

Modernization of hydrological measurement stations in Germany

End of last year our German representative Nautilus Marine Service GmbH in Germany (NMS) was awarded a contract by the German Waterway and Shipping Administration (WSV) to modernize their network of hydrological monitoring stations along the German coast. The upgrade comprises 7 data buoys and 10 river pile stations along the river Elbe estuary as well as the delivery of up to 130 SEAGUARD®s provided by Aanderaa Data Instruments (AADI) for different waterways and shipping offices along the Baltic Sea, the North Sea and the rivers Weser and Ems estuaries.

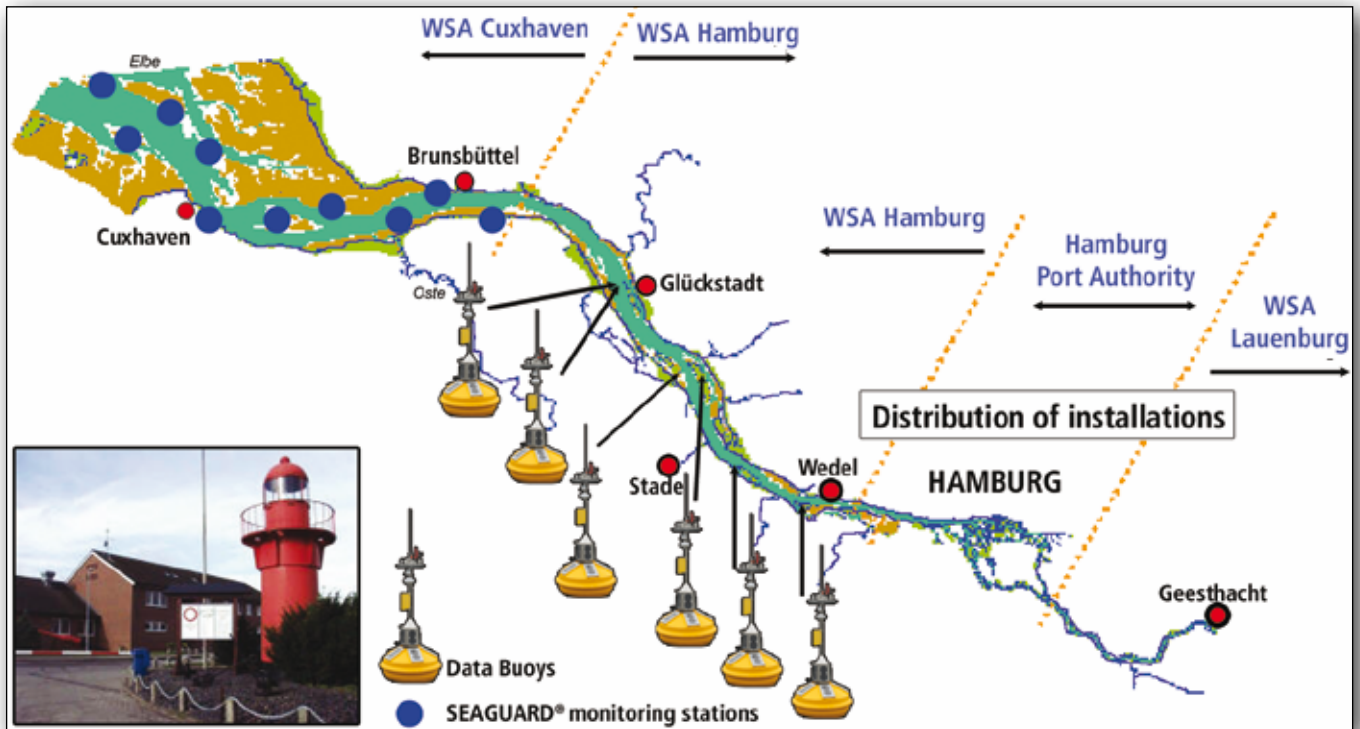


Fig. 1: Monitoring stations in river Elbe

The order was received in the face of strong competition and after a long procurement period and qualification process almost one year ahead of the public invitation to tender. Notwithstanding, the best commercial offer was placed by NMS and AADI. A key success factor was the excellent cooperation between NMS and AADI during the negotiation phase and good reputation of NMS and AADI within the WSV as a long-standing representative for AADI.

Nautilus Marine Service supplies oceanographic and environmental equipment as well as marine safety and rescue gear to the research, survey and monitoring markets. Nautilus Marine Service has also gained international reputation by its VITROVEX® high quality glass flotation and instrument housings along with associated services and accessories. Glass flotation and instrument housings can be provided in different shapes, sizes and pressure ratings up to full ocean depth.

In Germany they represent the interests of some of the world's leading manufacturers of marine technologies by providing sales and technical consultation advisory activities for their respective product lines. They can provide personnel in support of site installations, commissioning, product training and troubleshooting requirements.

In view of the modernization of the hydrological measurement stations along the river Elbe the combination of AADI products and services and the expertise of NMS for the design and installation of river moorings is a perfect match.

