



The SUBSEA newsletter

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EM 2040 Purchased in The Netherlands



Survey vessel BNR 1640

Following the announcement of the new EM 2040 multibeam echo sounder during the FEMME user conference in Lisbon, Kongsberg is already receiving orders for the 4th generation of multibeams.

Due to the success of this 4th generation multibeam like the EM 710 and EM 302, the EM 2040 shallow water multibeam system will be launched during the year.

Kongsberg Holland Maritime bv has been awarded to deliver the EM 2040 to survey company, Geoplus BV. To date, Geoplus has purchased 5 Kongsberg multibeam systems and the latest, the EM 2040- 0,5x1 degree dual head array, will be installed at the Survey vessel BNR 1640 in September 2010. The vessel is currently under construction and is being built under Lloyds Class, which will enable the vessel to operate in the Antarctic and Tropical areas.

The EM 2040 dual head system provides a wide swath of 200 degrees and a frequency range of 200 to 400 kHz, and is available in 0,5x1, 1 x 1 and 1x 2 degrees transducer array. Geoplus will be using the EM 2040 for survey activities as Bathymetry and pipe line inspection



Handshake between Geoplus BV and Kongsberg Maritime Holland BV

on shallow waters but will also have the option to use the system for deep water survey due to its wide frequency range.

Geoplus BV is located in Scheemda in the north of The Netherlands and operates world wide, carrying out inshore and offshore surveys for dredging, construction and offshore companies. Geoplus, is currently working on expanding its survey fleet with 5 vessels within two years to meet the demands of the survey market over the coming years.

Source Kongsberg Maritime Holland BV, Spijkensisse, The Netherlands

Second generation helicopter operations surveillance system to the US Navy as a part of new contract



Pictured – Joe DeLorenzo, Program Manager (far left), Mark Spiel, Logistics Management (2nd from left), Nancy Soper, Provisioning & Logistics (centre front) and Dan Bischoff, Project Team Leader (far right) from NAVAIR, and members of Kongsberg Maritime Ltd's Systems and Projects team during final system review/acceptance at Kongsberg's manufacturing site in Aberdeen, Scotland in October 2009

Kongsberg Maritime has successfully delivered the first Helicopter Operations Surveillance System (HOSS) for amphibious ships to the U.S. NAVY as part of an \$11,000,000 Naval Air Systems Command (NAVAIR) fixed price, Indefinite Delivery Indefinite Quantity contract awarded in December 2008.

The new contract is a follow-on to the original HOSS contracts awarded in

2007 which saw the successful development, qualification and delivery of 13 HOSS for amphibious ships, with the final system being delivered November 2008. Previous ship systems included seven Landing Ship Dock (LSD) and six Landing Helicopter Assault and Dock (LHA/LHD)-class variants.

Included in the new contract are design upgrades to the original system equip-

ment specifications (second generation), and delivery of numerous amphibious ship systems for up to five years. To date, four additional ship systems (ships 14-17) have been awarded and will be delivered from fall 2009 to winter 2010.

The design and implementation of the HOSS programme allows safer missions by permitting operational leaders more visibility of spaces on the ship and wider, zoomable views of places the previous legacy camera systems covered.

The second generation Helicopter Operations Surveillance System for amphibious ships is a highly robust multi-drop, low light-capable TV camera system with telemetry control via RS485 serial protocol.

Five different camera types are used within each system. The above deck camera uses high resolution monochrome sensors capable of operating daylight to quarter moonlight. The below decks camera uses the latest colour camera sensors suited to low ambient lighting conditions.

The HOSS for amphibious ships went through months of rigorous qualifications before the first system was successfully accepted and shipped.

Training Course for Shuttle Tanker crew



Our Training Center in Horten can now offer one week Position Reference Systems-course for shuttle tanker crew. APOS, HiPAP, GPS, DAPRS, Arthemis, FanBeam and Radius-operator training will all be incorporated into the course.

The training center has rigged two GPS-antennas to make the training as close as possible to the maritime operations likely to be experienced.

You can book your seat via email to km.training.horten@kongsberg.com. Please include the name of participant, company name, name of vessel and the invoice address.

The new generation Seapath® 300 family



inertial sensor of type MRU 5 or MRU 5+, which includes three angular rate gyros and linear accelerometers. Both sensors include the new unique angular rate gyro based on MEMS technology.

