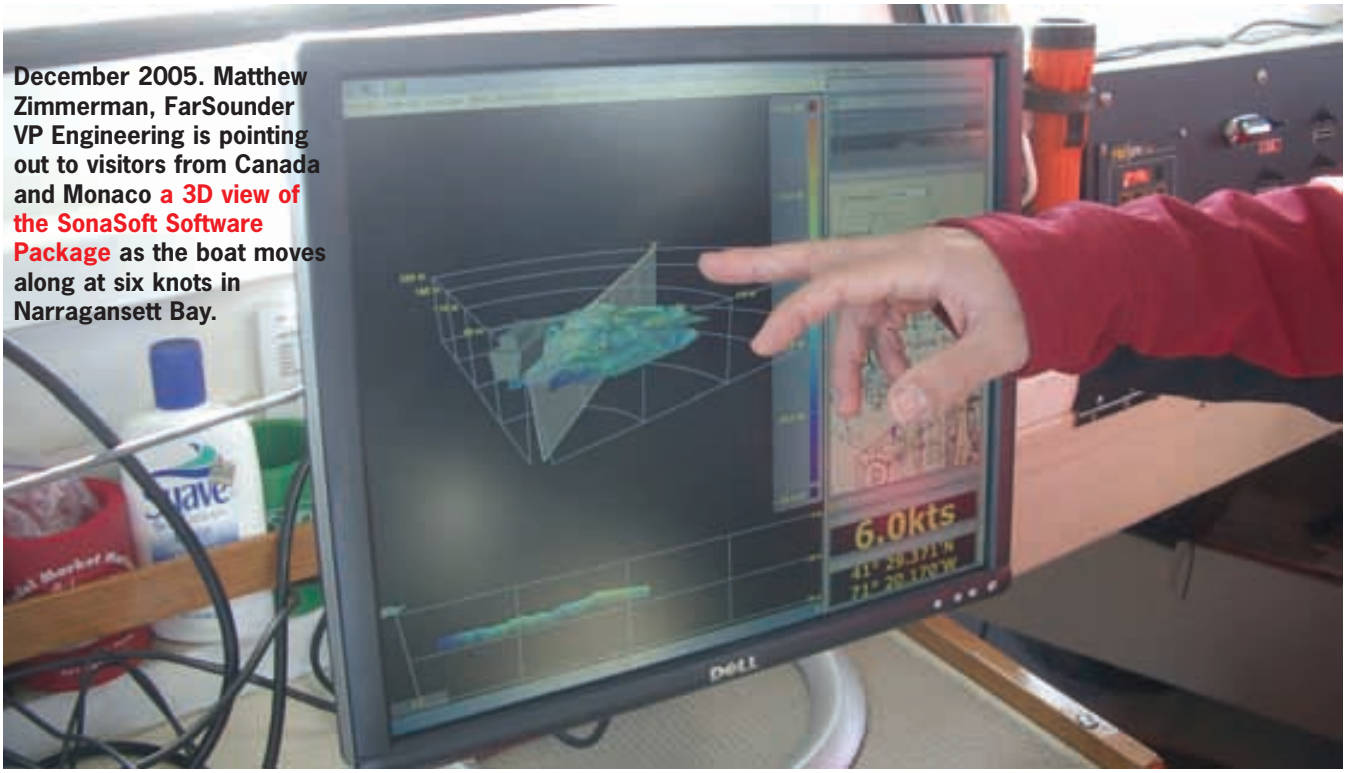
The company introduced the FS-3, its first commercialized product, in 2004. Its early customers included Superyachts and small cruise ships. Now that its reputation has spread, sales of the navigation and obstacle avoidance sonars are global and systems have been installed in diverse places such as Singapore, Germany, Australia, Turkey and Vancouver.

According to Cheryl Zimmerman, FarSounder's president, the company received a Phase 2 Small Business Innovation Research (SBIR) grant from the Department of Homeland Security to develop a low cost underwater threat detection system. FarSounder will design, build and operate a 3-D forward seeking sonar device that will locate divers and



FarSounder FS-3 sonar system being demonstrated for Phase 1 of and SBIR Proof of Demonstration for the Department of Homeland Security at Pier I at the Port of Quonset, Rhode Island in November 2005.

(Photo Credit: Evan Lapisky)



December 2005. Matthew Zimmerman, FarSounder VP Engineering is pointing out to visitors from Canada and Monaco a 3D view of the SonaSoft Software Package as the boat moves along at six knots in Narragansett Bay.

diver delivery vehicles. The SBIR project started officially at the end of June and will run for 22 months. FarSounder will demonstrate the product and hopefully commercialize it upon completion.

Swimmer detection technology is being used mostly in navy applications to protect ships in foreign ports from underwater intruders. In the U.S., the U.S. Coast Guard uses everything from cameras, to motion sensors to creative configurations of sonar systems designed for bottom mapping and target location on the seafloor. The swimmer detection systems in use today are geared toward locating a suspicious target, which triggers an alarm and a subsequent response by personnel.

The U.S. Navy and the U.S. Coast Guard are concerned about this threat - particularly given the response time needed by personnel once an alarm has sounded - especially in light of what happened to the USS Cole in Yemen several years ago. Although the Cole was attacked by a surface vessel, it showed the vulnerability of ships in port.

While the systems being developed to protect the Navy ships are more complex, costly and, understandably, proprietary, the SBIR grant that FarSounder received is an effort to spur technology innovation by small companies for the development of technologies that can be more economical for public ports and facilities.

The system that FarSounder is being asked to develop for the Department of Homeland Security will be low cost ($100,000 or less per 1,000 ft. of shoreline), 3-D and be able to be deployed in shallow water. Each sensor can have a wide area swath. The sensors will all be integrated to cover the coast line being monitored.

To prepare for the SBIR grant, FarSounder completed a market analysis to understand the demand for such a system and to determine which U.S. ports could benefit immediately.

They found that large ports such as Miami, and smaller ports such as Quonset Point in Rhode Island could both utilize the lower cost underwater threat technology being developed. In fact, FarSounder demonstrated how useful it can be on a very windy, low visibility day off the docks at Quonset. The results were tremendous. The system could identify a diver treading water and crawling along the sea floor, even in a 25 knot breeze and with silt kicked up on the bottom.

What sets the FarSounder system apart is its proprietary way of producing a 3D view of a target. One of the things they are going to do as part of the SBIR project is to add more sophisticated classification of targets using their 3D technology which combines spatial, geometric, temporal

FarSounder engineers Matt Coolidge and Evan Lapisky, and VP Engineering, Matt Zimmerman, ready system for deployment.

(Photo Credit: John Edwards, President of Sea Image Corporation, Victoria, Canada)

and spectral information. The more information gathered over a longer period, the more detailed an identification can result. Integration of this data will result in lower false detection rates. Unlike 1D and 2D sonar systems, FarSounder's unique 90 degree forward-looking sonar displays a new 3D underwater map every two seconds, and provides mariners with a major advancement in obstacle avoidance and navigation technology.

FarSounder's products have the potential to avert billions of dollars in damages attributable to marine groundings. It also can serve as an enormously positive environmental force by detecting and thus protecting the endangered Right Whale from fatal collisions with large vessels. Although forward-looking sonars exist in various forms, other technologies have very limited range in shallow water. This is precisely when the vessel's captain is in the greatest need of an accurate, real-time picture of the obstacles and water depths ahead of the vessel.

The Next Frontier?

Offshore Arctic

The offshore industry is renowned for understanding that its greatest strength and growth comes from the knowledge that it shares. As the industry seeks to explore and develop one of its most exotic, extremely cold and remote frontiers-the offshore arctic-its leaders are nurturing their most valued assets-people and experience-to consider new options and possible solutions.

The synthesis or integration of these assets, said John Stearns, vice president of Marine Pipeline Systems, INTEC Engineering, will expand industry's current near-shore arctic activity to longer offsets, to perhaps heavier ice conditions and greater water depths, and bring improved operating performance. "As an industry, we need to evaluate opportunities for innovation, leveraging existing knowledge in deepwater, subsea to beach systems and extended-reach drilling, to explore and develop hydrocarbons in regions with limited open-water access and multiple impacts for people and planet," said Stearns. "The arctic region is a challenging, complex environment. Industry needs to integrate its collective history, including development experience, technology deployment and safe operations, to consider how we might discover new solutions," said Stearns.

"The offshore arctic has large untapped reserves, with much of this reserve lying under seasonal or year-round sea ice. Our industry needs to innovate and collaborate to develop these reserves and address our increasing gap between energy supply and demand," said J. D. "Joey" Hall, Operations manager for Pioneer Natural Resources Alaska, Inc. Studies by the United States Geological Survey underscore the significant reserve potential of the arctic region: some 25 percent of all undiscovered reserves-onshore and offshore-for oil and gas are located in the Northern Hemisphere's arctic region.

Other studies indicate that the world's energy needs could increase by 100 million barrels of oil per day of crude over the next 25 years, making the offshore arctic an industry wide focal point for new exploration and development.

As steam rises above the water in a sea ice slot, a work crew prepares to survey the Oooguruk flowline test trench in the Beaufort Sea offshore Alaska. In March this year, INTEC Engineering assisted Pioneer Natural Resources Alaska, Inc., operator of the Oooguruk Field, in completing two 300-foot long test trenches-one near shore and one close to the gravel island drill site-to understand soil performance during trenching. INTEC completed detailed engineering of the Pioneer production pipeline system in winter 2006. The pipeline bundle installation completes in April 2007, with start-up planned for early 2008.

Newfoundland & Labrador, Canada
Ocean Technology Sector

Newfoundland and Labrador Ocean Technology Sector

A vast, resource-rich expanse of ocean has shaped the history, culture and economy of the province of Newfoundland and Labrador for centuries. That undeniable attachment to the sea, combined with the steadfast determination and creativity of its people, has placed Newfoundland and Labrador at the forefront of Canada's ocean technology industry. From offshore systems evaluation to underwater acoustics and integrated marine navigation, the province's ocean technology enterprises are achieving worldwide prominence.

Industry Profile

Newfoundland and Labrador is home to approximately 45 knowledge-intensive, small and medium-sized enterprises developing innovative ocean technology products and services for niche markets in Canada, the United States, Europe, Central and South America and Asia. These companies employ approximately 1,000 workers and generate total estimated revenues in the order of C$250 million.

Provincial Profile

- ***Most Easterly Province in Canada***
- ***Time Zone: EST + 1.5 hrs***
- ***Population: 515,961*** *(2005)*
- ***Capital City: St. John's Population: 182,485*** *(2005)*
- ***Total Coastline: 17,542 kms***
- ***Gross Domestic Product*** *(2005)**: C$22.3 Billion***
- ***Estimated GDP Growth 2006: 6.2%*** *(highest of all Canadian provinces)*

Ocean Technology Expertise in Newfoundland and Labrador

Ocean ICT and Marine Operations:

- ***Instrumentation / communication***
- ***Underwater acoustic technologies***
- ***Ocean mapping / sonar technologies***
- ***Remote sensing / radar technologies***
- ***Electronic charting, integrated marine navigation and course prediction systems***
- ***Wireless biotelemetry species monitoring systems***
- ***Marine geomatics***
- ***Ship voyage data recorder technology***
- ***ROV technology, underwater robotic control***

Ocean Technology Development and Marine Services:

- ***Numerical and physical modeling and testing***
- ***Boatbuilding, fabrication and repair***
- ***Fishing vessel design***
- ***Geotechnical services, marine weather and sea state forecasting***
- ***Marine transportation, port operations and cargo handling***
- ***Security technologies and ocean surveillance***
- ***Renewable ocean energy systems***
- ***Escape, evacuation, survival, safety and rescue solutions***

Clusters of Expertise, Partnership and Collaboration

St. John's, the capital city of Newfoundland and Labrador, boasts a mature and comprehensive concentration of marine technology research and development performers and companies. Much of the capacity is co-located within just a few city blocks, forming a unique environment conducive to intellectual and entrepreneurial interaction. This clustering of small and medium-sized enterprises, research facilities, educational institutions, municipal, provincial and federal infrastructure and related personnel has created tremendous synergy and encouraged a culture of collaboration.

Our world-class research and development infrastructure has created a cluster of ocean excellence. In fact, a key ingredient of our success is a unique partnership of companies, institutions and government agencies called Oceans Advance. This multi-stakeholder innovation cluster initiative facilitates world-class capability and aims to make the St. John's region an international location of choice for ocean technology.

Infrastructure, Research and Development

The Centres of Excellence, a term used to describe Newfoundland and Labrador's key ocean technology research and development facilities, serve as a backbone of the ocean technology community. These Centres, all located near or within Memorial University of Newfoundland, provide fundamental research, technology development expertise, industry incubation, testing, training and scientific validation services.

Facilities such as the National Research Council-Institute for Ocean Technology evaluate the design of vessels and offshore structures in its ice tank, towing tank and offshore engineering basin. Memorial University's Ocean Sciences Centre is a leading Canadian cold oceans research facility.

That's just the tip of the iceberg, so to speak. Many of these facilities are one of a kind and cater to an international clientele that includes port authorities, fisheries departments, coastguards, and academic institutions. In fact, we have all the unique ingredients of history, culture, economics and resources that few other places in the world can bring together in one marine and ocean technology focused location.

Newfoundland and Labrador has positioned itself as a high quality, innovative, and reliable supplier of specialized marine and ocean technology products and services to national and global markets. Our interest for the future is not only developing new technologies but to develop and provide integrated management solutions for the pursuit of the environment, resource extraction and resource management.

Canadian Centre for Fisheries Innovation ____ ***www.ccfi.ca***

Canadian Centre for Marine Communications ____ ***www.ccmc.nf.ca***

C-CORE ____ ***www.c-core.ca***

Faculty of Engineering & Applied Science – MUN ____ ***www.engr.mun.ca***

Marine Institute – MUN ____ ***www.mi.mun.ca***

Offshore Safety and Survival Centre ____ ***www.mi.mun.ca/ossc***

Centre for Marine Simulation ____ ***www.mi.mun.ca/cms***

Centre for Aquaculture and Seafood Development ____ ***www.mi.mun.ca/casd***

MI International ____ ***www.mi.mun.ca/mi_international***

Centre for Sustainable and Aquatic Resources ***www.mi.mun.ca/csar***

National Research Council Canada - Institute for Ocean Technology ____ ***www.iot-ito.nrc-cnrc.gc.ca***

Ocean Sciences Centre – MUN ____ ***www.osc.mun.ca***

For further information about the ocean technology sector in Newfoundland and Labrador contact:

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Government of Newfoundland and Labrador
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http://www.gov.nl.ca/intrd http://www.nlbusiness.ca

Areas of interest for offshore arctic and sub-arctic development, advises Lanan, include the Alaskan Beaufort Sea, the Canadian Arctic Islands, offshore northeastern Canada, the Russian Arctic, the Caspian Sea, Chukchi Sea and offshore Sakhalin Island.

Each of these regions, said Glenn Lanan, Pipeline Engineering discipline manager with INTEC, has specific challenges and common denominators. "The offshore arctic, in the context of its own dynamics, has its own 'thematic' characteristics in the realm of frontier development."

Similar attributes among the offshore arctic regions, he says, include remoteness; cold climate/ice; permafrost; defined, fragile ecosystems; and indigenous people.

"As industry better understands these characteristics, industry also will enhance its opportunities to evaluate technology improvements for oil and gas development in the various arctic regions. Importantly, we also will learn how best to minimize the 'footprint' that industry might leave behind," said Lanan.

Lanan explains that to be successful in the offshore arctic, industry must design and fabricate facilities that are both economical to build and safe to operate.

"To date, industry's offshore arctic development has been pipeline to shore. But we have the potential to install a fixed platform in the offshore arctic and tiebacks to offshore structures, as is presently completed in more temperate climates worldwide," said Lanan.

He adds that industry needs to reduce overall costs for offshore arctic exploration and development, extend its seasonal capabilities for construction and installation, find solutions that eliminate or minimize ice loading in offshore arctic development and overall, lessen uncertainties for reliable operation.