*At OI 2010 London
we will show:
BIAC Buoy
Data Logger SSH,
SEAGUARD® String
with Sensor Fixture,
New Oxygen Optode
AIS Drift/MOB Buoy*

Cont... Modernization of hydrological measurement stations in Germany



Fig. 2: examples of VITROVEX products (polished camera housing, flotation sphere, instrument sphere)

The data buoys provided by AADI are fitted with a SEAGUARD® RCM including a series of sensors just below the buoy in order to monitor water flow (speed, direction), temperature, pressure, salinity, turbidity and oxygen. A second, identical configured SEAGUARD® RCM is installed at approximately one meter above the river bed in a bottom frame linked with the data buoy by a special data and lifting cable. Data from both SEAGUARD®s are stored and can be transmitted in real-time from the buoy into the network of the WSV. The setup for the pile structure stations is similar. Here the same parameters as for the buoys will be measured approximately 2 meters and 4 meters above the river bed and transmitted in real-time as well.

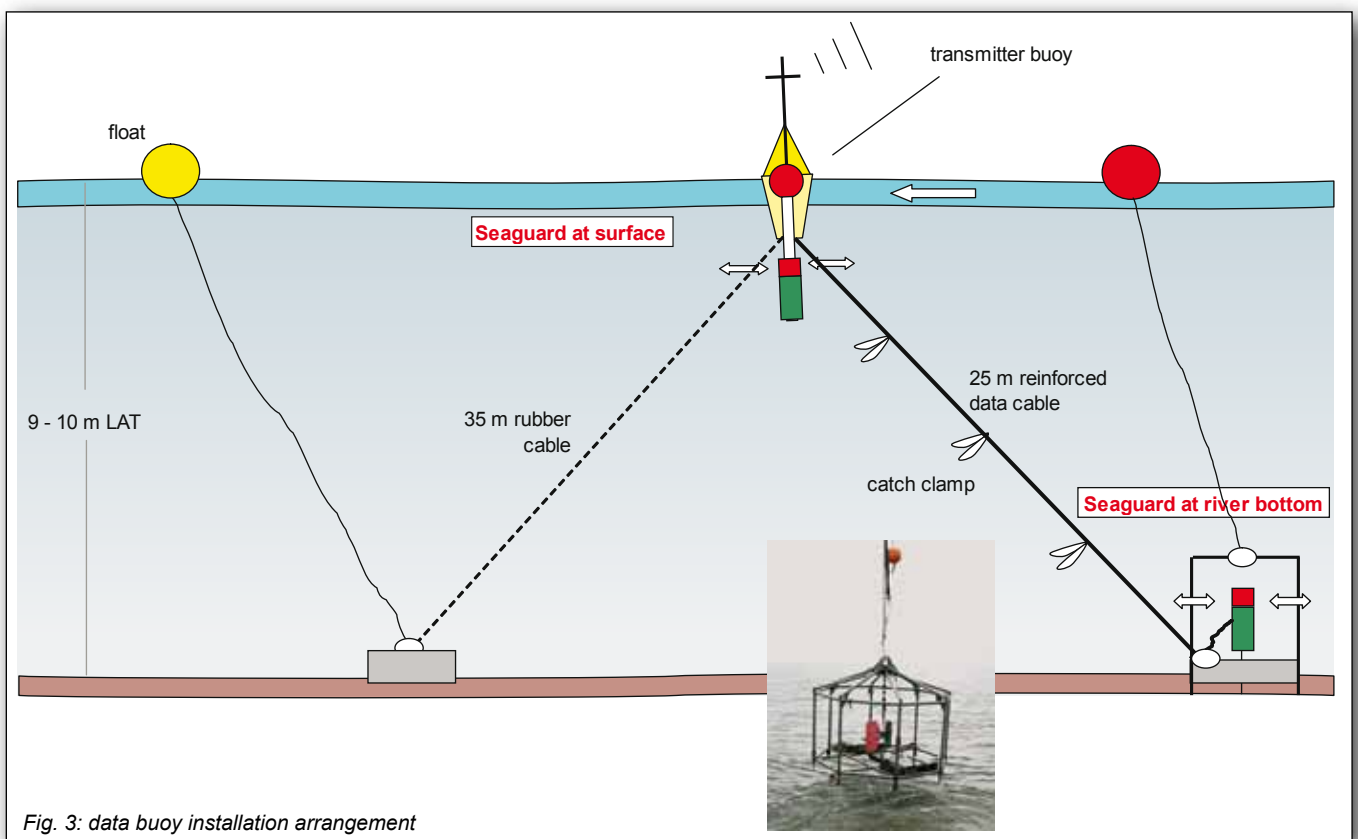


Fig. 3: data buoy installation arrangement

In addition to the acquisition of hydrological standard parameters along the river Elbe to fulfil their duties in terms of administration and the provision of safety for the federal waterway Elbe, and adjacent territorial waters for the WSV, the scientific focus has been put back on the basic transport processes of sediments, suspended material and the morphological behavior of the bottom zone of the tidal river Elbe and their natural and anthropogenic influences.

