



# The SUBSEA newsletter

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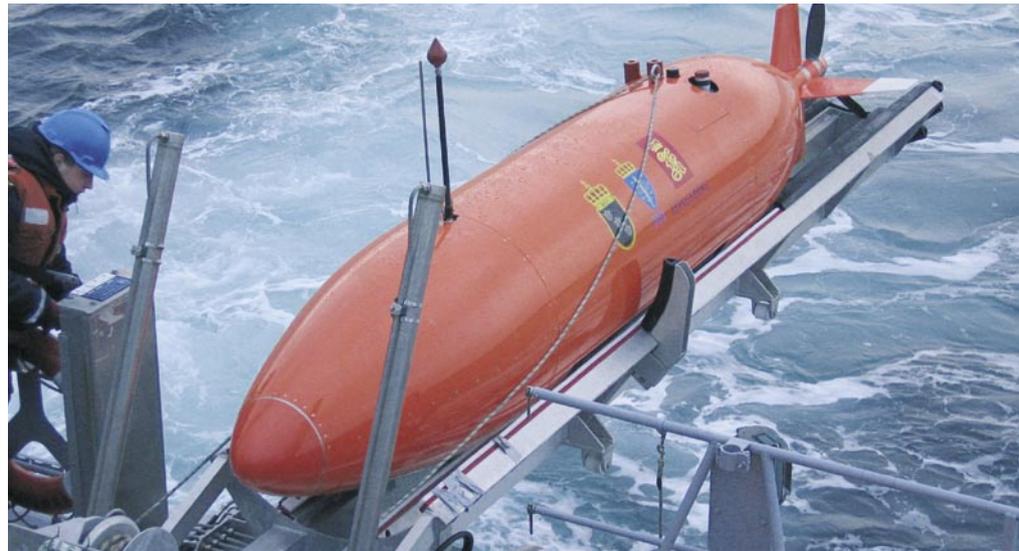
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## C & C Technologies acquires third HUGIN AUV

C & C Technologies, Inc. of Lafayette, Louisiana, USA has contracted Kongsberg Maritime to supply a HUGIN 3000 Autonomous Underwater Vehicle (AUV), for delivery April 2005. This will be the third HUGIN in C&C's AUV fleet. The order comes just 3 months after C&C Technologies, Inc. placed an order for a HUGIN 4500 (4500 meter depth rating), for delivery later this year.

The HUGIN 3000 AUV is rated to 3000-meters water depth, is slightly longer than it predecessors and is powered by the Kongsberg Maritime aluminum oxygen fuel cell battery, which provides a mission endurance of more than 50 hours before resurfacing. The vehicle will feature an enhanced survey sensor suite, basically consisting of:

- Multibeam echo sounder
- Side scan sonar
- Sub-bottom profiler
- Conductivity, temperature depth system



**26 - 29**  
**April 2005**

FEMME 2005  
Dublin, Ireland

## EM 710

## Canadian Hydrographic Service, leaders in Hydrography with EM 710



Halifax, Nova Scotia, Canada

The Canadian Coast Guard Ship 'Matthew' will be sounding with a new EM 710, IHO SP 44 Special Order capable multibeam sounder when the 2005 survey season begins.

Kongsberg Maritime agreed to provide a 2x2 degree EM 710 system as part of a Joint Project Agreement (JPA) between Kongsberg Maritime, Brooke Ocean Technologies and CHS. In February 2005, CHS chose to increase the system's

potential by installing an upgraded 0.5 x 1 degree transducer array. This means that the sounder can be converted to a 0.5 x 1 degree system at the Hydrographic Service's discretion without the need to modify the transducers.

To add versatility to the system, the transducer array will be mounted in a diver removable and serviceable gondolas which will eliminate the need to place CCGS 'Matthew'

in dry-dock should hydrographers wish to deploy the EM 710 on a different platform.

