



# The SUBSEA newsletter

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

## content



AUV News

PAGE 2

HPR 410P - Portable acoustic positioning system to French Comex S.A.

PAGE 3

HAIN a new reference for DP

PAGE 4

From the 'Oden' ship's diary: Amazing multibeam data

PAGE 5

More Kongsberg Multibeams for U.S. Academic Institutions

PAGE 6

Events calendar

PAGE 8



## *Season's Greetings*

Kongsberg Maritime wishes to thank all customers and partners for a valuable collaboration throughout the year.

This holiday season the companies comprising Kongsberg Maritime have decided to donate the funds traditionally set aside for gifts to business associates.

*Bola Pre Frente in Brazil  
have been named as the recipient.*

## Fugro in Brazil takes two HPR 408S ROV LBL systems and an EM 2000 MBES



During 2007, Fugro OPCO in Macaé, Brazil, purchased two ROV LBL systems of type HPR 408-S33 (depth rated to 3000 m).

The first package included an HPR 408 subsea transceiver, mini ROV transponders, 6 MPT339/DTR wide beam transponders and 4 of the same fitted with Digiquartz depth sensors. This equipment is used by Fugro on the CBO-owned (Companhia Brasileira de Offshore) vessel 'CBO Campos', which has also been fitted with a HiPAP 500 system this year.

The second system is similar, but with 10 MPT339/DTR standard transponders. The spread is used by Fugro onboard the Sealion-owned vessel 'Toisa Voyager', which was already equipped with a HiPAP 500 system.

Both vessels are on contract with Petrobras to do survey/inspection work down to a water-depth of 3000m. CBO Campos is on a 4 year contract and Toisa Voyager is on a 2 year contract.

In addition to the positioning systems and transponders, Fugro Brazil has also bought an EM 2000 multi-beam echo sounder for accurate seabed mapping. This system has been installed on the new FCV 3000 series ROV onboard CBO Campos.

## AUV News



The AUV market segments including defense, offshore, hydrography, and oceanography and research are growing. With increasing activity, 2007 has been a busy year for the Kongsberg Maritime AUV department. During the year, 14 new employees have been hired, and more are planned for. Challenging but also inspiring, concludes the new Vice President Mr. Bjørn Jalving.

Number one priority for the AUV department is to support existing customers. The department runs a 24 hour support service, deploys service engineers for field support and maintains stock of all components. HUGIN vehicles have operated in commercial operations in all parts of the world.

The HUGIN 1000 MR for the Royal Norwegian Navy is currently undergoing sea trials. The vehicle is equipped with the synthetic aperture sonar, HISAS 1030, which provides unparalleled imagery resolution and area coverage rate. Also the Finnish MCMV 2010 project is well in progress and the final design review is scheduled just after the New Year. The Finnish Navy will get three HUGIN 1000 vehicles with similar capabilities as HU-

GIN 1000 MR for the Norwegian Navy. The Finnish Navy AUVs will in addition be equipped with an anti-collision system with built-in under ice operation capabilities.

Another project well underway and scheduled for delivery winter 2008 is the HUGIN 1000 with 3000 m depth rating for the Norwegian Defense Research Institute (FFI) and the Institute of Marine Research (IMR). This vehicle is targeted for military and civilian research projects. The HUGIN 1000 with 3000 m depth rating should also be of interest for other markets, for instance offshore survey.

The HUGIN 1000 AUV project for India's National Hydrographic Office and the Alcock Ashdown Ltd. shipyard marks an important milestone with the use of AUVs for national hydrography.

With the ongoing expansion, the AUV department is in better shape than ever for ongoing and coming projects. The strengthened research and development capacity will also be used to develop new capacities and new applications for the HUGIN range of vehicles.

## HAIN Subsea system aids surveying of BP Greater Plutonio pipelines

Acergy, Paris has completed the installation of pipelines on the BP Greater Plutonio field development in Angola. The project, which covers the development of six fields, will be the first in Angola's Block 18 and the first BP-operated project in Angola.

The fields: Galio, Cromio, Paladio, Plutonio, Cobalto and Platina, collectively known as Greater Plutonio, are located in water depths of 1,200 to 1,500 meters. The development will consist of a single spread-moored floating, production, storage and offloading (FPSO) vessel linked by risers to a network of subsea flowlines, manifolds and wells.