Seapath at a glance Performance

- 0.01° Roll/Pitch
- Utilizes GPS and GLONASS
- PFreeHeave™
- 16 configurable ports via Ethernet, 3 analog channels and 8 serial lines
- Ready for Fugro XP/HP/G2 correction services

Applications

- Motion compensation of single and multi-beam echo sounders
- High precision seabed mapping to IHO standards
- Motion compensation of hydro acoustic positioning systems
- Dynamic Positioning
- Antenna stabilization
- Heading reference
- ADCP motion compensation

With an accuracy of 0.01°, utilization of both GPS and GLONASS as well as PFreeHeave™, the Seapath family now offers a unique solution for demanding operations in challenging environments. The possibility to use GLONASS in addition to GPS satellites significantly increases system availability, provides robust integrity monitoring and results in more precise solutions, particularly in environments with high levels of obstruction. In addition to utilizing standard DGPS, XP/HP/G2 and RTK corrections, the Seapath can be operated in floating ambiguity mode and can determine position accuracy down to 15 cm RMS by the combination of a single frequency receiver and RTK corrections.

High precision

Seapath 300 is a high grade family of products, developed specifically for the hydrographic market and other high precision applications where heading, position, roll, pitch, heave and timing are critical measurements in order to achieve highly accurate results. The Seapath 300 product family offers the best possible combination of GNSS signal and inertial data, enabling much better performance than each of the signals alone. It offers high output data rate (up to 200 Hz), zero delay on output data, data available in up to eight different measurement points, a total of 16 configurable ports via Ethernet, 3 analog channels and 8 serial lines.

An important part of the product is the

Full Picture suite of Subsea Acoustic Products for MV Fugro Searcher

Fugro's new build survey vessel the Fugro Searcher is to have a Full Picture suite of Subsea Acoustic products from Kongsberg.

The following products will be commissioned on the vessel later this year:

- HiPAP 500 high precision SSBL system
- EM 302 0.5x1 degree deep water multibeam system
- SBP 300 6 degree multibeam sub-bottom profiler
- EM 3002 shallow water multibeam system
- EA 600 triple frequency single beam system
- MRU 5 motion reference unit



The design of the vessel will permit simultaneous analogue/digital survey operations and AUV operations. Geotechnical and ROVSV duties can also be undertaken.

Diesel electric drive, specially designed hull form, resilient engine mounts and

rudder propellers will maximise station keeping and navigational control while ensuring acoustically quiet running at survey speeds.

The Fugro Searcher will be operated by Fugro Survey Limited of Aberdeen.

The Full Picture for Marine Science and Technology at Oceanology International

New imaging, camera and positioning systems from survey technology specialist

Kongsberg Maritime is preparing to demonstrate the latest developments across its broad portfolio of hydrographic, camera, AUV and positioning solutions for marine science and survey applications at the forthcoming Oceanology International exhibition, which takes place at London's ExCel, 9-11 March 2010. In addition to a selection of cutting-edge technology solutions on its stand (E600), Kongsberg Maritime will, together with MMT, perform live on-water demonstrations aboard the 16m survey vessel, Seabeam.

Hydrographic

Kongsberg Maritime will exhibit an extensive portfolio of new and upgraded multibeam and sonar systems during Oi10. Highlights include the world's only true wide band high resolution multibeam, the new EM 2040, which is designed to meet all requirements for shallow water mapping and survey inspection.

New imaging sonar products include

the 1171 series of Kongsberg Mesotech scanning sonar heads, offered in multi-frequency obstacle avoidance imaging and ultra high scan profiling configurations. GeoAcoustics, a KONGSBERG Company, will present its latest generation of survey quality dual frequency side scan sonar systems as well as sub-bottom profilers with versatile mounting and application options. GeoSwath Plus, which is available for KONGSBERG's HUGIN and REMUS AUVs, in addition to other manufacturer's AUVs, will also be shown in its latest compact version for portable small boat operations.