The arctic's limited open-water season, adds Hall, impacts all open-water logistics, including seismic acquisition; barge, jack-up or floater drilling; construction activity; and supply.

"The open-water season has a huge impact on project schedule, equipment scheduling and overall project management. And while ice is an annual occurrence, its duration and its degree are random variables. Wind and wave conditions also can be quite severe during this short time period," said Hall.

Ice present during the open-water season, adds Lanan, impacts operations and needs to be managed; that is, pushed out of the way and/or broken up by ice breakers, or the operation curtailed.

Ice impacts all aspects of offshore arctic development, says Lanan. Ice scour from ridges impacts the design of any on-bottom infrastructure, including wellheads, trees, flowlines, umbilicals or pipelines. Ice also impacts the design of any man-made structures, including gravel

A backhoe waits on the bottomfast ice sheet after breaking refrozen seawater to allow monitoring of the Pioneer Oooguruk flowline test trench. Operator Pioneer Natural Resources Alaska, Inc., with assistance from INTEC Engineering, built two test trenches in March this year to determine how equipment and side slopes will sustain the pipeline installation process in spring 2007.
Pioneer is in the execution phase of the Oooguruk field development off Alaska's North Slope in the Beaufort Sea. The project includes onshore and offshore components and represents industry's second offshore arctic field development with a subsea pipeline.

islands or steel or concrete structures.

Structures also must be able to withstand the loading imposed by ice, which can have similar mechanical properties to concrete.

"All of our offshore arctic activities must respond to or accommodate these challenges. Industrywide research and development will generate new possibilities," said Stearns. The offshore industry, adds Stearns, has the opportunity to leverage its extensive deepwater knowledge and capability.

"We've gained a lot of confidence working in deepwater while also building significant momentum for technology development and deployment. We can now apply lessons learned from this experience to the offshore arctic," said Stearns.

Lanan says two significant issues impact industry wide goals for offshore arctic expansion: the cost of drilling and the difficulty of getting an arctic-classed rig into the various regions; and the need to prove substantial reserves to support large, costly development.

Current pipeline developments, said Lanan, are less than 10 miles from shore and include pipelines that are up to 12 in. in diameter.

"But with substantial reserves, pipeline diameters could reach 48 inches, with lengths exceeding 300 miles in more than 1,000 feet of water," said Lanan.

Stearns adds that the Shtockman pipeline project in the Barents Sea offshore Russia is presently pushing the envelope for achieving these industry strides, but that Alaska also holds great potential for similar industry milestones. Of note, says Stearns, is Pioneer's Oooguruk development

(Continued on the bottom of page 37)

INTEC Completes Detailed Design of Oooguruk Pipeline Project

North Slope project to deliver industry-first for pipe-in-pipe production flowline technology in offshore Arctic

Traditionally used for insulation in cold, deep water in the Gulf of Mexico and the North Sea, the Oooguruk development project in the Beaufort Sea offshore Alaska will deliver the first application of pipe-in-pipe production flowline technology in the offshore Alaskan arctic when it comes onstream in early 2008. Pipe-in-pipe systems typically facilitate production flow and include an inner carrier pipe; a layer of insulation; and an outside "jacket" pipe.

"The pipe-in-pipe technology is an integral part of Pioneer's Oooguruk field development strategy and commitment to deliver a safe, prudent operation," said J. D. Hall, Operations manager, Pioneer Natural Resources Alaska, Inc. INTEC Engineering completed detailed design of the Pioneer production pipeline system in winter 2006.

Milestone

Pipe-in-pipe technology, said Glenn Lanan, INTEC's senior project manager for Pioneer's Oooguruk pipeline project, manages several key arctic issues, providing leak detection, protection and secondary containment. "Oooguruk is recognized as Pioneer's single-largest project worldwide and represents a critical milestone to the industry's pursuit of offshore arctic developments. Pipe-in-pipe technology and additional innovations will create new avenues for development offshore the North Slope and offshore arctic regions worldwide."

The Oooguruk project includes offshore and onshore components and is currently in the execution phase. The Oooguruk Field is estimated to contain 50 to 90 million barrels of gross oil resource and is expected to reach a peak production rate of approximately 15,000 to 20,000 barrels of oil per day by 2010.

Pioneer plans to drill approximately 40 production and injection wells from its offshore drill site over a three-year period.

The offshore portion of the Oooguruk project in Harrison Bay consists of a six-acre drill site with production facilities and a 5.7-mile subsea buried pipeline bundle to shore. The offshore development, which includes a gravel island in approximately five feet of water, will be an unmanned operation with remote control and monitoring systems.

The onshore portion of the project includes a 2.3-mile onshore pipeline system built on vertical support members and an onshore tie-in pad with power generation, separation, compression, metering and other support utilities.

The Oooguruk pipeline calls for an "open" bundle, where individual pipes are "strapped" together, rather than enclosed in a single large pipe, representing a "closed" bundle of pipes.

Lanan advises that the open bundle is less complex and lighter weight than a closed bundle, with no increase in risk. Pioneer considered a closed bundle but the design option proved cost-prohibitive for the Oooguruk multi-pipe development.

"While operators have used pipeline bundles for about 25 years in North Sea, the systems typically have been closed or limited to two pipes. Pioneer has selected a multi-pipe open bundle representing another industry stride in the offshore arctic," said Lanan.

Three Phase Development

Pioneer's open bundle consists of four pipelines, measures three feet wide and is two feet tall.

Eight-inch wide spacers package and separate the pipelines and facilitate pipe flexibility to avoid buckling of the lines. Each spacer is placed every 20 feet along the pipeline lengths.

The bundle includes:

- A 12.75-in. diameter (internal pipe) by 16-in. diameter (external pipe) PIP three-phase production pipeline: oil, gas and water
- A six-inch diameter gas pipeline
- An eight-inch diameter water pipeline
- A two-inch diameter diesel pipeline

The three-phase production line moves fluids from the offshore well to shore; the water and gas injection lines move fluids from shore to the gravel island; and the diesel fuel line extends from shore to the gravel island to supply emergency generation fuel and to support drilling/production activities.

The inner and outer pipes of the PIP production flowline are designed with high-frequency induction welded pipe. All of the flowlines are grade X-52, or higher, for compatibility with potentially high operational strains.

The annulus or gap between the internal and external pipes helps contain any potential leakage from the internal pipe in the event of an emergency. Pioneer will employ an annulus vacuum monitor or pressure monitoring system for further protection.

The inside of the internal pipe operates at about 600 psi. If high pressure is detected, an internal leak is identified. If low pressure is detected, a potential external pipe leak is identified.

Pioneer will excavate a nine-foot deep trench for installing the pipeline bundle and bury the pipeline a minimum of six feet to the top of the pipe: one foot of overdig; two-foot tall pipeline bundle; and six feet of cover or backfill.

The trench design and amount of overdig prevents upward movement of the pipeline and buckling during flowline operation. In March this year, INTEC assisted Pioneer in completing two 300-ft. long test trenches-one near shore and one close to the island-to understand soil performance during trenching.

"The test trench helps us to see how equipment and side slopes will sustain the pipeline installation process," said Lanan.

The structural design of the pipeline also averts buckling during production start-up when thermal and pressure expansion impact the pipeline.

project in the Beaufort Sea offshore Alaska.

"INTEC is currently supporting Pioneer's Oooguruk project with the design and development of industry's second offshore arctic production pipeline system," said Stearns. The first such development was BP's Northstar pipelines, also in the U.S. Beaufort Sea, installed in 2000. INTEC completed the design of the BP arctic pipeline production systems, as well.

Hall reports that Pioneer's Oooguruk development project is world-class, includes offshore and onshore components and is recognized as the company's single-largest project worldwide.

The three biggest pipeline challenges facing industry in the offshore arctic, says Lanan, include:

- **For shallow-water design:** Strudel scour-an arctic phenomenon of river overflood whirlpools-occurs as onshore snow melts each summer and river floodwaters flow offshore each summer at about late May/early June.

While strudel scours can potentially impact subsea pipeline operations, industry can monitor and minimize any unnecessary disruptions. A fiber optic temperature monitoring system-that is sensitive to temperature decrease-installed alongside a subsea pipeline system can detect seabed erosion and alert operators regarding pipeline stability issues.

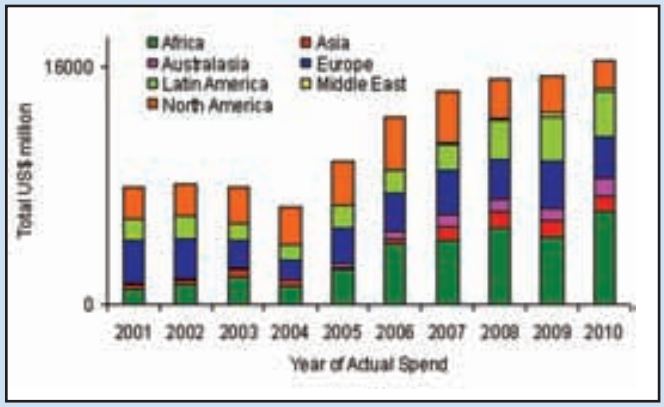
- **For deeper water design:** Ice gouging-another arctic phenomenon-such that ice keels, turns over or protrudes into the seabed with potential impact to subsea pipeline operations. While further research is required, studies indicate that deeper trenches and increased backfill may avert/lessen these impacts to pipeline operations.

- **For construction activities offshore the United States:** The U.S. Jones Act impacts barge availability, particularly pipelay and trenching capabilities for ice conditions.

West Africa Drives Subsea Success

"The subsea market has nowhere to go but up" say Howard Wright, Senior Analyst and Dr Roger Knight, Data Manger of Infield Systems.

The subsea market is on an upward growth path when looking at the value of the global subsea market between 2001 and 2010. This forecast is based upon the third edition of the Global Perspectives Subsea Market Update published by Infield Systems Limited. The first thing to notice is how the market is driven by a series of behemoth FPSOs in the Atlantic Basin, particularly off West Africa and in the Asia/Australia region by a series of LNG liquefaction plants to be fed by the rapidly expanding subsea to shore market. Current market fundamentals are extremely healthy for contractors, although less so for those operators who now are coming to realize the reality of the much mooted supply capacity-constraint issues. Operators are facing scheduling bottlenecks and risks as they attempt to secure the correct equipment and suffer the cost premiums associated with securing this equipment before their rivals. In this race there are bound to be winners and losers. We expect this to fuel M&A activity in this sector. To date, subsea production is used in 47 countries worldwide. These will be joined by a further 12 in short order. Infield Systems, forecasts a value of in excess of $16b per year for the subsea market within the next five years. This total includes the value of drilling and well completion equipment and associated pipelines umbilicals. However, a caveat to this is that if the rising costs are permanent, as opposed to a temporary shock, this value may well be exceeded by the end of the period. With prices increasing with almost every negotiated contract, there is certainly potential for this to escalate.



However, as new capacity becomes available particularly new drilling rigs and pipeline and subsea installation vessels then this inflationary pressure should ease as a new round of competitive cost cutting kicks in.

The subsea market has traditionally had a fair inventory of marginal prospects sitting on the developers shelves, waiting to be developed given the right economic environment. That right economic environment does now exist in terms of commodity prices. However, quite a few of these prospects still sit collecting dust in areas such as the North Sea. This leads to the question that if they are not ready to be developed now; just what conditions are necessary for them to be developed?

Looking at current trends there are a wide range of subsea completion projects in various stages of development across the world with over 40 countries experiencing some subsea development in their offshore waters. However, it is no surprise that West Africa is experiencing most sustained momentum of the subsea growth - the apogee of West Africa is not even in sight.

After the twin hits of Katrina and Rita to the major deepwater facilities in the GOM the market for subsea installation has recovered. However, in the longer term once the major hubs have been fully developed there is a question mark over where the new growth is going to come from. Currently in the GOM there is a healthy tick-along market of tieback satellite wells, with independents having a significant impact in this arena. An interesting trend which will be worth observing in the future is the impact of new enabling technologies such as HIPPS on the market. Although HIPPS debuted 17 years ago in the North Sea it is likely that that over the next two years it will see it first use in the Gulf of Mexico. The need for increased recovery by means of artificial lift in deepwater should also be an important driver within this market. Within Europe there are fewer large subsea developments such as Ormen Lange and Snohvit which have a significant impact on this market, but a high background of smaller tie-back projects. This has engendered a major structural change in operator type in Europe since 2001. Then Infield observed 93% of all future subsea wells, between 2005-2009, would be operated under IOC control, the current view is closer to 49%. This change reflects the changing nature of the developments, which are smaller and more challenging, thus opening the arena to smaller innovative companies with lower costs and margins. (Source: *Global Perspectives Subsea Market Update To 2010*)

(Photo Courtesy of Shell)

Offshore O&G Spend forecast to rise to $247B by 2010

Daily offshore oil & gas production, currently standing at around 43 million barrels of oil equivalent (boe), is forecast to grow to 53 million boe in 2010 and drive industry annual expenditure from $193 billion in 2006 to $248 billion by 2010, according to the "The World Offshore Oil and Gas Production & Spend Forecast," a study on the prospects for the offshore oil & gas industry published by Douglas-Westwood and based on information in the Energyfiles database.

Douglas-Westwood' managing director John Westwood said "High oil & gas prices over the period to 2010 will result in continued strong growth in the offshore oil & gas sector. Over the next five years we expect annual capital expenditure to increase by 10 percent from just under $110 billion in 2006 to $120 billion in 2010, but the real star of the show will be the less glamorous operational sector with a forecast growth of 53 percent, from $83 billion to $127 billion."

Energyfiles director and report lead author Dr. Michael R. Smith said "offshore spends are increasing rapidly but there are considerable differences across the regions. The main causes for the disparities are an increasing shortage of lower cost prospects in all but the Persian Gulf and the limited availability of deep water sedimentary areas with potential for oil and gas reserves outside those already identified in Brazil, the Gulf of Mexico, West Africa and some other less prominent regions. Nevertheless all markets will retain ever-higher levels of operating expenditure. Overall, we expect West Africa to show the greatest growth at nearly $13 billion."

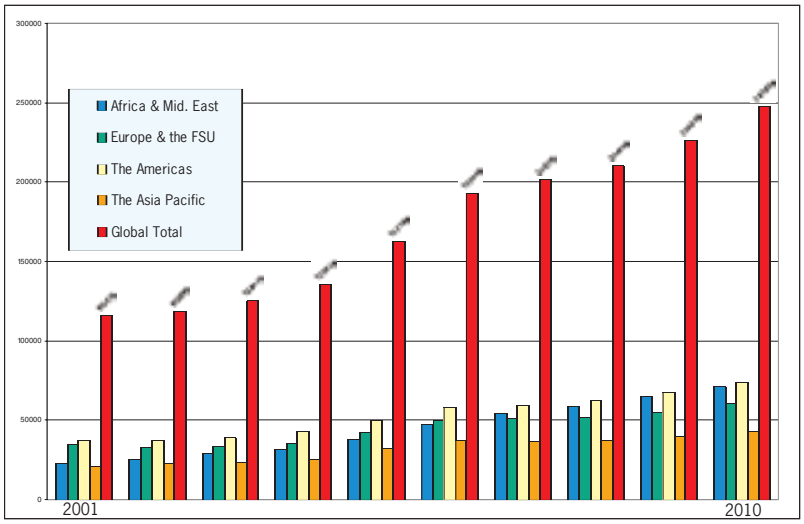
The report stresses that new activity in the mature offshore regions will increasingly become dominated by existing and new start-up small oil companies (along with the relevant National Oil Companies) as producing and exploration assets are acquired by smaller companies that specialise in marginal field developments and in scavenging for tail-end production.

