



The SUBSEA newsletter

Publisher: Kongsberg Maritime
Editor: Subsea Division
Tel.: +47 33034100
Fax: +47 33034384
e-mail: subsea@kongsberg.com
www.km.kongsberg.com

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Upgrade of 5 Landsort-class MCMVs with HiPAP 500 in Sweden

Kockums, who has received an order from the Swedish Defence Material Administration (FMV) to carry out a Mid-Life Upgrade on five Landsort-class MCMVs (Mine Countermeasures Vessels) has selected the Kongsberg Maritime's HiPAP 500 for positioning of the ROVs. To the Landsort-class,

which is constructed of glass fibre reinforced plastic (GRP) Kongsberg Maritime will deliver Hull Units in Low Magnetic materials. Kongsberg Maritime is pleased to see that the Swedish Navy has once again selected HiPAP 500 for its vessels.

Royal Norwegian Navy orders second HUGIN 1000 AUV



The Royal Norwegian Navy (RNoN) is following up the successful first phase of the Norwegian Mine Reconnaissance Program (HUGIN MRS) by placing an order with Kongsberg Maritime for another HUGIN 1000 AUV.

The HUGIN MRS Program is being developed in several phases with technology, concept development and field evaluations in progress since 1998. This stage of the program included a number of HUGIN operations by the RNoN throughout 2002 and 2003, mobilising one of the existing HUGIN AUVs onboard the Norwegian mine hunter HNoMS Karmøy. These opera-

tions resulted in successful demonstrations of the HUGIN AUV in military operations.

The RNoN placed an order for the first HUGIN 1000, a dedicated AUV for military operation in 2003 for delivery early in 2004. HUGIN 1000 is operated from the RNoN mine hunter, HNoMS Karmøy, and has been successfully deployed in several operations, including NATO exercises and in the NATO's Immediate Reaction Force MCMFORNORTH(1). Various types of operations have been performed, ranging from route surveys to covert mine reconnaissance and Rapid

Environmental Assessment (REA) missions.

Equipped with side scan or synthetic aperture sonar, multibeam echo sounder, and a state of the art integrated inertial navigation system, HUGIN AUVs provide high quality, high resolution imagery and bathymetry with excellent position accuracy. A proven launch and recovery system allows safe and efficient operation in high sea states.

The next HUGIN 1000 for the RNoN will be equipped with the HISAS 1030, a high resolution Interferometric Synthetic Aperture Sonar developed in co-operation between Norwegian Defence Research Establishment (FFI) and Kongsberg Maritime. Several other extensions and improvements will be implemented, based on the RNoN's extensive field experience with the existing HUGIN 1000 AUV.

The HUGIN AUVs have been developed in a dual civilian/military effort. In the civilian market the HUGIN 3000 is now established as the industry standard for AUV offshore surveying and is the only AUV that can run for 2.5 days at water depths down to 3000 meters, whilst operating multibeam echo sounder, side scan sonar and sub-bottom profiler. More than 55000 km of commercial surveying has been performed with the HUGIN 3000 AUVs. The work has taken place world wide at most deepwater offshore oil/gas provinces in water depth from shallow down to 3000 meters.

Kongsberg training centre in Macaé, Brazil



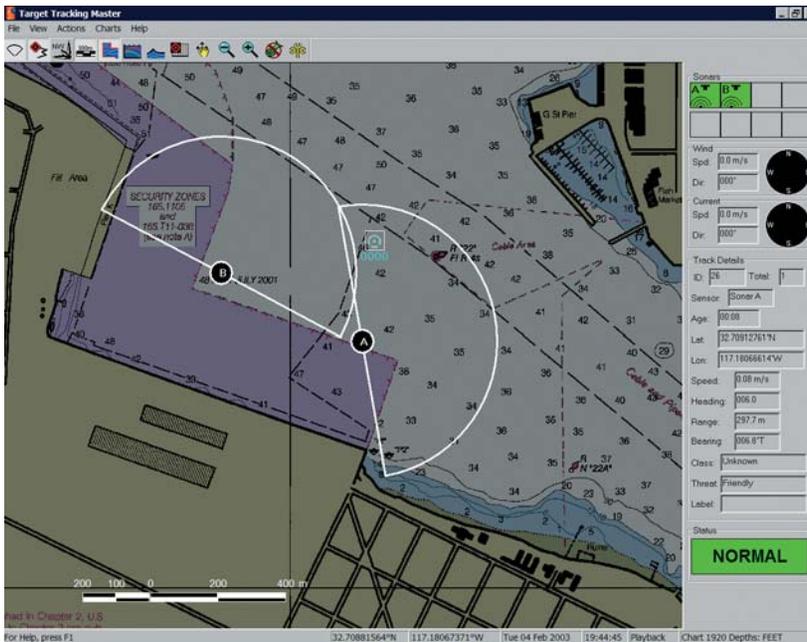
The first "APOS advanced" courses this year have been run at the Kongsberg training centre in Macaé, Brazil. The courses this time have been specifically aimed at drilling applications. The courses covers acoustic theory, SSBL and LBL positioning, acoustic riser angle monitoring as well as ACS (Acoustic

