

INMARTECH 2006

International Marine Technician Symposium

Proceedings



October 17 - 19, 2006
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts USA

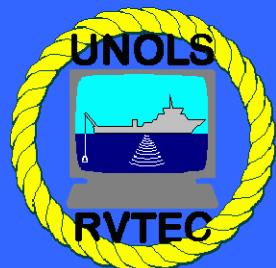


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Cover photo credits - clockwise from top left corner: AUV Vehicle *ABE* – Dan Fornari (WHOI), R/V *Kilo Moana* Lab - Bruce Applegate (U. Hawaii), Mooring deployment – SW06 Deployment Team (WHOI), OBS deployment - David Dubois (WHOI), and Trawl Net - Moss Landing Marine Laboratories Point Sur Website
<<http://marineops.mml.calstate.edu/ptsurnets.html>>.

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International Marine Technician (INMARTECH) Symposium 2006 PROCEEDINGS

Proceedings Introduction

The 2006 International Marine Technician (INMARTECH) Symposium was hosted by Woods Hole Oceanographic Institution, in Woods Hole, Massachusetts, USA on October 17-19, 2006. The INMARTECH 2006 program agenda is included as [Appendix A](#) of these Proceedings. The program includes a full listing of all session presentations, presenters, moderators, posters, and facility tour descriptions. The Symposium was attended by over 120 participants representing about a dozen different countries and over 50 different organizations. An attendance list is included as [Appendix B](#). An INMARTECH 2006 website was created prior to the symposium to provide information prior to the meeting as well as to post presentations that were made throughout the symposium. The site can be viewed on the University-National Oceanographic Laboratory (UNOLS) website at <<http://www.unols.org/meetings/2006/200610inm/inmartech06.html>>.

INMARTECH 2006 consisted of nine technical sessions:

- Ships, Shipboard Handling Systems, and Over-the-Side Safety Issues
- Innovations in Vehicle Systems
- Equipment and Procedure Innovations
- Underway Data Collection and Archiving Standards
- Long-term Instrumentation Deployments - Challenges, Issues, and Solutions
- Lessons Learned - Equipment Tricks, Techniques, and Cool Products
- International Shipping - Dealing with New Regulations (Chemicals, Samples, Instrumentation)
- Ship to Ship/Ship to Shore Wireless Access Protocol (SWAP)
- Shipboard Networks and Network Security

Each technical session was moderated by two symposium participants. The moderators introduced each presentation. At the close of each symposium day, the moderators provided a summary of their presentations during a wrap-up session. INMARTECH 2006 also included WHOI facility tours and poster presentations. Local area vendors were welcome to provide open-house events at their facilities following the INMARTECH Symposium. A listing of these vendor events is included as [Appendix C](#).

This Proceeding document is a compilation of all of the presentations that were made during the symposium. The document is organized by session in the order that presentations were made. A brief summary or abstract of each presentation is provided along with a photograph (when available) of the presenter(s).

[Appendix D](#) contains a list of abstracts for each presentation or poster. The list is in alphabetical order by author's last name.

Steering Committee:

The INMARTECH 2006 steering committee membership included:

- Barrie Walden, Woods Hole Oceanographic Institution
- Faith Hampshire, Woods Hole Oceanographic Institution
- Mary-Lynn Dickson, University of Rhode Island
- Erik Zettler, Sea Education Association
- Annette DeSilva, University-National Oceanographic Laboratory System

Contributing members from the International community included:

- Marieke Rietveld (Royal Netherlands Institute for Sea Research (NIOZ))
- Ed Cooper (NERC – National Oceanography Centre, Southampton)

INMARTECH 2006 - Sessions, Papers, and Posters: The following is a compilation of the Presentations provided during INMARTECH 2006

Day 1: Tuesday, October 17, 2006

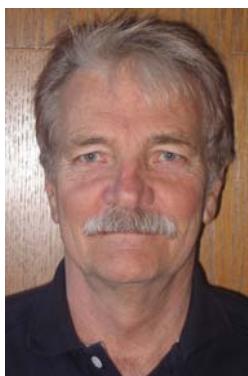
The INMARTECH 2006 Symposium was hosted by Woods Hole Oceanographic Institution (WHOI) and was held in Woods Hole, Massachusetts, USA on October 17, 18, and 19, 2006. Sessions were held in either the Lillie Auditorium of the Marine Biological Laboratory or the Redfield Auditorium of WHOI.

INMARTECH 2006 Welcome and Plenary Session (Lillie Auditorium)

Welcome Address from Woods Hole Oceanographic Institution (WHOI) – Dr. Robert Detrick, Vice President for Marine Facilities & Operations at WHOI, provided the opening address for the INMARTECH 2006 Symposium. He welcomed the meeting participants to Woods Hole and briefly reported on the facilities and research activities at WHOI.



Opening Remarks about INMARTECH 2006 – Barrie Walden (WHOI) welcomed the meeting participants. He provided information about the meeting format and associated logistics. The meeting would follow the printed Program Agenda ([Appendix A](#)). Session locations are identified in the program. Each technical session would be moderated by two individuals. These individuals would provide a summary of the session during a wrap-up session at the close of each day.



Session I: Ships, Shipboard Handling Systems, and Over-the-Side Safety

Issues – Session I was held in Lillie Auditorium. Moderators for this session were:

Bill Martin (University of Washington) 	Matthew Hawkins (University of Delaware) 
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The following presentations were made during Session I:

- **Wire Testing** – Rick Trask (Woods Hole Oceanographic Institution)



Presentation: <[SessionI\SessionI_Trask.pdf](#)>



- **Survey on Wire Maintenance and Testing** – David Fisichella (WHOI)

ABSTRACT – Many research vessels measure sea surface parameters at a considerable distance from the sample water's entrance into the piping system. For many parameters this is not an issue but temperature can be a problem and therefore measurement probes are frequently installed in the piping system as close to the inlet as possible. Unfortunately, there are cases where this is not practical. As an alternative, WHOI is experimenting with the Seabird SBE48, which is a measurement device that magnetically attaches to the ship's hull and uses the hull temperature as an indicator of sea temperature.

Presentation: <[SessionI\SessionI_Fisichella.pdf](#)>

- **Shipboard Handling Systems** - Matthew Hawkins (University of Delaware)



Presentation: <[SessionI\SessionI_Hawkins.pdf](#)>

Movies: As part of Matt's presentation he provided a few movie clips:

- <Seas.mov> (35 Mb)
- <Docking.mov> (76 Mb)
- <Winches.mov> (202 Mb)

These movie clips are available on the UNOLS website at:
<<http://www.unols.org/publications/reports/lhsworkshop/index.html>>.

- **Dynamic and Drag Induced Loads on Marine Cranes** – Steve Etchemendy (Monterey Bay Aquarium Research Institute)



ABSTRACT: Launching heavy packages at sea causes dynamic g-force loads that are often not considered in the safe working load of marine cranes. Lowering loads to the sea bottom requires drag induced loads to be considered. This talk will discuss the forces that must be considered for safe load handling.

Presentations <[SessionI\SessionI_Etchemendy.pdf](#)>

- **RRS James Cook - A Multi-Role Oceanographic Research Vessel Entering Service in 2007** – Ed Cooper (NERC – National Oceanography Centre, Southampton)



ABSTRACT: The Natural Environment Research Council (NERC), took delivery of the newly built multi-role research vessel RRS James Cook at the end of August 2006 from the Norwegian shipbuilder Flekkefjord Slipp & Maskinfabrikk AS.