The Hydroacoustic Aided Inertial Navigation (HAIN) Subsea system was installed on the deepwater ROV, which was operated by DeepOcean on behalf of Acergy, onboard the vessel 'Normand Tonjer'. Kongsberg was also contracted to provide offshore installation, training and assistance with the survey data post-processing.

The use of HAIN made a significant contribution to establishing the as-laid position of the pipelines and any relative movement following hydro-testing. Lateral movements of the lines are of concern to the operator, and it was important to ensure that no significant travel of the pipelines had occurred

prior to the start of oil production from the field.

By utilising the HAIN Subsea system, the global position and subsequent relative movement of the pipelines was established within very tight tolerances, and without the requirement to deploy large numbers of transponders, which adds significant cost to a project in terms of vessel time. The HAIN Subsea system in conjunction with other sensors on the ROV and the application of survey methodology enabled the received INS/USBL data to be processed on board to help complete the survey successfully and on schedule according to the water level.

## HPR 410P - Portable acoustic positioning system to French Comex S.A.

'Comex S.A.', a French company specializing in marine survey operations for the offshore industry, the navy and archaeological subsea research market, has invested in an HPR 410P portable underwater positioning system from Kongsberg Maritime.

The acoustic positioning system will be used on the 'Minibex' for shallow and deep water positioning of their manned submarine 'Remora 2000' and ROV 'Super Achille'.

The Minibex vessel can be used for exploring, locating and inspecting underwater structures, and identifying and recovering elements lost at sea.

The 'Janus' is Comex's most recent vessel and is a modern swath type catamaran, equipped with sophisticated underwater prospecting and inspection tools that can perform a wide range of work.

For more information: [www.comex.fr](http://www.comex.fr)



# HAIN - a new reference for DP

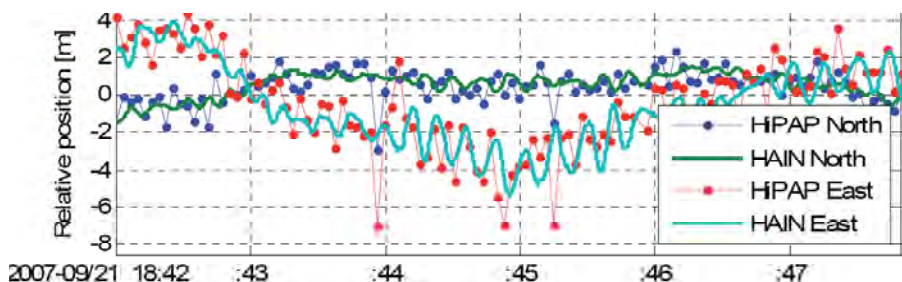


No one disputes the statement ‘A Dynamic Positioning (DP) system can never become better than its references’.

Automatic control of a vessel’s position in a critical operation or location requires good redundancy of all the control system components. Whether it is a vessel’s position extremely close to a fixed platform, or a construction platform vessel for a critical deep under-

water installation, it will require automated, accurate and controlled position keeping.

A DP system is a controlling computer that feeds the thrusters and propellers with accurate signals of power required to hold the position of the vessel, or to move it in a controlled fashion from one position to another, in any environmental weather condition. The DP cannot



Examples of relative position plots measured onboard West Navigator by HiPAP and HAIN



function without input from position reference systems and operates often with many such systems in an integrated solution.

Each position reference system contributes by sending its present logged position data to the DP. Each reference system has different characteristics of strengths and weaknesses. They are often classified according to how stable they are in position accuracy, position deviation and position update rate.

There are many position reference systems available in the market, but when a vessel is alone in the open ocean a long way from shore it is only the satellite based Global Positioning System (GPS) and the seabed transponder based Hydroacoustic Position Reference (HPR) that can give reliable reference positions.

Hydroacoustic Aided Inertial Navigation, or HAIN, will allow the weighting of the HPR to the same level as GPS in the DP algorithm. This is probably the best news for DP reference systems in 20 years!

