NEWSLETTER FOR CUSTOMERS OF KONGSBERG MARITIME

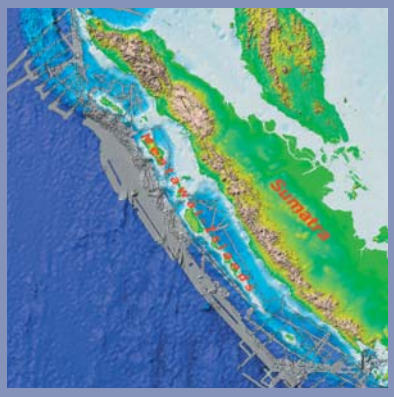
03/06

KONGSBERG

The SUBSEA newsletter

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

content



Letter from Royal Netherlands Institute for Sea Research:

EM 300 installation on the RV 'Pelagia'

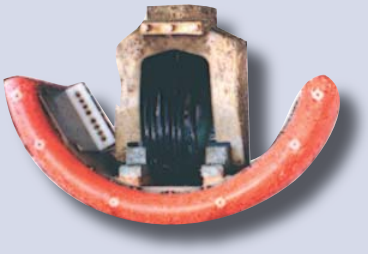
After an extensive European Tender Procedure we signed a contract with KM in mid January 2006 to purchase the EM 300 1x2 degr multibeam echo sounder for our research vessel 'Pelagia'. The installation was undertaken 2 months after the contract was signed, presenting quite a challenge for KM to produce and deliver the hardware so quickly. They responded well to this challenge, and furthermore the installation was then completed within just 2 weeks. Tasks undertaken included the installation of the gondola, the mounting and alignment of transducers, and of course installation of a great deal of cabling. We were very happy for the alignment to be carried out by the Norwegian company Blom Maritime AS, who proved to be very experienced in these kinds of precise measurements. The whole installation was managed effectively by the KM service engineer Ståle Myklebust. Then directly after the Harbour Acceptance Tests, the successful performance of the Sea Acceptance Trials completed our final step.

Looking back over the purchase and installation period we can summarize the experience as being swift, reliable, bringing no unwanted surprises, and undertaken by a team that was very pleasant to work with.

As a closing testament to the EM 300, this week the Electronics Engineer mailing from the RV 'Pelagia', 150 nM off the coast of Portugal said: "It is surprising how little support multibeam-operation requires".

SMM - Shipbuilding, Machinery and Marine technology. 26th – 29th September, Hamburg. Visit us at stand 136, hall 2

End of production for some of our products



EM 3000 was introduced in 1995, and has been an important shallow water multibeam echo sounder ever since, with more than 110 systems produced. It was supplemented by the more advanced EM 3002 late in 2003 and we are now stopping the production of the EM 3000.

EM 1002 was introduced in 1998, and has proven a reliable system for coastal surveying and mapping. More than 60 EM 1002 systems have been produced through the years. The EM 710, which was introduced in 2004 and is a modular, flexible concept, has several advantages concerning resolution and productivity and is now well established in the user community. We therefore stop further production of EM 1002 systems.

Both EM 3000 and EM 1002 will have full support for spares and service for several years from now on.

