



KONGSBERG

The Oi12 SUBSEA NEWSLETTER

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Sign up for demo vessel tour and meetings



Outside ExCeL, the multi-purpose vessel Geo Motion will be running Kongsberg Maritime equipment demos from the Royal Docks, on the hour, every hour during show opening times.

Systems on-board include the Kongsberg EM 2040 0.4 by 0.7 degree Dual Rx Multibeam system, Kongsberg Seafloor Information System (SIS) - real-time operator software, Kongsberg EA 440 Single Beam Echo Sounder with combined Side Scan and the Kongsberg Seatex Seapath 330+ positioning, heading and attitude sensor.

Please come to the stand to sign up for available demo slots (E600).

OCEANOLOGY INTERNATIONAL 2012

SENSORS, POSITIONING AND ENVIRONMENTAL FOCUS

As with previous years, Kongsberg Maritime will have a substantial stand at Oceanology International in 2012, focusing on the core product areas of underwater sensors, positioning and remote and autonomous vehicles.



The leading subsea technology company will also present how these systems will form the foundation of a sophisticated new Integrated Environmental Monitoring System it is developing for Statoil with partners IBM, DNV and Kongsberg Oil & Gas Technologies.

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Read more on page 2 ►

Visit our stand in boot €600

Oi12



IEM

KONGSBERG MARITIME CONTRIBUTES TO INTEGRATED ENVIRONMENTAL MONITORING SYSTEM

In order to reduce the environmental risks from oil and gas operations, a consortium consisting of Kongsberg Maritime’s subsea division, Kongsberg Oil&Gas Technologies, IBM, and DNV will develop a real-time environmental monitoring solution together with their client Statoil.

The Integrated Environmental Monitoring System (IEM) was introduced during a press conference at Strandpromenaden in Horten, Norway last week, where all of the consortium members were present. The consortium, which is led by Kongsberg Oil & Gas Technologies, includes Kongsberg Maritime Subsea providing sensor and communication technologies, IBM providing information integration and business analytics technology, and DNV providing marine environmental analytics and risk management practices. Statoil will have an active role in the project contributing with domain knowledge within offshore oil and gas operations.

Teaming up with the environment

The purpose of the project is to demonstrate solutions for continuous environmental monitoring of operations in sensitive areas covering all phases of an offshore operation, from preparation, drilling, production and demobilization. A major benefit will be to include the environmental monitoring into the daily



operation for early detection and reaction to potential environmental impact. There are several types of pollutants that could potentially harm the environment during oil and gas extraction. In principle there should be no emissions into the environment, but if there is an accident, it is important to detect any spills as soon as possible. Traditionally, oil companies have gone out to the platforms by boat to take samples of fish, shellfish and sediments in order to monitor the effects of any discharge of chemicals or leaks from the well and reservoir. “This system constitutes a paradigm shift in environmental monitoring”, said Vidar Hepsø from Statoil’s research centre during the press conference at Strandpromenaden. “Today, we collect samples every four years and generate a report from our findings. This method is not flexible enough and is not well adapted to various areas. We need to team up with the environment, and with the Integrated Environmental Monitoring System, we can monitor the entire life cycle of an oil field in real time. It will also allow monitoring of particularly sensitive areas so that we can adapt our operations to these areas,” he explained.

Real-time monitoring

One of the concepts of IEM is a system that can be used both before and after an operation

in sensitive areas using a variety of sensors from Kongsberg Maritime in order to detect environmental effects as early as possible. A network of selected sensors can be placed on the seabed and give oil companies a status on the environment before, during and after recovery. “Combining real-time environmental data and operating data will make it possible for the field operator to detect environmental effects in real-time and act on these immediately”, explains Arild Brevik, Product Sales Manager Subsea. “Kongsberg Maritime’s contribution to this project includes sensor technology and subsea communication infrastructure. Sensors are selected from a wide range that can measure physical, biological and chemical data from 3rd party vendors as well as KM sensors as cameras and acoustic sensors. By developing our existing technology into a complete integrated environment monitoring system, we get a unique application reference and we intend to offer our subsea monitoring concept as a scalable system in use for other applications in the future”, explains Brevik, who is responsible for making this product commercially available.

A collaborative effort

Kongsberg Maritime’s subsea solution will gather and bring data from the seabed up to



1 A collaborative effort

From left: Morten Torkildsen (IBM), Vidar Hepsø (Statoil), Karl Johnny Hersvik (Statoil), Even Aas (KOG) and Jens Erik Ramstad (DNV) onboard Simrad Echo.



the surface, where IBM takes over the data communication. Kongsberg Oil&Gas Technologies will contribute with its Integrated Operations components, enabling data to be interpreted in real time. "This is a unique example of a collaboration project", says Brevik. "Not only do we collaborate internally across KONGSBERG's own business units, but we also collaborate closely with the other members of the consortium as well as with the client, Statoil. Having succeeded in all phases from concept to contract, we are extremely proud to be a part of this collaboration, and to see the great interest Statoil has shown for our subsea products."