Resource Limitations

However, a particular concern is that over the next three years most sectors of the offshore industry will be equipment and people resource-constrained. "Day rates will remain high, especially for capital assets such as high specification drilling rigs and other vessels. The experienced

Global Offshore O&G Spending: 2001-2010

Total spend, $ million	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa & Mid. East	23066	25697	28764	31494	38413	47784	54369	58903	65035	71240
Europe & the FSU	34488	32925	33444	35701	42433	49672	50811	51837	54597	59973
The Americas	37533	37389	39064	42769	49744	57926	59442	62475	67587	73425
The Asia Pacific	21050	22807	23667	25561	32154	37508	36693	37376	39431	42846
Global Total	**116136**	**118819**	**124939**	**135524**	**162744**	**192890**	**201315**	**210590**	**226650**	**247484**



personnel needed to design, build, and operate drilling and production equipment will also command a growing premium".

However, it is noted that "new rigs have already begun to enter the market and are now serving to moderate day rate growth. These restraints are reinforced by limits on opportunities in offshore regions available to private oil & gas companies."

"The offshore market forces directing the industry towards new cost-cutting technology and other commercial innovations are strengthening. In this sphere the greatest challenges faced by technology developers remain problems related to the conversion of new products into proven hardware, in particular the reticence by oil companies to introducing unproven equipment into a high technology project.

New low-risk ways of product introduction are needed for both technology developers and oil companies to field-prove new technology."

In the light of growing offshore expenditure another challenge that both the oil companies and their contractors is facing is that of accessing human resources. "The 'skills shortage' may in time be addressed as new people enter the industry attracted by higher salaries. But the 'experience shortage' is far more challenging and there exists a growing potential for both technical and strategic mistakes to be made by inexperienced personnel acting in an environment of rapid technology advances" said Westwood.

Low Cost Plays Disappeared

On the other hand resource-limited growth is also of increasing concern said Dr. Smith. "Besides the portfolios of a few NOCs operating in the Persian Gulf, the low marginal cost oil plays have virtually disappeared. Opportunities for finding and developing large offshore oil fields with relatively benign sub-surface and reservoir conditions are now rare. Only the most demanding environments in ultra-deep waters and Arctic regions are expected to offer new large scale opportunities by the end of the period."

"Conversely, offshore gas still has opportunities related to the advent of new gas production and conversion technologies, the growth of gas markets in the developing world, and pressures by all governments to eradicate gas flaring.

LNG projects and the beginnings of a GTL industry are kick-starting the development of stranded gas fields that have been lying fallow for many years and are also encouraging new exploration drilling in gas-prone areas."

"What's more considerable growth is forecast for all forms of deep water production facilities, but especially floating production systems and subsea production and processing hardware. Subsea systems are also expected to attract an increasingly larger part of the shallow water offshore spend as marginal development programs escalate."

Future Oil Prices

"The oil price rises of the last three years have had a big effect on prices" said Dr. Smith. "The Energyfiles forecast for oil prices over the next five years is of erratic but generally flat levels in 2006 as oil demand growth is forced down by higher oil prices; as new non-OPEC production enters the market from the deep waters of West Africa, from the Gulf of Mexico and from the Caspian Sea; and as new LNG developments continue to replace oil use in Asia. Renewed oil price escalation is forecast after 2007 eventually leading to more cost inflation in the service sector. By 2010 the world will have entered a new, permanent energy capacity-constrained environment waiting on real large-scale alternatives to oil in the transport sector."

The report concludes that "offshore production forecasts show that the lengthy era of relatively low-cost oil and gas sources has ended. Higher oil and gas prices are here to stay - an oil price collapse could only be driven by a world-scale economic and/or political crisis that interrupts demand growth."

As we move beyond 2010 the future of companies operating in the offshore exploration and production industry will become increasingly vulnerable to outside economic and political circumstances. The period from 2010 to 2015 is still expected to be "the time period when global oil production from all offshore and onshore sources, including unconventional sources, will become seriously resource-limited and year-on-year declines in global oil output will begin. During the transition period, whilst new transport fuels will have to be developed, the world will need all the offshore oil it can get."

(Source: The World Offshore Oil and Gas Production & Spend Forecast, Douglas-Westwood)

MIROS Ship-based Radar Helps Manage Spills

MIROS will supply five marine x-band radar-based oil spill detection systems to the common oil spill response organization for oil producers on the Norwegian continental shelf, called NOFO. With these systems, NOFO will be able to track and manage oil spills independent of sea, weather and light conditions. "This is the first product to combine radar tracking of oil spills with complete sea status data such as wave and current information, which will give oil companies, coastal authorities and oil spill response teams the ability to detect more rapidly and respond more effectively to a spill. Once a spill reaches the coastline, its costs increase exponentially. This product can significantly speed clean-up before that happens," said managing director Erik Sandsdalen of MIROS. NOFO is owned by all of the companies operating on the Norwegian Continental Shelf, including BP, Shell, Total E&P, ExxonMobil, ChevronTexaco and Statoil, among others. According to NOFO's director of operations Jon Rødal, "Our owners have shown great interest in the ability to operate in conditions of darkness or low visibility."

The oil spill detection system has been under development since 2000, and builds on the company's Wavex Marine Radar technology. The oil spill detection system uses advanced image-processing algorithms and standard ship-based navigational radar to locate oil spills at a distance of up to four km, and track their movement at frequent intervals.

"Preventing spills from hitting coastlines is a matter of great economic and political importance, and the oil community itself is leading the way on this issue," said Sandsdalen. He refers to Norway's Pollution Control Authority, which has already stipulated ship-based radar tracking as part of spill response, and expects many other countries to follow suit.

The oil spill detection systems will be installed during 2006 on five of the 14 vessels NOFO uses in oil spill response. Rødal confirms that NOFO will consider equipping all of its spill response vessels with similar equipment.

Visit www.maritimeequipment.com/mt & Click No. 11

FMC To Supply Subsea System for Chevron's Frade Project

FMC Technologies was chosen by Chevron Frade LLC to supply subsea systems for its Frade project, offshore Brazil.

The contract has a value of approximately $130 million in revenue to FMC Technologies.

FMC Technologies' scope of supply for the Frade project includes 19 enhanced horizontal subsea trees (EHXT), wellheads, pipeline end manifolds with associated structures, production control systems and other related equipment. Deliveries will be completed from FMC Technologies' Rio de Janeiro facility.

The Frade discovery is located in the North Campos Basin, approximately 110 km off the Brazilian coast and 215 km North East of Macae at a water depth of approximately 1330 m (4000 ft.).

Project Overview
- Contract Award: 2006
- Sales: Houston, Texas
- Fabrication: Rio de Janeiro, Brazil & Houston, Texas
- Service Base: Macaé, Brazil
- Host Type: FPSO
- Contract Type: Lump Sum

Project Characteristics
- No. Trees: 19
- Water Depth: 1,330 m (4,000 ft)
- Tree Type: EHXT with FMC Choke Module
- Tree Pressure 5,000 psi
- Tree Bore size: 5"
- Hydrocarbon: Oil

Project Ownership
- Chevron 42.5%
- Nissho/ Inpex and Odebrecht 15%
- Petrobras 42.5%

Rig Contract with Fred. Olsen Energy

Hydro signed a letter of intent for a three-year contract with Fred. Olsen Energy ASA for a prolonged use of the drilling rig Bideford Dolphin from 2008 to 2011. Hydro is the operator of several new discoveries and subsea developments requiring rig capacity for drilling of production wells. This agreement allows Hydro to pursue an ambitious production drilling program on the Norwegian continental shelf in the coming years. The value of the contract for the period 2008-2011 is $4 62.5m.

Madagascar Drilling '07

ExxonMobil reportedly sees exploratory drilling operations off the northwest coast of Madagascar getting under way in 2007, Reuters reported. The oil giant has interests in four blocks along the Indian Ocean island's northwest coast. Exxon has a 50 percent stake in the Majunga block while 30 percent is owned by U.K. gas firm BG Group Plc and 20 percent by South Korea's top oil refiner SK Corp.

Aker Kvaerner Wins Subsea Booster Contract

Statoil signed a letter of intent with Aker Kvaerner to deliver a subsea seawater injection system for the Tyrihans project in the Norwegian Sea. The new generation pumps are expected to increase oil production from the Tyrihans field by 10 percent. Aker Kvaerner's contract value will be approximately $31.8m.

Aker Kvaerner Subsea will supply two subsea injection pumps to be installed more than 40 km from the Kristin platform where the oil and gas will be processed. The pumps will feature Aker Kvaerner's own LiquidBooster technology and will inject raw sea water for pressure support and stabilization of the oil zone.

Onyx Orders for Three Triton XLS Systems

Perry Slingsby Systems (PSS) said that Onyx Special Services has purchased three Triton XLS Systems. The new ROV Systems will be configured with 15-in. thrusters, 150 HPU with 30 HP integrated auxiliary HPU. Additionally, two of the systems will be rated to 4,000m. The 3,000m system will be delivered in November 2006, while the 4,000m system will be delivered in April and May 2007.

Hydro Secures Drilling Capacity

Hydro has signed a contract with Transocean, which ensures that Hydro has capacity for deepwater drilling operations for the 2007 to 2013 period. The contract includes use of the semi-submersible drilling rig Henry Goodrich in the two-year period from 2007 until 2009. In addition, Hydro will be able to use Transocean's newbuild enhanced Enterprise-class drillship, which is due to be completed by the middle of 2009. The duration of the contract for this drillship is four years. The contract with Transocean, which has a total value of close to $ 950m over six years, gives Hydro the opportunity to realize the value potential that exists in the company's attractive exploration portfolio in the US Gulf of Mexico.

Hydro plans to use the rig capacity to maximize the value of its extensive exploration portfolio. In addition, securing this rig capacity will allow Hydro to gain access to new exploration prospects in the area and will enhance Hydro's position in upcoming competitive lease sales.

It will also be possible to use the rigs in drilling assignments for Hydro in other deepwater areas.

The rig Henry Goodrich is built for drilling operations at water depths of up to 670 m, and will be upgraded with a client provided pre-laid mooring system for drilling operations at depths of up to 1,700 m (5,000 ft.).

The new enhanced Enterprise-class drillship will be equipped with

Delta Wave Introduces RigTrac

Delta Wave Communications launched the RigTrac system, which is designed to be a cost-effective solution for rig and asset tracking. While GPS tracking is nothing new, RigTrac offers a unique feature in that constant monitoring is not required until an asset moves from its designated location. Once out of its designated location, alerts are sent via SMS to cellular phones, email, as well as Delta Wave's dTrac on-line monitoring facility, which includes the GOM block chart. The RigTrac system is based on the Inmarsat constellation of satellites.

The premise of the system is quite simple yet effective. The installation of the system does not require any special training and can be performed by rig personnel. A small shoebox sized device is installed onboard the rig with a clear line of sight to the horizon. Once the unit is powered up the GPS coordinates are captured by the RigTrac system. Those GPS coordinates are then used to geo-fence the rig. A geo-fence is a virtual boundary or fence set up around the rig. The RigTrac unit sends in a position report every morning to verify that it is within its geo-fence and working properly. If the rig moves outside of its assigned geo-fence, an alarm signal is sent. That signal is immediately relayed to dTrac. The alarm notification is then displayed on the website map and notifications of the geo-fence breach are additionally sent to e-mail addresses and cellular telephones if so desired. The RigTrac unit will continue to send position reports until the rig returns to its original position or is re-geo-fenced at a new position. The position report intervals can be increased or decreased at the customer's choosing. The standard report interval is one report per hour until the rig is back on location or re-geo-fenced at a new location.

Another advantage of the system is tracking during rig moves. The rig operator may access dTrac and have the geo-fence disabled for rig moves. Then the rig will send a standard position report every hour during the rig move. Once the rig reaches the new site, the geo-fence is them activated. Lastly, the RigTrac system can be manually polled for an updated position at any time. This feature is very useful during both hurricanes and rig moves.

The RigTrac unit has four NO ports in order to accommodate different types of sensors for additional monitoring capabilities. Silent alarm switches may be added to upgrade the system to an SSAS system should such systems become required for MODU's (mobile offshore drilling units).

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O&G Attention Turns to the Atlantic OCS

Relatively limited oil and gas exploration and production has occurred on the Atlantic Outer Continental Shelf (OCS) when compared with the Gulf of Mexico (GOM). Ten oil and gas lease sales were held in the area between the mid-1970's and the mid-1980's. Forty-seven exploratory wells were drilled. Those wells produced only five hydrocarbon discoveries - all of which have been abandoned as noncommercial. There are currently no oil and gas leases off the Atlantic coast. Leasing and resource management activities for the Atlantic OCS area have been divided into four areas for planning purposes:

1. The North Atlantic Planning Area extends from Maine to New Jersey and includes over 92 million acres. Eight wells have been drilled and five discoveries have been made. However, there are currently no active leases in the area.

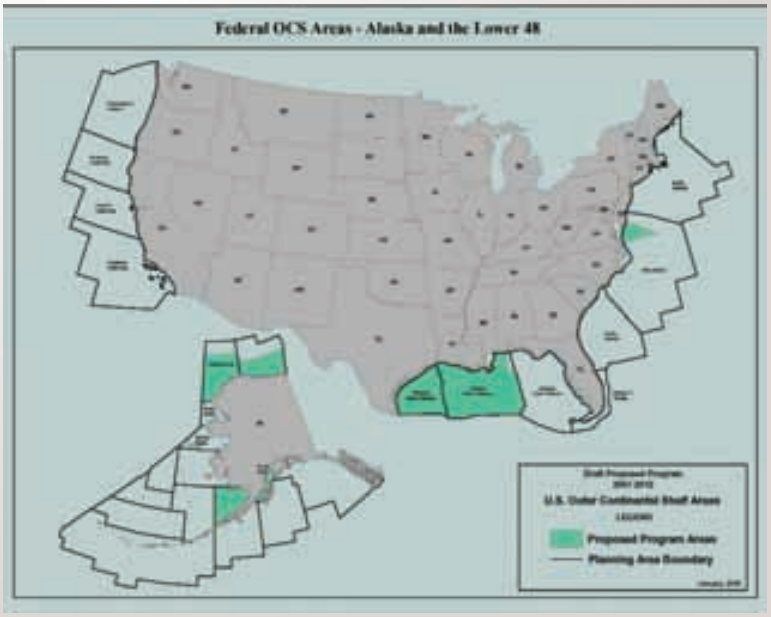
2. The Mid-Atlantic Planning Area extends from Delaware to North Carolina and includes over 113 million acres. This area had the most lease sales (5) and the most exploratory wells drilled (32). However, no discoveries have been made and no leases are currently active. A proposed lease sale in the 5-Year Program is located in this area.

3. The South Atlantic Planning Area extends from South Carolina to Florida and includes over 54 million acres. Only one lease sale has been held here and no leases are currently active.

4. The Straits of Florida encompasses over 9.5 million acres. Only one lease sale has been held here and no leases are currently active. As part of the proposed leasing 5-Year Program in the Mid-Atlantic Planning Area, the Minerals Management Service (MMS) has proposed a single lease sale development off the coast of Virginia.

The proposal was issued and open for a comment period that ended in April. Another comment period will be opened in the summer of 2006. Current presidential withdrawals or congressional moratoria have placed more than 85 percent of the OCS around the lower 48 states off limits to energy development, including all areas off Virginia.

"The idea of leasing Federal waters off the coast of Virginia comes in response to discussion in the State's legislature about the potential of energy development off its coast," MMS Director Johnnie Burton said. "However, no offshore development will occur off of Virginia unless the State's congressional delegation works to lift the moratorium," said Burton. The MMS is working to ensure a leasing plan is in place if Virginia seeks to end the moratorium and encourage offshore oil and gas The MMS estimates there are approximately 85.9 billion barrels of oil and 419.9 trillion cubic feet of natural gas that may be technically recoverable from all Federal offshore areas. The estimate for both oil and gas increased about 15 percent compared with the 2001 report. A significant amount of environmental study would be required and State moratoria would have to be lifted before any exploration of the Mid-Atlantic Planning Area could be considered. However, as our Nation's oil and gas needs grow, the Atlantic OCS may become a more attractive and viable area for exploration. (Source: MMS Ocean Science, March/April 2006)



dynamic positioning and dual activity technology, allowing for parallel drilling operations. The drillship is designed to drill in water depths of up to 4,000 m (12,000 ft.).