Cont... Modernization of hydrological measurement stations in Germany

Observed increases in dredging amounts at the Elbe estuary over the last years due to greatly increased dredging activities of the Hamburg Port Authority and an upstream shift in dredging areas of the WSV towards Hamburg during the same time period require more dredging capacity. Subsequently more ecological tests have to be carried out to give real-time input to live data models predicting the transport of sediments into the shipping channels.

Determination of true sediment loads is very important for the WSV who rely on exact measurements of turbidity. Well in advance of this project for the river Elbe, NMS and AADI studied ways to improve the calibration process of turbidity sensors in order to supply our customers with accurate and reliable instruments. Thus, the calibration coefficients for each turbidity sensor delivered for this WSV project are calibrated by means of 10 point calibration with a final check at 3 points.

As a result, all turbidity sensors can be interchanged; measurements are comparable and are of course within the required specification.

These technical advantages and elegant design concept have led to a winning combination. NMS and AADI are looking forward to strengthening our relationship with the WSV in Germany by successfully completing this project by the end of summer this year.

Loadtronic 3e for excavators will be launched at Bauma 2010



AADI has produced weighing systems for wheel loaders since 1991. The system is the preferred weighing system for several of the leading manufacturers of wheel loaders worldwide.

Our company is now proud to announce that we are launching the Loadtronic 3e scale for excavators at the Bauma exhibition in Munich. Loadtronic 3e has breakthrough capabilities when it comes to dynamic measurements and will therefore maintain the excavator's productivity. Typical examples for applications are gravel pit loading, construction work, crusher feeding, loading and material handling.

The Project Manager Mrs. Hilde Furset said to Sensor and Systems; "One of the goals when developing the new system for excavators is to still lead the race when it comes to dynamic weighing. This will maintain productivity, and most importantly, the customer will have the fastest return on their investments by choosing Loadtronic 3e".

We have installed beta systems in Europe and are receiving great acceptance for the excavator weighing system. Beta testing will continue until product release. Modern excavators are designed for increased productivity under all conditions; it is important not to sacrifice these benefits after installing a weighing system. The system is of course also very operator friendly, easy to use and easy to install.

Loadtronic 3e will be shown at our Booth 124C in Hall C2 at Bauma 2010. We are looking forward to be seeing you in Munich,

"one of the goals is to lead the race when it comes to dynamic weighing"

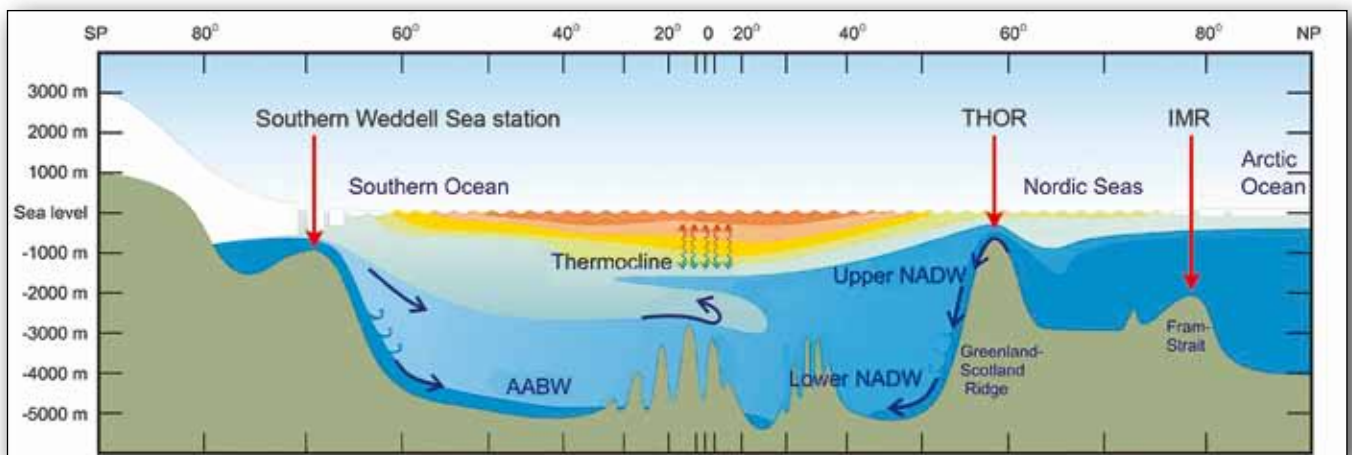
Study of the Bipolar Atlantic Thermohaline Circulation (BIAC)

One year ago the first advanced monitoring station was installed in the Weddell Sea in Antarctica. The station will make long-term observation of climate changes in one of the most important ocean currents in the world.



© K.L.Daae

Researchers at the Bjerknes Centre for Climate Research and engineers at AADI have developed the monitoring station in connection with BIAC – one of the largest projects in the International Polar Year (IPY). The monitoring station is placed on the edge of the continental shelf at approximately 500 meters and is designed to monitor the dense water formation processes. The most important parameters are current speed and direction, temperature and salinity.