The world's first

IEM is the world's first environmental monitoring project where a number of components

are tested simultaneously in an online sensor network system and integrated as part of their daily operations. The goal is that IEM will be expanded to handle environmental monitoring before, during and after an operation on the seabed. The group has great expectations of the system. "KONGSBERG considers this project as an important step in its longterm strategy in developing integrated, continuous

environmental monitoring systems to meet a growing demand for early detection and quicker response related environmental impact from offshore oil and gas activities", says Even Aas, Executive Vice President KONGSBERG. The project will run for three years, and a demonstrator version of the system will be tested onboard Kongsberg Maritime's Simrad Echo in Horten.

NOAA and Partners demonstrated success of EM 302 Multibeam Echo-sounder to detect and map deep-sea gas seeps

Multibeam sonar, an echo sounding technology commonly used to map the seafloor, can also be used to map and detect gaseous seeps in the water column, according to scientists testing the technology on board NOAA Ship Okeanos Explorer in the Gulf of Mexico.

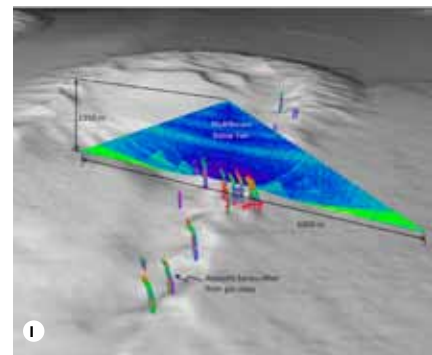
Following an earlier test in 2009 on Okeanos Explorer's multibeam sonar off the U.S. West Coast, the most recent expedition in the Gulf was the first comprehensive test of Okeanos Explorer's multibeam to detect deep gaseous seeps over a wide area. Its use during this mission confirms the effectiveness of the tool and may lead to extending NOAA's water-column mapping capabilities.

The expedition was conducted jointly by NOAA's Office of Ocean Exploration and Research (OER), the University of New Hampshire's Center for Coastal and Ocean Mapping and the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), as well as scientists and technicians from NOAA's Southeast Fisheries Science Center working in parallel from NOAA Ship Pisces.

With the Gulf of Mexico home to numerous gaseous seeps, data collected by multibeam sonar could prove valuable to researchers planning further studies of gas seeps and their effects on the marine environment.

The objective of the expedition was to test the sonar's ability to map gaseous seeps, not oil, as oil is more difficult to acoustically detect with the multibeam sonar. Techniques developed during this cruise are intended to help scientists better understand detection of gas seeps which may in turn better inform scientists who are working on techniques to map oil in the water column. "This capability will help increase our knowledge of the marine environment, including the distribution of natural sources of methane input into the ocean and the identification of communities of life that are often associated with methane gas seeps," said Thomas Weber, Ph.D., of the University of New Hampshire's Center for Coastal and Ocean Mapping and lead scientist of the mission.

"Mapping the seafloor and the water column are essential first steps in exploring our largely



1 Image produced

by the University of New Hampshire Center for Coastal and Ocean Mapping / Joint Hydrographic Center using IVS Fledermaus software.

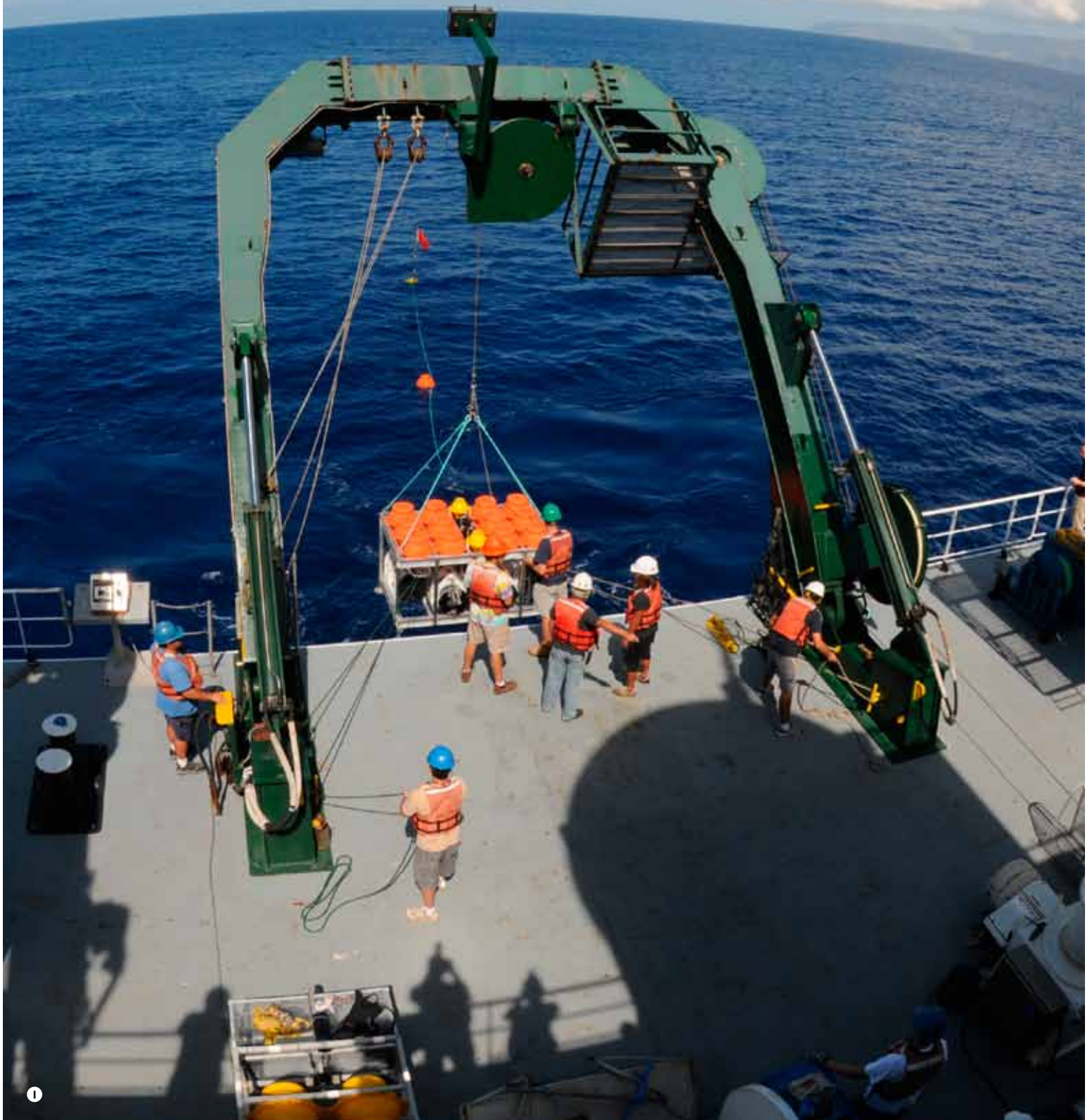
unknown ocean. This expedition confirms earlier indications that multibeam technology provides a valuable new tool in the inventory to detect plumes of gas in the water column, and especially in deep water," added Weber.