Offshore Discovery May be Largest in China

China's largest offshore oil producer, CNOOC confirmed the discovery of a large deepwater gas field made in partnership with Canada's Husky Energy. Calgary-based Husky said the field may contain 4 to 6 trillion cubic feet of natural gas. CNOOC has the right to a 51% stake in the project. CNOOC and Husky have been collaborating on offshore oil and gas exploration in the region since 2002. China's total gas reserves are estimated at 83 trillion cubic feet, according to data published by BP. (Source: www.marketwatch.com)

The Promise of Wilcox

What started out as a test well into formations of the Miocene epoch

yielded a surprise for drillers - a thick hydrocarbon-rich sand section not previously known to yield such potential reserves.

The promise of this Lower Tertiary sand section, called the Wilcox trend, in ultra-deepwater Gulf of Mexico (GOM) continues to be encouraging with the recent announcement of discoveries on BHP Billiton's Cascade prospect (located in 8,200 ft. of water) and Chevron/Devon's Jack prospect (located in 7,000 ft. of water).

The Wilcox trend was deposited as sands of a delta in the Lower Tertiary epoch. Both the Miocene epoch (which started 23 million years ago) and the Lower Tertiary (from 66 to 38 million years ago) are part of the Cenozoic period — the most recent of the three major subdivisions of geologic history. Some scientists believe the Wilcox trend may cover 34,000 sq. mi. and hold up to 15 billion barrels of recoverable oil reserves.

These discoveries and earlier Lower Tertiary finds have spurred great interest for prospects in the area. Recent lease sales in the Western GOM have seen strong bidding activity. The announcement of royalty relief for ultra-deepwater discoveries has also made the area more attractive. The interest in ultra-deepwater exploration is likely to continue to increase as more is discovered about this potentially world-class reservoir. (Source: MMS Ocean Science, March/April 2006)

Fiber Optical Rotary Joints for Offshore

A compact 4 to 21 pass fiber optic rotary joint from Schleifring for Single and Multi Mode fibers in an EExd certified stainless steel housing facilitates the transmission of electrical signals and Databus-signals even under most demanding use in offshore applications. The technical features - passive, bidirectional and unaffected by EMI, EMP and ESD - allow for the transfer of data rates up to 10 GBit/s even under extreme environmental conditions or in explosive atmosphere. An integrated connector box allows the access of customized reinforced cables and connection with the Fiber Optical Rotary Joint by FC-connectors.

Island Oil & Gas Begins Drilling Operations

Island Oil & Gas has spudded well 48/23-3 at Seven Heads West in the Celtic Sea offshore Ireland. The well is the first in its planned 2006 and 2007 drilling programs. Well 48/23-3 is designed to appraise a possible extension of the Upper Wealden gas sands that are producing gas in the 48/24-6 production well immediately to the east. The well, which is in a water depth of 329 ft., will be drilled to a planned total depth of 3,200 ft. TVD ss. Island concluded a Sub-Area Equity Interest Assignment Agreement for the Seven Heads West area with Marathon International Petroleum Hibernia Limited, through its wholly-owned subsidiary Marathon Seven Heads Limited (formerly Ramco Celtic Sea Ltd.) in February 2006. Under the Agreement, Island will fund 100% of the cost of the current well, including testing, in return for increasing its equity interest in the Seven Heads West, Sub-Area, from 12.5% to 55.75%. Island will operate the well during the drilling period but operatorship will revert back to Marathon once the drilling of the well has been completed. Well 48/23-3 is being drilled using the semi-submersible drilling unit, Petrolia, owned and operated by Petrolia Drilling Limited, under contract to Island. Subject to regulatory consents and approvals, Island intends to move the rig after the completion of the 48/23-3 well to

EXMAR Considers Separate Listing of Offshore Division

EXMAR signed a Letter Of Intent with Kiewit Offshore Services (USA) for the construction of one semi submersible hull, with an option for one additional unit. The semi submersible hull will be based on the EXMAR OPTI design.

The semi submersible hull will be the platform of the floating production facility, OPTI-EX, developed by EXMAR. EXMAR has commissioned Mustang Engineering to design the production plant of the OPTI-EX. The main design parameters for the OPTI-EX are such that the unit will be generic, modular and re-deployable.

The delivery of the first hull is planned in July 2008. Simultaneously with the construction of the hull, the production plant will be engineered and integrated, in order to have a fully commissioned and operational OPTI-EX by third quarter 2008. The investment for the OPTI-EX is estimated to be approximately $250m.

The main market target will be the deepwater GOM, although West Africa, Brazil and South East Asia have potential deepwater developments suitable for the OPTI-EX. Production of oil and gas will inevitably move to deeper water and smaller fields. With oil and gas demand remaining strong, the EXMAR OPTI-EX will be the perfect tool to develop these reservoirs. Following EXMAR's ambition to explore a separate listing of its offshore business, EXMAR has decided to engage DnB NOR Markets as financial adviser to review and explore the company's strategic and financial options.

the nearby Old Head of Kinsale prospect, to drill 49/23-1, the second well of its 2006 three-well program. The rig then moves on to the Donegal Basin for its planned third well, which will be operated by Lundin.

ORE Offshore to Showcase USBL

The TrackPoint 3P is designed to be a versatile, low cost acoustic tracking system manufactured to be extremely rugged for use in smaller boats. The TrackPoint 3P System includes a deck unit; an integrated USBL acoustic signal processor designed to operate with up to four targets sequentially for a wide range of subsea navigation and relocation tasks. It is contained in a portable, water resistant enclosure that interfaces to a hydrophone and PC or laptop computer that is used to send commands to the deck unit as well as to display the target position.

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Drill Equipment Contract to Aker Kvaerner

Aker Kvaerner signed a contract with Jurong Shipyard in Singapore for delivery of a drilling system for an ultra deepwater drilling semi-submersible platform. The total contract value for Aker Kvaerner is approximately $160m. The contract included the delivery of a complete drilling package consisting of engineering, drilling equipment deliveries and subsea equipment. The ultra deepwater drilling rig is scheduled for delivery in first quarter 2010.

Solar-powered Gas Platform Work Begins

The world's first gas platform powered solely by wind and solar energy has begun production, in a breakthrough for the offshore industry in low-cost exploitation of marginal fields. Royal Dutch Shell announced that it has begun pumping gas from its Cutter platform in the U.K. southern North Sea. The tiny platform, powered by two wind turbines and a pair of solar panels, cost $142.6m to develop and is expected to produce gas at the rate of some 3 million cu. ft. a day for the next 15 years. The Cutter platform, about half the size of conventional satellite platforms and built for 40 percent of the cost, uses only a fraction of the energy of traditional oil installations. It measures just eight meters by eight and has no helideck. (Source: The Independent)

Metocean Services International

Metocean Services International provides a range of oceanographic and meteorological services to the offshore oil and gas market, coastal engineers, dredging companies and port authorities. These include physical measurement services, desktop studies, data processing/reporting and weather forecasting.

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Oil Detection System

OSIL introduces the Slick Sleuth from InterOcean Systems, an above water oil detection system. In addition to InterOcean Systems, OSIL is

a distributor for AML, Guildline, Sontek and YSI. Products range from CTD, SV, current meters, water quality multi-probes, oil spill detectors, databuoys, tow-bodies, to salinometers and calibration standards. Monitoring systems are custom built for coastal, offshore and ports and harbors.

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Thin Jack: A Jacking and Separating System

Equipment and Technical Services (ETS) added Thin Jack technology to its equipment offering. Thin Jack is a patented, two-mm thin envelope capable of exerting hundreds of tons of force to jack, lift and separate difficult-to-move objects, such as pipeline flanges and concrete weight coatings.

Constructed from two sheets of high tensile (grade 316L) steel and TIG welded to form an envelope with a narrow metal tube protruding from the envelope, Thin Jack is inflated with oil or water using a hydraulic hand pump at pressures up to 8,700 psi (600 bar), thus expanding the envelope to 10 to 12 mm. The steel sheets are forced apart, converting all the energy from the pressurized fluid into forces perpendicular to the steel sheets. The force achieved is a function of area and pressure and can amount to up to 400 tons from a single Thin Jack.

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Undersea Defense

directory

ABS Americas
Contact: Martin A. Hruska, Manager - Business Development & Marketing
Phone: 281-877-6169
Fax: 281-877-6001
Email: abs-amer@eagle.org
Url: www.eagle.org
Product: ABS is one of the world's leading classification societies. Since 1862 it has been setting safety standards for the marine and offshore industries. ABS establishes and applies technical standards, known as Rules, for the design, construction and operational maintenance of ships and other marine structures.

ABSL Power Solutions
Contact: Catriona Watson - Marketing
Phone: 01505 680 221
Fax: 01505 680 222
Email: catriona.watson@abslpower.com
Url: www.abslpower.com
Product: Modular Batteries for UUVs, AUVs etc.

ASEA Power Systems
Contact: Russ Engle - Executive VP
Phone: 714-896-9695
Fax: 714-896-9679
Email: rengle@aseapower.com
Url: www.aseapower.com
Product: Mfg of Power Conversion - Frequency, Phase & Voltage Conversion.

Blackwater Marine, LLC
Contact: George Lulham- OPSO
Phone: 425-828-6434
Fax: 425-216-1121
Email: info@blackwatermarine.com
Url: blackwatermarine.com
Product: Full service diving and marine contractor.

DDL Omni Engineering, LLC
Contact: Marland Parsons - VP, Simulations and Systems Division
Phone: 757-306-0607
Email: marland.parsons@ddlomni.com
Url: www.ddlomni.com
Product: DDL OMNI Engineering LLC is an engineering and technical services company that has an ISO 9001:2000 registered Quality Management System. We provide engineering, information technology, planning and training, wargaming, integrated logistic support, test and evaluation, and environmental services to a wide variety of government and commercial clients. DDL OMNI is organized into five line operating divisions and a technology incubator organization corresponding to its prime service areas. These divisions are: Engineering Division (McLean, Va.); Engineering Services Division (Waterford, Conn.); Simulation and Systems Division (Norfolk and Virginia Beach, Va.); Acquisition Planning Division (Arlington and Norfolk, Va.); Information Technology Division (our affiliate company Walcoff & Associates in Fairfax, Va.).

Department of Ocean Engineering, Florida Atlantic University
Contact: Manhar Dhaank - Department Chair and Director of SeaTech
Phone: 954 924 7242
Email: dhanak@oe.fau.edu
Product: The Department of Ocean Engineering offers BS, MS and PhD degrees in Ocean Engineering. With a body of 120 undergraduate and 40 graduate students, the Department has grown to include FAU's seafront Institute of Ocean and Systems Engineering (SeaTech). We carry out defense-related research in the areas of acoustics, marine materials, marine vehicles, hydrodynamics and physical oceanography, structures, and nano-composites. SeaTech provides a means to collaborate with industry, academia and government and transition research products to application.

Diving Unlimited International, Inc.
Contact: Carol Heaton - Director of Govt. Sales
Phone: 800 325 8439;
Fax: 619 237 0378
Email: cmheaton@DUI-Online.com
Url: www.DUI-Online.com
Product: Manufacturer of high performance diving equipment specializing in drysuits, diver thermal protection (including hot water suits) as well as waterproof bags.

Goodrich Corporation - Engineered Polymer Products
Phone: 904-757-3660
Fax: 904-757-7116
Email: epp.sales@goodrich.com
Url: www.epp.goodrich.com
Product: Goodrich Engineered Polymer Products (EPP) division specializes in the design, analysis, and production of advanced composite and acoustic structures.

Harris Acoustic Products
Contact: David A. Mortimer - Business Dev. Mgr.
Phone: 508 850 3176
Fax: 508 660 6061
Email: sales@harrisacoustic.com
Url: www.harrisacoustic.com
Product: Manufacturer of transducers, hydrophones and diver held sonars for Navy, Industry, Public Safety and OEM.

Hafmynd • Gavia Ltd.

Fiskislod 73, 101 Reykjavik, Iceland
Tel: + (354) 5112990
Fax: + (354) 5112999
E-mail: info@gavia.is

Gavia AUV Corp.

880 Calle Plano, Unit K
Camarillo, CA 93012, USA
Tel: (805) 4846639
Fax: (805) 4849012
E-mail: info@gavia-auv.com

The GAVIA AUV System developed by Hafmynd LTD, is a commercially available fully modular compact AUV capable of both very shallow water and deep-water operations. The Gavia base vehicle is a mobile sensor platform that can be user configured on deck for a particular task or operating condition by the addition of one or more sensor, navigation or battery modules, which are inserted into the vehicle and locked in place by means of a unique twist lock system.

Circle 215 on Reader Service Card

Hibbard Offshore
Contact: Dennis Scro, Director, Development & Ops
Phone: 207-671-2545
Email: Dennis@HibbardOffshore.com
Url: www.HibbardOffshore.com
Product: ROV services to 6,600 fsw.

Hydroid, LLC
Contact: Kevin McCarthy - VP of Marketing
Phone: 508-563-6565
Fax: 508-563-3445
Email: kmccarthy@hydroidinc.com
Url: www.hydroidinc.com
Product: Hydroid holds the exclusive rights to the Autonomous Underwater Vehicle (AUV), REMUS. A family of REMUS vehicles has been developed for use to water depths as deep as 6000 meters. To learn more about the lightweight, compact REMUS 100; the highly versatile, modular REMUS 600; and the deep-water workhorse REMUS 6000 visit www.hydroidinc.com.

IXSEA INC.
Contact: Stephane Loeul
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Fax: +1 781 937 8806
E-mail: info@ixsea.com
Web: www.ixsea.com
Descr: At IXSEA we combine smart technology and experience with marine know-how to provide systems and solutions for the defense industry.
• OCTANS: gyrocompass and vertical reference unit
• MARINS, STARINS and PHINS: Inertial Navigation Systems (INS) designed for naval requirements.

Kemo Limited
Contact: Robert Owens
Phone: +44(0)20 8658 3838
Fax: +44(0)20 8658 4084
Email: technical@kemo.com
Url: www.kemo.com
Product: Manufacturers of signal filter/amplifiers, and specialist systems for SONAR calibration.

L-3 Communications Klein Associates
Contact: Rick Wetmore - Program Manager, Waterside Security Systems
Phone: 603-893-6131
Fax: 603-893-8807
Email: Rick.Wetmore@L-3Com.com
Url: www.L-3Klein.com
Product: HarborGuard Integrated Waterside Security and Surveillance system which combines radar & video surveillance technology to provide all day/night coverage of over water areas.

Marin Mätteknik AB
Contact: Anders Höfnell - Marketing Manager
Phone: +4631695280
Fax: +4631695290
Email: anders.h@mmtab.se
Url: www.mmtab.se
Product: MMT maps shallow, littoral and offshore areas for bathymetrical, geophysical and geotechnical surveys. Our information products enable nautical charts producing, subsea route and foundations engineering and marine environmental assessments and exploration.

Morgan Electro Ceramics
Contact: Jack G. Gray - VP Sales
Phone: 440-232-8600
Fax: 440-232-8731
Email: jack.gray@morganplc.com
Url: www.morganelectroceramics.com
Product: Manufacturer of Piezoelectric ceramic and PZT transducers and sensors.

Nautronix Ltd
Contact: Laura Cruickshank - Marketing Coordinator
Phone: +44 1224 775700
Fax: +44 1224 775800
laura.cruickshank@nautronix.co.uk
Url: www.nautronix.com
Product: Research and Development, NAS-HAIL, SeaPC, ADS2 development.

Noise Control Engineering Inc.
Contact: Raymond Fischer - President
Phone: 978-670-5339
Fax: 978-667-7047
Email: nonoise@noise-control.com
Url: www.noise-control.com
Product: NCE provides noise and vibration consulting services for all types of marine vessels and off-shore structures.