Cont...Study of the Bipolar Atlantic Thermohaline Circulation (BIAC)

The monitoring station is equipped with batteries sufficient for 5+ years operation. Data are stored onboard as well as being transmitted acoustically to ships passing by when ice conditions permit (January and February).



THOR and IMR stations

The role of the Thermohaline Circulation (THC) as a driving force of the ocean circulation, and therefore the global climate, is fully acknowledged.

The majority of the deep- and bottom-water production takes place in the Atlantic sector. The densest water ventilating the world ocean abyss is produced in the northern and southern extremes.

When dense water cascades down to great depths, it mixes with surrounding water masses to produce the various brands (types) of bottom water.

The replacement of the surrounding water is believed to be an important driving force for the global THC.

The BIAC concentrate on all aspects related to bottom water formation and THC in the past, present and future. Modeling and remote sensing are important tools, as well as in-situ measurements that will require adequately equipped icebreakers and moorings.

The next step in the study of the THC is called THOR (Thermohaline Overturning at Risk). THOR will develop and operate an optimal ocean observing system for the North Atlantic component of the THC. An observing system for measuring the THC related mass, heat and salt fluxes will be established, consisting of self-contained moorings, ship- and space borne measurements and autonomous instrumentation. These time series will be supplemented and extended in time with flux estimates from models with data assimilation.

THOR will utilize the next generation of the monitoring station, designed to be able to monitor close to the seabed as well as to withstand high currents.

Basically the station has the same features as the station that was deployed in the Weddell Sea, but is tailored to be able to monitor the overflow across the Greenland Scotland Ridge as well as in the Arctic (see previous page). Two identical systems are being built in cooperation between the Bjerknes Centre and AADI for the purpose.

These stations are also fitted with batteries for 5+ years of operation, acoustic modem, RDCP 600 current profiler with sensors for measuring temperature and salinity, acoustic release and beacon for localization in connection with retrieval.

The stations have options for installing other sensors and instruments as well as extended battery capacity.

Norwegian Clean Seas Association for Operating Companies (NOFO) standardize on the AADI Doppler Log



The display

The objective of the Doppler Log system is to monitor the true speed of the oil boom through water during recovery operations.

This speed is different from the speed that is shown on the ship's speed log because of the influence of wind on surface current.

The information is transmitted to the bridge of the ship that is in charge of the recovery operation.

Based on this information the ship's pilot is better able to control the speed of the oil boom through water and thereby avoid oil escaping from the recovery operation.

Today's conventional oil booms have a speed limit of 0.7 knots before they start to lose oil.

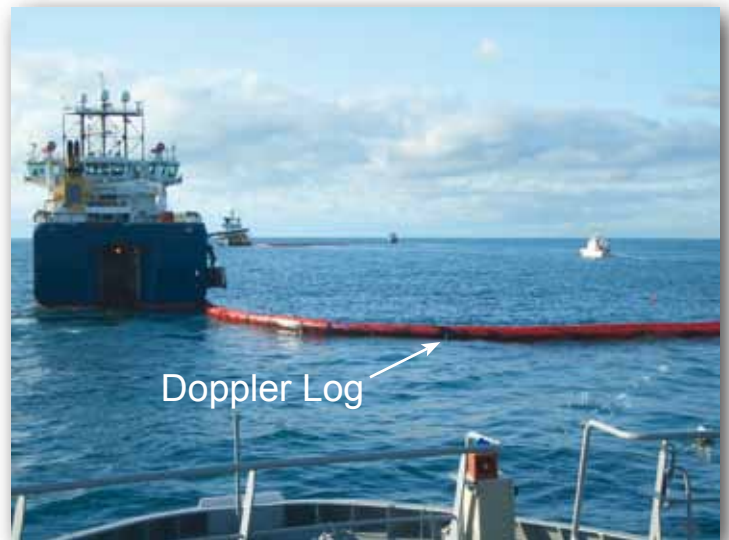
AADI has just signed a contract with NOFO where a complete oil boom formation system will be developed. Data on oil drift direction and speed will be combined with real-time plot of oil boom formation.

The system will be based on GPS/AIS information in order to be able to better control the shape of the oil boom, and consequently make oil recovery even more efficient.

NOFO is a leading oil spill responder owned by the oil companies operating in the North Sea. Their focus is on oil spill preparedness and technology development.

All areas where oil spill may occur, whether it is from oil operations or from ship traffic, are in NOFO's focus. Therefore, mechanical recovery as well as dispersant application, remote sensing and coastal and shoreline oil spill prevention and recovery is within their field of responsibility when it comes to technology development.

We are proud to announce that AADI was chosen by NOFO (based on an initiative from the Norwegian Coastal Authorities) to develop a system – a "Doppler Log" - that improves the efficiency of oil spill recovery from the sea.