About the system:

- The EM 710 to CHS is the first of its type in North America.
- Broad-band, composite ceramic transducers produce up to 400 soundings per swath and two swaths per ping at frequencies of 70 to 100kHz.
- Operational ranges from 3 m to more than 1000 m. (2000 m with FM sweep)
- Coverage is 5,5 times water depth.
- Swath coverage of up to 140 degrees with at least 5,5 times water depth even in shallow water.
- Shallow water pulse length of 0.15 ms is used, for deeper waters 0.5 and 2 ms, and for very deep waters FM chirps of up to 100 ms duration are available.
- Stabilized for roll (up to 15 degrees), pitch (up to 10 degrees), and also for yaw or heading deviation from nominal course (up to 10 degrees).
- Focused on both transmit and receive to maintain angular resolution at shallow water depths.
- Accuracy as specified by RMS deviation 5 cm or 0.2% of depth (mean over the swath, whichever is largest).
- Depth resolution 1.
- Sampling rate is more than 25 pings per second, depth permitting

## Kongsberg Maritime Ltd. - Rental open day

Kongsberg Maritime Ltd in Aberdeen held an open day to enable Rental companies to view the latest products available. Demonstrations were given on the new "Shorty" MPTs, HAIN, Navlab, Transponder Serial Interface, SIS controller software, Neptune and digital subsea camera. All the Aberdeen based rental companies attended and agreed it was extremely informative and should be made an annual event.

More rental information and our rental catalogue are available through our web. Visit [www.km.kongsberg.com](http://www.km.kongsberg.com) and select Rental.

Available products

- Subsea acoustic positioning
- Echosounding
- Swathe bathymetry
- GPS positioning
- Oceanographic instrumentation
- Underwater cameras



All the Aberdeen based rental companies attended

## FEMME

## Short history of the FEMME user conference



*FEMME conference in 2003*

Kongsberg Maritime (then Simrad) delivered its first multibeam echo sounder system, the EM 100, in 1986.

In 1988 it was decided to establish a forum for EM echo sounder system users; the FEMME conference. The FEMME is the Forum for EM Mutual Experience. The first FEMME was arranged in Bergen in 1989 with approx. 20 participants.

The FEMME 2005 in Dublin is the 10th FEMME. We have seen over the years since 1989 how the FEMME has developed in terms of number of participants, number of papers, quality of the papers, etc. As you can see from this list, the number of delegates has risen drastically since the first FEMME in Bergen in 1989:

Dec 1990 in Southampton, UK with 28 participants  
 17 – 18 March 1992 in Horten, Norway with 35 participants  
 15 – 17 September 1993 in Paris, France with 52 participants  
 5 – 6 October 1995 in Biloxi, US with approx. 110 participants  
 25 – 26 April 1997 in Monaco with 80 participants  
 1 – 4 June 1999 in Oslo, Norway with 101 participants  
 25 – 26 January 2001 in Victoria,



*FEMME conference in 1990*

Canada with approx. 155 participants  
 1 – 4 April 2003 in Cadiz, Spain with 140 participants.

Each FEMME has provided us with lots of stories, but the most dramatic one must have been in 1995 in Biloxi. Everybody had checked into the hotel and gone to bed for the night, then suddenly all guests in the hotel were alarmed and told that the hotel was in the process of being evacuated, due to hurricane

Opal that was approaching the coast! All FEMME participants (except one) were taken by bus up country, and put in a temporary hotel until it was possible to return to Biloxi again. Hurricane Opal hit the coast some miles east of Biloxi, and we could return to the conference hotel, and the conference could start. We shouldn't be bothered by such extreme weather in Dublin, but we're sure you'll return home with some stories to tell!

### More orders for EM 3002

Simrad BV has received an order for three EM 3002 multibeams from the dredging company Jan de Nul in Belgium. This is the 2nd order for three multibeams from the company. They now have six EM 3002 and 2 EM 3000 systems. Some of these systems will be used in very cold environments. The systems will use top end software such as Windows based SIS controller software and the acquisition software QINCY. Delivery of the EM 3002 systems is at the end of February and beginning of March.