Bill Shedd, a BOEMRE geophysicist and expert in hydrocarbon seeps who participated in the expedition as part of an ongoing collaboration with NOAA's OER, stated, "Our agencies have been working together in the Gulf of Mexico since 2003. We're optimistic and impressed about this new capability for exploration that was demonstrated so well during this expedition."

THE 100TH EM 710

DELIVERED TO R/V KILO MOANA OF UNIVERSITY OF HAWAII

Since their introduction 25 years ago, Kongsberg Maritime shallow/medium water multibeam echo sounder systems have been very successful in the market.



Since their introduction 25 years ago, Kongsberg Maritime shallow/medium water multi-beam echo sounder systems have been very successful in the market. The first system, EM 100, began operations in the North Sea in 1986. Over the years, Kongsberg Maritime has continuously worked to develop systems with even better capabilities and subsequently released the EM 1000 in 1991 and the EM 1002 in 1998. More than one hundred EM 100/1000/1002 systems were delivered from 1986 to 2007.

The EM 710 was introduced to the market during the fall of 2004 to replace the EM 1002. This system was a major leap forward in technology, incorporating many new features such as frequency modulated transmit pulses, dual swath per ping and multiple transmit sectors. The first EM 710 was delivered to the UK Royal Navy and installed onboard the HMS Endurance, the UK Navy's ice inspection vessel for the Southern Seas, and completed successful sea trials in April 2005. As with its predecessors, the EM 710 has been highly successful and is currently in operation in more than 25 countries around the world.

Kongsberg Maritime is very proud to announce a new contract for the purchase of our 100th EM 710 system. The contracted unit has a 1x1 degree transducer configuration and will replace the existing EM 1002 onboard the University of Hawaii's (UH) R/V Kilo Moana. R/V Kilo Moana is operated by University of Hawaii's School of Ocean and Earth Science and Technology (SOEST). Established in 1988,



SOEST has since grown to employ over 900 scientists, staff and graduate assistants. It is an international leader in such diverse fields as alternative energy, tropical meteorology, coral reef ecosystems, volcanology, seafloor processes, climate modeling and ocean mapping research, just to name a few.

The Kilo Moana, which means "oceanographer" in Hawaiian, supports a variety of coastal and open ocean science activities for UH and other U.S. and international institutions. The ship has a unique Small Waterplane Area Twin Hull (SWATH) design, which provides a comfortable, stable platform and no acoustic noise

① Courtesy of "R David Beales, University of Hawaii Creative Services".

② Vessel Kilo Moania

from bubble draw-down, even in high sea conditions. The ship has dynamic positioning and two multibeam echosounders – one low frequency system for deep-water seafloor mapping and one medium frequency system for medium and shallow-water seafloor mapping. The medium frequency multibeam is scheduled to be replaced with EM 710 No. 100 during the ship's next dry-docking period, which is scheduled for February 2012.

Unique Antique for the Hydrographic Institute Museum in Cádiz

In connection with the Kongsberg Maritime Subsea product seminar in Cádiz on September 15th, Simrad Spain and Kongsberg Maritime Subsea took the opportunity to donate an antique navigation instrument to the Hydrographic Museum in Cádiz, administrated by the Hydrographic Institute.