Deployment

Notes from 15 years of marine monitoring in the Øresund Strait

By: Anders Tengberg, AADI, Peter Göransson and Magnus Karlsson, Municipality of Helsingborg

The Swedish city Helsingborg is located by the Øresund Strait (SW Sweden). For 15 years the municipality has carried out the most elaborate marine monitoring program in Sweden which includes: bottom fauna sampling (two times per year), sediment pollutants (organic and inorganic), pollutants in mussels and run-off from land.

Less eutrophication: In general, conditions have improved in the area. Excess of nutrient coming from human activities has decreased because water from large point sources is better purified and because efforts have been made to reduce nutrient leakage from agriculture.

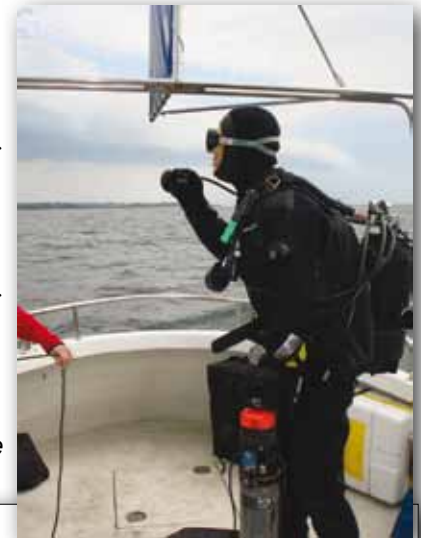
Toxic emission stopped: Also regional industry has improved the cleaning of process water which has led to less contaminant (organic and inorganic) in the region. An important result of the program is that a large continuous point source of organic contaminant from a chemical plant was discovered and stopped. At the factory they were not aware that this type of organic contaminant was formed as a production by-product.

Impoverishment of bottom fauna: In spite of a cleaner marine environment there has been a significant impoverishment (less biomass, less individuals and less species) of bottom fauna at basically all of the sampled stations. It is not only locally that decreasing bottom fauna trends have been registered, similar results are also reported from nearby regions like the Kattegat. It is not yet clear what has been causing the decrease. One theory is that there could be elimination due to periods of low oxygen which give a “memory effect” that makes it more and more difficult for the ecosystem to fully recover.

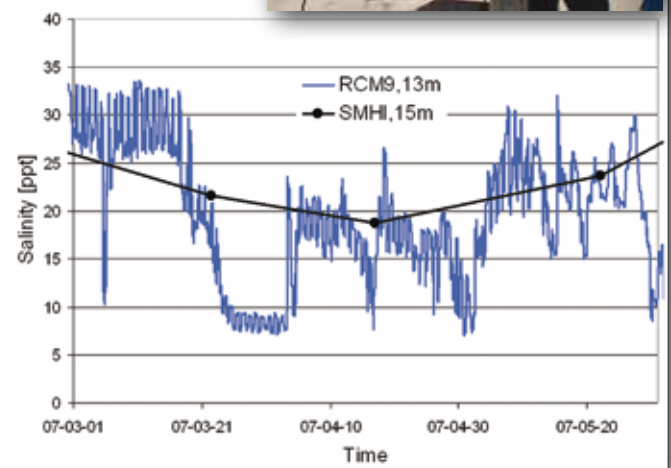
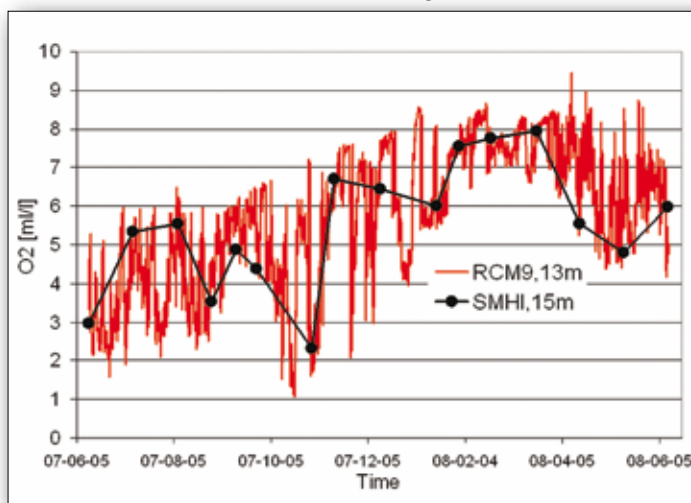
New knowledge from frequent measurements:

Starting in 2005 an RCM 9 (see picture) equipped with sensors for currents, temperature, salinity and oxygen is measuring at hourly intervals in the bottom water (12 m depth) at one of the stations. For decades the Swedish Meteorological and Hydrological Institute (SMHI) monitored the water column at a nearby station about every month. A comparison between monthly sampling and hourly measurements is thus possible and demonstrate that the value of data from decades of monthly sampling is limited (see figures below) since changes occur on much shorter time scales (hours-days). During 2010 the RCM 9 will be complemented with a cable connected optode to measure bottom oxygen gradients and a Chlorophyll sensor. The reason for this is to get a better estimate of the importance of benthic primary production which has been observed to boost bottom water oxygen concentrations during most of the spring and summer months.