At 91m length, 18.6m breadth and a draft of 5.5m the James Cook represents the introduction of a major facility to the UK Marine Science Community. The vessel as delivered includes the major scientific tools expected of such a vessel, for example a suite of deep ocean winches, over-side handling capability through gantries and cranes, multibeam echosounders, communications and networking. The vessel has Dynamic Positioning utilizing tunnel thrusters and a combination of twin propellers with rudders. In comparison with existing NERC vessels, the James Cook exhibits an improvement on the underwater radiated noise being ICES (Recommendation 209) compliant.

Currently the vessel is engaged on familiarization, training and commissioning exercises, which will lead in to the first science cruise in March 2007.

This talk will be used to introduce the vessel and some of her capabilities.

Presentation: <[SessionI\SessionI_Cooper.pdf](#)>

- **R/V Pourquoi pas ? A New Multidisciplinary Vessel for Ocean Research** –and



ABSTRACT: This paper gives a general description of the *Pourquoi pas?*, the new research ship of Ifremer, in terms of missions, functionalities and main particularities. It presents how this new ship, that was delivered in May 2005, is integrated among the existing fleet and focuses on the ability of the ship to accommodate and to deploy underwater systems.

Paper: <[SessionI\SessionI_Lefort_Nokin_Paper.pdf](#)>

Presentation:

<[SessionI\SessionI_Lefort_Nokin_PowerPoint.pdf](#)>

- Recent Developments on RRS *James Clark Ross* "Challenges of a Refit" – Steve Bremner
(British Antarctic Survey)

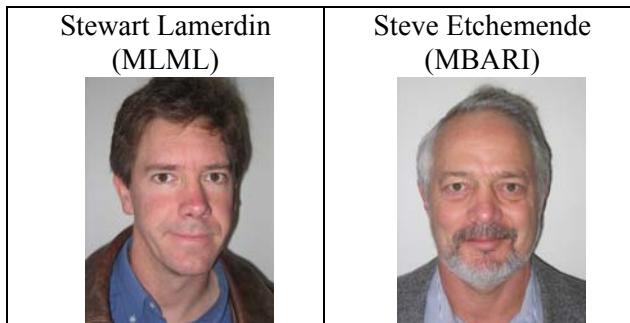


ABSTRACT: Increasing the capability of the vessel to extend its life and value to the community is often demanding. The recent installation of an Ultra Short Base Line System (USBL) and the modifications to enable the ship to deploy and operate the *ISIS* ROV have presented many challenges.

Presentation: <[SessionI\SessionI_Bremner.pdf](#)>

Session II consisted of two concurrent sessions:

Session IIa: Innovations in Vehicle Systems – Session IIa was held in the Redfield Auditorium (WHOI). The moderators for the session were:



Autonomous Underwater Vehicle (AUV) Operations:

- **Monterey Bay Aquarium Research Institute (MBARI) AUV Operations** – Steve Etchemendy (MBARI)



ABSTRACT: MBARI Marine Operations Division, provides the services of a multibeam mapping AUV and a mid-water AUV for CTD and variable sensor packages. This talk will review the capabilities of these two AUVs, and provide samples of science data for review.

Presentation: <[SessionIIa\SessionIIa_Etchemendy.pdf](#)>

- The *ABE* and *Sentry* Autonomous Underwater Vehicles – Dana R. Yoerger (WHOI)



ABSTRACT: This talk presents recent operational deep-water survey results from the Autonomous Benthic Explorer (ABE). Specific examples include bathymetry and magnetic survey, plume localization, hydrothermal vent site photo survey. Recent development progress with the Sentry AUV is also summarized.

Presentation: <[SessionIIa\SessionIIa_Yoerger.pdf](#)>

- **Video Plankton Recorder: A Systems And Operational Overview** – Josh Eaton (WHOI)



ABSTRACT: The Video Plankton Recorder (VPR) is becoming an important Oceanographic tool. The system provides high speed data collection and real-time data processing giving scientist effective use of ship time. The instrument provides CTD, Fluorescence, and Plankton data making it easy to map and identify features.

Presentation: <[SessionIIa\SessionIIa_Eaton.pdf](#)>

- **High Definition TV on *Hyper Dolphin*** –Tomoe Kondo (Nippon Marine Enterprises, ltd.)



ABSTRACT: The presentation introduces the "HDTV" installed on Hyper Dolphin (ROV of 3000m Depth Class) and its effective use for the operator. The presentation will include the HDTV specifications (including effective use) and pictures taken by the HDTV (Deep sea animals and plants, etc.).

Presentations: <[SessionIIa\SessionIIa_Kondo.pdf](#)>

Movie Clips:

<[SessionIIa\Kondo_movie.wmv](#)> and <[SessionIIa\Kondo_movie_6K.wmv](#)>

- **First Year of *Kaiko 7000*** –Atsumori Miura (Nippon Marine Enterprises, ltd.)



ABSTRACT: We produced the 2nd vehicle after the accident happened in 2003 to lose the original vehicle of "KAIKO". The name of the 2nd vehicle is "KAIKO 7000." I will introduce the operation in the first year of "KAIKO 7000," and also the problem found in the operation. The main Operation in the first year is as follows:

- Operation for ODP
 - Acquisition of Data from Seismometer set up at the sea bottom
 - Acquisition of Data from A-CORK
 - Advanced Circulation Obviation Retrofit Kit
- Sampling of rocks by separated towing mode in large area.

Presentation <[SessionIIa\SessionIIa_Miura.pdf](#)>

- **Towed Ocean Bottom Instrument (TOBI) - Upgrades for the 21st Century** – Duncan Matthew (National Oceanographic Centre, Southampton)



ABSTRACT: A new phase of development will keep The Towed Ocean Bottom Instrument (TOBI) at the forefront of deep-ocean research well into the 21st century. Since its inception TOBI has been kept up-to-date through a series of improvements and developments linked to scientific requirements. The latest upgrades, funded by NERC primarily for the benefit of UK marine science community, will include a state-of-the-art bathymetry sonar giving a co-registered data set with the existing sidescan, a high bandwidth fibre-optic communications link, a vehicle-specific underwater navigation system and a strap-down gyro.

TOBI's major role as a geological survey tool has lately been widened with the addition of light scattering sensors. Recent cruises on the German research ship FS Meteor and NERC ship RRS Charles Darwin have used TOBI to survey the Mid Atlantic Ridge near Ascension Island and locate new areas of hydrothermal activity. The data from TOBI was then used as a guide for further high detailed exploration of these areas using ROVs and AUVs.

Presentation: <[SessionIIa\SessionIIa_Matthew.pdf](#)>

- **Hybrid Underwater Vehicle for Full Ocean Depth Exploration** - Andy Bowen (WHOI)



ABSTRACT: The Hybrid Remotely Operated Vehicle (HROV), being designed and built by Woods Hole Oceanographic Institution (WHOI) with the support of the Space and Naval Warfare Systems Center San Diego (SSC San Diego), will provide a new level of accessibility for deep ocean research. HROV will be primarily an autonomous vehicle but will be reconfigurable to a teleoperated system by the installation of a fiber optic data link and a manipulator based work system.