This antique navigation instrument is a Graphometer double telescope with compass from 1771 built by Meurand - Quai de L'Horloge - Paris. This instrument, preserved in an excellent condition, is a unique and historical article for the museum's unique collection of items related to the history of hydrography. The Graphometer was used for topographic and cartographic applications on azimuthal and vertical angle measurements.

The donation ceremony took place at the Hydrographic Museum building in Cádiz, and the Hydrographic Institute Director, Chief Commander Guillermo Moreu, accepted the donation on behalf of the museum. The ceremony was attended by key people from the Hydrographic Institute together with the Kongsberg Maritime Subsea sales team who participated in the product seminar. A guided tour in the museum was also arranged to view the unique collection of hydrographic history.

① Donation ceremony

Jan Haug Kristensen representing Kongsberg Maritime is handing over the instrument to Chief Commander Moreu from Hydrographic Institute in Cadiz.



POLAND

MULTIBEAM ECHO SOUNDERS FROM KONGSBERG MARITIME IN POLAND

NAWIGATOR XXI, a training vessel owned by Maritime University in Szczecin, has been equipped with the first multibeam echo sounder EM 710 in Poland, capable of operating at the depths of up to 2000m.



The installation of the transducer at the bulbous bow as a result gave very good acoustic conditions for operation of the system. This mounting spot was proposed by Mr Bjorn Hoyum Larsen during his visit to Szczecin in August. At that time, a few various other mounting spots were considered. One of mounting option was on the gondola under the vessels hull, which, was rejected as it would change the parameters of the vessel's submersion and increase the installation costs. The ship owner wanted to avoid such a situation. The technical documentation regarding transducers' installation was prepared by the MIDCON – the Designe Office, while the documentation of electrical installation was prepared by Escort Ltd.

At present, Maritime University also owns the GeoSwath Plus 250 kHz multibeam echo-sounder, which is installed on HYDROGRAF XXI - another small training vessel.

Moreover, the Maritime Office in Szczecin owns two EM 3002D systems and the Hydrography Office of the Polish Navy in Gdynia has two EM 3002D systems as well. The Port Authority Gdansk also has one EM3002S system and a very similar one is owned by Gdańsk University of Technology. In December 2011, another GeoSwath Plus 500 kHz system will be delivered to the Hydrographic Office of the Polish Navy in Gdynia.

The echo sounder has been delivered and installed by Escort Ltd and the final stage of installing the transducers was conducted by Mr Terje Moe and Mr Jørgen Hamre, representatives from Kongsberg Company. Transducers Tx and Rx were mounted at the bow of the vessel during its stay at dry dock in Szczecin Ship Repair Yard 'Gryfia'. The

installation of the whole system took place in September 2011.

In the first week of October, a five-day long sea trial was carried out on the Baltic Sea. The trials and calibration of the system culminated successfully and the system worked very well, even during rough weather conditions.

New MRU models unveiled at OI 2012

During Oceanology International two brand new Motion Reference Units from Kongsberg Maritime's position reference specialist division, Kongsberg Seatex will be available. The MRU 3 is a completely new model within Kongsberg Seatex's 5th generation of roll, pitch and heave motion sensors. It is especially designed for heave compensation applications including real-time heave compensation of echo sounders and active heave compensation of offshore cranes. It provides heave measurements to meet IHO standards and achieves high reliability by using solid state sensors with no rotational or mechanical parts.

Another new model to the fifth generation of MRUs, the new MRU E, is specially designed for use in marine

applications that require an extended temperature range. It can operate at ambient temperatures from -25 to +70°C and can be installed on open decks, inside cabinets or on bulkheads. Typical applications include direct mounting under the helideck centre to measure 3-axes linear accelerations together with roll, pitch and heave. The MRU E will be used in a Helideck Monitoring System (HMS) where the helideck is located separately from the accommodation and hull. Because of the extended temperature range, no additional enclosure or cabinet is required and the system meets Helideck Certification Agency (HCA) requirements to measure helideck acceleration and calculate Motion Severity Index (MSI).



REMUS AUVs

HYDROID INTEGRATES HiPAP® WITH REMUS AUV

Hydroid will now offer the integration of Kongsberg Maritime's High Precision Acoustic Positioning (HiPAP®) system into its family of REMUS AUVs.



HiPAP® technology will provide REMUS users a faster, more accurate way to obtain an AUV's exact position and to update the vehicle's navigation system. The REMUS navigation system currently provides an accurate real-time estimate of its position, velocity, and heading, which permits the vehicle to autonomously self-navigate and to geographically reference and time stamp all data collected during a mission.

If desired, the onboard navigation system may be aided by acoustic transponders that are located on the seafloor, or, in shallow waters, aiding may be provided by surfacing and obtaining a position update using the Global Positioning System (GPS). Kongsberg Maritime's HiPAP® provides an additional means of aiding REMUS' navigation system by transmitting an independently established location, which is calculated by the HiPAP® system on the surface and then sent to the submerged REMUS vehicle over an acoustic communication link.