## HUGIN 1000

## Visit from Royal Australian Navy



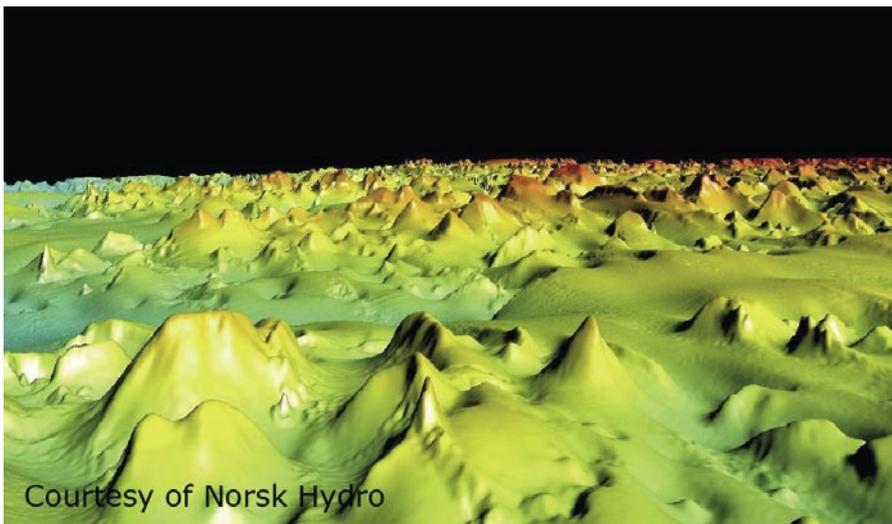
Kongsberg Maritime's Horten site received a delegation from 'The Royal Australian Navy' (RAN) and 'The Defence Science and Technol-

ogy Organisation' (DSTO). The three visitors were on a worldwide trip to monitor the present situation within UUVs (AUV), specially

designed for Mine Warfare operations. Their visit in Norway started with a short stop in Horten and continued with a demonstration of HUGIN 1000 outside Bergen. The demonstration was carried out by 'HMS Karmøy' from The Royal Norwegian Navy, Mine Warfare Flotilla. 'HMS Karmøy' is the only navy vessel in the world with an operational UUV like HUGIN 1000. The demonstration was a success and Cdr. Wesley Heron RAN stated; "We haven't seen anything like this UUV operation and we are greatly impressed by the professionalism demonstrated by the crew onboard 'HMS Karmøy' ". RAN is looking into its future needs of Mine Warfare Capabilities and most likely UUVs will be a part of that concept.

## HAIN

## Geoconsult buys second inertial navigation system – HAIN



Courtesy of Norsk Hydro

To satisfy the positioning requirements from Hydro on the Ormen Lange gas field, Geoconsult AS has bought its second Hydroacoustic Aided Inertial Navigation system (HAIN). Hydro has demanding requirements for accurate positioning

at the Ormen Lange field, which is one of the world's harshest deepwater seabed environments. In a gas production area with an extensive amount of seabed transport pipes, HAIN is a vital tool for improving underwater positioning. Geocon-

sult's Business Development Manager Arvid Pettersen reports that the impressive experience with the first system made the investment decision easy for this second system.

The HAIN combines the Acoustic and Inertial positioning principles; which is ideal since they have complementary qualities. Acoustic positioning is characterized 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 Subsea system solution is used for providing underwater vehicles with three times improved acoustic position accuracy and will also provide a higher position update rate.

## Hydrographic survey system on 'Palmyra'



'Palmyra' is the latest hydrographic boat delivered by the French shipyard OCEA for the General Directorate of Ports (GDP) in Syria.

KONGSBERG MARITIME was awarded the contract with the shipyard for the supply and installation of an integrated hydrographic survey system on board.

The spacious hydrographic room is equipped with an EM 1002 Multibeam Sounding system including Operator Station Software (SIS), MRU-5 Motion Reference Unit, Kongsberg bathymetric post-processing software, and an EA 400 38/200 kHz Singlebeam Echosounder. The equipment also includes a DGPS position system and a currentmeter.

'Palmyra' is a 60-foot aluminium vessel based on the model ECO 60 SC multipurpose workboats from OCEA. This range covers seven models of sizes 60' to 145' for bathymetric, hydrographic, oceanographic or buoy laying purposes.

The principle of these vessels is to offer a modular platform, with a great transversal stability and broad abilities, i.e. to carry labs containers on the aft deck.

'Palmyra' will be based in the port of Lattakie in the Mediterranean Sea.

The hydrographic survey system on board will allow GDP to carry out the following missions:

- Survey of the main harbour entrances
- Coastal survey and mapping of the EEZ
- Current profiling
- Water sampling

## Kongsberg Maritime strengthens its presence in Houston



Arnt-Helge Olsen is arriving Houston in April, and will stay there for a period of 2 years. He has a wealth of experience with acoustic positioning systems, gained from working for more than 8 years as a Chief Navigator and more than 4 years with Kongsberg Maritime specializing on underwater instrumentation. The demand for more accuracy and reliability in acoustic systems calls for

more expertise in the USA on HPR and HIPAP acoustic positioning systems. This extra activity in the North-American market has increased the need to work closer with our customers in order to provide improved service and day-to-day contact.