Presentation: <[SessionIIa\SesionIIa_Bowen.pdf](#)>

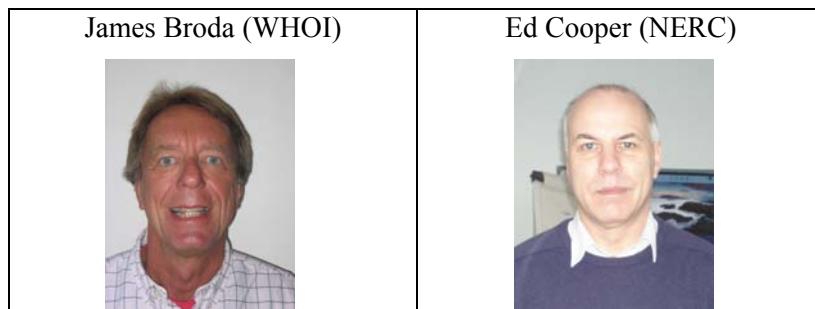
- **Gliders/Argo** – Breck Owen (WHOI)

Presentation: <[SessionIIa\SessionIIa_Owens.pdf](#)>



Session IIb: Equipment and Procedure Innovations

– Session IIb was held in Lillie Auditorium (MBL). Moderators for this session were:



- **WHOI Long Core Development: Update** – James Broda (WHOI)



ABSTRACT: An overview of the status of the WHOI Long Core Program will be presented. Ship modifications, handling equipment details, and the ODIM fiber rope traction system [CTCU] will be reviewed.

Presentation: <[SessionIIb\SessionIIb_Broda.pdf](#)>

- **Shipboard ADCP Systems and Heading Sensors: Status Report** – Julia Hummon (University of Hawaii)



ABSTRACT: University of Hawaii ADCP data acquisition and processing software "UHDAS" has been installed on two Antarctic research vessels, two NOAA ships, 8 UNOLS ships, and one other vessel. A system status report status and subsampled data are emailed from these ships daily, allowing the health of the systems to be monitored. In general, the ADCPs using UHDAS are doing well. Two installations are anomalous in that they require a scale factor to be applied to the measured velocities before use. This is unusual and warrants concern. The two instruments are the OS75s on the Thompson and the Wecoma. Recent refurbishing of the HDSS sonars on the Revelle has improved their characteristics, but there is evidence of small biases at low speeds. These are not understood. High quality ADCP data relies on a good installation of the transducer, and consistent feeds of gps position and high quality headings. Many different heading devices are used, including mechanical gyro, optical gyro, gps arrays (eg. Ashtech, gps compass), and more expensive systems that combine inertial sensors and gps arrays with Kalman filters (eg. POSMV, Seapath). Heading errors result in cross-track errors in the ADCP data which are proportional to the ship's speed. Heading errors should be kept to under a few tenths of a degree to keep the errors in the ADCP data under a few cm/s (Most open ocean velocities are under 20cm/s.) We use a gyro for smoothness and reliability and correct those headings with another instrument. Ashtech, Seapath, and POSMV are capable of high accuracy and are the preferred final heading reference. Some other devices (Phins, Marinus, Mahrs) may be adequate, with errors of a few tenths of a degree. Some gyros are quite bad, especially in high latitudes, having errors of several degrees. Newer gyros with a gps feed seem to be much better than older gyros. Preliminary tests of two "gps compass" devices indicate that they are not a replacement for the high-accuracy devices. Limited data from a Furuno "satellite compass" suggests that it is comparable to the better mechanical gyros. The CSI "gps compass" is far worse than any other device tested, with large excursions unflagged by its own QC.

Presentation: <[SessionIIb\Session_IIB_Hummon.pdf](#)>

- **Acoustic Backscatter and Remote Seafloor Characterization** – Luciano Fonseca (UNH)



ABSTRACT: The acoustic backscatter registered in multibeam and sidescan sonars records carries important information about the seafloor morphology and physical properties, providing valuable data to aid the difficult task of seafloor characterization, and important auxiliary information for a bathymetric survey. These backscatter records are the result of a complex interaction of the incident acoustic energy with scatterers at the sediment-water interface and with heterogeneities in the sediment structure, and are subject to strong radiometric and geometric distortions. It is necessary to understand the geometry and the processes involved in this interaction in order to compensate for these distortions and produce normalized backscatter values. The normalized records can be used in enhanced backscatter mosaics and in methods for remote seafloor characterization.

Presentation: <[SessionIIb\SessionIIb_Fonseca.pdf](#)>

- **Pressure Retaining Deep-sea Sampler** – Marck Smit (Netherlands Institute for Sea Research (NIOZ))



ABSTRACT: Most studies about the biological and bio-chemical processes in the deep-sea assume that pressure does not affect the measurements. A few comparative data indicate however that the hydrostatic pressure has a considerable effect on bacterial production and respiration. For these purposes a *pressure retaining deep-sea sampler* was developed at Royal NIOZ. The presentation will describe the development process of the NIOZ High Pressure Sampler and explain the working of it.

Presentation: <[SessionIIb\SessionIIb_Smit.pdf](#)>, Movies: <[HPS.mpg](#)>, <[WHOI_to_Texel.avi](#)>

- **A New Ultra Clean CTD-System for Sampling of Trace Elements and Isotopes** – Sven Ober (NIOZ)



ABSTRACT: The traditional way of ultra clean sampling of ocean waters for trace elements and isotopes is a very time-consuming and cumbersome process. A novel rectangular titanium CTD-frame was designed and constructed, holding 2 rows of 12 GoFlo samplers as well as a complete set of CTD-sensors. Due to the rectangular shape of the frame it is possible to move the frame inside of a custom made Clean Air Container. This enables sub-sampling and processing of samples in a clean environment without back-breaking sample bottle manipulation. This new approach is also very time-efficient: only 3 hours (instead of 10) for a complete 24 depth deep-ocean trace metal sampling cast including a CTD-profile. Testing and inter-calibration of the method has been done during a cruise in November 2005.

Presentation: <[SessionIIb\SessionIIB_Ober.pdf](#)>

- **Improvement of Air-Gun System for Multi-Channel Seismic Survey** – Hidenori Shibata (Nippon Marine Enterprises, ltd.)



ABSTRACT: JAMSTEC has two seismic survey systems one on R/V *Kairei* and the other on R/V *Kaiyo*. Each system uses 8 big size air-guns (1,500 cu inch each and 12,000 cu inch total) for seismic signal sources, and we have experienced various troubles related to the air-gun systems since the beginning of their operations. Moreover, as R/V *Kairei* and R/V *Kaiyo* were designed as multi purpose research vessels, use of large deck spaces for the operation of seismic survey system was not allowed. Accordingly, in the old systems, dangerous on deck

works near the high pressure air compressed air-guns were inevitable. When the towing flame was cracked in 2004, we decided to make new air gun systems to eliminate the causes of troubles experienced till that time and improve their operability and safety. Stainless steel circular pipe strength members through which cables and air lines ran, were replaced by stainless steel beams of H shaped cross section. This change made the installations of cable and air hoses much easier. High pressure air supply systems were also modified to avoid dangerous launch and recovery operations of the air-gun towing frames near pressurized air guns.

Presentation: <[SessionIIb\SessionIIb_Shibata.pdf](#)>

- **Upgrade of the RRS James Clark Ross Propulsion Control System** – Richard Bridgeman (British Antarctic Survey)



ABSTRACT: This presentation outlines the technology to be used to replace the ships electric drive control system and power management system installed at launch in 1991.