It is through long-term environmental monitoring programs like this that combine sampling, high frequency measurements and modeling that a deeper knowledge about changes in the marine environment can be obtained. The municipality of Helsingborg is building up knowledge about their local environment which is of benefit for the health and life of people and animals in this area.



A diver is ready to redeploy an RCM 9 after the regular 6 month service and data download



Upcoming events - Shows we will exhibit at in 2010:

ASLO Joint AGU/ASLO Science Meeting	Portland, OR	February 22-26	Oceanography
Pittcon 2010	Orlando FL	March 1-4	Laboratory science
Oceanology International 2010	London	March 9-11	Oceanography/ Environmental
Intertraffic	Amsterdam	March 23-26	Road and Traffic
Bauma 2010	Munich	April 19-25	Construction/ Machine excavation
Spill Con 2010	Melbourne, Australia	April 12-16	Oil Spill Response
International Harbour Masters Conference	Perth, Australia	April 19-23	Marine Transport/ Oil Spill Response
Shephard SAR Search & Rescue	Aberdeen, Scotland	April 21-22	Marine Transport/ Sea safety
Offshore Tcehnology Conference (OTC)	Houston, TX	May 3-6	Oil & Gas
2010 Joint Assembly	Igassu Falls, Brazil	Aug 8-13	Oceanography
Oceans 2010 MTS/IEEE	Seattle, WA	Sept 20-24	Oceanography
AGU 2010 Fall Meeting	San Fran, CA	Dec 13-17	Oceanography

Oxygen Sensor 4500 for the process control market



AADI has over the years proven its oxygen sensor series as the superior oxygen sensor. Its long-term stability and accuracy have been verified in a large number of scientific papers, written by the leading scientific communities around the world. Due to this fact, it is now standard in most scientific communities.

Based on this experience, AADI has widened its horizon with an industrialized version of the scientific oxygen sensor. With an industrialized design, this sensor is aimed at the process control market.

- Process industry controllers
- Water and waste water systems
- Ships
- Ballast water
- Aquaculture

The new sensor is called Oxygen Sensor 4500 and is equipped with 0 - 5V, 0 - 10V, 4 - 20mA or RS-232 output to cover the different industry standards.

This sensor has the same stability and accuracy as the scientific sensors because it uses the same measuring principal. It has the following advantages:

- Output parameter: Oxygen (% , μ M and mg/l) and temperature ($^{\circ}$ C)
- Not stirring sensitive (it consumes no oxygen)
- Fouling problems reduced to a minimum
- Measures absolute oxygen concentrations without repeated calibrations
- Long-term stability; 3 to 5 years
- Not affected by pressure
- Faster response time
- Operating depth is maximum 50 meter

The sensor provided with a preselection of cable lengths, 10, 20 or 50 meters, and with a preconfigured plug.



AIS Marking and Tracking Buoy

The AIS Drifter Buoy is designed to mark and track oil spill and other floating objects. drift, speed and direction is displayed on the electronic chart system on board ship or marker buoy is designed for easy deployment in an event. Its robust design allows for height, i.e. helicopter or platforms. The buoy is to be dropped around a detected oil spill track the drift of the spill.

The buoy can also be fixed to other objects for temporary marking. When the buoy is deployed it provides position, drift speed and direction on the chart system. No special programming or receiving infrastructure is needed. For larger spills several buoys can be used at the same time to mark the spill area. The AIS Marking and Tracking Buoy is developed based on specifications according to the requirements from The Norwegian Clean Sea Association for Operating Companies (NOFO).

Information from the buoy is transferred by AIS and displayed on the electronic chart system onboard any vessel that has up-to-date ECDIS software according to IMO standards. The buoy is proven after extensive tests in the North Sea as well as in the Barents Sea. In the Barents Sea the buoy showed excellent performance and the data were picked up well outside the specified range in wave heights of 10 meters.



The buoy position, on-shore. The AIS launch from 50 meters and will mark and

"We have had a great SEAGUARD year in 2009", says Ms. Ling



Seismic Marine Technology Ltd. was founded in 1993 by Ms. Ling Huang. The company employs 7 people today, and is situated in Beijing China. The ownership is today shared with Ms. Weiyuan Xu.

Specialized in oceanographic and geophysical markets Seismic Marine Technology has grown to be one of the main suppliers of scientific equipment to Chinese oceanographic customers, maintaining distribution for manufacturers like AADI (Aanderaa brand), Norway, for SEAGUARD® and RDCP acoustic current meters, with Smart Sensors; Ixsea (France) for acoustic releases and positioning system, Klein (USA) side scan sonars, Ocean Marine (USA) for Imaging sonar, Nautilus Marine GmbH (Germany) submersible floats, ISE (Canada) for ROV's, and more.