Position, attitude and heading Kongsberg Seatex, the specialist position reference and satellite positioning of Kongsberg Maritime will present the 5th generation of its Motion Reference Unit at Oi10. The MRU 5+ builds on the already advanced technology employed in previous MRU generations and takes roll, pitch and heave measurements closer to perfection than ever before, with documented roll and pitch accuracy of 0.01° RMS. Kongsberg Seatex will also exhibit the new position, attitude and heading sensor, Seapath 300, which



is designed specifically for the hydrographic market and other high precision applications where heading, position, roll, pitch, heave and timing are critical measurements. By combining GPS and inertial data, Seapath 300 offers unrivalled accuracy and availability in case of GPS drop-out.

Underwater Cameras

Kongsberg Maritime's Camera Group will be showing its latest high performance underwater camera and lighting products at Oi10, including: the upgraded OE14-502 HDTV camera with direct HDSDI connectivity, the latest OE13-124 BIT low-light navigation camera, the new OE10-102 Pan & Tilt and OE10-103 Rotator units and a number of new general purpose halogen and LED lamps.

Visit the Kongsberg Maritime stand at Oi10 (stand no. E600) to find out more about these highlighted products and other new and existing technology solutions for marine science and survey applications. Visitors to Oi09 can book demonstrations aboard Seabeam throughout the duration of the exhibition.

Successful Kongsberg Maritime Subsea product seminar in Rotterdam



Pictured from left - - Roar Hansen, KM, Graham Lester, Hydroid, Gwyn Hagenaers, Tideway and Gert Brouns, Tideway.

A very well attended product seminar was made through Wednesday 17th February gathering most of our existing clients and some new. The Subsea division made presentations about new developments and new possibilities within the Subsea concept which covers:

- KM Hydrography including GeoAcoustics

- KM AUV including Hydroid.
 - KM underwater Camera and CCTVs
 - KM Mesotech underwater surveillance and scanning sonars for other applications.
 - KM Fishery Research
 - KM Naval sonars
 - KM Underwater Instrumentations (HiPAP etc.)
 - KM Seatex MRUs
- Thanks to KM Holland for a well organised day.

Hydroid Provides two REMUS 100 AUV Systems to Florida Atlantic University

Hydroid, Inc. has announced that Florida Atlantic University (FAU) has ordered two REMUS 100 Autonomous Underwater Vehicle (AUV) systems.

The two Hydroid REMUS 100 Vehicles will be operated by FAU's Institute for Ocean and Systems Engineering. They are part of FAU's National Science Foundation Major Research Instrumentation Program (NSF MRI) award and are intended to complement FAU's capabilities and enable research in cooperative behavior between AUVs.

According to Edgar An, Principal Investigator on the NSF award, the two new REMUS 100 systems will be used to advance research in the use of multiple AUVs and in high-speed data communication. It is expected that the REMUS vehicles and the associated research will benefit new investigative opportunities at the Institute, including the development of fixed and mobile autonomous



surface and underwater platforms for studies of coastal processes, studies of ocean noise and its impact on marine mammals, air-sea interaction, and characterization of electromagnetic fields in the coastal oceans.

Hydroid Inc. holds the exclusive license from the Woods Hole Oceanographic

Institution for the manufacture and further development of the REMUS Autonomous Underwater Vehicle (AUV) technology. In June 2008, Hydroid was acquired by Kongsberg Maritime, and now offers the REMUS and HUGIN family of autonomous vehicles that meet a full range of autonomous needs.

FEMME 2011

We have the pleasure to inform you that plans for the FEMME 2011 conference in Norway are rapidly developing. The multibeam user conference will take place in Trondheim in Week 14, 5-8 April 2011. Invitations will be sent out in September 2010.

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 experiences and ideas among the users coupled with the development of hydrographic communities around Kongsberg Maritime systems.

All participants to the last conference in Lisbon in 2009 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, please contact Nina Hovland by emailing subsea@kongsberg.com



FEMME 2011
Trondheim, Norway



The Challenges of Mapping Small Hydroelectric Dams



Small hydroelectric generation stations can provide local, environmentally friendly power wherever a suitable head of water exists. By the end of 2008 'small-hydro' was generating over 85 gigawatts of power from installations with capacities of a few hundred KW up to a few tens of MW (compared to the Hoover dam at over 2000MW). These installations often use existing dams or are developed alongside new dams whose primary purpose is river water-level control or irrigation. There are many thousands of these small dams worldwide (over 95,000 in the USA alone) and maintaining this infrastructure requires accurate mapping and monitoring. This presents some novel challenges to the hydrographic surveyor and this article describes the experiences of one company providing hydrographic surveys of dams in the Apennine mountains of Italy.