Presentation: <[SessionIIb\SessionIIb_Bridgeman.pdf](#)>

Day 1 Wrap-Up Session (Redfield Auditorium) – Day 1 of the INMARTECH Symposium ended with a wrap-up session. The moderators provided brief summaries of the technical presentations that were made throughout the day:

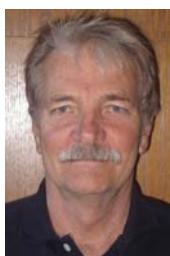
- Session I Summary: Ships, Shipboard Handling Systems and Over-the-Side Safety Issues – Bill Martin (University of Washington) and Matthew Hawkins (University of Delaware)
- Session IIa Summary: Innovations in Vehicle Systems – Stewart Lamerdin (MLML) and Steve Etchemende (MBARI)
- Session IIb Summary: Equipment and Procedure Innovations – James Broda (WHOI) and Ed Cooper (NERC)

Facility Tours (Ships, vehicles, and equipment) and Poster Session – Facility tours and a poster session coincided with a reception on Tuesday evening following the Day 1 Technical Sessions. The posters were on display in the MBL Club. Below is a listing of the facility tours, tour guides, and posters:

- **Facility Tours–R/V *Oceanus*** -

Tour Guides:	
Patrick Rowe (WHOI) 	John Dyke (WHOI) 

- **Facility Tours–CRV *Tioga*** – Ken Houtler (WHOI)
- **Facility Tours - AUV *Sentry*, Video Plankton Recorder, Hydrographic Van** - Barrie Walden (WHOI)



- **Facility Tours – Isotope Van** – Matthew Hawkins (U. Delaware)



- **The NOAA Portable Seagoing Air-Sea Flux Standard** - Chris Fairall (National Oceanographic and Atmospheric Administration)



DEMONSTRATION DESCRIPTION: The air-sea interaction group at ESRL/PSD (formerly ETL) is constructing a 3rd -generation flux measurement system to use as a portable standard to promote the quality assurance of NOAA and UNOLS R/V's and other components of the Ocean Observing System (principally buoys). The system is nearing completion and the first field deployment is planned in 2007. Components of the system will be shipped to Woods Hole and assembled for demonstration at the WHOI pier next to the R/V

Oceanus. Some background information is provided below: . Requirement: There is a need for air-sea flux measurements of high accuracy and high time resolution - Intensive field programs - Satellite retrievals - NWP/Climate model products - Climate monitoring . Relevant quantities: Turbulent fluxes (stress, sensible and latent heat), radiative fluxes (solar and IR), precipitation, bulk meteorology (wind speed, air temperature, humidity, SST). . Potential: Present technology allows measurements of net heat input to the ocean from ships and buoys to an accuracy of about 10 W/m², but this accuracy is not being realized on most platforms . Solution: Implement a multi-faceted program of quality assurance, intercalibration, and data archiving. - Research Vessels (NOAA, UNOLS, Navy, Coast Guard,..) - VOSClim . Strategy: Create a ship flux measurement group - Construct a state-of-the-art portable flux standard that can be installed on any ship to obtain best possible characterization of the relevant variables - Construct a distributed set of sensors to be place with ship sensors for side-by-side intercomparison . Implementation: - Work with each ship operator to improve sensor suite, placement, connection methods, processing, etc - Perform a computational fluid dynamics (CFD) assessment of the flow distortion effects for specific sensor locations - Set up a web site with a Flux Manual detailing procedures and best practices for measurements from ships and flux estimation methods

- **Poster: Useful Techniques for Bottle Salinity Measurements** - -Naoko Takahashi (Marine Works Japan LTD.)

Poster Description: Bottle salinity data are obtained to calibrate CTD data as well as get the value of salinity in Oceanography. We employ a specific method described in Aoyama et al., (2002) in order to make a precise measurement on the salinometer, Model 8400B "Autosal", manufactured by Guildline Instruments Inc. In the sequence of salinity measurements, we measure the IAPSO Standard Seawater (SSW) provided by Ocean Scientific International Ltd. to know the precision of measurement. We keep the standard deviation of SSW and that of absolute differences for replicate samples, which indicates "overall" precision, were under 0.001 in salinity (PSS-78) in the last few years. These values satisfy the WOCE requirements. In the poster, we will show you about our useful techniques for sampling, data acquisition, and maintenance of AUTOSAL in detail.

- **Poster: Temperature Error Caused by Attitude Motion of Sea-Bird 9plus CTD** – Satoshi Ozawa (Marine Works Japan LTD.)

POSTER DESCRIPTION: A periodical temperature error seen in the CTD data is examined by comparing with the attitude motion of the CTD measured by an ADCP. The CTD system was composed of a Sea-Bird 9plus CTD (two sets of temperature and conductivity sensors) and 12-litter Niskin bottles on 36-position Carousel Water Sampler. The ADCP (RDI Workhorse Monitor, 300 kHz) was attached to the water sampler frame and lowered along with the CTD system. The CTD and the attitude motion data were obtained under several operating conditions by changing the weight of the water sampler frame and lowering with or without a plate which minimize a rotating motion of the CTD system. Vertical profiles of the temperature difference between the two temperature sensors obtained at down-casts (nominal descent rate was 1.2 m/s) are examined. For operating conditions without the plate, the difference periodically fluctuates even in the deep ocean where the vertical temperature gradient is small. The maximum peak-to-peak difference is about 0.0006 degrees C with a period of about 3.5 minutes which corresponds to a wavelength of about 250 m. Similar fluctuation is seen in the salinity difference (maximum peak-to-peak difference is about 0.0006), although it is not seen in the conductivity difference. Therefore the fluctuation of the salinity difference is found to be caused by the temperature fluctuations. The periodical fluctuations in temperature difference are compared with the attitude motion of the CTD. The period of the fluctuation completely agrees with the period of tilting and rotation of the CTD system. Although the tilting (maximum angle of 25 degrees) may cause

discrepancy of temperature between the two temperature sensors by changing vertical positions of the two sensors (maximum distance of 30 cm), the fluctuation in temperature difference must be caused by other reason because vertical gradient of temperature is too small (less than 0.0001 degrees C per 30 cm) in the deep ocean to explain the temperature difference. The fluctuation of the tilting may change slightly a flow rate of the pump-controlled flow in the T-C duct which connects the temperature probe and the conductivity cell. The periodical temperature errors related to the tilting are likely to be caused by changing viscous heating around the temperature probe.

- **Poster: Technical Services of Marine Works Japan Ltd.** - Testuharu Iino (Marine Works Japan Ltd.)