Ms Xu and Ms. Huang have ended a fantastic year selling SEAGUARD® current meters to Chinese customers along the whole south east coast. Chinese scientists and researchers have shown loyalty to the Aanderaa current meters for many years, because of the extreme quality and high data return. The large number of SEAGUARD®s has been supplied to more than 20 scientific and research institutes, upgrading parts or all their instrument pools to the ultra modern technology that the SEAGUARD® offers. An increased sales activity with the new SEAGUARD®, together with extended sales support from AADI, has given results beyond expectations. The activities also resulted in a great increase in deliveries of the RDCP 600 (acoustic current profiler) and stand-alone Smart Sensors.

Found on the beach - treasure trove from Cascais, Portugal

In November 2009 we received a message from one of our well known Norwegian customers, SINTEF, that one of their employees had been on holiday in Portugal and found one of our Data Storage Units on a beach in Cascais, just outside Lisbon.

Even though the serial number was illegible, part of the production date could still be read. The unit was still functioning and data was downloaded by SINTEF and mailed to Aanderaa Data Instruments.

Out of the production date and the type of data and the location our Service dept. sent a request to Instituto Hidrografico (IH) in Portugal and the device found is very likely from a TR 7 temperature string.

IH had moored a thermistor string off the northeast of the Lisbon area in December 2008. Later, this mooring was lost, presumably on account of rough winter seas or fishing activity.

We at AADI are very pleased to learn that our equipment is so well known that it is recognized and picked up even if found among beach flotsam and are of course proud of the fact that the valuable data was downloaded without problems.



A new crane OEM has been successfully trained in MIPEG products



To comply with the latest customer requirements crane manufacturers outside the traditional North Sea area are seeing an increasing demand for the integration of Gross Overload Protection Systems.

The MIPEG combined Safe Load Indicator with Rope Speed Indicator has proven that it fulfils this safety requirement which includes MOPS and AOPS functions.

Favelle Favco, one of Asia's preeminent (significant) crane manufacturer, has recently been trained and has successfully commissioned cranes which include these features.

In addition, demand is increasing for the Mipeg Slew Operation Limiting system. This unit offers a 3D "limiting system" giving better utilization of the limited deck area on platforms, rigs and other vessels without compromising safety.

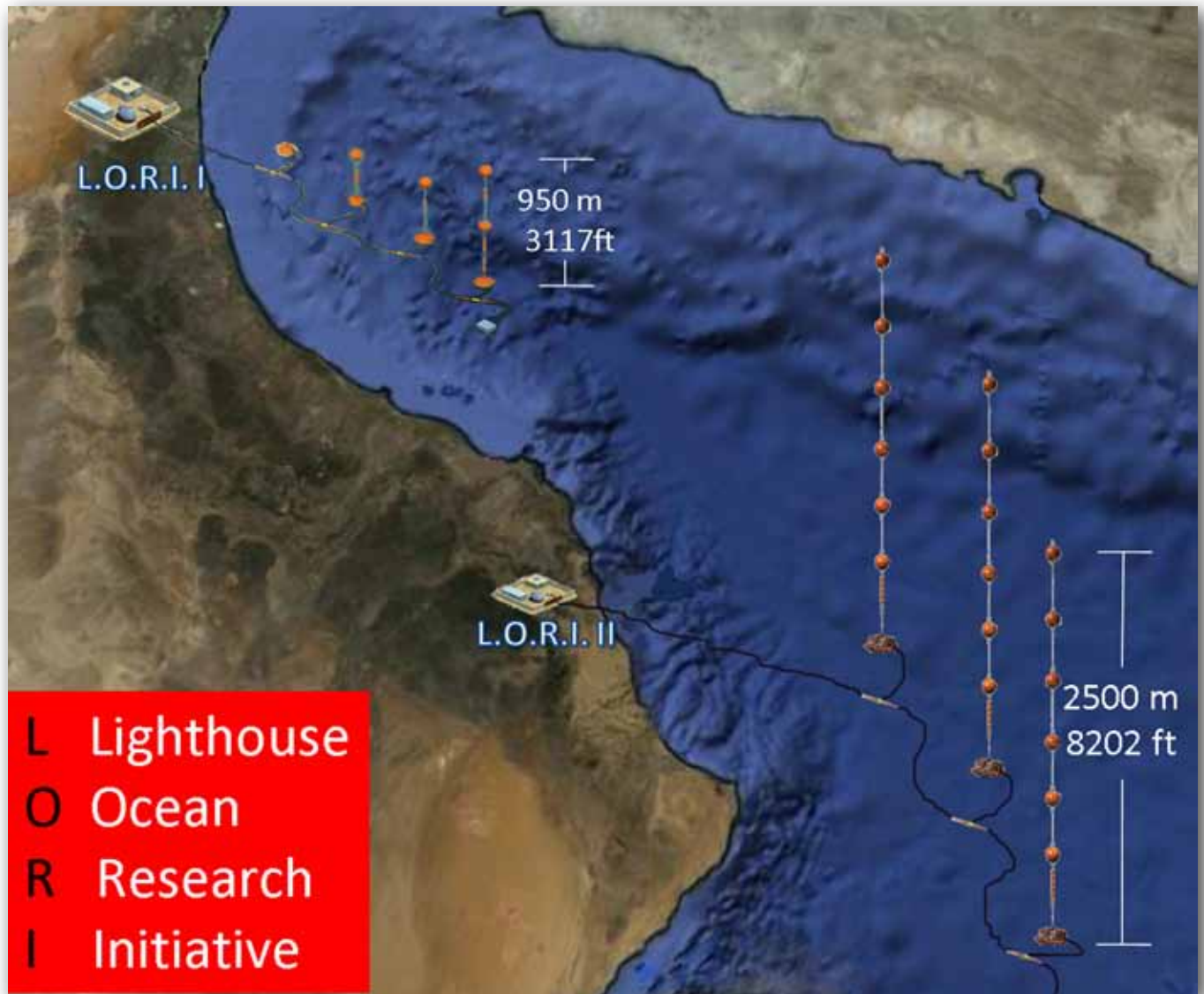
Favelle Favco, one of Asia's preeminent crane manufacturers, takes the next step with MIPEG products