back-up system for BOP).

The major drilling companies have sent personnel for this training. More courses are scheduled in the 2nd half of the year.

In addition, "APOS Advanced for surveyors" courses are also offered.

SM 2000 test/demo installation in Horten



Canada, is a compact and versatile solution for detection of possible underwater threats against harbours/naval bases, ships or platforms. The installation in Horten will be used for system demonstrations as well as for developing and testing of software solutions for automatic detection and tracking of sonar targets. The SM 2000 can be delivered as a complete solution for protection of sensitive areas, or it can be integrated with additional sensors and computer systems to form a larger system configuration.

An SM 2000 95 kHz sonar for detection of divers and swimmer delivery vehicles was deployed just outside the

factory buildings in Horten during may this year. The sonar, which is produced by Kongsberg Mesotech in Vancouver,

Another successful conference



This year's FEMME conference (Forum for EM Mutual Experience) was held in Dublin, Ireland, in April. It was the 10th time the conference was held and it drew 165 participants from 23 countries. The participants came from a wide range of institutions that use Kongsberg Maritime multibeam systems, and they shared their experiences and ideas in many different areas. "Our goal is to have our customers share their experience with our equipment, thus increasing their knowledge and providing us

with information to enhance the performance of our multibeam systems," says Nina Hovland, coordinator of the event. "We also try to create a social programme for the participants and this year's conference dinner was held at Trinity College, which was founded in 1592. It was a wonderful end to yet another successful FEMME conference," concludes Nina.

The event was organised with help from local organizers from the Geological Survey of Ireland (GSI) and the Marine

Institute. These two institutions are currently involved in a project with the objective to map Ireland's marine territory (The Irish National Seabed Survey). Equipment from Kongsberg Maritime has been central in this project which is the largest marine mapping programme underway worldwide. The Irish participants greatly appreciated that Kongsberg Maritime chose to hold the conference in Dublin because it helped draw attention to the advances Ireland has made in marine survey.

Kongsberg Maritime at Underwater Intervention 2005 in New Orleans



Underwater Intervention is the combined annual conference of the Association of Diving Contractors International and the ROV Committee of the Marine Technology Society. It has been held yearly in New Orleans the last couple of years with good attendance at the exhibition floor. Many interesting papers were presented in the conference section. This year Kongsberg Maritime displayed its new revolutionary HAIN,

Hydro acoustic Aided Inertial Navigation system together with the unique spherically shaped HiPAP acoustic positioning system.

Another area of interest is the HUGIN Autonomous Underwater Vehicle. This Kongsberg Maritime AUV is the only commercially successful vehicles in use, operated by some of the major survey companies in the world for commercial collection of high resolu-

tion hydrographic data to water depths down to 4500 meters.

The new HUGIN 100 AUV is the naval version and is specially designed for Mine Counter Measure.

UI 2005 was another roaring success. The mood on the exhibition floor was very upbeat, with visitor traffic at times almost to the point of congestion. It appears that many of the long discussed offshore projects are finally moving beyond the planning and into the procurement stage and it was visible in the attitude of the suppliers.

Some of the discussion panels were extremely well attended. A few of the papers were standing room only. Attendance at MTS Committee meetings was higher than it has ever been and we are already looking forward to 2006.

R/V METEOR installs Kongsberg multibeam package



Kongsberg Maritime was recently awarded a major contract by The German RF Forschungsschiffahrt GmbH in Bremen. The contract is for supply and installation of two multibeam systems and the corresponding software, for the German research vessel METEOR.

The package includes 1 x 2 degree deep water multibeam EM 120 and a 1 x 1 degree medium water multibeam EM 710. Both systems are operated by the Seafloor Information Software (SIS) and are capable of displaying and logging information of the water column.