POSTER DESCRIPTION: Japan Marine Works Japan Ltd. (MWJ) has about 160 marine technicians, and they provide various scientific services on activities of Japan Agency for Marine-Earth Science and Technology (JAMSTEC). The marine technicians of MWJ support extend into operation and maintenance of onboard equipments and data quality control. Some member of marine technicians takes charge of technical development and their division is named Marine Technology Development Section. The marine technicians have many technical problems such as Machinery, Electricity, Database, and Software in marine research. It is tackling so that the problem for which special knowledge is needed also in it can be coped with. Moreover, analysis accuracy of marine research apparatus and technical development business about the improvement in functional are also performed. We have developed about more than 30 products from 2001, and introduce about three products of them. 1) "Mr. Moor" (The software for designing of Oceanographic moorings) The "Mr. Moor" can be used to assist in the design and configuration of single point oceanographic moorings, such as the tension of mooring, the shape of mooring after deployment. The "Mr. Moor" is for a sub-surface mooring mainly and is calculated by using the Lumped mass model. A characteristic operability of this software is the increasing number of component parts in the mooring that can be inputted, the edit function of mooring composition parts and the selectable graph functions of a calculation results. 2) "Mr. Deep" (The tow fish monitoring software) To survey the deep sea with the tow fish, the "Mr. Deep" can be used to get exact position and posture of the tow fish, and to display the detailed bathymetric chart by using SEA-BEAM data at real time on operation. The main functions are also displaying the locations of research vessel, the information of transponder, the bathymetric chart by SeaBeam, the detailed depth data measured by the CTD and the gimbal sheave data. 3) "Magnet Switch Data Logger (MSDL)" The "MSDL" can be used to check a mechanical error of the trigger that is attached on the water sampler system, and this mechanical error of the trigger is influenced by rolling and pitching of the multiple corer. The main function is apprehending the actuation time of the trigger by the magnet switch. And this is also recorded actuated on non-volatile storage on logging time. It can control the data from a computer. The chassis of the "MSDL" is made of titanium Ti-6AL-4V and the maximum depth can be used is to 7,000m.

- **Poster: The Acoustic Navigation Of Deep-Towed Underwater Imaging Vehicles Using A Reversed Ultra Short Base** - Duncan Matthew (National Oceanography Centre, Southampton)



POSTER DESCRIPTION: Background of the development, in-house R & D to prove the concept and finally getting a commercial company interested in developing and manufacturing a system.

- **Poster: Alaska Region Research Vessel** – Steven Hartz (University of Alaska)



POSTER DESCRIPTION: Overview of the future U.S. National Science Foundation research vessel for the Alaska region.

- **Poster: Sea Education Association Oceanographic Training Vessels as Ships of Opportunity**
- Erik Zettler (Sea Education Association)



POSTER DESCRIPTION: Describes equipment and cruise tracks of SEA vessels in Atlantic and Pacific.

- **Poster: The Technology Improvement of Radiosonde Observation and Evaluation Character of the Humidity Sensor** - Ryo Oyama (Global Ocean Development Inc.)

POSTER DESCRIPTION: We have the atmospheric soundings by radiosonde on R/V Mirai since 1997. Vaisala sounding system and RS-80 sensor had been used. In 2004, a new sensor RS92-SGP (RS92) which is compact and light weight was introduced. It improved sensor precision and made the operation easy. However, after this change, we sometimes happen to have a trouble that the radiosonde sensor collides with a launcher at release, consequently RS-92 has damaged. In addition, RS80 had dry bias in its humidity sensor (Wang et al. 2002, etc) and the humidity sensor of RS92 was added some new features. So we think that it is necessary to be sure that RS92 doesn't have dry bias and the other new problems. To prevent the sensor from the collision with launcher, we adjusted the length of thread between the radiosonde sensor and the balloon before release. As a result, we could found an appropriate length and launch all the soundings without a trouble under moderate wind condition (10m/s). We also tried a system that lift up the sensor from the bottom to the top of launcher as a countermeasure of the strong wind condition. Though it remained some problems to be solved, we could be sure that it would be useful. In relation to humidity sensor of RS92, we examined its response with comparing humidity calibrators and confirmed that highly precise humidity data (the accuracy is better than 1 %) could be acquired with RS92. One example of the new features is that RS92 is equipped with two humidity sensors. When one sensor measures humidity, another sensor is heated to remove the water drops on the humidity sensor. Changing the role alternately keeps their accuracy. So we also investigated its heating influence under the different wind condition. As a result, it is found that the acquired humidity data by RS92 shows the influence of heating on the weak wind condition (2.3m/s). It was confirmed that the influence of heating is nothing in the actual sounding (with ascending about 3.5m/s).

Day 2: Wednesday, October 18, 2006

Day 2 Plenary Session (Lillie Auditorium) – Barrie Walden opened day two of the INMARTECH Symposium in the Lillie Auditorium. The morning agenda would consist of two concurrent Sessions; IIIa and IIIb. After the lunch break, all meeting participant would convene together for one Session IV in Redfield Auditorium.

Session IIIa: Underway Data Collection and Archiving Standards – Session IIIa

was held in Lillie Auditorium (MBL). Moderators for the session were:

Dennis Shields (NOAA)	Rich Findley (University of Miami)
	

- **Quality Improvement and Control System (QuIC System)** – Ilya Nikanorov (University of Miami)



ABSTRACT: The Quality Improvement and Control (QuIC) System is web-based, automated software which provides complete control over inventory, documentation, logbooks and allows knowledge base communications. All factors are critical for successful operations of UNOLS marine technical groups. Many issues have been addressed by this system including timely calibration protocols, equipment history tracking, software maintenance, warranty information and streamlining the day-to-day operation of marine technology departments. This invaluable tool offers a central location for use at sea, ashore, or from home, with any web interface.

Presentation: <[SessionIIIa\SessionIIIa_Nikanorov.pdf](#)>

- **The Frame-Grabber System for Integrated Content and Data Access** – Steven Lerner (WHOI)



ABSTRACT: Today's scientific vessels generate large amounts of data collected from a variety of sensors. Although all the data is logged via shipboard dataloggers, it is difficult for scientists to re-create this integrated information and have the ability to view and access an entire cruise in an integrated fashion. We present a methodology of using data snapshots to address these needs on-ship and on-shore.

Presentation: <[SessionIIIa\SessionIIIa_Lerner.pdf](#)>

- **The SAMOS Data Assembly Center** – Shawn Smith (Florida State University)



ABSTRACT: An overview of the data assembly center (DAC) for the Shipboard Automated Meteorological and Oceanographic System (SAMOS) Initiative will be provided. The presentation will include results of the 2005 pilot project, including updates on vessels contributing observations, the ship profile database, and issues

that arose during initial implementation. A summary will outline the data flow and quality control procedures applied to all observations provided to the DAC. The benefits of participating in the SAMOS initiative will be described in relation to both the vessel operator, marine technician, and downstream data users. Examples of two way communication between SAMOS DAC and pilot project vessels will show how near real-time data evaluation on shore can benefit observers at sea. The DAC plans to recruit additional vessels at INMARTECH. Information on how to participate in SAMOS will be provided to interested vessel operators. The talk will emphasize the importance of detailed metadata to ensure data collected is useful for future generations of researchers. Proper sensor exposure will be highlighted as a way to make substantial improvements to data quality.

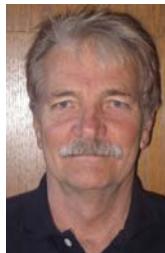
Presentation: <[SessionIIIa\SessionIIIa_Smith.pdf](#)>

- **LabView** – Rich Findley (University of Miami)



Presentation: <[SessionIIIa\SessionIIIa_Findley.pdf](#)>

- **WHOI's Underway Data Collection System** – Barrie Walden (WHOI)



ABSTRACT: The research vessels and manned submersible of the Woods Hole Oceanographic Institution utilize a versatile data collection software application written to simplify common tasks faced by marine technical support personnel. This presentation will provide an overview of the system's present capabilities and underlying architecture. Strengths, weaknesses and developments for the future will be discussed.

Presentation: <[SessionIIIa\SessionIIIa_Walden.pdf](#)>

The complete Calliope documentation <[Calliope\Documentation\Calliope_Instructions_222.pdf](#)> and installation software can be found in the directory titled "Calliope" on this disk.

