



03/10

The SUBSEA newsletter

Publisher: Kongsberg Maritime
Editor: Subsea Division
Tel.: +47 33034100
Fax: +47 33044753
e-mail: subsea@kongsberg.com
www.km.kongsberg.com

content



South America update
PAGE 2

Outstanding EM 302 performance in the Pacific
PAGE 3

MS1000 system successfully trialed at hydroelectric dam in Laos
PAGE 4

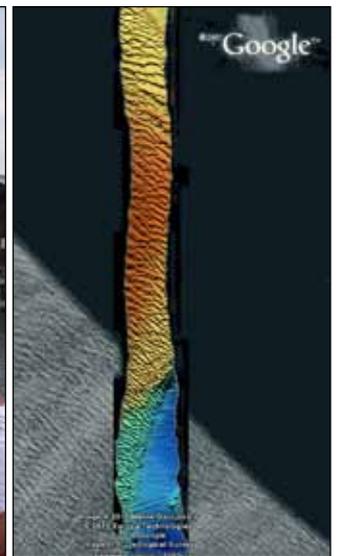
Cameras for latest Eastar Offshore ROV
PAGE 5

MS1000 Sonar used for demanding hull restoration project
PAGE 6

Kongsberg acoustics in the Gulf of Mexico
PAGE 7

Hong Kong Marine Department upgrades to EM 3002
PAGE 8

First EM 2040 Demo Demonstration for US customers



The EM 2040 was installed onboard the University of New Hampshire (UNH) research vessel Coastal Surveyor using a specially designed sonar testing bow mounting arrangement. The installation was completed in a few hours, and the system was tested over 2 ½ days with a number of visitors enjoying the high performance of the EM 2040. Just outside of Portsmouth harbour

(New Hampshire) there are areas with nice sand waves at approximately 10 m depth. The system was tested in 200, 300 and 400 kHz modes with different pulse lengths. The shortest pulse length is 25 us (40 kHz bandwidth). The wide bandwidth pulses reduce the measurement noise and increases the resolution. All participants were thoroughly impressed by the EM 2040 results.



REMUS and HUGIN User Conference

Please remember to visit our REMUS-HUGIN AUV page (link below) for registration to our User Conference in October 2010:

<https://www.viaregi.com/ausersconf2010>

South America updates

The Hydrographic Office of the Brazilian Navy increases its seabed mapping capabilities further

The Directorate of Hydrography and Navigation (DHN) has used Kongsberg Maritime multibeam echo sounder systems since 1998 when the first system EM 1000 was installed aboard NHO Taurus.

Over the years DHN has strengthened its seabed mapping capabilities by getting more equipment and growing its internal capacity.

In 2009 an EM 302 was installed onboard NHO Sirius. Since then, the

NHO Sirius has conducted some very successful surveys in the Atlantic after the completion of the installation.

In 2008 the Brazilian Navy acquired a new Antarctic research vessel, NHO Almirante Maximiano. The vessel has undergone several modifications for her new tasks, and currently the installation of an EM 302 together with a SBP 300 is taking place at the Naval Shipyard in Niteroi (Rio de Janeiro).

In July 2010 a new agreement between the Brazilian Navy and Kongsberg Maritime for the supply of further systems was signed. The agreement is for the supply of two EM 710 (0.5x1 degree) systems for NHO Taurus and NHO Amorim do Valle, one EM 122 (1x2) together with a SBP 120 for NHO Cruzeiro do Sul and an EM 2040 for NHOFLU Amazonia. The agreement also includes the supply of associated sensors and services.

South America updates

Chilean Hydrographic Office acquires multibeams for post-earthquake survey



Kongsberg Maritime has an ongoing contract with ASMAR Shipyard of the Chilean Navy in Talcahuano for the supply of equipment to the new Chilean research and hydrographic vessel AGS 61 Cabo de Hornos, but after the devastating earthquake in Chile during the morning of the 27th February 2010, this project is facing a delay.

One of the tasks of the Chilean Navy Hydrographic and Oceanographic Service (SHOA) after the earthquake is

to establish any changes to the seabed terrain in areas that were strongly affected by the earthquake. Such areas are a.o. Talcahuano and Concepcion in the Biobio region of Chile where the epicenter of the earthquake was.