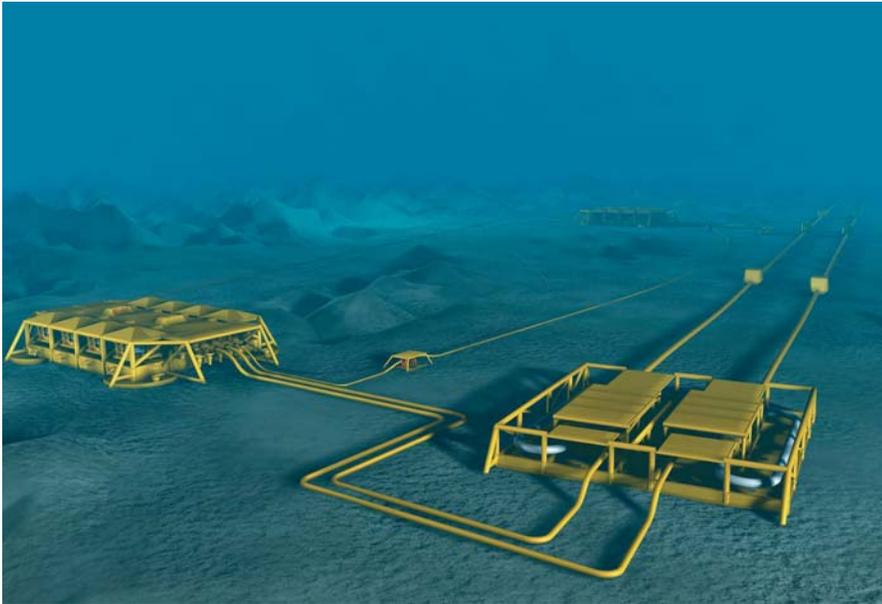
R/V METEOR is a 97.5 m multi-purpose research vessel with the capacity for up to 28 scientists and is operated on behalf of the government of the Federal Republic of Germany.

The vessel operates worldwide and is suitable for all marine research disciplines, including marine geosciences, oceanography, meteorology, planctology and marine zoology.

KG R/V METEOR will be the third German research vessel fitted with a multibeam survey suite from Kongsberg Maritime.

R/V SONNE owned by RF Forschungsschiffahrt GmbH is fitted with an EM 120 and R/V MS MERIAN which, is operated by Briese Schiffahrts GmbH & Co. has had the EM 120 and the EM 1002 installed.

Work Over Acoustic Control System



Ormen Lange subsea

Kongsberg Maritime recently handed over to FMC Kongsberg Subsea a brand new Work Over Acoustic Control System (WACS) purpose built for the Ormen Lange gas field. The purpose of the Work Over Acoustic

Control System (WACS) is to provide a back-up system for the hydraulic Work Over Control System on the Ormen Lange template so that the critical Work Over functions such as Emergency Shut Down and Emergency

Quick Disconnect can be performed in the event of Work Over Control System failure. The WACS includes the following main components:

Topside Equipment:

- Acoustic Surface Control and Operator Unit (ASCU)
- Winch with cable and Transducer
- Jumper cable
- Portable control unit for life boat or helicopter use
- Surface Test Unit
- Charging Unit

Subsea Equipment:

- Fully redundant battery powered Acoustic Subsea Control Module (ASCM)
- Subsea Transducers
- Subsea Hydraulic Interface Jumper

FMC Kongsberg Subsea reports their satisfaction with the project work and delivery. Installation at Ormen Lange will take place some time during 2nd quarter 2006.

Second HUGIN 3000 delivered to C&C Technologies



Delivery of the second HUGIN 3000 to C&C Technologies took place on schedule on 18th of May this year. The order was received just before Christmas last year and represents a record short production and testing time in a common effort between the Kongsberg