Our engineers have the experience and expertise to evaluate and control both internal and external noise in an optimal manner, thus reducing cost and impact on space, weight, and operation of the vessel.

Ocean Design Inc. (ODI)
Contact: John Flynn - Director Sales & Marketing
Phone: 386-236-0780 x1443
Fax: 386-236-0960
Email: jflynn@odi.com
Url: www.odi.com
Product: ODI (Ocean Design, Inc.) is the world leader in subsea electrical and fiber optic interconnect systems. ODI's high reliability connectors, cable assemblies and junction boxes are used worldwide for offshore oil and gas, defense, oceanographic and research applications. ODI's wet-mateable connectors include signal and high-power electrical, fiber optic, and hybrid electro-optical products. All are based on patented oil filled, pressure balanced technology. ODI Wet-Mate connectors eliminate variabilities in sea state conditions, weather, and operator proficiency to eliminate the performance risks in operations. Companion dry-mate submersible connectors compliment these wet-mate lines.

Ocean Marine Industries, Inc.
Contact: Jeanne Dorsey - Director,Sales and Dist.
Phone: 757-382-7616
Fax: 757-382-5012
Email: info@oceanmarieninc.com
Url: www.oceanmarineinc.com
Product: DIDSON Dual-frequency Identification Sonar.

ORE Offshore
Contact: Gregory MacEachern
Phone: 508-291-0960
Fax: 508-291-0975
Email: sales@ore.com
Url: www.ore.com
Product: ORE Offshore is a leading manufacturer of high accuracy acoustic positioning systems and acoustic release products.

Porter & Co
Contact: Richard T. Porter - President
Phone: 360-661-2169
Fax: 360-221-6075
Email: rtp@whidbey.com
Product: Marine government contracting & undersea surveillance consulting services.

Remote Ocean Systems
Contact: Edward Petit de Mange - Director, Sales and Marketing
Phone: 858-565-8500 x112
Fax: 858-565-8808
Email: epetit@rosys.com
Url: www.rosys.com
Product: The product line includes underwater video cameras, underwater lights, rugged pan and tilt units, and video inspection systems.

Seacon Branter & Associates, Inc.
Phone: +1 (619) 562-7071
Fax: +1 (619) 562-9706
Email: seacon@seacon-usa.com
Url: www.seacon-usa.com
Product: Seacon, leading manufacturer of underwater connectors, wet and dry, mateable connectors, underwater electrical connectors, switches, fiber-optic and connector cable assemblies, able to provide solutions with existing or custom designed connector products

SeaLandAire Technologies, Inc
Contact: David C. Sparks - President
Phone: 517-784-8340
Fax: 517-784-8589
Email: dsparks@sealandaire.com
Product: SeaLandAire Technologies Inc. is a qualified small business with a staff of 12 full-time and 10 part-time personnel. Our employees have a strong background in low cost, innovative land and sea technology related to light-weight, small size platforms for acoustic, seismic and optical operation. Our engineering staff has junior and senior mechanical/hydromechanical engineers, senior electrical and RF (application) engineers, mechanical designers and prototype/limited production technicians. We have an ongoing relationship with both of the nation's top schools of engineering located here in Michigan's technology corridor. SeaLandAire Technologies Inc. was founded in 1997 by two engineers from a major U.S. sonobuoy engineering and production company. Our first projects included involvement with the hydromechanical cabling for free floating undersea hydrophone arrays and shallow water (<500m), moored sensor systems. We presently have contracts with the NavSea and SPAWAR.

SeaTrepid LLC
Contact: Bob Christ - Principal
Phone: +1(610)469-1730
Fax: +1(610)469-1730
Email: bob.christ@seatrepid.com
Url: www.seatrepid.com
Product: SeaTrepid LLC is an underwater engineering organization specializing in applied robotic solutions in support of scientific, public safety, commercial, and military applications. Our focus as an organization is the persistent development of effective equipment and techniques for lowering of risks to personnel and accomplishing underwater tasks in hazardous environments.

Technical Equipment International Ltd
Contact: Donald C.A Watson - Director
Phone: 972-9-7462518
Fax: 972-9-7462519
Email: techg@attglobal.net
Url: www.nightvision.org
Product: Designed and manufacturer of Night Vision Systems and other Allied Products for use above and below water.

Teledyne Benthos
Contact: Peter Zentz
Phone: 508 563-1000
Fax: 508 563-6444
Email: pzentz@benthos.com
Url: www.benthos.com
Product: Maker of a wide range of oceanographic products for military, research, and oil and gas applications.

The Underwater Centre
Contact: Steve Ham - Mrktg. Mgr.
Phone: +44(0) 1397 703 786
Fax: 44(0) 1397 704 969
steve@theunderwatercentre.co.uk
Url: www.theunderwatercentre.co.uk
Product: The Underwater Centre is one of the world's top training centers for commercial divers and Remote Operated Vehicle Pilots. The Underwater Centre now offers its world class facilities for marine companies, offshore, government and military organizations wishing to undertake subsea trials of various underwater technologies, equipment or machinery.

Triton Imaging, Inc.
Contact: John Thomas - Director Sales & Marketing
Phone: 831-722-7373
Fax: 831-722-1405
Email: sales@tritonimagincinc.com
Url: www.tritonimaginginc.com
Product: Triton Imaging, Inc. is a leading software and hardware provider of multi-component data acquisition systems and advanced data processing solutions for seafloor search and survey. Fully-integrated systems. Triton offers complete search/survey solutions: acquisition, processing, data fusion, visualization, and analysis of multibeam echo sounder, sidescan sonar, FLS, SAS, seismic, sub-bottom profiler, and magnetometer data.

TSS (International) Ltd.
Contact: Ted Curley - Regional Sales Manager
Phone: (978) 948-6688
Fax: (978) 948-2355
Email: sales@tssusa.com
Url: www.tss-international.com
Product: gyrocompasses, inertial navigation systems, motion sensors, steering control systems, pipe & cable detection.

Woods Hole Group
Contact: Bill Grafton - Sales Manager/Environmental Scientist
Phone: 5084956253 Fax: 5085401001
Email: wdgrafton@whgrp.com
Url: www.whgrp.com
Product: Founded in 1986, Woods Hole Group offers coastal and ocean engineering, measurement & environmental assessment services; Real-time measurement system design, integration & operation; Software application for monitoring multiple sensors; System installation & field services; Computer modeling & Data telemetry worldwide.

QinetiQ Names U.S. CEO

QinetiQ appointed Duane P. Andrews as CEO of its North American operations. Andrews was until recently chief operating officer at SAIC, the $7.8b research and engineering company. He has built a distinguished career in defense and security both within the U.S. government and in the private sector. Prior to joining SAIC in 1993, he was the U.S. Department of Defense's (DOD) Assistant Secretary of Defense for Command, Control, Communications and Intelligence.

DMT Hires DOV Manager

Deep Marine Technology hired James Pearl as its Direct Operated Vehicle (DOV) Operations Manager.

Pearl is an experienced diver that has worked extensively with both ROVs and Manned Submersibles. He will be responsible for the operations of the DMT exclusive DeepWorker 2000 Direct Operated Vehicle submersibles including scheduling, maintenance, crewing, certifications, and safety. The DOV is a cutting edge technology, one atmosphere submersible that combines the traditional technology of a work class ROV with the three-dimensional viewing and tactile feedback of a diver.

SMD Hydrovision, Sonavision Reach Agreements

Sonavision and SMD Hydrovision have reached agreement for the transfer of service and calibration the UK90 and UK94 Bathymetric systems and design and development of a successor. The UK90 and UK94 were developed in the 1990's. Sonavision will, under license, offer service and calibration services for the systems from its Aberdeen base, and will introduce an updated version in late 2006 as part of their new complete ROV sensor package.

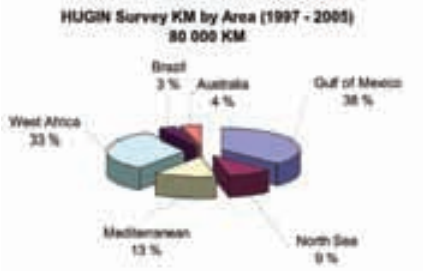
Also, Sonavision and SMD Hydrovision have reached agreement for Sonavision to take over maintenance, service and spares of the Hyball ROV system for its Hyball customer base.

The Hyball all electric ROV was introduced by Hydrovision Ltd. of Aberdeen in the 1990's and has been used for many years in a variety of roles including offshore inspection in the oil and gas industry, harbor, dam and ship maintenance, ROV pilot training and biological and environmental survey. An upgrade "offshore" version was introduced and in total around 200 systems have been manufactured. Sonavision will, under license, offer spares, maintenance and support services for the Hyball systems from its Aberdeen base. SMD Hydrovision's parts stock, dedicated tooling and test equipment is transferred to Sonavision's Aberdeen base under the agreement.

DMT Elects New Chairman

Deep Marine Technology elected Bruce C. Gilman chairman of the board. A businessman with CEO level management expertise, Gilman's four-decade subsea career is highlighted with professional accomplishments such as president of both Perry Offshore & Oceaneering International Inc.; president and founder of Sonat Subsea Services; president, CEO & director of Sonsub Inc., and chairman and president of Saipem Inc. Gilman is a graduate of the Polytechnic University of Brooklyn in Aeronautical Engineering; a registered Professional Engineer (PE); and the Marine Technology Society President-elect and Fellow.

Elevated Hugin AUV Activity



Activity has been very high in the Hugin AUV department so far in 2006. At present, the new 4,500 m depth rated Hugin 4500 is under final assembly and testing. Hugin 4500 has increased battery capacity and a higher performance payload sensor package. The payload sensor package is in whole supplied by the end customer C&C Technology,

which is also the end customer for the first Hugin 4500.

Another Hugin 3000 is scheduled for delivery to Fugro NV, at the end of this year. This will be the second Hugin 3000 to Fugro NV, with the first delivery taking place in 2004. The delivery of the next Hugin 1000 to the Royal Norwegian Navy (RNoN) is also scheduled for delivery at the end of 2006. Hugin 1000 is mainly directed towards military applications but also has potential towards marine research, etc. This Hugin 1000 will include an advanced, very high resolution Synthetic Aperture Sonar (SAS), which is undergoing sea trials now.

Tyco Telecommunications Completes Contract

Tyco Telecommunications has achieved the status of Ready for Provisional Acceptance (RFPA) under the terms of a multi-million dollar turnkey contract with Transworld Associates (Pvt.) Ltd, for the TWA-1 Undersea Cable Network. The system, the first privatized cable network to land in Pakistan, will link Karachi in Pakistan, Fujairah in UAE and Al Seeb Muscat in Oman.

The initial implementation of the network includes two fiber pairs connecting the three landings in a trunk and branch arrangement with each fiber pair initially commissioned to carry 10 Gb/s. This Dense Wave Division Multiplexing (DWDM) undersea fiber optic cable system is more than 1,200 km in length and capable of carrying up to 1.28 Tb/s of transmission capacity when fully upgraded.

Fugro GEOS Wins Award

Fugro GEOS won a safety award from a leading training and advisory bodies. The company, provider of oceanographic & meteorological (metocean) systems, was given the International Safety Award by the British Safety Council for the third consecutive year. David Ballard, CE of the British Safety Council, said: "For nearly fifty years we have led the way in promoting health, safety and environmental best practice in society. In the 21st century, many organizations worldwide are now making health and safely a top priority. Through achieving an International Safety Award, Fugro GEOS is helping to make our vision of a safe working environment a reality."

BMT SeaTech Studies Harbor Re-design Plan

BMT SeaTech Ltd. completed a comprehensive study for Defense Estates South West. Forming part of the Portsmouth Harbour Regeneration Project, the study looks at the re-design of the deepwater channel for Portsmouth Harbor in the light of its use by large future warships for the Royal Navy. When a large ship enters a port or harbor, it frequently has to do so along a comparatively shallow and often winding approach channel. BMT has extensive experience of approach channel design and was commissioned by Defense Estates to review the suitability of the present channel for large warships proposed for the future. In addition, an alternative "straight in" channel design, remote from the present channel, was to be reviewed.

At Portsmouth, channel design is constrained by a number of elements. One is the historic harbor entrance, bounded on both sides by structures dating back to Henry VIII which understandably must not be touched. Similarly, the Spit Sand Fort must be avoided, as should other sites of historical interest such as that occupied by the remains of the Mary Rose.

From a navigational point of view, the present approach to the harbor entrance involves a number of course changes in, or near, the entrance

Gardline Orders New Multibeam Tech

Gardline, a seabed mapping specialist, has taken delivery of the latest generation EM 710 and EM 3002 multibeam systems from Kongsberg Maritime. The EM 710 1 by 1 degree multibeam will be installed on the RV Triton, Gardline's triple hull hydrographic survey ship and the EM 3002 dual head multibeam will be installed on the MV Confidante, Gardline's specialist shallow draft coastal survey vessel.

which puts a large ship at risk. Therefore, the elimination of these changes was seen as an important part of any new channel design.

Portsmouth, however, possesses a significant natural advantage. There is a natural channel, underlying the present approach channel, which has been formed as the tide moves water in and out of the harbor. By making use of this channel, BMT was able to produce a design that both eliminated the awkward course changes at the harbour entrance and made the fullest use of the available, natural, deep water. This so-called "Blue 2" channel led to significantly reduced dredging costs compared with the alternative "straight in" channel and avoided both the Spit Sand Fort and the Mary Rose site.

VideoRay, BlueView Announce Purchase

VideoRay LLC and BlueView Technologies announced an agreement outlining the purchase for resale of 50 ProViewer 450 sonar systems. The agreement is expected to result in the rapid deployment of sonar technology to the more than 600 VideoRay users, and new customers of the companies' underwater inspection products. VideoRay has been evaluating multibeam technology as a tool for enhancing operations and navigation in low-visibility water. The BlueView ProViewer has been extensively tested by key customers in port security, law enforcement, and commercial diving environments, and has allowed users to accomplish previously difficult or impossible missions.

EGS Commences Indian Ops

EGS commenced its Indian Operations with the incorporation of EGS Survey Pvt. Ltd. (EGS India), based at Navi Mumbai (India). Commander PK Tyagi, IN (Retd), will lead unit as the Managing Director of EGS India. Cdr. Tyagi is a leader in the survey industry in India, and brings wide ranging professional expertise and more than three decades of experience to EGS India. Until earlier last month, he led the largest Indian survey company, Elcome Surveys Pvt. Ltd., as its CEO. He resigned from that position in order to start EGS India.

C & C Geomar Completes Pemex Survey

C & C Geomar, located in Ciudad del Carmen, recently completed a large multi-channel high-resolution seismic survey for Pemex Exploration Y Production. The survey, located in the southern portion of the Gulf of Mexico, used surface navigation, multibeam bathymetry, a sub bottom profiler, side scan sonar and a 24 channel multi-channel seismic system to collected geophysical data in water depths ranging from 7 to 1,700 m.

Technip Continues Plan to Rebuild Fleet

Technip is teaming with DOFCON, a subsidiary of DOF, for the joint ownership and management of its new build DP III DSV. This vessel will be mostly dedicated to the support of the Statoil frame agreement signed with Technip for diving, pipeline repair, contingency and modification services. Based on the Aker OSCV-06L design and 153-m long, the vessel will be equipped with a 300-ton crane and a 24-man dive system built to Norwegian standards. The delivery is due in late 2008.

Technip also signed an eight-year charter agreement for a new DPII diving support vessel (DSV). Based on an Aker ROV06 design, the 105-m long vessel, owned by DOF, will be fitted with an 18-diver saturation system which will be supplied by Technip. The vessel, which will operate mainly in the U.K. Continental Shelf, will be equipped with a 150-ton crane and all equipment necessary to execute both subsea construction and installation, as well as repair and maintenance (IRM) projects in the most challenging North Sea or deep water environments. She is due for delivery in 2007. Technip also confirmed the Memorandum of Understanding (MOU) for the joint marketing of the subsea construction vessel built by DOF in Brazil.