To be able to complete this very important task, SHOA has acquired two EM 3002 multibeam echo sounder systems with sensors. These two systems will be installed onboard two of SHOA's vessels during this fall in order to be operational as soon as possible.

Sonars for Finnish Navy attack craft

Kongsberg Maritime has received an order from Patria Aviation Oy for the supply of sonar systems to be used aboard the Finnish Navy's Rauma Class Fast Attack Craft. The order was taken 2nd July 2010 and is part of a larger project to upgrade the vessels, which started service in the early nineties.

Four Rauma Class vessels will benefit from sonar systems, which have been proven to perform over decades of use aboard military vessels. The upgrades will be carried out by main contractor Patria and will take place between 2010 and 2013 with all four vessels expected to be operational in 2014 until at least 2020. The project has been implement-

ed to ensure the Ramua Class' readiness for today's threats.

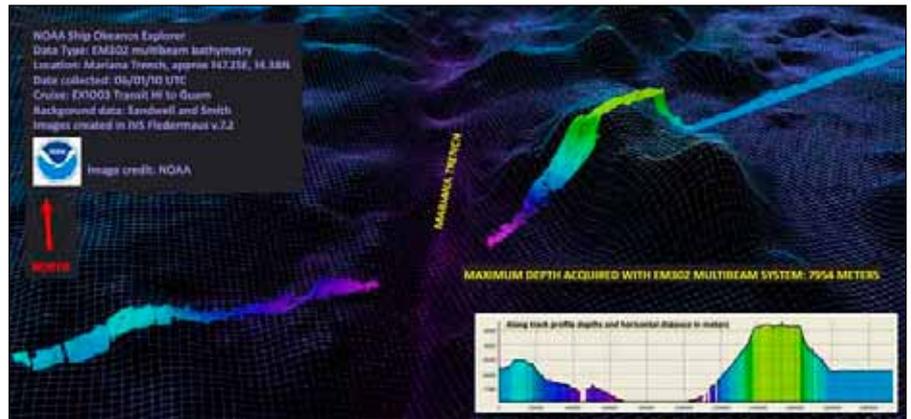
"We're pleased that Patria has selected us to be part of this important upgrade project for the Finnish Navy," comments Trond Helland, Product Sales Manager Subsea, Naval Sonars. "Confidence in our Naval sonars is very high as they are already in use by a number of naval customers throughout the world aboard frigates, corvettes, coast guard vessels and fast patrol boats."

Kongsberg Maritime has developed sonars for use by Naval vessels for over four decades, for applications including



anti-submarine warfare and mine hunting. We also offer a range of high quality, proven COTS (commercial off the shelf) solutions for naval applications including underwater positioning, single and multi-beam echo sounders, sub-bottom profilers and Autonomous Underwater Vehicles.

Outstanding EM 302 performance in the Pacific



The NOAA vessel Okeanos Explorer recently tracked the bottom over the Mariana Trench down to 7954 metres with its EM 302 multibeam echosounder, which is theoretically calculated to reach 7000 meters depth. With a maximum known depth of about 10,916 metres, the Mariana Trench is the deepest part

of the oceans anywhere in the world. As the only United States ship assigned to systematically exploring our largely unknown oceans, the Okeanos Explorer was fitted with a EM 302 multibeam echo sounder last year in order to provide high-resolution maps of the seafloor. The National Oceanic Atmospheric

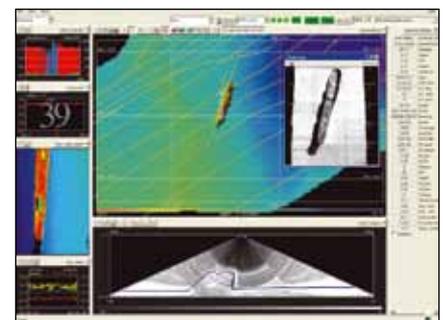
Administration (NOAA) operates a wide assortment of hydrographic survey, oceanographic research, and fisheries research vessels and has a full suite of Kongsberg multibeams, including an EM 122 (1x1 Degree) for the ship Ronald H. Brown and an EM 710 (0.5x1 Degree) for the ship Rainer.