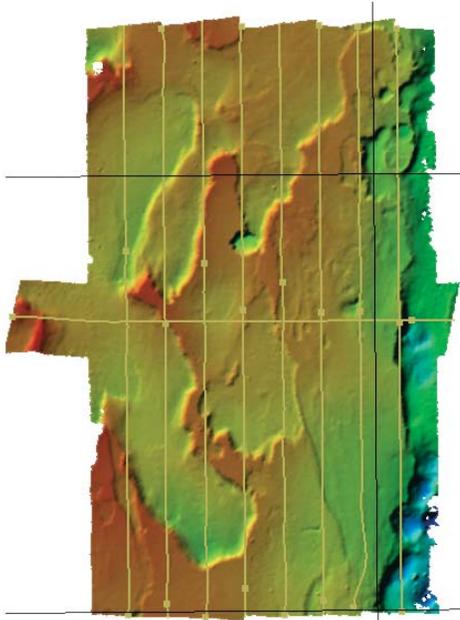
Maritime HUGIN Team and the C&C Technologies HUGIN Team. The first HUGIN 3000 for C&C Technologies has successfully been occupied with surveying work for the offshore oil and gas industry since 2000. There isn't much time for rest though – C&C has

placed an order for a HUGIN 4500 with 4500 meter depth capability and extended operational performance to be delivered end 2005.

Since the start in 2000 more than 55000 km of commercial surveying has been performed with the HUGIN 3000 AUVs. The work has taken place world wide at most deepwater offshore oil/gas provinces in water depth from shallow down to 3000 meters. HUGIN 3000 is now established as the industry standard for AUV offshore surveying and is the only AUV that can run for 2.5 days at water depths down to 3000, whilst operating multibeam echosounder, sidescan sonar and sub bottom profiler.

HUGIN 1000 a smaller and more modular version of the HUGIN 3000 is now in regular use by the RNoN, one of the first navies with an operational AUV capability.

New Kongsberg EM 710S passes Initial Royal Navy sea trials



already noted, the survey suite on HMS Endurance now features one of the most versatile multibeam systems available today.

HMS Endurance's mission is to patrol and survey the Antarctic and South Atlantic, maintaining very close links with the United Kingdom Hydrographic Office and the British Antarctic Survey. She normally spends up to 7 months each year on deployment and final EM 710S performance trials are planned to take place between 6th and 13th July in UK waters. Kongsberg Maritime engineers will be on hand during the trials.

Kongsberg Maritime's latest generation of multibeam echosounders has passed initial trials onboard the Royal Navy Ice Patrol Ship, HMS Endurance. With the initial trials considered a successful and the impressive capabilities of the EM 710S

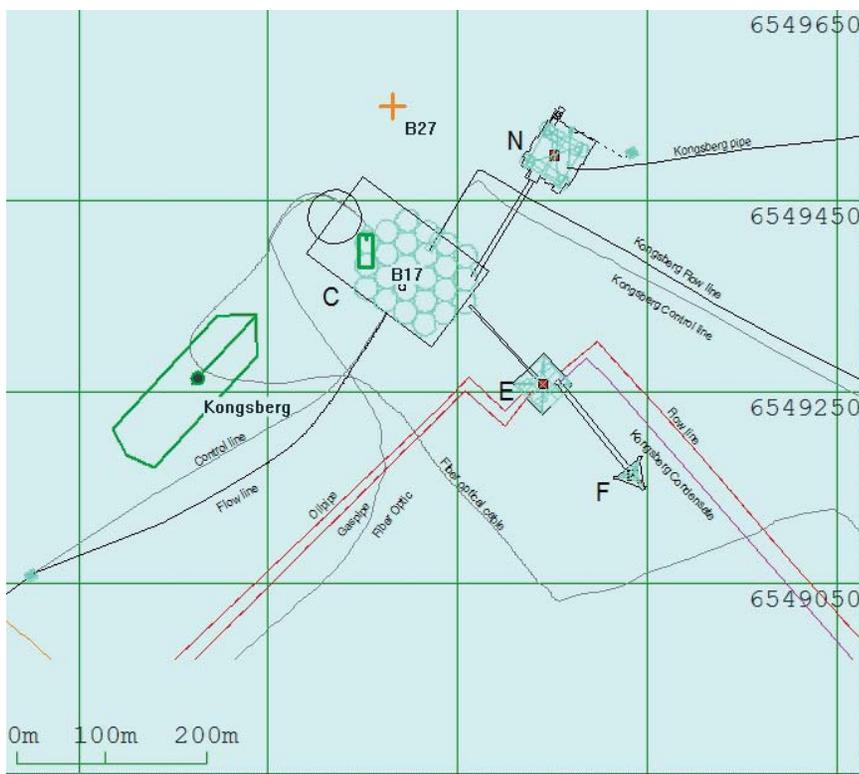
The EM 710 multibeam echo sounder is a high to very high resolution seabed mapping system capable of meeting all relevant survey standards. The system configuration can be tailored to the user requirements, allowing for choice of beamwidths as well as

transmission modes. The minimum acquisition depth is from less than 3 m below its transducers, and the maximum acquisition depth is up to 2000 m. Acrosstrack coverage (swath width) is up to 5.5 times water depth or 140 degrees to a maximum of more than 2000 m.