As Kongsberg Maritime sees a growth in the subsea construction market the extra presence in Houston can offer technical solutions and assistance during planning of operations, training of personnel and also start-up assistance once the job gets going.

Unique Kongsberg Maritime technology makes possible the HiPAP, which is a market leader in acoustic positioning, making it ideal for ROV

operations. HiPAP enables huge cost savings with the use of LBL, MultiUser LBL and SSBL. It can also be equipped with a Hydro Acoustic Inertial Navigation system; HAIN Subsea, which can improve short baseline positioning of an ROV with up to three times the accuracy

- ROV/AUV can be positioned from the surface in any direction from vertical to surface with range up to 3000 meters (10 000 ft) with very high accuracy.
- Multi User LBL made simple, easy to use and cost effective.
- LBL that can be switched into high accuracy mode (2cm) with huge cost savings on projects.
- Powerfull easy to use portable acoustic systems for vessels of opportunity.

## ACOUSTIC BOP CONTROL

## Deepwater operation of BOP from HiPAP



Deepwater Frontier is the first vessel to install the 3000 meter MF (Medium Frequency) Acoustic Control System (ACS). In fact, the request to Kongsberg Maritime from Transocean for an ACS for BOP that could be operated from the HiPAP transducer down to 3000 meters of water depth, initiated the development of the

system. The new ACS, named ACS 433 replaces an existing BOP control system delivered by another manufacturer. ACS 433 will, in an emergency situation, control and monitor the operation of six BOP valves via an acoustic control link.

A complete delivery consists of:

- Redundant subsea control system

- Battery operated portable surface control transceiver
- Subsea transducers
- Dunking transducer
- BOP simulator for testing and verification
- Software for operating the BOP control system from HiPAP MMI.

Previously, Kongsberg Maritime has delivered several BOP control systems with 3000 meter specification, but these have been LF (Low Frequency) system to secure the long range. The ACS 433 intalled on board a vessel with HiPAP fulfils Petrobras' requirement regarding communication to the BOP is by using hull-mounted transducers.

The system was delivered in May 2004 and installed on the rig in September. Installation was carried out by the Kongsberg Maritime Brazil office in Macaé

## Byron Bank



*Adrián Madirolas (National Institute for Fisheries Research, Hydroacustics section) Federico Isla (National University of Mar del Plata, Coastal Geology Department)*

This part of the coast of Patagonia is composed of cliffs of marine deposits of Miocene age (Patagonian formation). Jurassic rocks can also be distinguished as needles that come close to the sea level, e.g.

the Sorrel Rock. Cabo Blanco cape is a tombolo where one of these vulcanitic outcrops induced the diffraction of waves, and caused the pattern of beach-ridge systems formed during Pleistocene when sea levels were higher than today.

In April 2004 the first Argentine multibeam survey took place in the area to the north of Byron Bank. The R/V Cap. Oca Balda, operated by the National Institute of Fisheries Research (INIDEP), employed an EM 1002 multibeam echosounder in cooperation with the fishing company Glaciar Pesquera S.A. The survey aimed to produce detailed bottom bathymetry and backscattering information of the area. The underwater topographic image obtained confirmed the existence of a northern extension of these relationships at depths of 30-0 m. The multibeam echosounder re-

corded a plateau structure sampled with gravel on top of it. The terrace is composed of the Miocene marine deposits and the gravel is related to the ancient coastline deposits of Pleistocene age. Mean depth in this section of the survey area was about 90 m.

In the center of the image, a significant depression with steep walls of about 16 m, and covered by mud represents one of the tectonic ponds characteristic of the Patagonian emerged morphology. The detailed bathymetry performed by this equipment distinguished small-scaled gorges associated to turbidity. Two rocks (assumed to be of Jurassic vulcanitic origin) can also be seen on the left corner of the image, inducing comet marks produced by the significant tidal currents (from ESE to WNW), also characteristic of the Patagonian inner shelf.

**HIPAP 450**

# A new modular version in the HiPAP family

The HiPAP 450 system has the same operational and technical performance as the HiPAP 350 system, but it can be upgraded to full HiPAP 500 performance at any time.