In 2007 Pangea Srl was contracted by Enel SPA to perform bathymetric and topographic surveys around hydroelectric plants located in the Lazio and Abruzzo regions of central Italy, including installations on rivers such as the Liri (province of Frosinone) and the Tiber (upstream of Rome).

The project covered many sites, with each individual survey project fairly

limited in area, including some dams only a few tens of meters across. The accuracy requirements for monitoring the sedimentation and shape of a dam floor are comparable to a ship navigation channel or dredge works. Knowledge of the water depth and total volume is required for dam maintenance and to maximize the renewable energy output. Detailed bathymetry allows improved irrigation planning and flood control, and survey images show the status of the dam infrastructure (such as the threshold and sluice gates). Accurate depth maps can also be critical to the safe operation of the hydroelectric facility and inform the risk assessment of the dam structure.

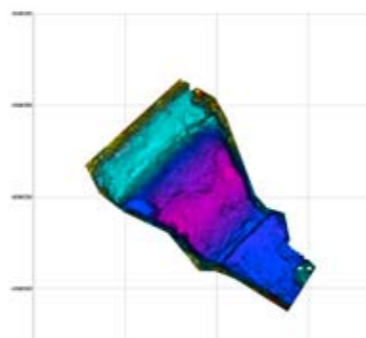
For this contract, Pangea chose two vessels: a 3.7m long aluminium boat and a 4.30m inflatable boat. The advantages of the aluminium boat is its lightness and strength; it is easily transportable, is straightforward to launch and robust around obstacles. However it was found to be fairly unstable especially when loaded with crew and numerous instruments that raised the centre of gravity. The advantage of the inflatable boat was the stability, allowing good mobility when the boat was fully loaded and operating. However it was heavier and less resilient, leading to transport difficulties where waterside access was limited and the greater likelihood of damage during launching or around obstacles.

The selection of a suitable integrated hydrographic package was key to successful completion of the contracts. The requirements were for wide swath bathymetric mapping to better than IHO special order specifications along with co-registered side-scan images for structure inspection, with reasonable productivity in water depths often less than 1m and data collection up to the waterline. The GeoSwath Plus (GS+) interferometric sonar from GeoAcoustics Ltd (a Kongsberg Maritime Company)