Tyco Telecommunications Wins TTC Contract

Tyco Telecommunications was selected by TransTelecom Company

(TTC) as the sole provider of the first undersea communications system connecting the Sakhalin Islands to TTC's digital mainland backbone. The network, to be laid across the Tatarsky Strait, will eliminate the region's dependence on the satellite channels it uses for communications. The 2006 project implementation will deploy 214 km of STM-16 equipment (2.5 Gbps) one meter under the seabed of the Tatarsky Strait.

ELSS Pods Delivered to Singapore Navy

OceanWorks International announced the delivery of Emergency Life Support Stores (ELSS) transfer pods to the Republic of Singapore Navy (RSN). The ELSS pods will be used to support the Navy's submarine rescue operations. This delivery is the result of a follow on order that augments the RSN inventory of ELSS transfer pods. The RSN has been successfully using OceanWorks transfer pods and pod delivery system since it was delivered in 2003.

SBX Acquires Vessel

SeaBird Exploration Limited (SBX) has acquired M/V Sentinel, a dynamically positioned vessel built in 1979. The vessel will be converted to a Source/Ocean Bottom Seismic ship. Total cost for the vessel, including upgrade and additional equipment, is expected to be up to $20 million. The vessel is expected to be in full operation from early 2007.

L-3 Closes Purchase of Nautronix

L-3 Communications Holdings Inc. has completed its purchase of Nautronix Defense Group, the mine and anti-submarine weapons systems maker, for $65m in cash plus a possible $6m more, depending on financial performance. Nautronix will be renamed L-3 Communications Nautronix Holdings Inc. (Source: Reuters)

ROV Committee Names Scholarship Winners

Patrick Hickey, Jason Gillham, David Kunz and Eric Lieb have been selected as recipients of the Marine Technology Society's 2006 ROV Committee Scholarships. In addition Laura Fenton and Tasha Snow received special MATE Center MTS ROV Committee Scholarships.

Hickey, who will be a freshman at Penn State University, was awarded $5,000; Gillham who will be a senior at the University of Waterloo was awarded $2,500. Kunz who will be a sophomore at Gonzaga University, and Lieb who will be a sophomore at Texas A&M University in College Station each received $1,250. As winners of the MATE Center (Marine Advanced Technology Education) ROV Committee Scholarships, Fenton who will be

Institute Awarded $300k Grant

Avijit Gangopadhyay

The John Adams Innovation Institute has awarded a $300,000 grant to two University of Massachusetts campuses to develop a Center of Excellence in Applied Ocean Observation Systems. UMass Dartmouth and UMass Boston will jointly develop the Center through their respective marine units, the School for Marine Science and Technology (SMAST) and the Department of Environmental, Earth and Ocean Sciences (EEOS).

According to the proposal, the Center of Excellence will seek partnerships with ocean-related companies, government labs, and other academic institutions to develop core technologies and evolve them to commercial applications. The Center will conduct both applied and basic research relevant to the next generation of integrated observation/ modeling systems, platforms and sensors. The Center's initial emphasis will be in the areas of ocean-forecasting systems and fisheries applications, according to principal investigator Avijit Gangopadhyay, Associate Dean of SMAST. The grant, he says, is an "excellent opportunity to work together to integrate the strengths of the Massachusetts marine technology sectors and stimulate the growth of the region's marine research corridor for the future."

attending Florida Atlantic University received $3,000, and Snow who will be attending the University of Washington received $2,000. All will be recognized during the Awards Presentations at Underwater Intervention '07 in New Orleans, Louisiana.

Drew Michel, Chairman of the ROV Committee of MTS initiated the scholarship program in 1994. Since then it has awarded over $80,000 to deserving students. Scholarship applications for 2007/8 must be received by April 15, 2007. Details on how to apply and additional information on the MTS ROV committee can be found at http://www.rov.org/.

Kollmorgen Awarded $17.2m Option

Kollmorgen Corp., Electro-Optical Division, Northampton, Mass., was awarded a $17,210,195 fixed-price incentive and firm-fixed price modification under previously awarded contract to exercise an option for production of seven integrated submarine imaging systems (ISIS), including associated on-board repair parts and installation-checkout spares for the SSN 688 class submarine; and one ISIS SSGN class production system, including associated on-board repair parts and installation and check-out spares. The integrated submarine imaging system will provide mission critical, all weather, visual and electronic search, digital image management, indication, warning, and platform architecture interface capabilities for SSN 688, SSN 21, and SSGN class submarines.

i-Tech's Announces Deepwater ROV Program

Global contractor, i-Tech, part of Subsea 7, said it has placed a significant order for new build deepwater work class vehicles, which will be supplied with advanced, light weight, high performance handling systems. The systems, to be named Centurion Qx, have been specifically designed and built for i-Tech and its target market.

The 125hp Centurion Qx will be rated to operate at water depths up to 2,000m as standard with options to upgrade to 3,000 m and beyond. The systems will be built by SMD Hydrovision (SMDH) at its Turbinia works on the River Tyne in Newcastle, UK. The Centurion Qx is an evolution of the successful Subsea 7 designed and built Centurion work class series. The new Centurion Qx will incorporate a number of key components used on SMDH's proven Q-Series range of ROV's including DVECS distributed control and the latest generation Curvetech thrusters.

OceanWorks Completes Testing of Thruster

OceanWorks International, Inc. completed successful testing of a new thruster system for the Hardsuit atmospheric diving suit.

The first system will be delivered on a Hardsuit system scheduled for delivery to an undisclosed NATO Navy in the spring of 2006. The new thrusters can be directly retrofit to both HS1200 and HS2000 Hardsuit systems.

The new high performance thruster system provides significantly improved reliability and vertical and horizontal thrust. Another advantage is noise reduction that allows for improved communications.

WHG Wins NOAA Contract

Woods Hole Group, Inc. won a real-time current monitoring project with the National Oceanic and Atmospheric Administration (NOAA) in the Great Lakes. Under contract to NOAA, Woods Hole Group will install two Horizontal Acoustic Doppler Current Profilers (HADCP) for real time data reporting in two rivers adjacent to Lake Erie.

One installation will be on the Maumee River in Toledo, and one will be on the Cuyahoga River in Cleveland. Both locations are considered critical for safe vessel navigation and will provide real-time river current conditions.

The real time current information is intended to assist the Great Lakes Shipping Association, Lake Carriers Association, and Lake Pilots Association to more safely navigate. After the installations are complete, NOAA will process and disseminate the river current information through their Great Lakes PORTS on-line data display http://www.glakesonline.nos.noaa.gov/

EM 120 Multibeam Echo Sounder to Portugal

Estrutura de Missão para a Extensão da Plataforma Continental (EMEPC)/Ministry of National Defense and Kongsberg Maritime AS signed a contract for the supply of the following equipment: EM 120 2x2; EM 710 1x2; Seapath 200 RTH; EK60 38/120, Sync. unit and SVP Plus. The contract also included installation, sea trials and training. The equipment will be installed onboard R/V Almirante GagoCoutinho (ex. T-AGOS 5), of the Portuguese Navy during 2006.

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FMC Debuts SONARtrac Surveillance Technology

FMC Technologies and CiDRA Corporation announced the commercial release of SONARtrac Surveillance Technology, a clamp-on monitor that uses sonar array processing to help accurately measure topside performance data and allow operators the opportunity to enhance separator performance and the potential for increased well production.

SONARtrac is the newest product in FMC's portfolio of oil and gas solutions, which includes its Smith meters and Sening tank truck products. "Offshore oil and gas producers often find it difficult to achieve complete separation because of the inherent variation in operating conditions," said Ed Otto, SONARtrac product manager. "SONARtrac Surveillance Technology helps measure gas in liquids and liquids in gas and provides information operators need to make adjustments in the event incomplete separation should occur. With daily production values reaching several million dollars, operators need all the information they can get to make the right well production and recovery choices."

SONARtrac's clamp-on design is designed to allow quick installation in the field without process interruption. Operators will have access to constant, real-time data to detect measurement error and the ability to identify the presence of liquid carryover in gas that could cause expensive downstream equipment damage.

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RCS-100 Digital Observation Camera

The RCS-100 Digital Observation Camera is a rugged and reliable digital camera for capturing images in both day and low light situations. Using both CCD and SPD technologies, the RCS-100 can use a standard Canon EF lens or specialized lens to capture images up to 1km away. Its rugged and lightweight design allows the user to operate in the worst conditions and the camera can function underwater to a depth of 100m. The operator can also remotely operate the RCS-100 from up to 1km away using a PC and specialized software. Additional software is also supplied to manage the images captured by the RCS-100.

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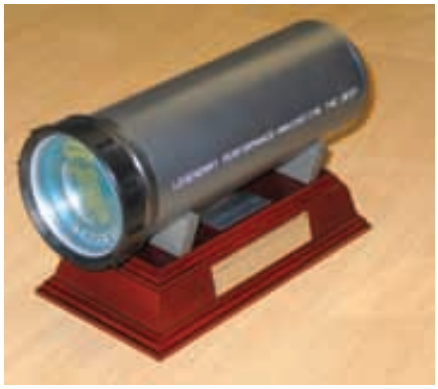
Kongsberg Delivers Final Production Sit Camera



The replacements for the SIT camera in the Kongsberg Maritime product line are the OE15-102 and OE15-103 Enhanced CCD camera products. They use Cooled-CCD sensor technology combined with high-gain low-noise amplification to provide equivalent low-light performance to the SIT in underwater operations. They are virtually immune to the image burn-in problems that can affect all image-intensifier cameras in bright daylight conditions. The success story of the SIT low-light camera for underwater ROV navigation began in the early 80's with the beginning of the boom in ROV operations within the fledgling Offshore

IXSEA and Thales launch STARINS range

IXSEA has joined forces with Thales to launch STARINS, a new range which combines Military GPS and Inertial Navigation Systems (INS). The new range includes STARINS 120, STARINS 200 and STARINS 200 Embedded.

STARINS 120 combines IXSEA's Photonic Inertial Navigations System (PHINS) with GRAM-S military Thales GPS and outputs position, heading, roll, pitch, depth, velocity and heave. Its high-accuracy inertial measurement unit is based on IXSEA's FOG technology coupled with an embedded digital signal processor that runs and advanced Kalman filter. Applications include surface navigation for frigates, MCMV and fast patrol boats as well as SDV.

Starins 120.

STARINS 200 and STARINS 200 Embedded are the ultimate navigation solutions for all navy platforms based on state of the art Thales GPS and IXSEA's inertial technologies. Performance and reliability drive these naval navigation systems. STARINS 200 and STARINS 200 Embedded can be used onboard corvettes, submarines, frigates, aircraft carriers and navy test vessels.

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Oilfield industry in the North Sea. As demand for larger, deeper, more powerful and more capable work-class ROV systems grew, so did the demand for the SIT camera as a primary ROV navigation tool. Even today the SIT camera continues to provide a peformance level in water that is difficult to match with newer camera sensors.

However, Kongsberg Maritime is confident that its new CCD camera models will live up to the performance bar set by SIT. "It was with some sadness that just recently the last production OE1324 SIT camera rolled off the Kongsberg Maritime production line, however our R&D efforts have resulted in more than worthy replacements," said Dave McKay, Kongsberg Maritime camera division. "It's fitting that the customer should be Oceaneering International, a company that has pioneered underwater ROV operations."

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ROV from AC-CESS

AC-CESS' AC-ROV employs four vectored horizontal thrusters and two vertical thrusters for inspection of confined and hazardous targets and environments. The standard system components include AC-ROV, surface control unit, intuitive hand controller, monitor & stand options, tether configuration to client requirement, tether deployment system (TDS), flight assist functions, tool kit, storm case, instruction manual, training, operators online secure area.

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New Device Monitors UPS System

AMETEK Solidstate Controls introduced a new Device Relationship Management (DRM) approach that provides users of its Uninterruptible Power Supply (UPS) Systems with the ability to monitor their UPS and battery systems using a single device, either through their UPS system's communications interface or as a stand-alone unit. "Our P3 Solutions (PROactive, PREdictive

Night Sentry Mk11 Underwater Monocular

Technical Equipment International (TEI) has extended its range of professional Night Vision Systems and Allied Products.

Night Sentry Mk11 is a high performance underwater, head-mountable Night Vision Monocular permitting observation under most low light level conditions both above and below water, subject to water visibility, to a maximum depth of 50 m. Alternatively the unit can be weapons mounted as a 'stand-alone' unit or with a night vision compatible Holographic Weapon Sights such as those specially produced by E.O Tech Inc for Night Vision Systems.

It consists of a high performance 25mm F/0.95 Objective Lens, 18mm Second Generation PLUS Image Intensifier, Ocular Lens. A comfortable, fully adjustable Head Mount is also provided.

The Image Intensifier operates from a 3v Lithium Battery permitting the Operator about 40 hours of use. High Performance 2nd or 3rd Generation Image Intensifiers can also be employed.

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and PREventive) is a logical and important step forward in the evolution of our service business," notes Jim Weathers, Client Services Manager for Solidstate Controls. "Solidstate offers 24/7 aftermarket support to its UPS system customers that includes on-site troubleshooting, repairs and preventive maintenance.

The end-to-end nPhase SmartService solution includes secure bi-directional communications over GSM/GPRS and CDMA networks, a hosted application customized to AMETEK's needs, and a 24/7 Network Operations Center. Through a partnership with Beckett LogiSync, a provider of information enabled embedded communications products, the nPhase solution interfaces with the AMETEK UPS control system at the operating system level. Vital data is transported securely and bi-directionally to centralized information systems with Internet access. Enterprise software tailored to AMETEK needs enables service technicians to proactively administer repairs and adjustments to the UPS system, typically over the phone, creating a more proactively responsive service than was previously possible.

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WDT Barriers for POLA/POLB

Wave Dispersion Technologies (WDT) said that its patented floating marine barriers - WhisprWave Small Craft Intrusion Barriers (SCIB) - have been contracted for installation at the Port of Los Angeles (POLA) and the Port of Long Beach (POLB), the largest commercial ports in the U.S.

SCIB creates a floating line of demarcation and exclusion zone for maritime force protection. It was designed for the most adverse marine conditions including winds of 100 mph. Loads are carried by steel cables encased in two in. EPDM rubber connecting cables. These same steel cables create a significant maritime port security barrier against intrusions and/or entry by unauthorized, stray or threatening vessels.

The $2.9m agreement includes the design, fabrication and delivery of 10,000 ft. of floating security barriers. Delivery is anticipated to commence within 90 days and to be completed by year's end.

This agreement represents Wave Dispersion's largest installation to date.

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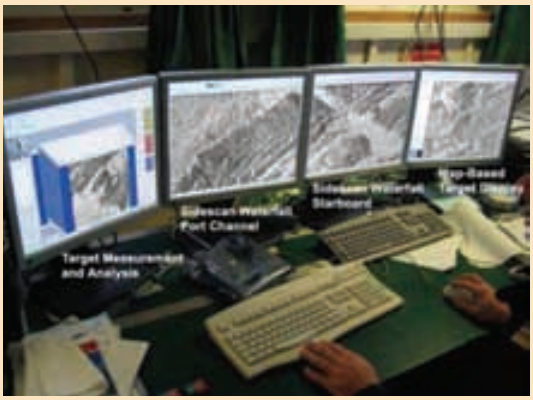
Triton Passes NATO UUV Trials



Triton Imaging said that its AUV-Suite post-mission analysis (PMA) software participated in recent Unmanned Underwater Vehicle (UUV) Mine Countermeasure trials conducted by the NATO Undersea Research Center (NURC). The Triton software was used by the Royal Norwegian Navy with its HUGIN 1000 vehicle to process sidescan and multibeam data and to acquire, analyze, and identify targets during the exercise. The configuration of the AUV-Suite during the exercise consisted of the four-screen display shown in the image below. The Commander, Mine Warfare Command (CMWC) UUV Platoon evaluated the performance of Triton's software during the exercise and made the following recommendation, "The Triton Imaging, AUV-Suite PMA software had robust and advanced capabilities with an operator-friendly graphical user interface, better than any PMA software package observed or used by the UUV Platoon. Incorporation of this software or another package with similar features is recommended for any shipboard U.S. UUV system."