EM 120 - Multibeam survey off Suma

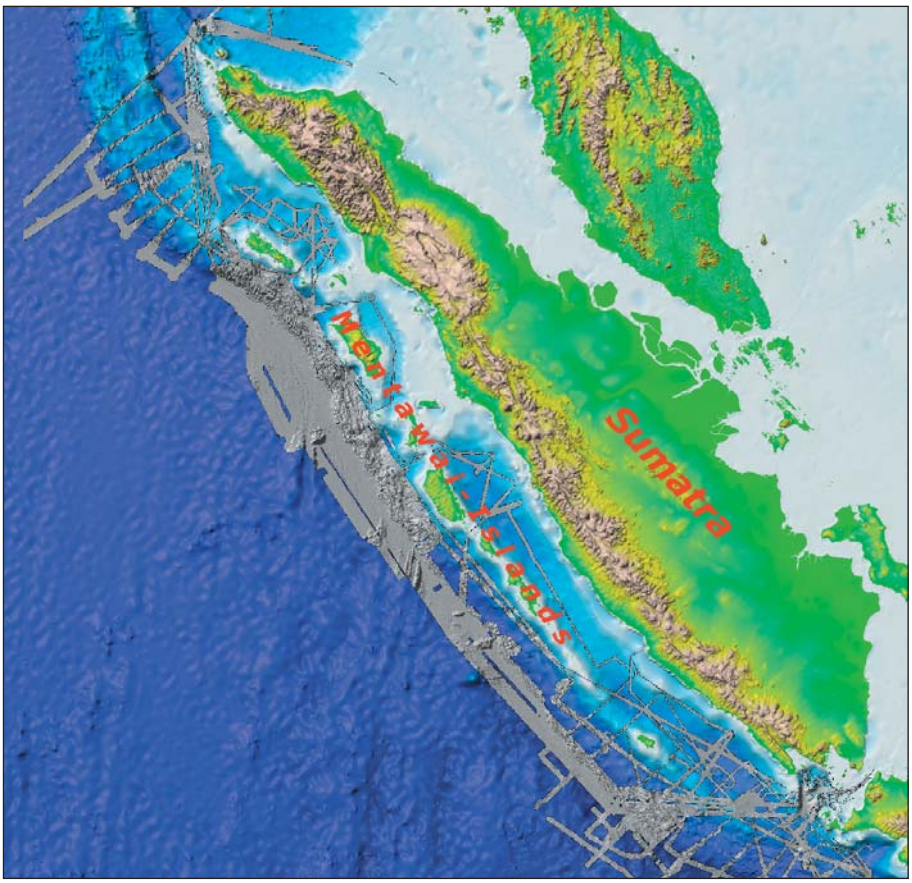


Figure 1: Area surveyed with RV 'Sonne' off Sumatra, background filled with global elevation data based on satellite altimetry.

The devastating tsunami of December 26, 2004 dramatically demonstrated the need for a better understanding of the dynamics of the ocean floor in Southeast Asia.

A jigsaw puzzle of lithospheric plates comprises the outer shell of the earth. The plates are in motion driven by internal convective forces. Due to different relative movements along their boundaries massive tectonic energy is accumulated and may be released violently, resulting in natural disasters such as earthquakes, volcanic eruptions and tsunamis. At the continental margin of the Sunda Arc, which stretches along the southern coast of Java and Sumatra (Indonesia) and follows the Andaman – Nicobar Island Chain, the Indo-Australian-Plate is sub ducted beneath the Eurasian Plate. Large-scale natural disasters are frequent in this area.

In order to assess the natural hazard risk

HMS Endurance - Pole to Pole fundraising event

The HMS "Endurance", belonging to the UK Navy, is equipped with an EM 710 multibeam echo sounder, and has already made new underwater discoveries on her expeditions to the Antarctic regions.

They are now arranging a fundraising event "Pole to Pole", during which their team will cycle, run, and row a distance which corresponds to the distance from the North Pole to the South Pole during 2007. KM is a sponsor to this event.

For more information see www.visitandlearn.co.uk.