HAIN systems onboard Seadrill’s West Navigator and Ocean Rig’s Eirik Raude have been running with excellent results while the vessels have been in drilling operation in 850 and 2700 meter water depth respectively.

The HAIN is an ‘add-on’ system to the HiPAP or HPR system and uses either the LBL or the SSBL position output as position aiding in an algorithm that also reads an Inertial Measurement Unit (IMU). An IMU is the sensor in Inertial Navigation System (INS).

After years of development and experience from navigation of the autonomous underwater vehicle HUGIN, the ‘HAIN DP Reference’ is now developed using the same technology.

With more than a year of field tests, system improvements and proven excellent performance, it is expected that this products will fulfill a huge demand for improved subsea reference for DP systems.

From the 'Oden' ship's diary

## Amazing multibeam data:

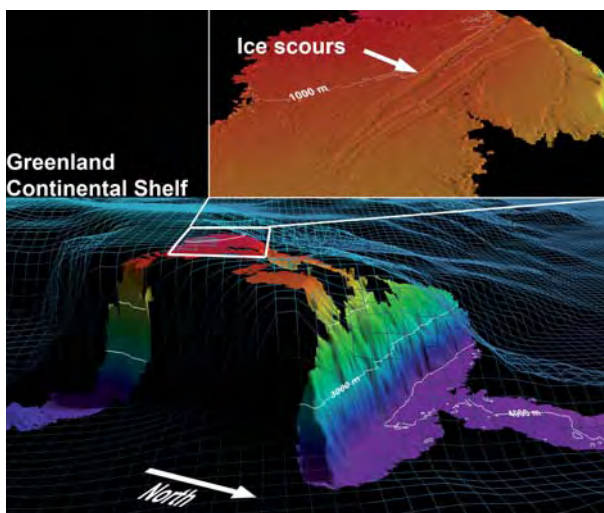


Image: Multibeam image from Morris Jesup Rise showing large iceberg scours at depths of 1050 m.

The northern plateau of Morris Jesup Rise was covered by more and more multibeam data as we criss-crossed with Oden to make occasional stops for a 360 degrees pirouette. Shortly after the data was acquired, post processing begun.

The detailed image that emerged provided all information needed to locate some coring sites for different scientific purposes. We planned to take two cores in the largest iceberg scour so we could get material for dating the ice scouring.

Follow the expedition online:  
[http://www.geo.su.se/forsk-marine-geologi-projects/follow-the-expedition-online-3\\_en](http://www.geo.su.se/forsk-marine-geologi-projects/follow-the-expedition-online-3_en)

Kongsberg Maritime has installed an EM 122 1°x1° multibeam hydrographic echo sounder and one 3° SBP 120 sub bottom profiler on the Icebreaker 'Oden' for the University of Stockholm and the University of Gothenburg, Sweden.

The Knut and Alice Wallenberg foundation have financed the purchase together with the Swedish Research Council.

Multibeam image from Morris Jesup Rise showing large iceberg scours at depths of 1050 m.

The project is a co-operation between Sweden and Denmark.

## HiPAP® transducer N° 600 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 their own typical characteristics when it comes to size of beams, operating area, range capability, accuracy and portability.

## More Kongsberg multibeam for U.S. Academic Institutions

Two more U.S. academic vessels, the R/V Marcus G. Langseth and the R/V Melville, have recently been outfitted with Kongsberg deep water multibeam systems, and a portable EM 3002D shallow water system has been ordered by an institution on the East Coast.

### EM 122 for R/V Marcus G. Langseth Lamont-Doherty Earth Observatory of Columbia University



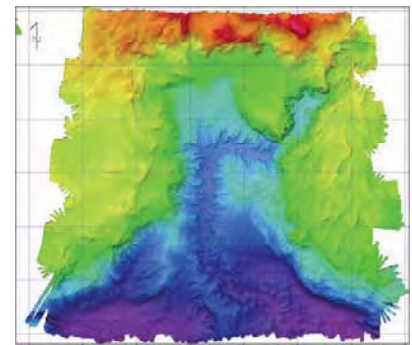
The R/V Marcus G. Langseth is a 71.5 m long, 2578 ton research vessel owned by the National Science Foundation and operated by Lamont-Doherty Earth Observatory of Columbia University.