- **SW06 Data Handling** – Andrew Maffei (WHOI)>



ABSTRACT: During the summer Shallow Water 2006 experiment logistics information for 25 PIs, 6 ships, 8 gliders, 3 REMUS class AUVs, 64 surface and subsurface moorings, 2 aircraft, and 4 drifting moorings that were inter-connected with HiSeasNet and SWAP (wifi) was made available to researchers on all vessels (and on shore) in near-real-time using a new software tool called ExView.

Presentation: <[SessionIIIa\SessionIIIa_Maffei.pdf](#)>

Movie clip: <[SessionIIIa\LynchGoogle.mpg](#)>

- **Roles of Nippon Marine Enterprises, Ltd. Marine Technicians in Research Submersible Cruises**
– Satoshi Okada (Nippon Marine Enterprises, Ltd.)



ABSTRACT: NME Research Associates often participate in scientific research cruises conducted by JAMSTEC (Japan Agency for Marine-Earth Science and Technology) on science parties' demands. Research associates are responsible for the management of various scientific data such as geo-magnetic data, gravity data, navigational data and image data obtained during the cruises. These data are gathered by sensors prepared by scientists, or those attached to the research vessels and to such manned and unmanned deep submergence vehicles as "Shinkai 6500" and "Kaiko". To ensure the scientific application of those data, Data inventory sheets are made, in which information about the conditions under which data are obtained and auxiliary data necessary for scientific use of the data are written. Some times primary data quality controls are also done for the decisions of the survey strategy on board. Jobs of research associates onboard the vessel will also be introduced and a flow chart will be shown.

Presentation: <[SessionIIIa\SessionIIIa_Okada.pdf](#)>

- **National Oceanic and Atmospheric Administration's SCS** – Dennis Shields (NOAA)



Presentation: <[SessionIIIa\SessionIIIa_Shields.pdf](#)>

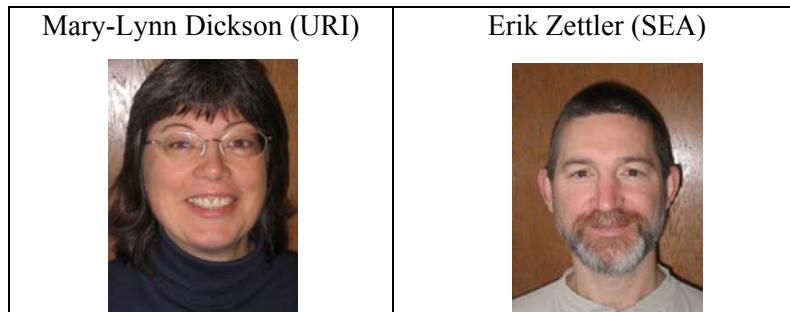
- **Two Data Management Tools for Oceanographic Research** – Val Schmidt (University of New Hampshire)



ABSTRACT: Media-prep: A perl script to partition large data archives into media sized chunks in preparation for archival, Elog: A digital electronic logbook for metadata collection.

Presentation: <[SessionIIIa\SessionIIIa_Schmidt.pdf](#)>

Session IIIb: Long-term Instrumentation Deployments - Challenges, Issues, and Solutions – Session IIIb was held in Redfield Auditorium (WHOI). Moderators for the session were:



- **Shallow Water “06” 62 Moorings in 6 Days** – John Kemp (WHOI)



Presentation: <[SessionIIIb\SessionIIIb_Kemp.pdf](#)>

- **The ORION Global Scale Observatory- An Array of Open Ocean Moorings for Interactive Ocean Observation** – Dan Frye and Don Peters (WHOI). Don Peters presented the paper.



ABSTRACT: The National Science Foundation is planning to fund the construction and operation of ocean observatories on coastal, regional, and global scales. The Global Scale Observatory will consist of an array of moored platforms located in scientifically important areas in the deep ocean. The observatory infrastructure to be funded under this plan will include surface buoys and associated power generation and communications equipment along with sensor arrays on the seabed, in the water column and at the air-sea interface. Two-way communication between the surface buoys and the shore will be accomplished with satellite telemetry links while communication between buoys and sensors will utilize fiber optic and copper conductor links as well as acoustic links. Surface buoy technology will include both single point discus buoy moorings and tri-moored spar buoys. The presentation will present the conceptual plan for the Global Scale Observatory and discuss the technology that will be used to implement the array.

Presentation: <[SessionIIIb\SessionIIIb_Frye_Peters.pdf](#)>

- **Monterey Accelerated Research System,(MARS) a Test Bed Cabled Observatory** – Steve Etchemendy (MBARI)



ABSTRACT: MARS, the Monterey Accelerated Research System, was created to economically test and evaluate technology destined for ORION observatories. This talk will review the MARS system capabilities and associated developments to enable the MARS Operations and Maintenance group to support future ORION scientists and engineers.

Presentation: <[SessionIIIb\SessionIIIb_Etchemendy.pdf](#)>

- **Ocean Bottom Seismometry at Woods Hole Oceanographic Institution-Toward a Permanent Presence** – Beecher Wooding (WHOI)



ABSTRACT: A brief history of Woods Hole Oceanographic's seismic instrumentation will be presented, with emphasis on the evolution toward the current long deployment seismographs. New projects involving permanent sensors will be discussed.

Presentation: <[SessionIIIb\SessionIIIb_Wooding.pdf](#)>

- **Fast Thermistor String Model 3** – Edwin Keijzer (NIOZ)



ABSTRACT: In order to monitor fast and vigorous internal waves in the ocean NIOZ had developed a fast Thermistor String. Using this Thermistor String at sea several problems occurred, such as: complex cabling and water intrusion. For this reason a new version was developed. The major features of the new – model 3 – Thermistor String are: no connecting cables anymore, stand alone sensor units, local data storage and 2 year stand alone battery capacity. The presentation will describe the development process of the model 3 Fast Thermistor String and will explain the working of it.

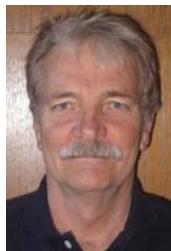
Presentation: <[SessionIIIb\SessionIIIb_Keijzer.pdf](#)>

Session IV: Lessons Learned - Equipment Tricks, Techniques, and Cool Products

Products – Session IV was held in Redfield Auditorium (WHOI). Moderators for the session were:

Patrick Rowe (WHOI) 	Tom Wilson (Stony Brook University) 
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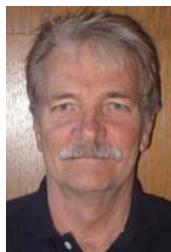
- **Metal-Free Instrumented Block and Light Weight .322 Wire Block** – Barrie Walden (WHOI)



ABSTRACT – WHOI has developed two rigging blocks useful under a variety of conditions. The first is a metal-free, large diameter block providing a speed and wire out measurement capability. Data can be provided to a display or logging device as an RS232 serial stream via a cable or as a wireless transmission. The second block was developed for use with .322 CTD cable under less-than-ideal fair-leading conditions. The block's light weight minimizes the sheave side loading necessary to pull the block into the correct orientation.