atra to access the natural hazard risk in SE-Asia

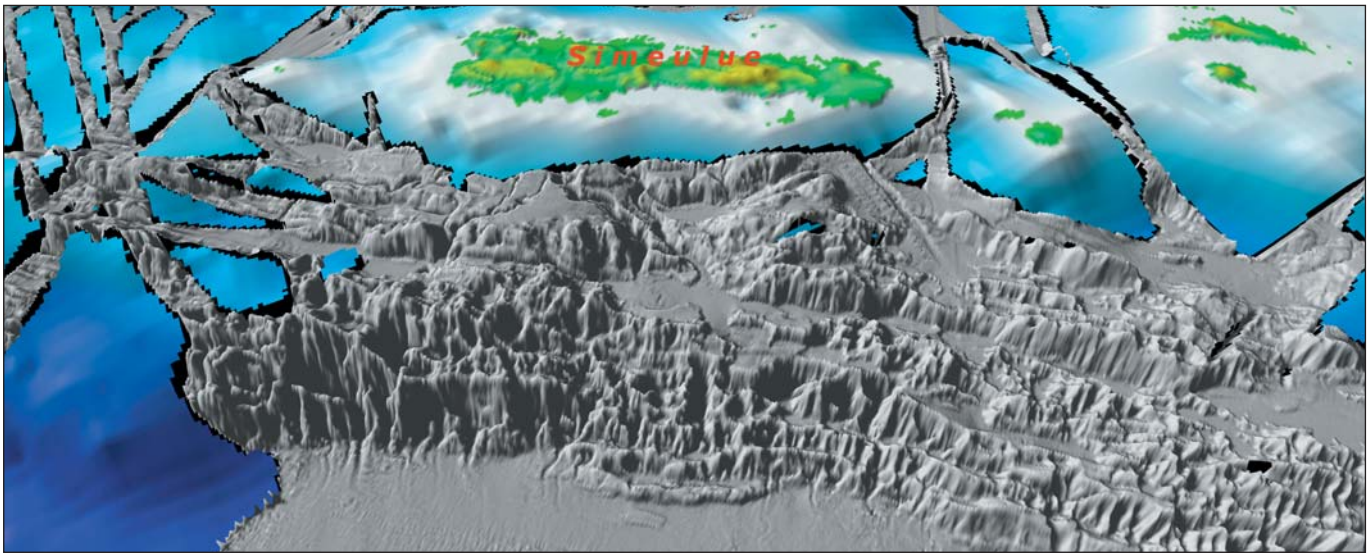


Figure 2: Perspective view of the continental slope off the island of Simeulue.

of the area German geoscientists from IFM-GEOMAR in Kiel and the BGR in Hanover conducted a comprehensive multibeam bathymetry survey with RV 'Sonne' from October 2005 until March 2006. The whole area that was mapped is shown in figure 1. The main objectives of the project were to better understand the mechanism of the December 26, 2004 earthquake, to find out differences to the March 28, 2005 earthquake, to constrain possible mechanisms that generate tsunamis, to delineate the obvious segmentation of the continental margin, and to find indications of mass-wasting processes along the slope. Furthermore, the bathymetry data will also be used to determine appropriate sites for ocean bottom stations of the German-Indonesian Tsunami Early Warning System (GI-TEWS) which will be set up in the area, and, finally, for model calculations of tsunami wave propagation in the Indian Ocean.

Data Acquisition

Since 2001, RV "Sonne" has been equipped with a Kongsberg Maritime EM 120 multibeam system in a 2° by 2° configuration. This 12 kHz, deep-water system records 191 beams with a total swath width of 150°. In order to achieve a sufficient along-track coverage a survey speed of 10 knots was continuously maintained. In water depths greater than 2500 m the 191 beams were focused in a swath of 120° width to gain higher resolution and a better data quality.