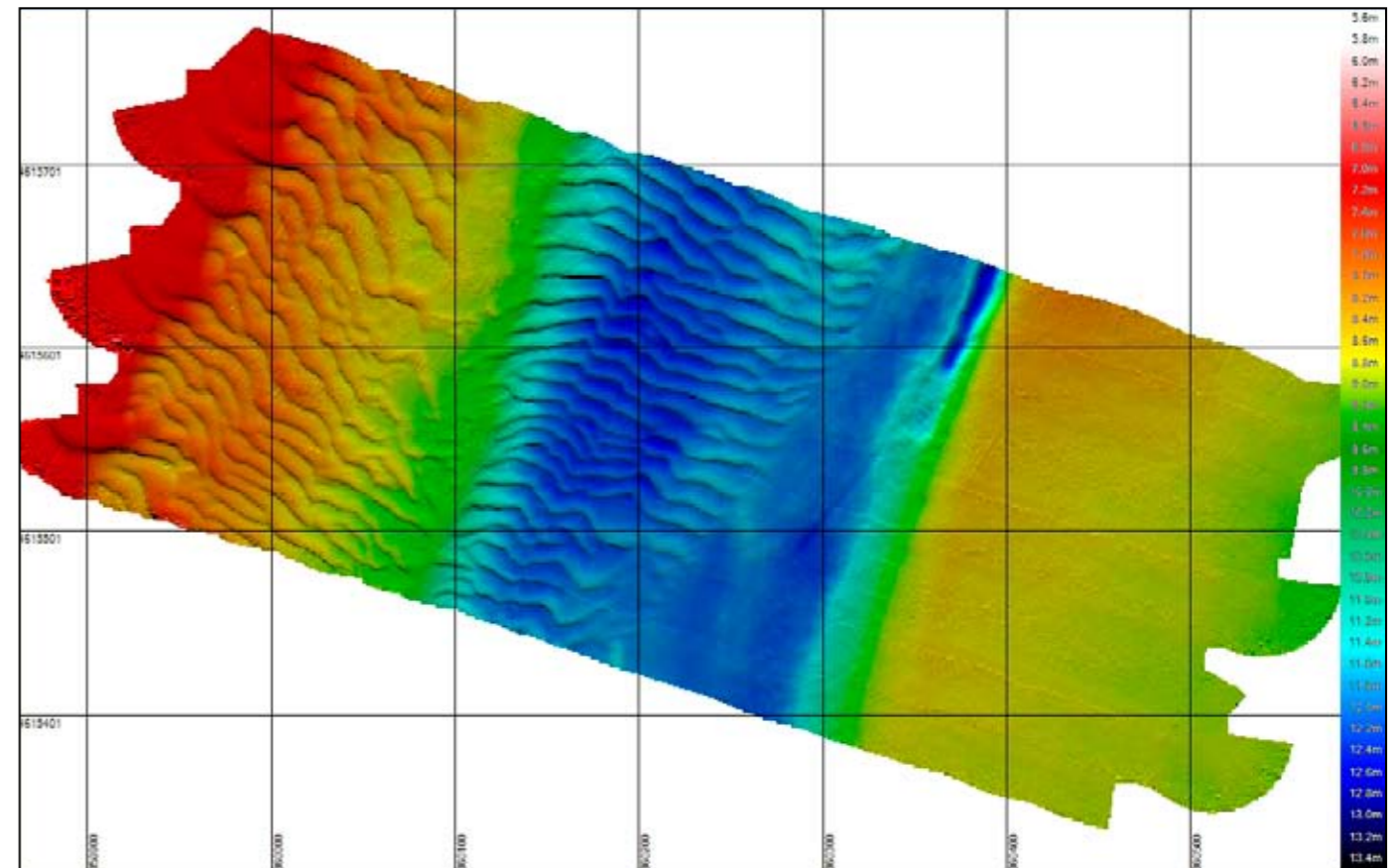
was chosen. One of the great advantages of the GS+ for this type of small boat work is its compactness. Most of the ancillary sensors are integrated into the transducer V-Plate which saves space, saves time during installation and allows pre-calibration of the offsets between the sensors. Another advantage of the GeoSwath is the robustness of the V-Plate and transducers; more than once an accidental grounding left the system undamaged. The equipment sometimes had to be hand carried over rough terrain to the waterside, which is only feasible for a compact system like the GeoSwath Plus.

The data deliverables were bathymetry and side scan data processed by GS+ as well as depth profiles exported directly from the real-time data collection windows. The real-time side scan data displays also proved to be very useful for data interpretation on-site. After carrying out successful survey seasons in 2008 and '09 Pangea can report that the compact GeoSwath Plus is ideal for this type of small boat hydrography in harsh environments.

This project has shown that modern highly accurate wide swath hydrographic survey equipment can be economically deployed for restricted area surveys, with rapid mobilisation and limited time on-site. Even the smallest hydropower dam can be fully mapped quickly and efficiently. This type of mapping capability can be used to increase the safety and efficient operation of small-hydro projects worldwide.



Results from GeoSwath Plus Trials on REMUS 100 AUV



Sandwave field'



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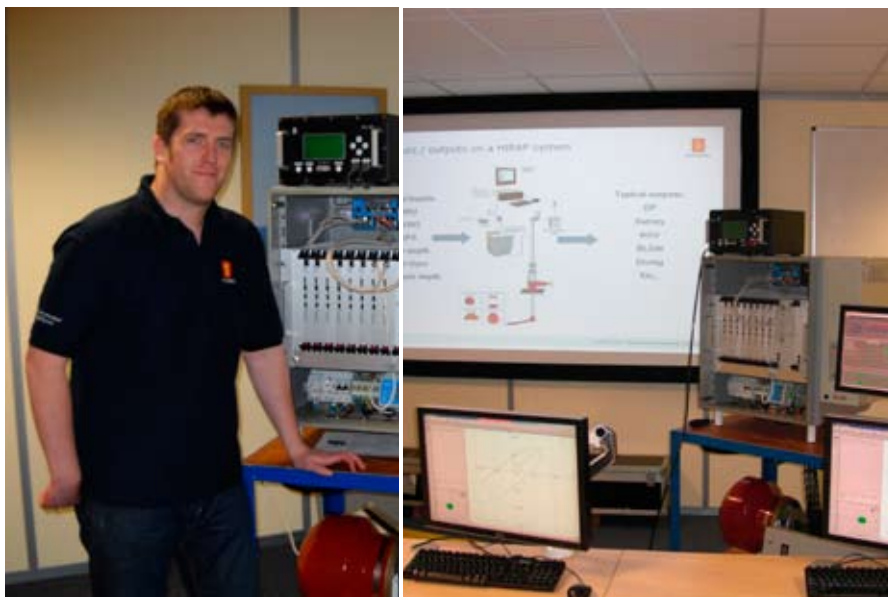
acterization of electromagnetic fields in the coastal oceans.