The system is available for different resolutions/array sizes, from 2 x 2 degrees to 0.5 x 1 degree. The smaller versions can be delivered also for a portable over-the-side mounting bracket. EM 710 features many significant technical advances, such as focussing of both transmit and receive beams, full electrical stabilisation of all beams for ship motions including pitch, roll and yaw, and sectorized transmission.

EM 710 will in addition to the bathymetric and imagery seafloor data also process and display water column data. The highest resolution version produces 2 parallel depth profiles per ping sequence, with a total of 800 depth soundings.

More informative APOS display



Kongsberg Maritime has added new functionality to the APOS display (HiPAP's Acoustic Positioning Operation System). In addition to the possibility of inserting figure markers (Circle, Triangle and Point) into the APOS display, the operator may now also import a drawing file of a structure or a field layout and have it as display background information.

This function can be of great help in subsea operations where a drawing is available depicting subsea structures, pipelines or other infrastructure. Subsea construction engineers, ROV pilots and other subsea personnel have already expressed their enthusiasm over this new feature. CAD file drawings with .dwg and .dxf extensions can be imported and used as a 2D background in the APOS display. The import and display of background figures is a standard feature in HiPAP operator stations.

IMAR acquires new Kongsberg Maritime multibeam package



Imar Survey Limited has announced the acquisition of its latest suite of shallow and medium depth multibeam echo sounder systems from Kongsberg Maritime. The new suite includes EM 3002 dual transducer head multibeam system with Seafloor Information System, EM 1002 and EA 400 SBES. The EM 3002 is an advanced multi-beam echo sounder with extremely high resolution and dynamically focused beams. It is suited for detailed seafloor mapping and inspection with water depths between 0.5 and 150 meters. Due to its electronic pitch compensation system and roll stabilized beams, the system performance is stable even in foul weather conditions.

Typical applications of the multibeam package include:

- Mapping of harbours, inland waterways and shipping channels with critical keel clearance
- Inspection of underwater infrastructure
- Detection and mapping of debris and other underwater objects
- Detailed surveys related to underwater construction work

or dredging

- Environmental seabed and habitat mapping
- Mapping of biomass in the water column

Each of the new systems has been supplied with Kongsberg's Neptune, Triton and Poseidon post-processing packages.

IMAR's hydrographic survey team continues to play a major role in the Irish National Seabed Survey. In association with Maritech Consultants Ltd, the team has recently returned to Seabed Survey to begin its third year surveying with the Irish Marine Institute, providing senior hydrographic personnel and expertise for the research vessels, 'Celtic Explorer' and 'Celtic Voyager'.

Since 2003, the hydrographic and charting team has completed surveying more than 60,000 km in depths ranging from 50m – 200m and surveyed a number of estuarial and harbour areas using Kongsberg Maritime EM 3000 and EM 1002 multibeam systems to LINZ order 2/1 survey standard.

GEUS orders the first EM 3002 multibeam in Denmark



GEUS – Geological Survey of Denmark and Greenland, department of Quaternary Geology, has placed an order for a dual EM 3002 system.

The contract includes SIS - Seafloor Information System, Neptune, CFloor post-processing software, MRU-5, Seapath-20, SV plus-probes and training. The system is to be delivered in the beginning of July with installation and sea-trials in the mid of August.

NAVTEK AS order deep and shallow water multibeam from Kongsberg Maritime

Horten based NAVTEK AS, recently placed an order for an EM 300 30 kHz 2x2 degree system and an EM 3002 300 kHz single system with SIS and Neptune.

The production and delivery of the systems will be done on very short notice, displaying Kongsberg Maritime's flexibility. The Factory Acceptance Test will take place only 3 weeks after signing the contract and delivery is scheduled to take place the following week.

The systems will be installed at the Astilleros Gondan shipyard in Spain.



KONGSBERG

KONGSBERG MARITIME AS

P.O. Boks 111 N-3194 Horten Norway Telephone +47 33 03 41 00 E-mail subsea@kongsberg.com
www.km.kongsberg.com