New multibeam for The Memorial University of Newfoundland's Marine Institute

The Marine Institute's School of Ocean Technology is the proud owner and operator of a new EM 710 multibeam echo sounder. The 1x2 degree system was installed on the MV ATLANTICAT in Triton, Newfoundland. Sea trials were conducted in and around St. John's during the week of August 16 with the assistance of Dr. John Hughes Clarke of the University of New Brunswick and Mr. Andre Roy of the Canadian Hydrographic Service. Preliminary results indicate that the system meets or exceeds its design specifications.

The vessel's catamaran configuration made installing the transducers a challenge. Kongsberg Maritime's Halifax office provided a turnkey solution that included a custom made gondola, installation and complete vessel survey.

The EM 710 will be used for training, applied research and development programs in various aspects of ocean



Screen capture of a wreck, with backscatter and water column imagery, taken during sea trials.

technology. The multibeam echo sounder will be an important tool for the school's new Ocean Mapping Program, which will produce graduates with a solid background in collecting, managing, analyzing and disseminating ocean data. The program prepares graduates for careers in government and institutional marine research, hydrographic surveying, environmental research, offshore mineral resource exploration and marine

hardware and software development.

Learn more about these programs by visiting www.wherewanttobe.ca or by calling the Marine Institute's Student Recruitment office at 1-800-563-5799.

For more information about the EM 710 or other KONGSBERG multibeam or single beam sounders, please contact the Kongsberg Maritime office in your area.

MS1000 system successfully trialed at hydroelectric dam in Laos



The MS1000 high resolution sonar is lowered into the dam.



A mosaic image showing high resolution MS1000 Sonar scans of a 55m section of the dam wall. Water visibility is less than 0.2m in the dam.

For two days in April 2010, Kongsberg Maritime Pte Ltd (Singapore) together with S.D.A. Group Co., Ltd (Kongsberg Maritime's Subsea Agent based in Thailand link: www.sdagroup.com) conducted MS1000 high resolution underwater inspection trials at a hydroelectric power dam in Laos.

The trials were conducted for staff from the inspection and maintenance department. Currently, inspections of the underwater structures are carried out using traditional methods such as divers. However poor water visibility, strong currents and dangerous water intakes required a safer and more accurate method

to inspect the condition of the underwater structures.

The MS1000 high resolution sonar head was used for the trial and was deployed from the top of the dam wall at approximately 20 m height above the water surface. Data was recorded in the MS1000 software program. A number of scans were made over a 50m section of wall and consequently merged to form the image below. Each scan was completed within 4 – 5 minutes, and the data was processed that same evening to present to dam staff the following morning.

The results showed the area of the dam

wall scanned to be in good condition. There was sedimentation build up on the concrete steps of the dam floor, which is clearly evident in the image. However this was not an issue to the dam staff.

An object was seen lying against one of the steps, so the sonar was moved closer to this object for further investigation. It appears to be a stick or piece of metal leaning against the dam wall. Divers will investigate this object upon the next inspection.

The customers were very pleased with the results and are now investigating the purchase of the system to use as part of their monitoring works.

1st Jornadas de Engenharia Hidrográfica

The Portuguese Hydrographic Institute (IHPT) has organized for the first time the Jornadas de Engenharia Hidrográfica (Hydrographic Engineering Workshop). Almost one hundred and forty researchers and university students working with areas of marine science and technical studies of the sea attended the event.

The 1st Jornadas de Engenharia Hidrográfica covered eight themes: Hydrographical Investigation and Nautical Cartography, Operational Oceanography, Physical Oceanography, Navigation Security Methods, Sediments Dynamics, Sea Geology and Chemistry, Geographic Information Systems and Seashore Ambient Data Management, and Sea Technologies. In total, 68 papers were given. The organization committee plans to have the event every two years.