First results

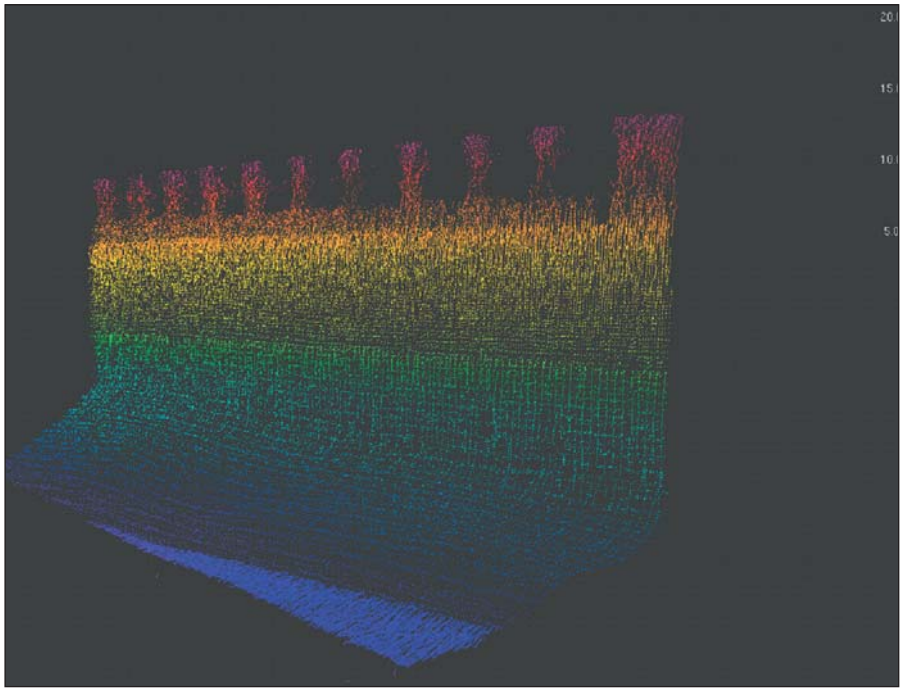
The EM 120 multibeam data was processed and visualized to display the morphology of the ocean floor along the continental margin. The topographic relief of the survey area is remarkable. Within a distance of just about 100 km the water depth increases from zero at the shores of the Mentawai Islands to more than 5000 m. Consequently, the continental slope is characterized by a very steep lower slope showing gradients of up to 15°. A midslope terrace dominated by sequences of basins filled with sediments and a steep upper slope sculptured by deeply incised canyons (fig. 2) was also mapped. The overall picture of the morphology of this part of the Sunda Arc subduction zone clearly indicates the active ongoing tectonic processes and underlines the potential hazards of this boundary zone between the two plates.

Wilhelm Weinrebe, IFM-GEOMAR
Stefan Ladage, BGR

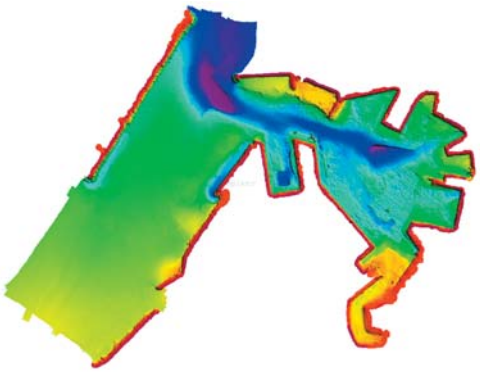
The grand opening of Escort Poland's new location

The Kongsberg Maritime (Hydrography dept.) distributor, Escort, celebrated its new office building in Szczecin, Poland on June 2nd. In connection with the opening, Escort President, Zenon Markowski invited its main customers to a seminar presenting Escort's main partners. Beside Kongsberg Maritime, Simrad Yachting, Tideland (UK) and ACSA (France) were invited to give presentations. The event was planned and supported by the whole Escort organisation.

New upgrade to EM 3002 at ISMAR of Ancona (Italy)



Dock wall of Ancona Harbour image



Ancona harbour mapping

Following the successful research carried out in the underwater acoustic field using the Kongsberg Maritime EM 3000 MBES, Istituto di Scienze Marine (ISMAR) of Ancona, of the National Council of Research (CNR), Italy, has recently upgraded with a new EM 3002.

CNR-ISMAR Ancona is a multidisciplinary scientific and advisory centre undertaking a range of research programmes on environment, fisheries, aquaculture and marine technology. Since June 2001 the 16m long R/V 'Tecnopesca II' was equipped with an EM 3000 system and the multibeam technique was adopted not only for a hydrographical but multiple purposes. It helped to better understand the areas under study and acted as a tool to monitor and quantify the impact of human activities on the marine environment. Extraction areas, disposal sites of material dredged from ports and harbours, artificial reefs, areas of ecological interest as well as areas around off-shore gas platforms and pipelines have all been mapped in greater detail using the system.