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Q&A with Bruce Crager, CEO, Intec Engineering

(Continued from page 19)

MTR: What markets, by vessel niche, do you see as being lucrative in the coming years? Which segments do you see on the decline?

CRAGER:

Potential growth areas:

- Construction vessels capable of multitasking in deepwater, including laying large-diameter pipelines efficiently and installing deepwater templates, moorings, risers and other equipment
- Multifunction construction vessel for the arctic environment
- Multipurpose vessel for subsea tie-back installations
- FPSOs in GOM
- Floating LNG and floating storage and regasification units

Potential decline areas:

- Areas with high risks because of political, economic and cultural unrest

MTR: What do you consider to be the biggest challenges (i.e. Legislation, technical demand, competition, etc.) to your company's continued success?

CRAGER:

- Shortage of skilled personnel
- Globalization; i.e., the ability to outsource project scope and resource sharing
- Local content requirements of NOCs and alliances with indigenous contractors
- Commoditization of "highly" specialized services and operator expectations for low-cost solutions
- Jones Act for offshore Alaskan arctic vessels and GOM shuttle vessels
- Offshore arctic design and construction technology advancement to mitigate high investment costs
- Limited visa quotas limiting movement and development of skilled engineers

Bruce Crager, CEO, Intec Engineering

Bruce Crager is chief executive officer of INTEC Engineering. He joined the company on Feb. 14 this year, bringing more than 30 years of management and execu-

tive experience in the oil and gas industry. Eager to further INTEC's global growth in deepwater, subsea and arctic areas, he advises that the company continues to be on the forefront of technology and technology development.

"INTEC's technology leadership continues to flourish, with the offshore industry relying on INTEC to create value, particularly in the offshore frontier, so that projects may go forward," said Crager.

With expertise in serving both international operators and suppliers, Crager has focused his career on leading teams and companies in the evaluation and selection of field development solutions. His forte includes floating production systems and subsea production initiatives.

Crager was president of ABB Offshore Systems Inc. from September 2001 through March 2004. At ABB, Crager was responsible for all company activities, including profit and loss, company growth, strategic planning and coordination with other ABB divisions. Annual revenues were $135 million. ABB OSI provided project management services and subsea equipment under EPC-engineering, procurement and construction-contracts with values as high as $200 million.

Crager reports that one of his most-revered projects is Oceaneering's early 1990s installation of the "Ocean Producer" floating production/storage and offloading (FPSO) system, which is still operating offshore Angola. "At 50 feet of water offshore Gabon, the 'Ocean Producer' was the shallowest water installation of any FPSO to that date. Designing for this limited water depth was a real challenge, especially because this project was Oceaneering's first FPSO conversion, installation and operation," said Crager.

In terms of technology innovations, Crager led a team at Hughes Offshore that developed the Placid Oil production system installed in the Garden Banks area of deepwater Gulf of Mexico. Installed in the mid-1980s, he reports that the system remains one of industry's significant stepping stones for water depth, number of wells and a large template design.

"The Placid subsea system accommodated 24 wells with satellite trees in water depths exceeding 2,200 feet," said Crager.

For information on posting a job on these pages and on the "JOBS" site at www.seadiscovery.com, contact Dale Barnett at tel: 212-477-6700; fax: 212-254-6271; or e-mail: barnett@marinelink.com

PROGRAM MANAGER

Job Location: USA, CA Sacramento

Join the Sub-Sea world of Schilling Robotics!

Schilling Robotics is the world's leading supplier of telerobotic manipulator systems for remotely operated vehicles (ROVs) and cable trenching machines used in offshore oil, telecommunications, scientific, and military operations. We offer four standard remote manipulator systems. We also produce the QUEST electric and hydraulic work-class ROV systems and the Remote Systems Engine, a set of modular building blocks for underwater propulsion, actuation, control, and communication.
Schilling Robotics is an employee-owned company that emphasizes high personal standards, team focus, accountability, and honesty from its employees.
Our web site is www.schilling .com

Program Manager-ROV/ETO Systems

Description: Responsible for complex, multimillion-dollar ETO/ROV system projects. Critical liaison between client, engineering, production, and Schilling Robotics management. Reports to director of program management.

Responsibilities:
- Manage complex engineer-to-order (ETO) and remotely operated vehicle (ROV) build programs for clients
- Review equipment specifications with engineering to determine resource requirements to complete project
- Execute contracted requirements for engineering, equipment, and documentation deliverables
- Establish schedule for assigned programs to meet clients requirements
- Act as liaison with manufacturing to ensure proper resourcing for project
- Weekly track all project costs, deadlines and insure that projects remains on schedule and withinbudget
- Report project status to client and corporate and plant management on weekly basis
- Provide support to other internal departments as required and desired.

Qualification Requirements:
- 8 to 10+ of project management experience
- 4 years project management experience in or ROV Offshore Oil field
- Proficient in use of MS Office, MS Project, and MRP/ERP software
- Experience in managing complex projects for vessel ROV equipment and/or services
- Technical competence
- Strong drive to "create opportunities," "make things happen," and aggressively meet deadlines
- Self-motivated
- Good verbal and written communications skills.

Preferred Qualifications
- Accredited PMP
- Experience in dealing with ROV industry clients

Please send resume to HR@Schilling.com
HR Department
Schilling Robotics, LLC
Sacramento, CA and Houston, TX, CA 95618USA
Phone: 530-753-6718
Email: HR@Schilling.com
WEB: http://www.schilling.com

APPLICATION PROGRAMMER/ SUPPORT SCIENTIST

Job Location: USA, MD Greenbelt

Candidate will support the Global Modeling and Assimilation Office (GMAO) at the Goddard Space Flight Center. Candidate will support the ocean data assimilation system development and the conduct and evaluation of assimilation experiments. Candidate will also participate in retrieval and pre-processing of ingest data and the evaluation of ocean analyses on seasonal forecast experiments with the GMAO coupled model.

Education: Requires a M.S. or Ph.D. in Physical Oceanography or related field.

Required Skills: Solid background in code and script development in FORTRAN90 and UNIX along with previous hands-on experience in modeling and/or data assimilation.

Desired Skills: Experience with CVS is desirable. Experience with large-scale computations, particularly ocean modeling and data assimilation is highly desirable.

To apply go to www.saic.com/career and reference requisition 49719

Todd Hall
SAIC (Scientific Applications International Corp)
One Enterprise Pkwy, Suite 300
Hampton, VA 23666 USA
Phone: 757-827-4884
Email: todd.a.hall@saic.com
WEB: http://www.saic.com/career

SOFTWARE APPLICATION ENGINEER/SUPPORT SCIENTIST

Job Location: USA, MD Goddard Space Center

Support Scientist: Candidate will support the Global Modeling and Assimilation Office (GMAO) at the Goddard Space Flight Center. Scientific analyst is sought to support analysis of the impact of satellite altimetry in ocean analyses and climate forecasts. The duties are to conduct statistical analysis of the ocean structure, sea surface temperature, upper ocean heat content in ocean analyses and climate forecasts to determine areas of impact of altimetry compared with in situ data.

Education: Requires a M.S. or Ph.D. in Physical Oceanography or related field.

Required Skills: Knowledge of ocean circulation and statistical analysis techniques is required. Ability to handle large data sets, to code in FORTRAN and to plot with IDL and/or Matlab is also required.

Desired Skills: Experience with CVS is desirable. Experience with large-scale computations, particularly ocean modeling and data assimilation is desirable.
To apply go to www.saic.com/career and reference requisition number 57987

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SAIC (Scientific Applications International Corp)
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TECHNICAL SOLUTIONS PROVIDER - MARINE

Job Location: Canada, Fredericton

CARIS is expanding operations at its global headquarters in Fredericton, New Brunswick, Canada. Opportunities exist for dynamic individuals with practical experience in hydrographic applications.

We need people who can:
- Build close working relationships with clients
- Identify technical problems, formulate and demonstrate integrated solutions for new and existing clients
- Use and build their industry knowledge to discover potential clients
- Respond to RFP's, reply to incoming inquiries and formulate unsolicited business plans
- Exhibit and/or present at international conferences and tradeshows

Multilingual capabilities, specifically in French or Spanish would definitely be considered an asset.

Interested applicants should forward their resume to jobs@caris.com and include "Reference: Technical Solutions Provider - Marine" within the subject line.

We thank all applicants in advance for their interest, however, only those selected for an interview will be contacted.

Established in 1979, CARIS is the leading developer of geomatics software designed specifically for hydrographic and marine industries. CARIS products and services are continually selected number one by esteemed military agencies, survey contractors, ports and harbours, and academia among others. For more information about CARIS visit www.caris.com.

jobs@caris.com
CARIS
115 Waggoners Lane
Fredericton, Canada
Phone: 1-506-458-8533
1-506-459-3849
Email: jobs@caris.com
WEB:http://www.caris.com

ROV PILOTS & SUPERVISORS

Job Location: United Kingdom, Offshore

Qualified ROV Pilots and Supervisors with Seaeye Tiger and TMS experience required for worldwide assignments with leading international Subsea Engineering company. Good day rates and 28 day rotations. Immediate work available

Location: Offshore, W/Wide

David Green
TEK Personnel Consultants
4th Floor, Broadstone House,Broadstone Road,Stockport
Manchester, SK5 7DL, United Kingdom
Phone: +44(0)161 975 0321
Email: davidgreen@tekpersonnel.co.uk
WEB: http://www.tekpersonnel.co.uk

TECHNICAL ASSURANCE SUPERINTENDENT

Job Location: USA, Houston, TX

BP is one of the largest oil and gas producers in America and is a major player in petroleum exploration and production around the world. If you are someone who is driven to make a difference, to prove yourself and ready to make a move in your career, BP is the place for you.

BP is currently seeking a:

- #6873 Marine Engineers
- #6874 Naval Architect

A detailed job description and application process can be viewed online: www.bp.com/careers/us, click on "Experienced Hires," then click "Search by job number" and enter the specific job #6873 or 6874 in the keywords/job ID field. The successful applicant must submit and pass a drug screening test prior to employment and may be required to participate in a random drug-screening program.

BP is an Equal Opportunity Employer.
Email: BPCAREERS@BP.COM

OFFSHORE ASSURANCE SUPERINTENDENT

Job Location: USA, TX Houston

BP is one of the largest oil and gas producers in America and is a major player in petroleum exploration and production around the world. If you are someone who is driven to make a difference, to prove yourself and ready to make a move in your career, BP is the place for you.

BP is currently seeking a:

- #6765 Offshore Assurance Superintendent

A detailed job description and application process can be viewed online: www.bp.com/careers/us, click on "Experienced Hires," then click "Search by job number" and enter the specific job #6765 in the keywords/job ID field. The successful applicant must submit and pass a drug screening test prior to employment and may be required to participate in a random drug-screening program.

BP is an Equal Opportunity Employer.
Email: BPCAREERS@BP.COM
WEB: http://www.bp.com/careers/us

SENIOR PROJECT MANAGER

Job Location: United Arab Emirates, Dubai

Minimum 10 years experience in the offshore oil and gas industry.

Minimum 7 years project management experience on EPC offshore oil and gas projects. Must have relevant experience on jackets and decks fabrication projects, marine installation projects; also must have managed projects with an engineering content. Candidates must be able to offer evidence of having worked in the capacity of project manager on two or more large and complex EPIC offshore oil and gas project in the last 5 years.

Must have worked as project manager for an E&C contractor in the offshore oil and gas industry.

Kristen Vosmaer
Peoplenext
Milwaukee, WI 53222 USA
Phone: 414-276-9800
Email: kvosmaer@peoplnext.com

WEB APPLICATIONS PROGRAMMER

Job Location: USA, MS Stennis Space Center

The Science Applications International Corporation (SAIC) ESO Operation seeks an experienced Web Applications Programmer for its National Data Buoy Center at Stennis, MS. Candiate must be able to lead a team in the design, development, maintainence, testing and troubleshooting of software programs for web systems in support of the National Data Buoy Center. Responsibilities include coding and maintenance of scripts, creation of dynamic and static web pages, database and data maintenance, web replication, and to serve as the technical contact backup to other web developers. Develops documentation for new and existing programs. Designs specific enhancements and plans upgrades to software. Determines system specifications, input/output processes and working parameters to meet business requirements and hardware/software compatibility. Directs the translations of functions to be automated. Assists with training new web programmers and software end-users. Approves changes (amending program flowcharts, developing detailed processing logic and coding changes.) Oversees testing, document changes, and operator instruction development. Evaluates simple interrelationships in the immediate programming area, consults with users to determine needs/modifications, and implements changes upon approval from higher level staff member. Is responsible for meeting goals within time constraints. Recommends solutions to problems related to software web design. Contributes to the preparation and presentation of results to clients and the professional community. Develops web software development cost and schedule estimates. Oversees design/architecture changes and/or enhancements to web systems. Must possess a BS in computer science, or computer related field. An MS would be a plus.

Todd Hall
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Phone: 757-827-4884
Email: todd.a.hall@saic.com
WEB: http://www.saic.com/career

MARINE TECHNICIAN

Job Location: USA, WA Seattle

MUST BE US CITIZEN, FUGRO EMPLOYEE OR POSSESS VALID VISA FOR WORK AND RESIDENCE IN THE US

General Position Summary:
The responsibility of the Marine Technician involves a wide range of specialized technical skills regarding FSSI engineering, navigation and technical administration, to include assembly, operation, repair, maintenance, and mobilization/demobilization of the company's survey equipment. The incumbent also provides technical support on survey system development projects.

Essential Functions:
- Assemble, operate, repair, maintain and mobilize/demobilize FSSI's mechanical, electrical and navigational survey equipment.
- Stand a watch during surveys.
- Assist with the maintenance or refurbishment of select survey and navigation field systems.
- Assist engineers and surveyors with calibration, testing and certification of equipment prior to deployment to the field. Maintain equipment and adequate spares stock levels while offshore.
- Maintain the good working order of both the survey systems and the workshop/warehouse.
- Safely pack and stow equipment in preparation for transport.
- Conduct light construction activities and utilities' maintenance coordination.
- Assist with research and development of new FSSI systems and procedures.

Specific Job Skills:
- Strong electro mechanical aptitude involving a wide range of survey systems hand tools, and test equipment.
- Strong problem solving skills and the ability to resolve both technical and personal issues relevant to the job.
- Flexibility with changing schedules and work situations.
- Possess strong interpersonal skills that include the ability to work effectively with peers, subordinates, and superiors. Must have an excellent ability to communicate in a professional manner and seek a "win-win" solution.
- Ability to multi-task.
- Must be highly organized and able to work with deadlines.
- Excellent written and verbal communication skills.
- Computer literate.
- Fluent in written and spoken English.

Education and Experience:
- Two years of college or technical school preferred.
- 5+ years experience in a technical discipline involving troubleshooting and main-

tenance.
- Seagoing experience preferable, however not necessary.

Job Conditions:
- Normal office working conditions onshore.
- Up to four months at sea aboard a ship in close quarters.
- Physical requirements for mobilizing and demobilizing a vessel can be strenuous.
- International travel, often to remote locations.
- Pre-employment physical and drug screen (required).

Company
Pioneering research and proven development of advanced technology make Fugro Seafloor Surveys, Inc. (FSSI) an industry leader. Our expert technical team offers a wide range of skills used to develop cost- and time-effective solutions for specific projects.