The target is to constitute a national scientific/technical forum that will address Hydrographical Engineering and other areas such as Oceanography, Navigation and Marine Geology. The 1st

Jornadas de Engenharia Hidrográfica also featured an exhibition area where Kongsberg Maritime AS Hydrography had a stand, together with our Portuguese representative 3p Consultores.

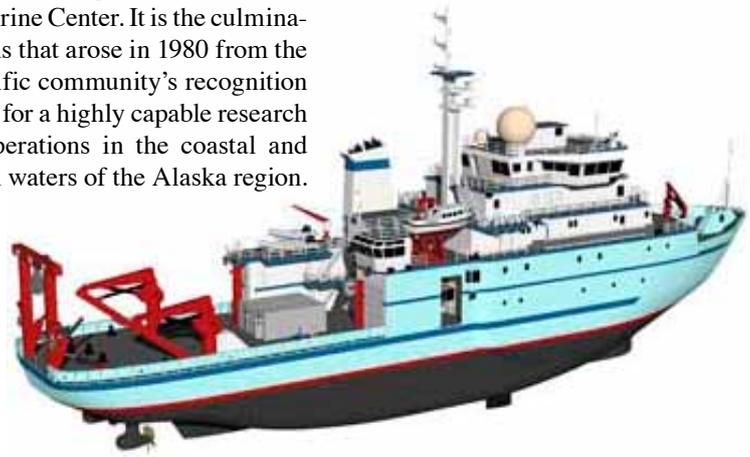
KONGSBERG selected as scientific hydroacoustic systems integrator for Alaska Region Research Vessel

Kongsberg Maritime will supply a sophisticated suite of acoustic systems, including multibeam and scientific echo sounders for the Alaska Region Research Vessel (ARRV), R/V Sikuliaq, which has been commissioned by the owner, the National Science Foundation and will be operated by the University of Alaska, Fairbanks.

Kongsberg Maritime's specialist US company, Kongsberg Underwater Technology, Inc. has been chosen as the scientific sonar systems integrator for the ship. R/V Sikuliaq will have an impressive array of sonar equipment including several Kongsberg Maritime manufactured systems such as the EM 302 deep water multibeam echo sounder, EM 710 shallow water multibeam echo sounder, TOPAS PS 18 parametric sub-bottom profiler and the EK 60 scientific echo sounder. In addition, the new Kongsberg Seatex Seapath 320+ will be supplied as a vessel attitude, heading and position reference for the scientific sonar suite.

The R/V Sikuliaq is currently under contract for detailed design and construction at the Marinette Marine Corporation in Marinette Wisconsin,

and will be home ported at the UAF Seward Marine Center. It is the culmination of plans that arose in 1980 from the U.S. scientific community's recognition of the need for a highly capable research ship for operations in the coastal and open ocean waters of the Alaska region.



"The new vessel will open up the ice-choked waters of the Alaska region to scientists from all over the world," said Terry Whitledge, director of the Institute of Marine Science at the UAF School of Fisheries and Ocean Sciences and the project leader. "As the first vessel in the UNOLS fleet with significant research capability in seasonally ice-covered waters, scientists on board the ARRV will be able to investigate a variety of ecosystem issues, including the response of Alaska's fisheries to climate change."

R/V Sikuliaq will be 254 feet (77.4 m)

long and capable of breaking through 2.5 feet of ice at a speed of 2 knots, and will be able to accommodate a total of 26 scientists for up to 45 days at sea. It is designed and built to American Bureau of Shipping polar class 5 (PC 5) standards, which will allow the ship and its crew to work safely for longer periods of time in a wide variety of Arctic waters. When completed it will be one of the most technologically advanced research ships in the world enabling a wide variety of oceanographic research to be conducted and then transmitted to virtually any academic institution on the planet.

Cameras for latest Eastar Offshore ROV

Eastar Offshore Pte Ltd has chosen an extensive suite of Kongsberg Maritime cameras and lights for its latest ROV system.

Eastar and its wholly owned subsidiary Alam Subsea, is an established and rapidly expanding ROV manufacturer based in Singapore. The company designs, manufactures and provides operational support packages for a range of products including work and observation class ROVs, depth rated from 1000m down to 3000m.