Presentation: <[SessionIV\SessionIV_Walden.pdf](#)>

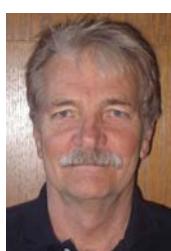
- **Field Repairable Slip Rings** – Barrie Walden (WHOI)



ABSTRACT: A number of failures and the associated repair costs has resulted in development of a hydrographic winch slip ring assembly that can be repaired in the field for minimal expense. Surprisingly, after approximately six years of service, the prototype required its first repair last month; the replacement parts cost about \$30.00.

Presentation: Demonstration

- **Far-End Cable Tension Monitor** – Barrie Walden (WHOI)



ABSTRACT – Experience shows that CTD cables are most likely to fail at the instrument end rather than at the head block where conditions would seem to be the most severe. There have been many cases where an instrument has been recovered in what was judged to be one lowering short of wire failure based upon armor “bird caging” a short distance from the termination. The thought is that this condition results from a combination of wire lowering speed, ship motion, instrument weight and drag such that the wire goes slack at the instrument and is then subjected to snap loading. This situation is difficult to detect using conventional winch monitoring instrumentation so, to test the theory, WHOI purchased a load pin for use at the cable’s connection to a CTD. Evaluation is still in progress but it appears that this device has allowed us to correctly detect slack conditions and these conditions have resulted in severe damage to the cable.

Presentation: Demonstration

- **Hot Glue... And you thought it was just for arts and crafts!** – Patrick Rowe (WHOI)



ABSTRACT: A brief look at a unique method for water proofing cable splices used in underwater applications.

Presentation: <[SessionIV\SessionIV_Rowe.pdf](#)>

- **Seafloor Search with Remote Sensing** – Paul Matthias (Raytheon)



ABSTRACT: Many miles of navigated side scan sonar, sub bottom profiler and magnetometer data collection and analysis collected over two decades have identified techniques for maximizing data and image quality. We review some of these techniques, as well as some of the challenges and lessons learned associated with their application.

Presentation: <[SessionIV\SessionIV_Matthias.pdf](#)>

- **Securing Fish Exclusion Cages on the Sea Bed by Scuba Divers** – Andre Cattrijssse and Hernandez Francisco (Flanders Marine Institute). Andre Cattrijssse presented the paper.



ABSTRACT: For the purpose of biological experiments cages needed to be set in the vicinity of a shipwreck. We present how we dealt with the problem of choosing, placing and securing the cages at 20m depth in a turbid and high current environment. The presentation communicates about the problems faced, and solutions found and to aims at receiving inputs for improvements.

Presentation: <[SessionIV\SessionIV_Cattrijssse_Francisco.pdf](#)>

- Improved Mooring Cable Stopper – Jack Schilling (Netherlands Institute for Sea Research (NIOZ))



ABSTRACT: During INMARTECH 2004 we showed a short video impression with the title: "A safe way to deploy deep sea moorings". In this a new way of deploying deep sea moorings it was demonstrated how to connect current meters, sediment traps etc. in a safe way. In the meantime, two years later, we had made a few modifications so that the cable stopper gives us more profit when we deploy and recover a deep sea mooring.

Presentation: <[SessionIV\SessionIV_Schilling.pdf](#)>

- **New Water Sampler Valve: High Opening Ratio and Inert Material** – Edwin Keijzer (NIOZ)



ABSTRACT: Water sampling using Niskin-bottles or other types of bottles is regarded as a standard method. On the other hand our scientists are facing several drawbacks in these systems, such as: restricted refreshment rate (opening ratio), closing control uncertainties, contaminating materials and user-unfriendly preparation. At NIOZ an idea is being developed about an improved closing valve. This valve will be explained and demonstrated.

Presentation: <[SessionIV\SessionIV_Keijzer.pdf](#)>

- **Hull Penetrating Instrumentation - Platform for Ferries** – Lorendz Boom (NIOZ)



ABSTRACT: A presentation about the 'hull penetrating instrumentation-platform' we are using on the ferrie between the island Texel and the mainland for long-term measurements concerning: current, temperature, salinity, changes in depth, transport of particles and the algae-activity of the water going in and out the 'Waddensea' with the tide.

Presentation: <[SessionIV\SessionIV_Boom.pdf](#)>

- **Sea Surface Temperature Monitoring** – David Fisichella (WHOI)



ABSTRACT – Many research vessels measure sea surface parameters at a considerable distance from the sample water's entrance into the piping system. For many parameters this is not an issue but temperature can be a problem and therefore measurement probes are frequently installed in the piping system as close to the inlet as possible. Unfortunately, there are cases where this is not practical. As an alternative, WHOI is experimenting with the Seabird SBE48, which is a measurement device that magnetically attaches to the ship's hull and uses the hull temperature as an indicator of sea temperature.

Presentation: <[SessionIV\SessionIV_Fisichella.pdf](#)>

- **Kilo Moana's Real-time Shipboard Multibeam Bathymetry and Backscatter Mosaic Display System** – Bruce Appelgate and Roger Davis (University of Hawaii). Bruce Appelgate presented the paper.



ABSTRACT: The Hawaii Mapping Research Group (HMRG) of the University of Hawaii has developed a bathymetry and backscatter mosaic software package that is suitable for use either in real-time survey operations or non-real-time processing applications. The system was originally developed for use with HMRG's own towed sonar systems but is also compatible with shipboard multibeam systems. It has been operational on R/V Kilo Moana under the supervision of the University's Ocean Technology Group marine science technicians for well over a year in support of that vessel's Kongsberg/Simrad EM120 and EM1002 multibeams.

Presentation: <[SessionIV\SessionIV_Appelgate.pdf](#)>

- **Guide To Making Climate Quality Meteorological And Flux Measurements At Sea** – Shawn Smith (Florida State University)



ABSTRACT: Description of your demonstration or product: A handbook and training materials developed by Frank Bradley and Chris Fairall as part of the SAMOS and WCRP Working Group on Surface Fluxes. This manual is intended for a wide readership. Primarily it is for the guidance of scientists and technicians who are responsible for the installation and/or maintenance of meteorological equipment on board ships, whether research vessels specifically engaged in air-sea studies, ships able to provide relevant data of opportunity, or commercial vessels recruited as part of the Voluntary Observing Ship network.

Presentation: <[SessionIV\Session_IV_smith.pdf](#)>

- **Three Solutions found for Irish Research Vessels**– Bill Dwyer (P&O Maritime Services Ireland Ltd)



ABSTRACT: A brief description solutions to three different problems. Firstly a simple a CTD davit design, secondly a simple method to reduce Vortice Induced Vibration and finally managing mooring chain on a small vessel.

Presentation: <[SessionIV\SessionIV_Dwyer.pdf](#)>

- **The MSRC Vortex Debubbler** – Tom Wilson (Stony Brook University)



Presentation: <[SessionIV\SessionIV_Wilson.pdf](#)>

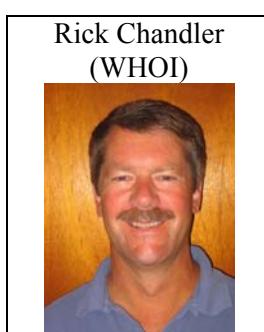
Day 2 Wrap-Up Session (Redfield Auditorium) – Day 2 of the INMARTECH Symposium ended with a wrap-up session. The moderators provided brief summaries of the technical presentations that were made throughout the day:

- Session IIIa: Underway Data Collection and Archiving Standards – Dennis Shields (NOAA) and Rich Findley (University of Miami)
- Session IIIb: Long-term Instrumentation Deployments - Challenges, Issues, and Solutions – Mary-Lynn Dickson (URI) and Erik Zettler (SEA)
- Session IV: Lessons Learned - Equipment Tricks, Techniques, and Cool Products – Patrick Rowe (WHOI) and Tom Wilson (Stony Brook U.)