In mid March 2005 a dual-head demo version of the new EM 3002 system was installed on 'Tecnopesca II' and employed in all the multidisciplinary works carried out by CNR-ISMAR. A bathymetric state investigation of the water areas of Ancona Harbour was conducted using the demo EM 3002D. The same survey had been carried out in November 2001 using the old EM 3000D system, allowing a comparison between the two sets of data. The multibeam echo sounder represents an essential instrument for the management of port infrastructures, updating of charts to ensure safety of navigation, providing data to carry out dredging works, defining the volumes of removed materials, checking the condition of dock board walls, etc.

The results have been impressive, enabling extremely high resolution and detailed acoustic images of both sea bottom and dock walls. The new MBES will provide several benefits, not least the faster data acquisition allowed by the real-time visualization of seabed mapping.

Venture Drilling goes for second HiPAP® 500

Venture Drilling, a company owned 50/50 by Sindvest ASA and Petrolia Drilling ASA has placed an order for another HiPAP 500 and accessories for the drilling vessel 'Valentin Shashin' – to be renamed Deep Venture. The vessel is at present undergoing re-activation/classification work in Buenos Aires where it has been laid up for the last two years. It is being marketed for drilling operations worldwide down to 4.200 ft water depth.
The HiPAP 500 system has already arrived in Buenos Aires.

Spanish Navy extends multibeam capabilities

Kongsberg Maritime has recently entered into a contract with the Spanish Hydrographic Institute of the Navy (IHM) to deliver and install the new EM 302 1ºx2º on its survey launch, H/V 'Malaspina'. The system will be installed during the mid life upgrade program starting in 2007 and will form a key part of an integrated survey package consisting of the EM 302, EA 600 12 kHz and Seapath 200.

Today, IHM operates two 12.5 meters hydrographic launches, 'Malaspina' and 'Tofiño'. Both utilise Kongsberg Maritime hydrographic equipment, providing a high level of flexibility and performance. The launches have surveyed the majority of Spanish harbours, with outstanding results. The level of detail and resolution achieved is extremely high, making it possible to define objects, such as pipelines, cables, etc. that had not been mapped previously.

The new EM 302 onboard 'Malaspina' includes all the features of the EM 300 multibeam echosounder, the current market leading product for marine geology mapping of seabed for depths to 5000 - 6000m. It utilises chirp technology to obtain extended range capability for surveying from the shoreline right through to beyond continental rises. The EM 302 also provides high-density signal processing as well as increased number of soundings for improved resolution.

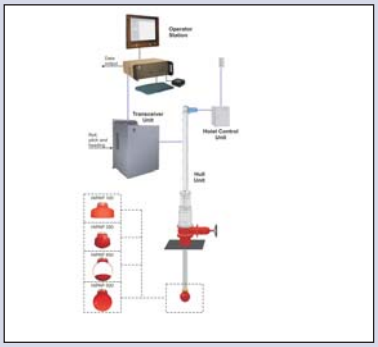
In 1999 the IHM acquired the first EM 3000 Dual Multibeam Echo Sounder System (MBES). After this they have had to adapt their organization as well as to change the traditional operational procedures used for single beam echo sounding. They have also built an expert group on MBES data post processing that converts the processed data into real art work.

In 2004 IHM installed an EM 300 2ºx4º on board H/V 'Tofiño' who was already equipped with EA 600 12 kHz and Seapath 200. The EM 300 onboard H/V 'Tofiño' has been upgraded to a EM 300 1ºx2º during the mid life program that in taking place this year.

"The IHM has been using Kongsberg Maritime equipment for its core survey activity for several years now and the integration of the new EM 302 1ºx2º on 'Malaspina' will extend its capabilities greatly," comments Freddy Pøhner, Kongsberg Maritime. "We continue to develop and innovate, and our latest multibeam echosounders provide even more accuracy and efficiency to suit many applications."