The newest ROV systems from Eastar will be fully equipped with a package of cutting-edge, field-proven cameras and lights from KONGSBERG, including:

- OE14-366 Colour Zoom camera
- OE14-372 Fixed focus colour
- OE14-110 Compact colour camera

- OE15-100 Black and White
- OE15-358 Black and White
- A range of underwater lighting including HID and Halogen lights

"We decided to go for Kongsberg for our cameras and lights because essentially, they are industry standard. They also offer great after sales assistance and of course the all important local supply and good lead times," said Stuart Raines Operations Manager Eastar Offshore Pte Ltd.

Eastar has produced over 16 ROV systems to date. They are in operation all over Asia, on projects for prestigious clients such as Shell, BP, Petro Vietnam, ONGC India, Petronas (Malaysia), Korea National Oil Corporation (KNOC), Exxon Mobile, CONOCO, Agip and Chevron



Eastar Offshore Pte Ltd Operations manager Stuart Raines with the Deep Swift 2 ROV. This is a 3000m depth rated, 175HP workclass ROV.

Kongsberg extends rental capabilities with Hydroid Remus 100 AUV



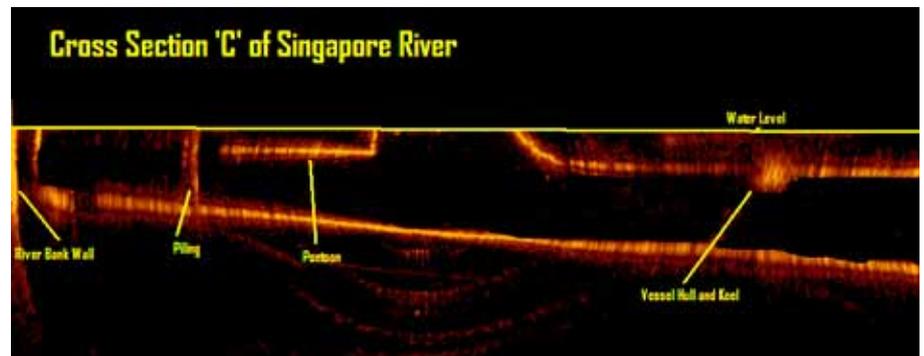
Kongsberg Maritime Ltd, has announced that it is adding the Hydroid REMUS 100 Autonomous Underwater Vehicle (AUV) to its pool of Kongsberg Rental Equipment. The AUV will further enhance the company's existing portfolio of leased specialist equipment, which supports customers undertaking survey and inspection tasks within the offshore oil and gas, environmental and renewable energy markets. Typical REMUS 100 applications include:

- Hydrographic Surveys
- Mine Counter Measure Operations
- Harbour Security Operations
- Environmental Monitoring
- Debris Field Mapping
- Search and Salvage Operations
- Fishery Operations
- Scientific Sampling and Mapping

The availability of the REMUS 100 for rental will allow potential AUV users such as survey companies and subsea contractors to access AUV technology without significant capital investment and training of specialist support staff.

The new REMUS 100 vehicle is equipped with a high performance side scan and swath bathymetry capability and incorporates sophisticated navigation sensors as part of the vehicle positioning solution. Trained Product support engineers will be available to support customers operations in the field.

MS1000 Sonar used for demanding hull restoration project



Example of cross-sectional profiler of the Singapore river clearly showing the vessel hull, river bed, pontoon and riverbank.



The Tongkangs weighing more than 80 tonnes, had to be lifted for the restoration.

UMC International (UK) chose Kongsberg Maritime's MS1000 high resolution single beam scanning sonar in a project to restore two traditional Malay wooden vessels – Tongkangs – located in the Singapore river.

The restoration of the Tongkangs, which are normally used as restaurants, required a lot of information such as water levels in the river, river profiles, shape of the Tongkangs' hull below surface and minimum keel clearance. This task would traditionally be performed by divers, however due to almost zero visibility conditions in the river, the high level of accuracy required for the measurements, and the danger of having divers underneath the vessels in confined spaces, UMC chose to engage the services of the MS1000 high resolution sonar.