Day 3: Thursday, October 19, 2006

Day 3 - Plenary Session (Redfield Auditorium) – Barrie Walden opened day three of the INMARTECH Symposium in the Redfield Auditorium. The morning agenda would consist of two concurrent Sessions; Va and Vb. Following Session V, all meeting participants convened for Session VI in Redfield Auditorium. INMARTECH 2006 adjourned mid-day after closing remarks from Barrie Walden.

Session Va: International Shipping - Dealing with New Regulations (Chemicals, Samples, Instrumentation) – Session Va was held in Redfield Auditorium (WHOI). The moderator for the session was:



- **International Shipping:** Dealing with New Regulations – Stephen Senior (WHOI)



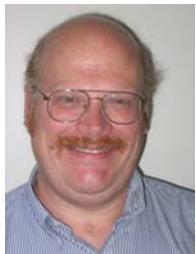
ABSTRACT: The manager of the Shipping Department at Woods Hole Oceanographic Institution will explain recent regulation changes in the transportation industry, identify required documentation, outline basic steps to a successful shipment and provide resources for further information.

Presentation: <[SessionVa\SessionVa_Senior_shipping_regs.pdf](#)>

- **Panel Discussion** - Following Stephen Senior's presentation, the floor was open for discussion. A panel that included Stephen, Debra Snurkowski, Asst. Distribution Mgr. at WHOI, and Leo Barry, President of Barry International, were on had to answer questions.

Leo Barry (Barry International) (photo unavailable)	Stephen Senior (WHOI) A portrait photograph of Stephen Senior, a man with glasses, wearing a dark shirt, smiling.	Debra Snurkowski (WHOI) A portrait photograph of Debra Snurkowski, a woman with blonde hair, wearing a blue shirt, smiling.
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- **International Guide to ISPM** - Tom Wilson (Stony Brook U)



Tom Wilson provided: *THE OCEANOGRAPHER'S GUIDE TO ISPM-15- Shipping Wooden Packaging Across International Borders*, prepared for INMARTEC 2006 by Thomas C. Wilson, Jr., Ocean Instrument Laboratory, Marine Sciences Research Center, Stony Brook University, Stony Brook NY 11794-5000 USA.

Document: <[SessionVa\Oceanographers_Guide_To_ISPM_15_wilson.PDF](#)>

Session Vb: Ship to Ship/Ship to Shore Wireless Access Protocol (SWAP) –

Session Vb was held in Redfield Building, Room 204. Moderators for the session were:

Toby Martin (Oregon State University) 	Val Schmidt (University of New Hampshire) 	Jim Akens (WHOI) 
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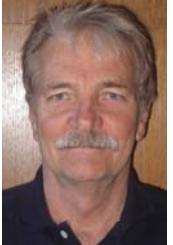
- **Ship to Ship/Ship to Shore Wireless Access Protocol (SWAP) – Val Schmidt (UNH)**



ABSTRACT: The state of the Ship-to-Ship/Ship-to-Shore Wireless Access Protocol (SWAP) program will be reviewed including system design, current operations and installations around the fleet. A report will be made regarding progress made during the recent SWAP development weekend as well as additional planned upgrades and modifications. Time will be provided for questions and a moderated discussion.

Presentation: <[SessionVb\SessionVb_Schmidt_SWAP.pdf](#)>

Session VI: Shipboard Networks and Network Security – Session VI was held in Redfield Auditorium (WHOI). Moderators for the session were:

Rich Findley (U. Miami)	Barrie Walden (WHOI)
	

- **HiSeasNet: Bringing the Internet to the High Seas for 4 Years and Counting** – Steve Foley (SIO)



ABSTRACT: HiSeasNet is a satellite network linking ships at sea to their home institutions and the Internet via 3 satellites spanning the Pacific and Atlantic oceans. Using C-Band and Ku-Band technology, UNOLS research vessels enjoy full-time IP data connections for real-time data transfer to and from shore at speeds of up to 200 kbps. With 4 years of successful operation and now 10 ships online, HiSeasNet has encountered and overcome a variety of problems and continues to change the way science is done at sea.

Presentation: <[SessionVI\SessionVI_Foley.pdf](#)>

- **The R/V Pelican's Experiences with the HiSeasNet Small-footprint Ku-band System** – Brenda Leroux Babin (LUMCON)



ABSTRACT: Just as the R/V *Pelican* was preparing to leave the dock for Puerto Rico, the ship went online with HiSeasNet. Utilizing a SeaTel 4006 1, Ku-band antenna, the R/V *Pelican* now has an always on connection to LUMCON's network. This system was invaluable to the crew in Puerto Rico as they watched the progression of several hurricanes and tropical storms moving through the Atlantic. This presentation will focus on the trials and successes we've had getting this system up and running.

Presentation: <[SessionVI\SessionVI_Babin.pdf](#)>

- **Research Vessel Network Management and Computer Security:**

- ***Wecoma*** – Toby Martin (Oregon State University)



ABSTRACT: Network security on R/V *Wecoma*, the good, the bad, the ugly.

Presentation: <[SessionVI\SessionVI_MartinToby.pdf](#)>

- **R/V Thomas G Thompson** – Bill Martin (University of Washington)



ABSTRACT: PowerPoint presentation on the security procedure used aboard the R/V *Thomas G. Thompson*.

Presentation: <[SessionVI\SessionVI_Martin_Bill.pdf](#)>

- **WHOI** – Jim Akens (WHOI)



Presentation: <[SessionVI\SessionVI_Akens.pdf](#)>

- **Scripps Institution of Oceanography**: Presentation: <[SessionVI\SessionVI_Meyer_Weeks.pdf](#)>

Jon C. Meyer (SIO)	Kristopher K. Weeks (SIO)
A head-and-shoulders portrait of a man with a beard, wearing a dark jacket.	A head-and-shoulders portrait of a man with glasses, wearing a dark shirt.

- **Ocean Drill Ship** - Andrew Trefethen (Texas A&M IODP)



Presentation: <[SessionVI\SessionVI_Trefethan.pdf](#)>

- **International Experiences:**

- **National Oceanographic Center, Southampton** - Dougal Mountifield (NOCS)



A verbal summary of the network security in place at the National Oceanographic Center, Southampton was provided.

- **British Antarctic Survey - David Blake (BAS)**



Presentation: <[SessionVI\SessionVI_Blake.pdf](#)>

INMARTECH 2006 - Closing Remarks – The final session was held in Redfield Auditorium (WHOI). Barrie Walden provided a few closing remarks. IFREMER in Toulon, France has offered to host the INMARTECH Symposium in 2008. The next INMARTECH Symposium in 2008 will be held in France.

Barrie (WHOI) thanked the INMARTECH 2006 presenters for their contributions, as well as the attendees for their participation. Participants applauded the efforts of Barrie and Faith Hampshire in hosting the Symposium.

The meeting adjourned at noon.



photo by Annette DeSilva (UNOLS)

Appendices: (click on links below to view Appendix)

- A. [INMARTECH 2006 Program](#)
- B. [Symposium Participant List](#)
- C. [Vendor Facility Open-House Announcements](#)
- D. [Abstracts - Listed alphabetically by Author \(including Posters\)](#)