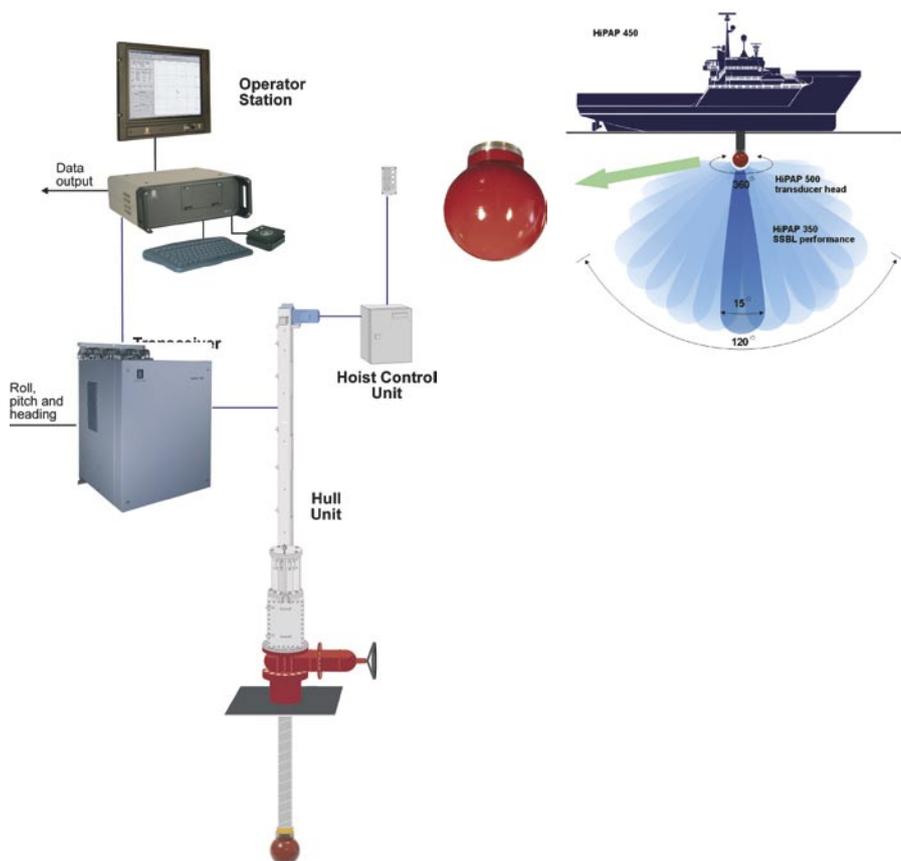
The new system is available at a very competitive price enabling the buyer to save cost until the requirement of the top level of underwater positioning arises.

Except for shortage of 6 of the advanced 32 channel Transmitter / Receiver Boards and Software, the HiPAP 450 system configuration is identical to the HiPAP 500.

This means that the HiPAP 450 transducer is the same unit as the

HiPAP 500 with the unique and advanced spherical transducer. It has the same amount of elements as the HiPAP 500, but only the 46 lower sector elements of the sphere are “activated” and in use. These elements are all computer-controlled.

The HiPAP 450 uses medium-narrow “listening” beams of +/-7,5 degrees for reception of signals from the transponder(s). For the interrogation of the transponder(s) a wide beam is used. The operating area below the vessel is 120 degrees, as the HiPAP 350 system. The typical maximum operating range is 3000m, as for the HiPAP 350 system.



## Acoustic Positioning Methodology - Update Forum



Kongsberg Maritime conducted an Acoustic Positioning Methodology Forum in Paris on 26th January 2005. Project managers, engineers & surveyors from a range of oil operators, marine contractors, engineering and design companies, attended the event, which was held at the Novotel Paris La Défense.

The focus of the event was a technology update on the HiPAP® acoustic positioning system. Under discussion were the capabilities of the system and its innovative option, the Hydro-acoustic Aided Inertial Navigation system (HAIN). HAIN offers operators the opportunity to maximise subsea positioning performance, particularly on deepwater projects.

Recent system development results, related to HAIN operations by customers, were shared and discussed, accompanied with demonstrations of the different systems, including the new modular multi-function MPT transponder.

Guests found the forum provided an excellent opportunity to discuss & add feedback to the possible methodology related to the use of these systems. The event strengthened the working relationship between manufacturer & customer which is so vital to the focused development of Kongsberg Maritime systems.