"As our customers' trust and confidence in REMUS has grown over the past years, the need to track and communicate with our vehicles during a mission has diminished," said Christopher von Alt, President and one of the co-founders of Hydroid. "Today, many owners deploy their vehicles and set them free to execute their mission, returning to recover them six to 24 hours later at a preprogrammed location. However, some customers choose to stay in contact with and track their vehicles during a mission. The compatibility of Kongsberg

Maritime's HiPAP® system with REMUS is of interest to both groups." HiPAP® is a family of high precision acoustic position systems based on the Super Short Base Line principle. The system can provide precise 3D position to an acoustic transponder on the vehicle. When combined with heading, pitch, roll, yaw and ship position data, the positioning system can support the computation of the vehicle's subsea position in near real time. The HiPAP® information is used either to track the vehicle or to update and bind the vehicle's position if it is accurately time-stamped over the acoustic communication link. HiPAP®'s unique transducer technology and advanced digital signal processing form an ideal solution for obtaining an AUV's exact position at any time when it's

HiPAP® with REMUS AUV

HiPAP® technology will provide REMUS users a faster, more accurate way to obtain an AUV's exact position and to update the vehicle's navigation system.

in range of the ship. The components of a HiPAP® positioning system required to support REMUS consist of the surface vessel mounted spherical acoustic array, the HiPAP® processor, and a subsea transponder that is mounted on the REMUS vehicle. "Hydroid has a proven track record of providing our customers with intelligent solutions for their needs in the field," added von Alt. "To that end, this upgraded capability will offer REMUS users a more efficient way of establishing and updating the position of their REMUS vehicles."

FEMME 2013

Kongsberg Maritime is pleased to announce that the FEMME 2013 Multibeam User Conference will take place in Boston, Massachusetts, USA in April 2013. Invitations will be sent out in August/September 2012 and a web page for information and online registration will be established.

Boston is a historical and beautiful city, and a lot of information can be found on the internet on pages like <http://www.cityofboston.gov/> or <http://www.boston.com/> or many other addresses.

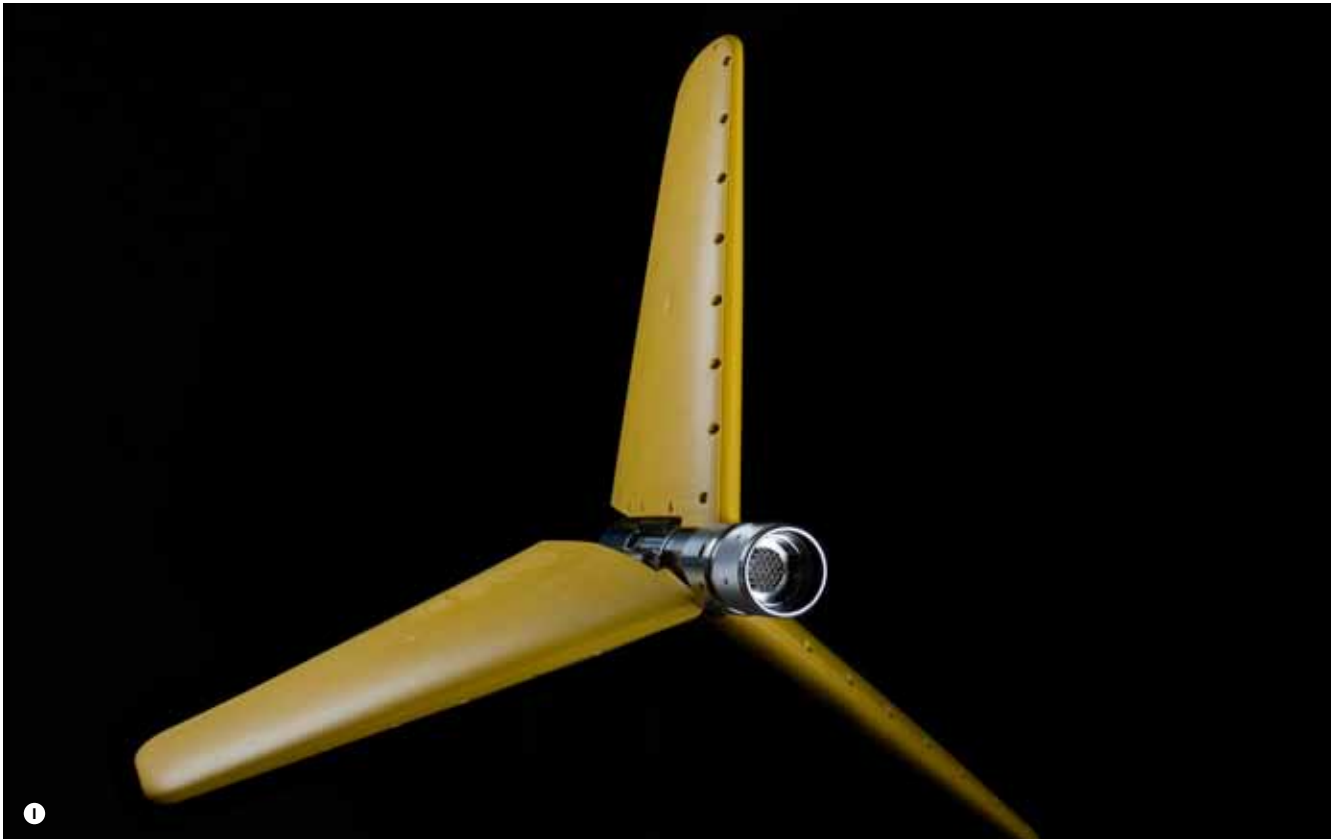
As before, presentations by users of Kongsberg Maritime multibeam echosounders will constitute a very central part of the conference, so we invite you to send suggestions of topics, abstracts and other ideas to the paper committee at the following address: helge.uhlen@kongsberg.com.