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The AUV at start of mission

Kongsberg Maritime Ltd appoints new HiPAP System Instructor



Kongsberg Maritime Ltd, Training & Marine Simulation Centre, Aberdeen has appointed Ed Fennell as Hydro-acoustic Systems Instructor. Ed will be delivering HiPAP system operator and technical training at Kongsberg's new Training Centre, based at Westhill, Aberdeen.

The company now offers a new 3 day HiPAP technical course, 2 day LBL Operators course and 2 day HiPAP Portable 350 system training, in addition to the standard 2 day Basic Operator (APOS) course.

HiPAP Technical Training Course- 3 days

Provide participants with an understanding of HiPAP® 350 and HiPAP® 500 principles and how the system is operated. Participants will also learn about the standard system units and maintenance of the different units.

- System background information
- Basic positioning on demo computers
- Communication
- System unit descriptions

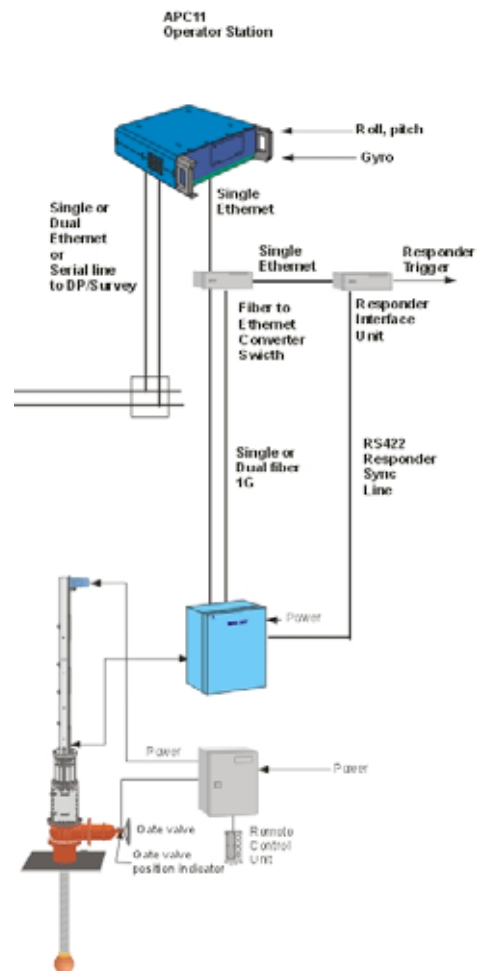
- Operator station
- Transceiver
- Hull unit
- Transducer
- Transponders
- System configuration
- Calibration
- Maintenance & fault finding
- Use of standard documentation

Benefits to customer

This course gives the participant unique access to the latest HiPAP systems & operating software.

Courses use custom designed training consoles & HiPAP system aids which:

- Maximise HiPAP system performance
- Develop operator skills and confidence
- Ensure correct system configuration
- Assist identification and correction of system errors
- Instruct on system checks and basic faultfinding
- Prevent accidents and system failure due to operator error or mistake



- Reduce downtime and disruption to the project schedule
- Enable better pre-operational planning
- Motivate and help the retention of employees
- Enhance company HSE profile and operational reputation
- Reduce overall operational risk
- Reduce operational costs
- Complement internal training regimes

For more details contact Kongsberg Maritime Ltd by emailing km.training.aberdeen@kongsberg.com or telephone +44 (0) 1224 671670.