The MS1000 was operated in profiling mode to take cross sectional profiles of the river bed and cross sections of the hull. It was also used in imaging mode to scan the riverbed to check for any obstructions. The scan were completed in 6 hours working time and data processed that evening to provide information to the UMC engineering department. In addition, the Tongkangs, each weighing over 80 tonnes were required to be lifted from the water in order to inspect, and repair the hull.

UMC International Engineering Director Mr. David Richards had the following to say: 'I am very impressed with this technology, in particular how user friendly both the hardware and software are, compiling a composite picture of the river bed and vessel hull was achieved easily and quickly, and I can see many more applications for future use.'

UMC and its wholly owned subsidiary MUM's (Maritime Underwater Maintenance – Singapore) was founded in 1972 and offers a global network of services specializing in waterborne repair and maintenance technology. The company has a range of products and services to support afloat maintenance of ships and rigs, but also designs bespoke equipment and processes for unique challenges. A specialist team of engineers and naval architects is employed to develop such systems, which include cofferdams, blanks, lifting systems, and many other applications.

GeoAcoustics launches new digital Side Scan Sonar



1000m depth rated aluminium towfish of GeoAcoustics' digital side scan sonar, Sonar 2094 Digital.

GeoAcoustics, A KONGSBERG Company, is proud to launch the next generation of digital side scan sonars: the all new Sonar 2094 Digital.

Sonar 2094 Digital is based upon the industry standard GeoAcoustics Dual Frequency Side Scan Sonar. Around 1000 of these systems have been sold since their 1994 launch and hundreds of thousands of line-kilometers have been surveyed across the world's oceans. The

system is renowned for its data quality, ease of use, ruggedness and dependability.

Sonar 2094 Digital combines these features with the latest in digital technology to generate a giant leap in system performance:

- Simultaneous dual frequency, 114 kHz and 410 kHz
- 24bit data acquisition offering a dynamic range that makes acquisition

AGC and TVG obsolete thus providing repeatable results

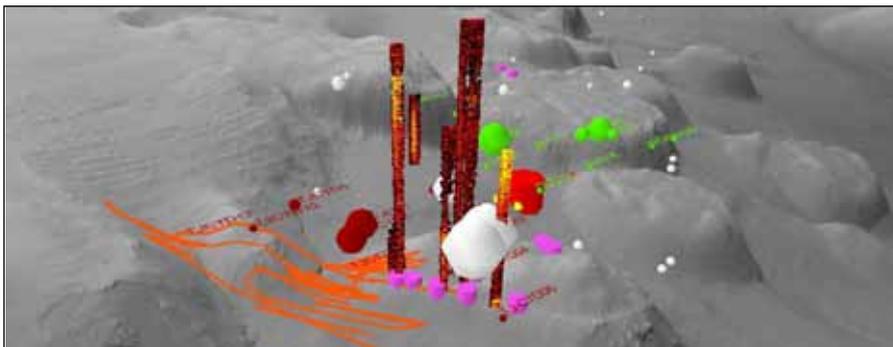
- Extended range performance through 20 MHz raw data sampling and dynamic digital filtering techniques
- Improved resolution
- Very long cable operation

Sonar 2094 Digital incorporates the established 159D towfish design, which is now equipped with new, fully digital electronics, supported by a wide bandwidth link to the new Digital Side Scan Transceiver deck unit.

The towfish can be supplied with attitude and/or depth sensors options as well as an RS232 channel for a magnetometer interface. Its standard depth rating is 1000m with a 2000m rated towfish available.

The Digital Side Scan Transceiver has an onboard Windows® PC for acquisition software installation and can be delivered with an inbuilt GPS interface. Attractive upgrade paths are available for existing GeoAcoustics Dual Frequency Side Scan users.

Kongsberg acoustics in the Gulf of Mexico



Natural seeps (red and yellow columns) mapped by Thomas Jefferson, and by Gordon Gunter (purple cylinders) along with CTD stations showing high fluorescence (brown, green and white spheres). The Deepwater Horizon well site is in background (red cylinder) and distribution of Bottom Following Reflectors is represented by orange lines.