If you have any questions about the conference or would like to discuss possible presentations, please contact: nina.hovland@kongsberg.com, chris.hancock@kongsberg.com or jan.haug.kristensen@kongsberg.com.

AcuWing®

KONGSBERG DEPLOYS AcuWing® FOR eBird®

Hydroacoustic positioning for marine seismic streamer control. Enhanced functionality implemented in the award-winning eBird concept.



eBird has, since its introduction at the SEG in 2009, gained high attention within the seismic acquisition community with its sleek and functional design, utilization of innovative technology and solutions together with proven performance in large seismic streamer spreads.

By utilizing Kongsberg Maritime's world leading technology and know-how within hydroacoustics, Kongsberg Seatex AS is now enhancing the eBird concept and releases AcuWing® for eBird® - a solution for streamer position and shape determination.

AcuWing represents a novel approach to streamer positioning by adopting the latest technology within hydroacoustics to interchangeable eBird wings. AcuWing can replace any wing on a standard eBird and utilize the same power and communication lines as eBird.

According to Gard Ueland, President of Kongsberg Seatex AS, this development of

eBird further strengthens Kongsberg's presence in the seismic industry.

"We are pleased to present Kongsberg's cutting edge acoustic positioning technology in eBird. The elegant connector-less solution of eBird will fully benefit AcuWing. We believe our customers will appreciate the flexibility and ease of use AcuWing brings to planning, operating and maintaining streamer spreads. It also shows our commitment to developing new and valued solutions for our customers – all in close cooperation with our customers" he states.

eBird® is unique in seismic operations with its ability to control lateral position of the streamer in addition to vertical position and roll orientation. eBird® is a bird for lateral, vertical and roll streamer control in marine seismic acquisition. This enables the surveyor to have positive control of streamer roll orientation, depth and separation during the whole operation including deployment and retrieval.



1 AcuWing® for eBird®
Now enhancing the eBird concept and releases AcuWing® for eBird® - a solution

Subsea Seminar 2011

KONGSBERG MARITIME LTD HOSTS SUCCESSFUL SUBSEA SEMINAR IN ABERDEEN



Aberdeen-based Kongsberg Maritime Ltd host the Kongsberg Maritime Subsea Seminar 2011, which featured presenters from across the Kongsberg Subsea product groups and attracted almost 80 people from across the UK survey market.

The theme of this year's event was 'Integrating a New Generation of Technology' and presentations focused both on new developments in Kongsberg equipment and the integration of this technology with other products to achieve the best results. The presentations were mostly application orientated, with data and conclusions from recent successful projects interspersed throughout the talks.

The event was a big success and an ideal setting to showcase the latest technologies to existing and potential customers. With a large number of key customers opting to attend, it also proved a great networking opportunity. The aim of the seminar was to not only present new products and technology to customers, but to also present new ways of utilising Kongsberg technology. By enhancing the technical and practical knowledge amongst companies and individuals, this will

ensure that users are maximising productivity of the equipment they have invested in.

Presenters on hand to guide delegates through the technology and results were; Finn Otto Sanne, Product Manager Motion Sensors at Kongsberg Seatex; Ralf Timm, Vice President Sales at Geoacoustics; Berit Horvei, Product Manager Multibeam; Craig Wallace, Senior Subsea Engineer; Ian Florence, Subsea Acoustic Specialist; Jan Erik Faugstadmo, Vice President UNAV, and Einar Gustafson, Sales Manager AUV.

In addition, there was also various operational equipment and models on hand which provided a visual and practical element to proceedings. Working equipment included a HiPAP 351, cPAP, cNode Maxi and cNode Mini. Multibeam software SIS was also set up on replay mode showing data captured during a recent project. Models on show included a HiPAP 500, EM 2040, full-size REMUS 100 AUV model and a scaled version of the HUGIN 3000 AUV.

The Kongsberg Maritime Subsea Seminar also saw the unveiling of the new Kongsberg Maritime T-shirt design, created exclusively for Kongsberg by Ian Florence.

Papers given by KONGSBERG during OI 2012

AIS for advanced maritime operations

By Cato Eliassen,
Project manager, Systems,
Kongsberg Seatex AS
Navigation & Positioning
Tuesday March 13,
morning session



Abstract

Maritime operations have become more and more complex and several specialised vessels might be involved in the same operation. Cooperation requires communication. Frequencies are difficult to obtain. AIS is a system that became mandatory for all SOLAS vessels in 2004 and has dedicated frequencies for exchange of data between vessels.

The system has capabilities outside only exchange of navigational data. Utilisation of the system such as transmission of automatic warnings to approaching vessels and virtual AIS AtoN transmissions reduces the burden on the involved vessels and ensures safer operations.