Both the 'Malaspina' and 'Tofiño', using the existing Kongsberg Maritime systems were recently utilised to make a special edition of navigational charts with very high resolution data for the Americas Cup, which will take place in Valencia in 2007.

HiPAP system no 450 delivered



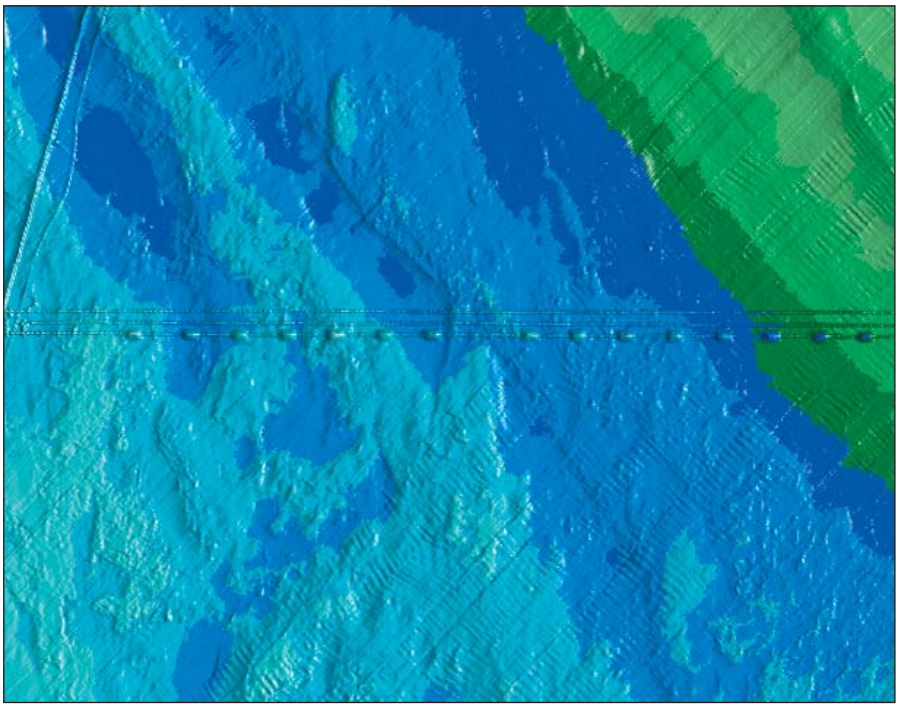
HiPAP was first developed with the focus of using the Super Short Base Line (SSBL) principle, as the market requirement was to try to avoid the Long Base Line (LBL) principle in deep water accurate seabed survey applications. The main advantage of the SSBL principle is that it only requires installation of one vessel-mounted transducer and one subsea transponder.

The unique transducer technology along with advanced digital signal processing of HiPAP has been proven to obtain optimal position accuracy. The HiPAP series of transducers features many more elements than any of its competitors, providing increased acoustical and mathematical redundancy, improved noise suppression and by far the best accuracy.

All HiPAP systems can install the Long Base Line and Multi User Long Base Line (MULBL) functionality providing the operator flexibility when this is required. The HiPAP systems can also be integrated with our different Hydroacoustic Aided Inertial Navigation (HAIN) systems for improved subsea position accuracies and faster position update rates.

The HiPAP family now consists of 5 members: HiPAP 100, HiPAP 350, HiPAP 450, HiPAP 500 and the portable HiPAP 350P. They all have theirown typical characteristics when it comes to size of beams, operating area, range capabiity, accuracy and portability.

Kongsberg EM 3002D multibeam used for a survey project at Qatar



National Petroleum Construction Company (NPCC), Abu Dhabi was awarded a contract for the Engineering, Procurement, and Construction of the Initial Field Development (IFD) and Full Field Development (FFD) for a project at Qatar.