When the R/V Maurice Ewing was retired by Lamont-Doherty Earth Observatory (LDEO) in 2004, the former Norwegian seismic vessel Western Legend was acquired as a replacement and renamed the R/V Marcus G. Langseth. The vessel has since undergone major modifications to make it the primary geophysical research vessel in the U.S. academic fleet. In

addition to a seismic system with both 2D and 3D capabilities, the modifications also included the installation of a 1° x 1° EM 120 multibeam echo sounder and preparations for the future addition of a Kongsberg sub-bottom profiler. The installation of the 3° x 3° SBP 120 system, which may occur in 2008, will further enhance the extensive geophysical capabilities of this vessel.

The EM 120 system presently installed will be changed to an EM 122 when this upgrade path becomes available, also, most likely, in 2008. With both the vessel recertification and the commissioning of the EM 120 already completed, the R/V Marcus G. Langseth is expected to enter science operations in late 2007 or early 2008. One of this vessel's primary missions will be to survey deep water drill sites as part of the Integrated Ocean Drilling Program.

<http://www.ldeo.columbia.edu>



Multibeam data from the Gulf of Mexico collected with R/V Marcus G. Langseth during commissioning of the EM 120 system in October 2007.

### EM 122 for R/V Melville Scripps Institution of Oceanography

The R/V Melville is a large, multi-mission oceanographic research vessel operated by Scripps Institution of Oceanography.

It can accommodate as many as 38 scientists on expeditions lasting up to 40 days. First launched in 1970, the Melville underwent major refurbishing and lengthening around 1990, at which time a Seabeam 2000 multibeam system was installed.

This system was recently replaced by a 1° x 2° Kongsberg EM 120 multibeam echo sounder at the SSK Shipyard in Sasebo, Japan. Following successful at-sea testing and commissioning, the EM



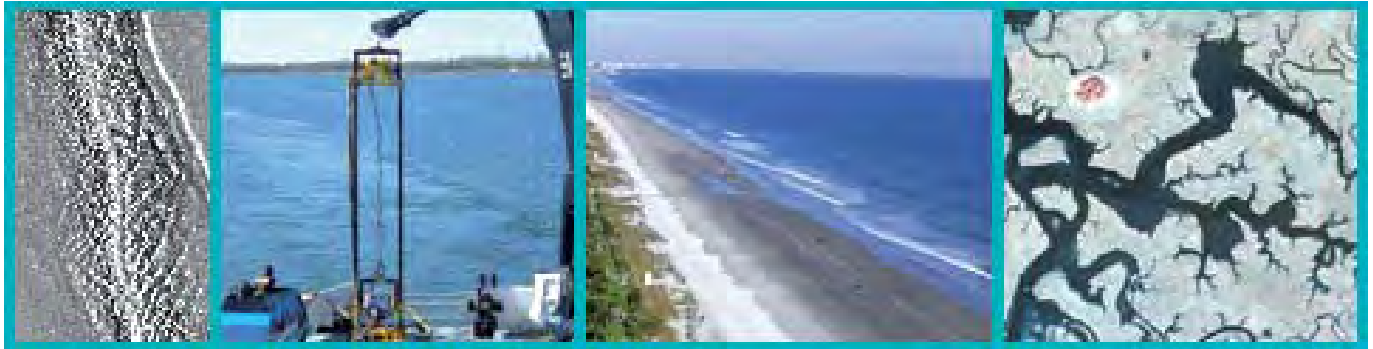
The R/V Melville, 97 m long with a displacement of almost 3000 tons, is one of the largest oceanographic research vessels in the U.S. academic (UNOLS) fleet. The photos above were taken during the recent EM 120 installation in Japan. (No – the windows in the bulbous bow are not there to provide the multibeam operator with a scenic view!)

120 system was accepted by Scripps in October this year. As part of the contract, Kongsberg will upgrade this EM 120 to an EM 122 when this next generation system becomes available.

Another vessel operated by Scripps, the R/V Roger Revelle, is also equipped with a 1° x 2° EM 120. Upgrading this system to an EM 122 is also in Scripps' plans.