New functionality and improved performance of an integrated INS/DGNSS attitude, heading and position sensor

By Finn Otto Sanne,
Product Manager ADS,
Kongsberg Seatex AS
Navigation & Positioning
Tuesday March 13,
afternoon session



Abstract

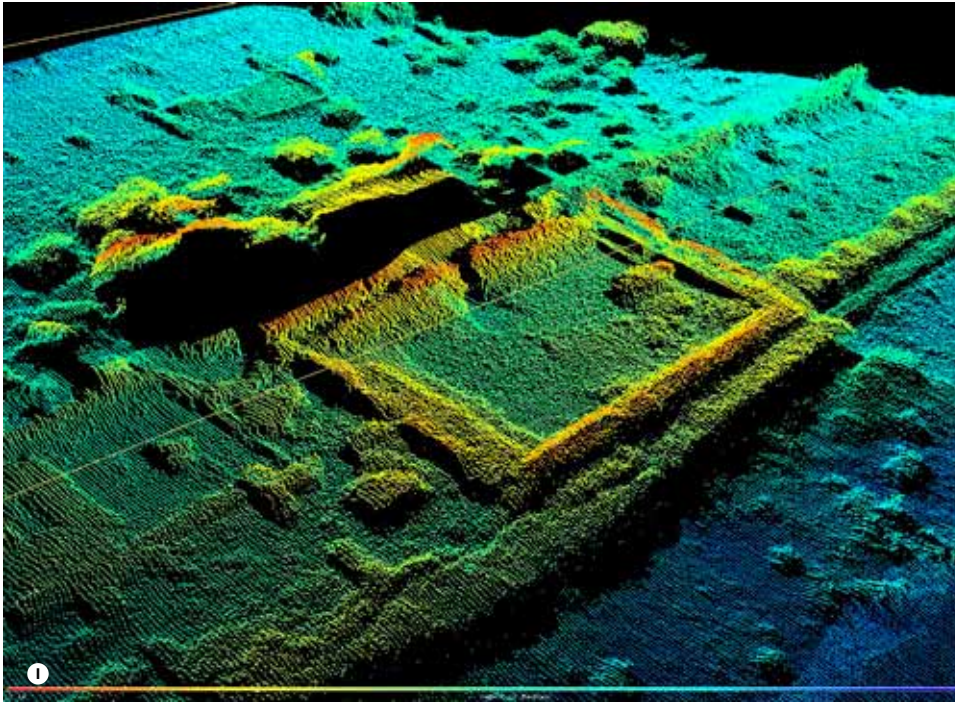
A high performance INS/DGNSS sensor requires an optimal integration of inertial sensor data and GNSS measurements. The latest MEMS gyro developments in combination with carefully selected accelerometers are enabling the performance required for demanding survey applications.

The paper presents some of the achievements related to MEMS gyro development and results obtained by the MEMS gyro/accelerometer combination integrated with high performance DGNSS measurements.

EM 2040 multibeam

SUCCESSFUL EM 2040 MULTIBEAM DEMONSTRATION IN NAPLES, ITALY

Once again Kongsberg Maritime have conducted a very successful demonstration, proving the unparalleled performance and resolution of the EM 2040.



Villa dei Pisoni, Parco Sommerso di Baia, Courtesy of Italian Ministry for Heritage and Cultural Activities

The demonstrated system consisted of an EM 2040-07 and Seapath 330+ and was installed on Calafuria 35, a boat owned by Diamar.

The EM 2040 transducers and MRU-5 motion sensor was installed on a bow arrangement, which made the installation flexible, but yet very robust and with only one day necessary to install the system.

Both private and public companies were invited and witnessed the demonstration. The area chosen for the demonstration was the coastal area between the towns of Baia and Pozzuoli, west of Naples. The area was chosen for its many historical features on the seabed.

“As the screen was filled with high resolution survey data, it created an image of an ancient structure from the Roman time, swallowed by the sea many centuries ago”. Instead of a multibeam seabed layout the customers witness a map of a town coming from the past. Among many structures, it was easy to recognize the “Villa dei Pisoni” from the first century AD, a manor belonging to a wealthy

family who organized the conspiracy against Nero. The remains of the walls are visible in the planimetry and in the multibeam images. It shows the private thermal and internal corridors with niches and apses, while the center area is what once an internal garden was.

During the demonstration, there was also time to show a survey from more “modern” civil work structures, like the port of Pozzuoli. The participants focused their attention on the analysis of the state of the wharves, the scouring of the piers, the dredging condition, and the localization of debris and waste on the seabed. Another application showing the EM 2040 as a valuable analysis tool was to examine the state of a culture of mussels and its anchoring lines due to the integrated visualization of the water column.

It was a real comprehensive demonstration with excellent results, and on more than one occasion show the versatility of the EM 2040, not limited only to the hydrographic mapping, but extended to all areas of use including scientific and archeological analysis. All images

are unprocessed and truly show that with the EM 2040 hardly any processing is needed.

The demo was a meeting with the past and the present, from ancient Rome a step back 2000 years, to structures and features of today.

About the area:

The earth’s crust is a solid carpet that floats on a planet made of magma. Some areas in the world this crust is very thin, one of these areas is the Gulf of Pozzuoli, close to Naples in Italy.