We combine extensive field experience and commitment to state-of-the-art technology with continuous development of proprietary surveying hardware and software systems. Our resulting advanced survey systems have been proven in numerous commercial surveys throughout the world's oceans. FSSI systems have mapped over 2.6 million square kilometres of seafloor to depths of 9,500 meters, all to hydrographic standards for accuracy and precision. Some of the largest international marine surveys awarded in recent years certify our superior performance and reliability.

Fugro Seafloor Surveys, Inc. (FSSI) is a focused team of 37 with expertise in a wide array of fields including geology, engineering, information technology, marine operations, project management and administration.

Carrie Higley-Krowka
Fugro Seafloor Surveys
2727 Alaskan Way - Pier 69
Seattle, WA 98121 USA
Phone: 206-441-9305
Email: hr@seafloor.com
WEB: http://www.seafloor.com

COMMERCIAL MANAGER

Job Location: USA, WA Seattle

MUST BE US CITIZEN, FUGRO EMPLOYEE OR POSSESS VISA AUTHORIZING WORK IN THE USA.

General Position Summary:
The Commercial Manager is responsible for development, bidding, and commercial administration of FSSI projects. This requires constant contact with existing and potential clients with the purpose of expanding FSSI's regional and international market share of the marine survey, research and development, and data management industries.

Essential Functions:
- Review and respond to Request for Quotations (RFQs), coordinating all contract budgeting, proposal preparation, and contract negotiations for FSSI.
- Assume daily responsibility for compliance with terms and conditions of all contracts.
- Oversee all US and international business authorizations including import/export procedures and requirements, survey and vessel permitting, customs and clearance of FSSI equipment and personnel.
- Maintain direct and frequent contact with existing and potential international clients
- Maintain commercial and marketing communications within the Fugro Group of companies and develop FSSI's role in supporting and utilizing the Fugro network.
- Coordinate FSSI's roll in joint Fugro Group business endeavors.

Secondary Functions:
- Provide commercial support to FSSI project managers and survey operations.
- Coordinate banking needs with the FSSI Controller.
- Stay generally informed about the businesses of FSSI to perform administrative, operational and executive functions in the absence of the company President.

Supervisory Responsibility:
The Commercial Manager reports to the President, and supervises all project management personnel from moderately- to highly-experienced. As department manager, incumbent plays a primary role in hiring and evaluating all department personnel.

Specific Job Skills:
- Ability to prepare sound business plans for marine survey projects, including cash flow, risk analysis, and profitability.
- Strong knowledge of contracting as well as marine survey practices, equipment, and requirements.
- Possess strong interpersonal skills that include the ability to work effectively with clients, peers, subordinates, and superiors from a variety of cultures. Must have an excellent ability to communicate in a professional manner and seek a "win-win" solution.
- Ability to read and write technical documents.
- Strong problem solving skills.
- Supervisory management skills.
- Ability to multi-task.
- Must be highly organized and able to work with deadlines.
- Excellent written and verbal communication skills. Fluent in written and spoken English.
- Computer literate.

Education and Experience:
Extensive international marine survey administrative experience preferred. An MBA with relevant job experience could be substituted.

Job Conditions:
- Predominately normal office working conditions.
- National and international travel.

Company
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Additional information at:
www.seafloor.com

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Seattle, WA 98121 USA
Phone: 206-441-9305
Email: hr@seafloor.com
WEB: http://www.seafloor.com

GEOPHYSICAL DATA ANALYST

Job Location: USA, WA Seattle

MUST BE US CITIZEN, FUGRO EMPLOYEE OR POSSESS VALID VISA FOR RESIDENT/WORK IN THE USA.

General Position Summary:
The Geophysical Data Analyst will work offshore and onshore to process and quality control bathymetric data and seafloor imagery using a suite of Fugro sonar processing software. The candidate will also be responsible for rendering a variety of survey data into industry standard cartographic formats utilizing various CAD and GIS software packages.

Essential Offshore Functions:
- Assist with 24-hour sonar data processing and chart production.
- Data management and administration.
- Preliminary chart production.
- Vessel mobilization and de-mobilization.

Essential Onshore Functions:
- Survey preparation.
- Data integration for chart production.
- Data format conversions.
- Sonar post-processing.

Specific Job Skills:
- Advanced knowledge of Windows and/or UNIX operating systems.
- Knowledge of GIS systems and theory.
- Familiarity with sonar data processing and bathymetric modeling.
- Use of Microstation and/or AutoCAD drafting/charting software.
- Keen attention to detail and exceptional organizational skills.
- Ability to learn processing methodologies quickly.
- Flexibility with changing schedules and work situations.
- Possess strong interpersonal skills and the ability to work effectively with peers, and superiors.
- Knowledge of cartographic methods.
- Fluent in written and spoken English.
- Strong interest in marine geology and ocean processes.

Education and Experience:
B.A/B.Sc. or higher in geology, oceanography, marine engineering, or related field. Interest and experience in oceanographic processes and data analysis a plus. Experience with data processing and/or cartography is advantageous.

Job Conditions:
- Predominately normal office working conditions.
- Up to four months at sea aboard a vessel in close quarters. Cannot be debilitated by seasickness. Pre-employment physical and drug screen is mandatory.
- Physical requirements for mobilizing and demobilizing a vessel can be strenuous. Must be able to lift 50lbs and walk up and down steep, narrow stairs and gangways.
- International travel, often to remote locations.

Company
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Seattle, WA 98121 USA
Phone: 206-441-9305
Email: hr@seafloor.com
WEB: http://www.seafloor.com

SEAGOING ELECTRONICS ENGINEERING TECHNICIAN

Job Location: USA, WA Seattle

MUST BE US CITIZEN, FUGRO EMPLOYEE OR POSSESS VALID VISA FOR WORK AND RESIDENCE IN THE US

General Position Summary:
The Seagoing Electronics Engineer provides technical support on survey system development projects and is responsible for assembly, operation, repair, maintenance, and mobilization/demobilization of the company's survey equipment.

Essential Functions:
- Provide technical support on systems development projects.
- Identify improvements, plan, design, and test new and existing technology and survey equipment.
- Maintain or refurbish all field electronic and mechanical survey systems to include proper calibration, testing and certification prior to deployment to the field; and maintenance of adequate equipment and spares stock levels.
- Conduct light construction activities and utilities' maintenance coordination.
- Safely pack and stow equipment in preparation for transport.

Specific Job Skills:
- Strong knowledge of digital and analogue integrated circuitry, DSP logic, micro-processing, RF principles, sonar fundamentals and ability to use a wide range of test equipment.
- Strong problem solving skills, and ability to resolve both technical and personal issues relevant to the job.
- Flexibility with changing schedules and work situations.
- Possess strong interpersonal skills that include the ability to work effectively with peers, subordinates, and superiors. Must have an excellent ability to communicate in a professional manner and seek a "win-win" solution.
- Ability to multi-task.
- Must be highly organized and able to work with deadlines.
- Excellent written and verbal communication skills.
- Computer literate.
- Fluent in written and spoken English.
- Pre-employment physical and drug screen (required).

Education and Experience:
- B.Sc. in Electronic Engineering Technology or higher.
- 5+ years experience in electronic troubleshooting and maintenance.
- Seagoing experience preferable, however not necessary.

Job Conditions:
- Normal office working conditions onshore.
- Up to four months at sea aboard a ship in close quarters.
- Physical requirements for mobilizing and demobilizing a vessel can be strenuous.
- International travel, often to remote locations.

Company
Pioneering research and proven development of advanced technology make Fugro Seafloor Surveys, Inc. (FSSI) an industry leader. Our expert technical team offers a wide range of skills used to develop cost- and time-effective solutions for specific projects.

We combine extensive field experience and commitment to state-of-the-art technology with continuous development of proprietary surveying hardware and software systems. Our resulting advanced survey systems have been proven in numerous commercial surveys throughout the world's oceans. FSSI systems have mapped over 2.6 million square kilometres of seafloor to depths of 9,500 meters, all to hydrographic standards for accuracy and precision. Some of the largest international marine surveys awarded in recent years certify our superior performance and reliability.

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Email: hr@seafloor.com
WEB: http://www.seafloor.com

OCEANOGRAPHER

Job Location: USA, MA Marion

Growing company in the field of operational oceanography seeks oceanographer

Experience & Skills Desired:
B.S. required, M.S. or Ph.D. desired, in oceanography, preferably physical
Experience and interest in field work at sea
Excellent oral and written communications skills
Successful candidate will be required to analyze data, write reports, prepare proposals, and communicate with clients
Must be willing to travel

Other:
Software skills at a level to be commensurate with M.S. Oceanography - please list.
Resume should respond to desired skills listed above.

Horizon Marine, Inc. is a leader in commercial oceanography providing services of real-time ocean current monitoring and forecasting for the offshore industry. Excellent working environment, compensation, benefits. Salary to commensurate with experience.

Send resume to:
Horizon Marine, Inc.
15 Creek Road
Marion, MA 02738
horizon@horizonmarine.com

James Feeney
Horizon Marine, Inc.
15 Creek Road
Marion, MA 02738 USA

Phone: (508) 748-1860
(508) 748-1525
Email: horizon@horizonmarine.com
WEB: http://www.horizonmarine.com

FIELD SERVICES MANAGER (INSTALLATION/DEPLOYMENT)

Job Location: USA, CO Englwood

Jeppesen, a Boeing subsidiary and the world's leading provider of aeronautical data, is looking for a Field Services Manager (Installation/Deployment) in its' Jeppesen Marine division. Jeppesen Marine is focused on providing the marine market with similar digital navigation and information solutions as in aviation.

Jeppesen Marine has been chartered with the same underlying values that launched Jeppesen in 1934 - improving safety and efficiency through innovative navigation solutions. Jeppesen is in a strong position to bring proven technologies and solutions from the highly advanced aviation markets to marine markets.

Essential Functions:
- Intimate knowledge of marine electronics and how to install/integrate with other onboard electrical/electronic systems.
- Ability to work effectively with both customers and dealers. Provide technical support to the on-going business.
- Project management experience and the ability to effectively manage system deployments.
- Ability to develop and write key installation and integration instructions. Develop FAQ's. Must have excellent writing skills.
- Develop training programs for customers, dealers and Jeppesen's internal support organization.
- Develop and implement Train the Trainer program for our customers on how to install and troubleshoot the applications and data.
- Excellent presentation skills.

The ideal candidate will have a minimum of five (5) years experience in integrating software systems with electronic systems.

See our full job description on the Jeppesen Website. To apply for this position, please follow the link below:

http://www.recruitingsite.com/csbsites/jeppesen/careers.asp

Jeppesen is an Equal Opportunity Employer.

Judy Bell
Jeppesen Marine
55 Inverness Drive East
Englewood, CO 80112 USA
Phone: 303-799-9090
720-489-3858
Email: judy.bell@jeppesen.com
WEB: http://www.jeppesenmarine.com

IT PROFESSIONAL

Job Location: USA, MA Marion

Growing company in the field of operational oceanography seeks an IT Professional

Horizon Marine, Inc. seeks an IT professional to support a team of oceanographers. Horizon Marine has been providing oceanographic data collection and analysis services to the offshore industry since 1982. The staff member has primary responsibility for managing the company's desktop, server, database, network, and communications infrastructure. The staff member will also lead the development and implementation of web-based applications and assist with R&D projects and testing of marine data collection hardware. Horizon is looking for a creative and independent individual with an interest in the marine environment who is willing to tackle new challenges.

Required Experience/Education:

B.S. in physical or computing sciences; System administration; and SQL, Matlab, Javascript, and PHP application development.

Desired Experience or Interests: GIS application development; Marine sciences, weather forecasting, sailing

Submit resume to Horizon Marine, Inc., 15 Creek Road, Marion, MA 02738; or send via email to horizon@horizonmarine.com.

James Feeney
Horizon Marine, Inc.
15 Creek Road
Marion, MA 02738 USA

Phone: (508) 748-1860
(508) 748-1525
Email: horizon@horizonmarine.com
WEB: http://www.horizonmarine.com

ENGINEER I OR II

Job Location: USA, MA Woods Hole

The Woods Hole Oceanographic Institution is seeking a skilled, energetic electronics designer to be part of a seafloor research group. You will be part of a team developing and operating seismic instrumentation deployed from research ships throughout the world. You will perform significant design tasks related to ocean bottom instrumentation and support equipment and lead the implementation of these designs in a seagoing environment. You will be expected to perform, for example, circuit design and development, system integration, battery design, and embedded software creation using current CAD and software tools. Sea Duty required. For a detailed job description and to apply online, please visit http://jobs.whoi.edu. EOE/M/F/D/V

Recruiter
Woods Hole Oceanographic Institution
Human Resources Office, MS#15
Woods Hole, MA 02543 USA
Email: employment@whoi.edu
WEB: http://jobs.whoi.edu

MECHANICAL ENGINEER

Job Location: USA, MA Pocasset

Hydroid, the leading producer of autonomous underwater vehicles, seeks a highly qualified, BSME or equivalent, mechanical engineer to support both new development and manufacturing efforts. Qualifications include more than five years of experience in the design of ocean instruments and/or underwater vehicles; demonstrated proficiency in material selection for underwater applications with corrosion considerations, structural analysis (FEA skills desired), electronics packaging, CAD and solid modeling (AutoCAD and Solidworks), and strong communication skills. Selected candidate will research, develop, plan, design mechanical and electromechanical products, oversee and coordinate activities involved in fabrication, operation, application, installation, and repair of mechanical or electromechanical products and systems. Applicants selected will be subject to a government security investigation and must meet eligibility requirements for access to classified information.

Send resume and salary requirements to Hydroid, LLC 6 Benjamin Nye Circle, Pocasset, MA 02559 or e-mail to hr@hydroidinc.com.

Human Resources
HYDROID, LLC
6 Benjamin Nye Circle
Pocasset, MA 02559 USA

Phone: (508)563-6565
(508)563-3445
Email: hr@hydroidinc.com
WEB: http://www.hydroidinc.com

SEASTAR SALES REPRESENATIVE

Job Location: USA, VA Dulles

JOB SUMMARY
Manage the sales process by locating, pursuing, developing and closing new business in assigned territory. Work with current accounts and subscribers for additional business, follow up on new sales leads, provide product and sales demonstrations to prospective customers and formulate appropriate business relationships with accounts and SeaStar Agents. Analyze sales territory information, generate sales forecasts and work with existing SeaStar Agents. Assist in the implementation of sales and promotional programs, train SeaStar Agents and business partners on how to sell products and services. Domestic and international travel from 30 - 50% is required. Work closely with other Geoeye team members to insure coordination and successful achievement of objectives. Interacts with all levels of the organization and external representatives at a higher level. A Bachelors Degree (BA/BS) or equivalent experience is required. Knowledge of Word, Excel, PowerPoint and Windows required. Experience in Outlook and ACT! preferred. Fluency in both English and a foreign language preferred; ideally Spanish, Japanese, Korean, or Chinese.

Kelly Vogel
GeoEye
21700 Atlantic Blvd
Dulles, VA 20166

Phone: 703-480-4621
703-450-9573
Email: recruiter_dulles@geoeye.com
WEB: http://www.geoeye.com

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The World's largest, most informative and data packed edition of the year. This commemorative double edition features our exclusive Annual Forecast & Analysis, as

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- ***Ports & Harbors Report***
- ***Homeland Security Update***
- ***U.S. Navy Technology Report, including Undersea Defense***
- ***Environmental Report***
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The First Hi-Rez, Environmentally-Safe Digital Seismic Streamer.

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www.geometrics.com/seismographs

GEOMETRICS

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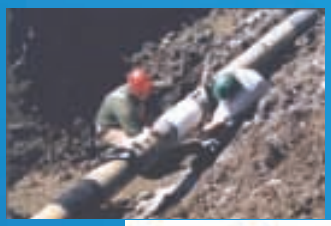

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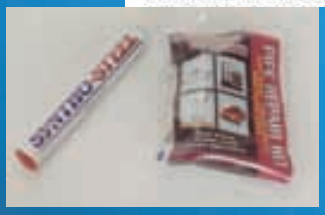

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