As part of the project NPCC Survey undertook a full route multibeam, sidescan sonar, single beam echo sounder and magnetometer survey of the area in question onboard the spot charter vessel 'Al Saratan'. Unique System rentals provided primary and back up systems as required to compliment the project. Through the utilization of Unique System's EM 3002D dual head multibeam system the near 3000 line km was acquired in 31 days covering an area of nearly 240 km^2. Surveyed water depth ranged from 7 meters through to 63 meters. The navigation and data processing was done using NPCC's EIVA Navipac and associated processing modules. Full final processing was undertaken onboard, though the final 106 charts were plotted back at NPCC Survey's offices in Mussafah, Abu Dhabi.

Mr Guy Odell – Survey Manager, stated: "This was our first venture into full multibeam survey services and many thanks go to the great support from both Eiva A/S of Denmark and Unique Systems, Sharjah. Eiva A/S in provided their processing expertise during the initial phases of the survey including and trained our staff in the subtleties of MBES data collection & processing.

Unique, on the other hand provided us with complete technical support with respect to the commissioning, installation and operation of the EM 3002D system. We acquired the data in a cost effective period. All parties are very pleased with the quality of the data and that, in conjunction with EIVA's Google earth module have provided the client with a very useful and transportable data set.

MBES Statistics:
Total Survey Duration:
66 Days (Inclusive of Weather)

Break Up of Survey Duraton

Total No. of Operational days:
34.71 Days

Weather Down Time: 31.29 Days

Total Line Kilometres: 2985.775

Total Square Kilometres MBES Data Acquired: Approx. 240 (236.25)

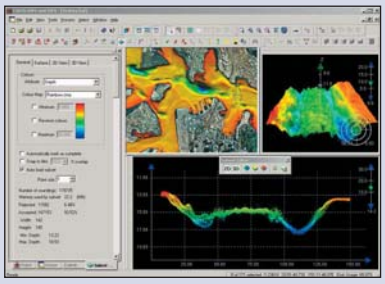
Depth Range Encountered:
From 63m to 7m (Reduced to LAT)

Charts Produced: 106

Navigation System: EIVA

MBES offline processing software: EIVA – Navi edit, Navi model, imaging modules

CARIS HIPS&SIPS, special offer for users of NEPTUNE



There is now an established cooperation agreement between Kongsberg Maritime and CARIS concerning post processing software for KM multibeam echo sounders. As a part of this cooperation, CARIS offers a special price for NEPTUNE users who want to change over to CARIS HIPS/SIPS software. The special rate is € 5,000 (for territories inside of Europe, Middle East, and Africa) or $ 5,000 USD for all other locations. The price includes the first year's subscription services.

Weighting of GPS, HiPAP and HAIN position references in a DP system.

A DP system calculates a variance for each of the position-reference systems in use. The system assigns different weighting to each position-reference system, based on its calculated variance. In this way, the system is able to place more emphasis on the position-reference systems that are providing the best measurements. Any reference system with accuracy (standard deviation) less than 1 meter and with an update rate of minimum 1 second is allocated equal weight in the DP system.

For physical reasons, the HPR systems will very often have either a reduced update rate or a reduced standard deviation compared to the GPS systems. Two HPR systems with update rate 2 seconds, will contribute 33% to the overall model and two HPR systems with update rate 3 seconds will contribute 25% to the overall model. Also there are situations or periods where HPR, even in LBL mode, will have accuracy worse than 1 meter, meaning that the weight on HPR is reduced.

If we look at HPR (or HiPAP) the following typical figures will be valid when operating in 1000 meter water depth.

	HiPAP SSBL	HiPAP LBL	GPS
Standard deviation	+/- 2 meters [1)]	+/- 0,5 meter	+/- 0,5 meter
Update rate	1,5 seconds [2)]	2,5 seconds	1 second

1) Accuracy of 0,2 % of depth
2) Travel time of 1,3s plus computation time

Acoustic and Inertial positioning principles in combination are ideal, since they have complementary qualities. Acoustic positioning is characterised by relatively high and evenly distributed noise and no drift in the position, whilst inertial positioning has very low short-term noise and relatively large drift in the position over time. The HAIN position reference system provides several important advantages for DP operation.