A phenomenon known in the area is the bradyseism which consists in slow lateral movements of the crust with rising and lowering of, due to volume changes in underlying magma chamber or hydrothermal activity. The effects of this phenomenon are clearly visible on many structures built by man.

In 37 BC, a Roman Emperor, Ottaviano, decided to build a port named “Portus Julius”. The naming of the port was in honor of Gaius Julius Caesar Augustus.

The magnificent port was intended for the im-

1 EM 2040 result

2 How-it-was

3 How-it-is

pressive arsenal of the most important Roman fleet and was an important naval port during the civil war against Sesto Pompeo, the civil war that cause the end of the Roman Republic. Portus Julius offered a comprehensive array of administrative naval services: warehouses for the storage of food and supplies, cisterns for potable water, dry docks for hull maintenance and workshops for the repairing of sails, recreational facilities, the Temple of Poseidon, and discreet brothels.

Geographically the area was extremely favorable giving natural protection of warships and suitable for establishment of a shipyards. The Romans fielded all their skill in engineering and construction by building a channel between the port to Lake Lucrino, which was much larger at that time, and Lake Avernus, which provided a safe harbor.

“Portus Julius” had a coastal pier of 372 meters long, built on arches resting on pillars. It was defended by a long dam, which included the entrance to the waterway leading to Lake Lucrino; on this dam passed also the Way Herculea (or Via Herculanea).

In 12BC the imperial fleet was moved to a nearby port (Misenum), because of the shallow water of Lake Lucrino and partial cover-up and the port was reverted to civilian purposes.

The functions as a commercial port were maintained by Portus Julius for a long time, until the fourth century, when it was abandoned due to the gradual lowering of the shoreline caused by the bradyseism and the slow retreat of the coast line, which brought to the disappearance of the Lake Lucrino. The lateral movement of the coast continued until September 28, 1538 when the area was hit by an eruption resulting in the birth of a new mountain, Monte Nuovo (New Mount), the destruction of the village Tripergola and a partial lifting of the area.

But Port Julius, sign of glory and human skill, slowly disappear, men forgot of its existence, nothing remains but the faint memory of something great, somewhere, until 1956 when it was rediscovered thanks to aerial photos.

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capacity perfectly suited for subsea construction work and

Mini

– a small transponder for ROV/AUV mounting and subsea construction work.

cPAP®, a new compact subsea transceiver, designed for ROV positioning is also part of the new transponder family. cNODE® transponders feature full acoustic telemetry links and can operate with both Cymbal and HPR 400 acoustics so vessels not using the new Cymbal protocol can still benefit from the performance of the new transponders. Because cNODE® transponders are model-less, they can operate on both SSBL and LBL positioning without changing the mode of the transponder. All cNODE® transponders have aluminium housing and 4000m depth rating as standard. They feature a modular design based on standard housings (a steel transponder housing for special operation is available) that may have various add-on modules attached, including different transducers (from omni to very narrow beam width), remote transducer, different internal sensors (inclinometer, depth, sound velocity), interface for external sensors and release mechanisms. A Transponder Test and Configuration unit (TTC cNODE®), for acoustic test on deck, configuration and software download is also available. The new, Kongsberg Maritime developed Cymbal acoustic protocol used by cNODE® and the second generation HiPAP® family is designed for accurate positioning of subsea transponders in SSBL/LBL mode and data communication with subsea transponders, and BOP control systems. It utilises Direct Sequence Spread Spectrum (DSSS) signals for positioning and variable speed data communication, and can be adapted to the acoustic communication conditions; noise and multi-path. The Cymbal protocol provides new characteristics for both positioning and data communication, including: Improved range capability and accuracy to 0.01m, reduced impact from noise, directional measurements for more robust positioning, expanded power management for greater battery lifetime, variable data rate to secure longer range and highly reliable communication, and integrated navigation and data link that sends critical data between the positioning signals.

Kongsberg Maritime is showcasing an advanced new range of acoustic underwater positioning systems and transponders, designed to harness the power of ‘Cymbal’, Kongsberg Maritime’s sophisticated new signal processing protocol whilst also being backwards compatible with the HPR 400 protocol and analog transponders.

In addition to a new family of transponders called cNODE®, new systems include HiPAP® 501/451/351/351P, which are the second generation of Kongsberg Maritime’s de facto industry standard acoustic underwater positioning system and offer improved position accuracy, longer range capability and faster data telemetry. The new cNODE® series of transponders consists of three models:

Maxi

– a full size transponder with large battery capacity, floating collar and release mechanism, and long life operation, designed primarily for seabed deployment.

Midi

– a short transponder with good battery

We are always there, wherever you need us

Kongsberg customer services organisation is designed to provide high-quality, global support, whenever and wherever it is needed. We are committed to providing easy access to support and service, and to responding promptly to your needs. Support and service activities are supervised from our headquarters in Norway, with service and support centres at strategic locations around the globe – where you are and the action is.

As part of our commitment to total customer satisfaction, we offer a wide variety of services to meet individual customers' operational needs. Kongsberg support 24 is a solution designed to give round-the-clock support. For mission-critical operations, Kongsberg support 24 can be extended to include remote monitoring. We can adapt the level of support needs by offering service agreements, on-site spare part stocks and quick on-site response arrangements.

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KONGSBERG

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