Lighthouse R&D on Schedule to Start Operations On Deepwater Seabed Observatory

Lighthouse R & D Enterprises Inc. (Houston, Texas) deepwater cabled seabed observatories have doubled their depth rating. A 4000 meter LORI II (Lighthouse Ocean Research Initiative) system went active in December 2009 and fully operational on January 2, 2010. LORI II is comprised of 21 fully sensed Aanderaa Data Instruments (Bergen, Norway) RDCP 600 Recording Doppler Current Profilers arrayed throughout the water column from depths of 500 to 3000 meters. Three 75-kilohertz Teledyne RD Instruments (Poway, California) Workhorse Doppler Current Profilers are also utilized as the LORI II system begins the real-time characterization of the marine environment around Cape Ras Al Hadd Oman according to a statement from Lighthouse R & D Enterprises, Inc.

“A fiber-optic cable acts as the backbone to the system,” stated Ken du Vall, President and Chief Operating Officer (COO) of Lighthouse R & D Enterprises, Inc. According to Lighthouse, the armored cable runs from an unmanned and automated shore facility nearly 350 kilometers to power the 24 sensors and provide virtually unlimited bandwidth for the return of sensor data from the three deepwater arrays. The 2000-meter prototype LORI I began in 2005 with installation of four arrays utilizing eight Aanderaa RDCP 600’s at various depths down to 1000 meters.

“This endeavor marks the culmination of three years of dedicated effort by Lighthouse R & D Enterprises with selected vendors to design, build, test, install and operate the most advanced monitoring system for marine research,” said Ken du Vall. For more information, visit www.lighthousehouston.com

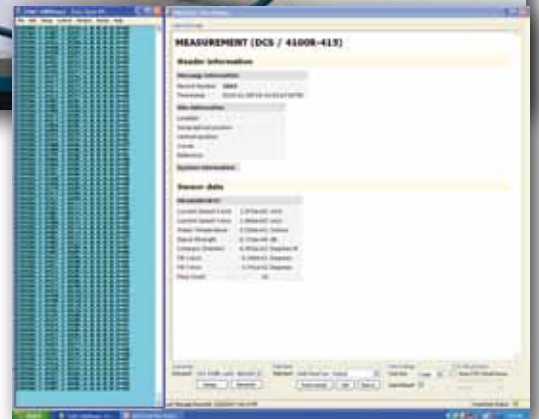


Integrated Ocean Current and Water Temperature monitoring system for Dynamically Positioned (DP) Oil Drilling Rig in Brazil from AADI Inc.



Aanderaa Data Instruments, Inc. delivers to Brazil an integrated Ocean Current and Water Temperature monitoring system for a Dynamically Positioned (DP) Oil Drilling Rig.

In the fall 2009 our USA office was asked to come up with a solution to provide real-time input for Ocean Currents to the oil rigs DP navigation and propulsion controls. The DP's system data format needed to be NMEA 0183 and currents needed to be relative to the rig coordinates. AADI's solution utilizes our DCS 4100R Doppler Current Sensor, sensor cable, an NMEA Protocol Converter, industrial 19 inch color LCD touch screen PC with keyboard, and AADI's Real-Time Data Collector software.



The hardware needed is commercially off-the-shelf; the software is also a commercial solution, this provides the operations personnel with simplified and fully automated data retrieval, data storage in a SQL database along with capacity for future expansion of the rig monitoring network. Remote users can be granted access to the data via the internet and still remain secure onboard. Other capabilities include adding high data rate applications like Ocean Wave measurements, vessel draft, and a full meteorological sensor suite. These systems are fit for Oil and Gas platform Helideck monitoring, Dredging and Hydrographic Survey, Vessel Traffic Monitoring Information Systems, Coastal Storm and other environmental monitoring applications.

For additional information contact infoUSA@aadi.no/