The Deepwater Horizon drilling rig explosion in the Gulf of Mexico created a large marine oil spill and KONGSBERG acoustic products have since been used as tools to monitor the damage. The vessels from the National Oceanographic and Atmospheric Administration (NOAA) that moni-

tored the distribution of the oil flow all had KONGSBERG acoustic systems in common.

The Gulf of Mexico spill brought several research ships with previous different missions together for this assignment. These vessels, both from the NOAA

hydrographic fleet; R/V THOMAS JEFFERSON and R/V NANCY FOSTER as well as vessels from NOAA Fisheries which included; R/V HENRY BIGELOW, R/V PISCES, R/V GORDON GUNTER, R/V OREGON II and R/V DELAWARE II, along with university vessels all used KONGSBERG echo sounders.

Their assignment was to map natural seeps and determine the presence of oil in the water column. KONGSBERG's unique class of research echo sounder were pushed to the limit and provided critical information to the scientists to assess and monitor the damage caused by the spill.

Although the Deepwater Horizon well has been capped, the research and assessment studies will continue for a very long time.

Hong Kong Marine Department upgrades to EM 3002



The HKHO survey vessel shown here fitted with dual head EM3000 high resolution multibeam system, which is being upgraded to the EM3002.

Hong Kong Port is one of the busiest container ports in the world. In terms of vessel arrivals and departures, cargo and passenger throughput, it is also one of the major ports of the world and is a gateway serving the southern parts of Mainland of China.

The Hong Kong Marine Department is the administrator of the port, with the principal functions to ensure safe operation of the port and all Hong Kong waters as well as to operate the Hong Kong Shipping Register and safeguard the quality of Hong Kong registered ships. In the context of navigational safety, the Hong Kong Hydrographic Office (HKHO) - an establishment under the Hong Kong Marine Department, has taken on a role primarily as provider of nautical information for port users. To achieve this, the HKHO carries out hydrographic surveys continually to gather relevant data which include water depths and seabed nature. Together with other navigational information, up-to-date nautical charts and publications are produced for port users.

The HKHO performs the following main functions:

- Acquisition of hydrographic data
- Collation and maintenance of

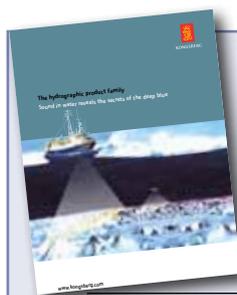
- hydrographic data
- Publication of nautical charts and publications
- Updating of nautical charts and publications
- Search for wrecks.

The hydrographic survey requirements for a port this size are extremely demanding and for this reason in 1998 the HKHO purchased a dual head EM 3000 high resolution multibeam system for one of the three survey vessels carrying out the above mentioned tasks. In

July 2010 Kongsberg Maritime’s Singapore office was officially awarded the contract to upgrade the HK Marine Department EM 3000 system to the latest EM 3002 high resolution multi-beamsystem. The benefits of this upgrade include such advanced features as:

- Increased sounds density and resolution
- Lower noise electronics with improved bottom detection algorithms
- Fully stabilized beam’s corrected for roll and pitch
- Longer pulse length signals allowing greater range performance from the system
- Water column imagery to see objects off the seafloor.

“We are very pleased with the performance of EM 3000 system over the years,” Said Mr KL Hung, Assistant Hydrographer of the HKHO. “It is a reliable system that has met our surveying needs fully and effectively. We believe the advance features of the EM 3002 can deliver higher survey quality and results that enable us to meet challenges in the new era. We have been receiving good technical support from KONGSBERG in the past, and are looking forward to stronger support and close cooperation after the system is upgraded.”



New brochure:

A common brochure for the hydrographic product family is now available. The brochure can be downloaded from our web page: <http://www.km.kongsberg.com/> - support – document downloads – Hydroacoustic systems – Multibeam echo sounders

Updated brochure:

High precision acoustic positioning - HiPAP®
 The brochure presents can be downloaded from our web page: <http://www.km.kongsberg.com/> - support – document downloads – Brochures – Product brochures – HiPAP Family brochure