By introduction of HAIN, the following will be the result when operating in 1000 meter water depth.

	HAIN SSBL	HAIN LBL	GPS
Standard deviation	+/- 1 meter	+/- 0,5 meter	+/- 0,5 meter
Update rate	1 second	1 second	1 second

We can see that by introducing HAIN both to the SSBL and the LBL will take the acoustic positioning up to a point where these references will be given the same weight as GPS in the DP algorithm. The above also shows that the HAIN SSBL principle could be used with high DP weight in 1000 m depth compared to only 500 m without HAIN. The reliable LBL positioning will by introduction of HAIN also obtain the high DP weight as the update rate to DP will be 1 second, which is the same as the GPS gives. With all the other benefits mentioned above it is sure that the Hydroacoustic Aided Inertial Navigation (HAIN) system has come to stay, and will ultimately also ensure more reliable DP operation.

New software specialist - Seabed classification

Bjarte Berntsen has been appointed as software specialist in the Subsea Department, working with seabed classification etc. Bjarte has a Siv.ing. degree in physics from NTH (The Norwegian Institute of Technology) and a Dr.Ing. degree in hydroacoustics from NTNU (former NTH). He has previously worked in the Naval Department of Kongsberg Simrad and also spent two years with process simulation at Kongsberg Maritime, Bekkajordet.

Antwerp Hydro'06
6-9 November 2006

International Hydrographic Conference 2006 - Hydro06 "Evolutions in Hydrography"

Antwerp (Belgium), November 6-9, 2006

Visit us at stand no. 5

We have the pleasure to inform you that plans for the FEMME 2007 conference in Amsterdam are rapidly developing. The multibeam user conference will take place in Amsterdam in Week 12, 19-23 March 2007. Invitations will be sent out in September 2006.

FEMME is Kongsberg Maritime's forum for users of our multibeam echo sounder systems. The objective of the conference is to improve the skills of the users, and the performance of the Kongsberg Multibeam systems themselves. We aim to achieve this through the exchange of experience and ideas among the users and the development of hydrographic communities around Kongsberg Maritime systems.

All participants to the last conference in Dublin in 2005 will receive an invitation in addition to our new 'multibeam customers'. If you would like to receive an invitation or have any questions regarding the conference, or wish to submit a paper, please contact Nina Hovland on this e-mail address: km.femme.2007@kongsberg.com or by telephone +47 33 02 39 38.

Preliminary program:

March 20, Tuesday
- 10:00 – 19:00 Registration
- 12:00 – 16:00 Kongsberg tutorials
- 19:00 – 22:00 Ice-breaker event at the conference hotel

March 21, Wednesday
- 07:00 – 09:00 Registration/Mob. Presentations/poster presentations
- 09:00 – 17:00 Conference program; presentations and discussions
- No official program in the afternoon

March 22, Thursday
- 09:00 – 17:00 Conference Program; presentations and discussions
- 18:30 – 24:00 Conference Dinner

March 23, Friday
- 09:00 – 12:00 Kongsberg tutorials

FEMME 2007
Amsterdam, The Netherlands

Events calendar:

September
26 - 29 SMM, Hamburg, Germany

27 - 28 UUVS, Southampton, United Kingdom

October
12 - 14 Vietnam Oil & Gas expo, Hochiminh city, Vietnam

18 - 20 Techno Ocean, Kobe, Japan

November
5 - 8 12th ADIPEC, Abu Dhabi, United Arab Emirates

6 - 9 Hydrographic Conference 2006 (HYDRO 06), Antwerp, Belgium

December
5 - 12 OSEA 2006, Singapore

Subscribe to news:

Four times a year Kongsberg Maritime releases its Subsea newsletter, which is available for download or sent by regular mail to your postal address. Please visit our website for subscribing and unsubscribing.

Send us your story:

We would be delighted to print your experience or 'products in action' report that would fit the mission of this newsletter. Please forward your story and pictures to: subsea@kongsberg.com

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