<http://shipsked.ucsd.edu>

## EM 3002D for Coastal Carolina University



The Center for Marine and Wetland Studies at Coastal Carolina University will significantly increase the scope of geophysical research along the South Carolina coast when it takes delivery of a dual head EM 3002D Multibeam Echo Sounder within the next couple of months. A Seatex Seapath 200 vessel reference system is also part of the delivery.

According to center director Paul Gayes, professor of marine science and

geology, the addition of the EM 3002D establishes an integrated state-of-the-art mapping capability.

With the acquisition of this equipment the center will have the means to conduct highly advanced, comprehensive profiling and mapping of the ocean floor.

Together with other advanced instrumentation this will make it possible for center scientists and students to study how sediments and near shore reef environments interact with waves and currents moving above.

The data derived from these studies will have many important applications, from planning beach renourishment projects to the management of fishing habitats.

<http://www.coastal.edu/cmws/>

## New head of the AUV Department



Mr. Bjørn Jalving succeeded Karstein Vestgård as Vice President for the Kongsberg Maritime AUV Department in August this year.

Bjørn has 14 years of AUV experience from the Norwegian Defense Research Establishment (FFI) before joining Kongsberg Maritime in 2006. He holds a MSc. in engineering cybernetics from The Norwegian University of Science and Technology (NTNU).

Bjørn has been responsible for the development of the HUGIN control, navigation and mission management systems.

## GeoCentury buys HAIN Subsea systems for Chevron Agbami Field Development support

Geocentury, Aberdeen has purchased two new HAIN Subsea systems to support its services to Technip on the Chevron Agbami Field Development.

The Agbami field lies in OPL Block 216, in water depths between 1250 & 1400 meters, approximately 220 miles south-east of Lagos and 70 miles offshore Nigeria, in the central Niger Delta.

The HAIN Subsea systems will be mobilised on board the Technip vessels,

'Deep Pioneer' and 'Normand Pioneer' in the next few weeks.

Kongsberg Maritime has conducted system training for the GeoCentury project personnel in their Aberdeen Training Centre.

## Events calendar - First part of 2008:

DATE:		EVENTS:	COUNTRY:	CITY:
<b>JAN</b>				
06.01.08	09.01.08	HYPACK 2008	USA	Savannah
21.01.08	23.01.08	MEOST	UAE	Abu Dhabi
29.01.08	01.02.08	Pacific 2008	Australia	Sydney
29.01.08	31.01.08	UI (Underwater Intervention)	USA	New Orleans
<b>FEB</b>				
12.02.08	14.02.08	Deep Offshore Tech. (DOT)	USA	Texas
<b>MARCH</b>				
10.03.08	13.03.08	Gastech 2008	Thailand	Bangkok
11.03.08	13.03.08	Oceanology International	United Kingdom	London
17.03.08	19.03.08	DIMDEX	Qatar	Doha
26.03.08	28.03.08	ASIA Pacific Maritime	Singapore	Singapore
<b>APRIL</b>				
08.04.08	10.04.08	Marine Construction Europe	France	Paris
09.04.08	11.04.08	Sea Japan	Japan	Tokyo
13.04.08	15.04.08	MELAHA 2008	Egypt	Hurghada
21.04.08	24.04.08	DSA	Malaysia	Kuala Lumpur
<b>MAY</b>				
05.05.08	08.05.08	Canadian Hydrographic Conference	Canada	Victoria
05.05.08	08.05.08	OTC	USA	Houston
08.05.08	11.05.08	Ocean 2008 (OTO)	Japan	Kobe
20.05.08	22.05.08	MOC	Egypt	Alexandria
21.05.08	22.05.08	DTA	ASIA	Singapore
<b>JUNE</b>				
03.06.08	06.06.08	Caspian Oil & Gas	Azerbaijan	Baku
02.06.08	06.06.08	Posidonia	Athens	Piraeus
04.06.08	05.06.08	UTC - Underwater Technology Conference	Norway	Bergen
10.06.08	12.06.08	AUVSI's Unmanned Systems	USA	San Diego
10.06.08	12.06.08	Seawork - Workboat Exhibition	United Kingdom	Southampton
10.06.08	12.06.08	UDT Europe 2008	United Kingdom	Glasgow
24.06.08	26.06.08	Subsea Survey	Texas	Galveston

