Research Vessel Technical Enhancement Committee (RVTEC)

Scripps Institution of Oceanography
La Jolla, CA
October 19, 1998
1998 Annual Meeting Minutes
Compiled by Tony Amos and John Freitag from notes taken by Tony Amos

Appendices

The meeting was held in conjunction with the International Marine Technical Committee (INMARTECH) meeting and was limited to one-day rather than the usual two to three-day RVTEC meeting format.

Meeting Called to Order - The 1998 annual meeting was called to order October 19th at 9:00 am in Hubbs Hall at Scripps Institution of Oceanography in La Jolla, California. The introduction was made by Woody Sutherland (SIO), who outlined the meeting "housekeeping", admonishing participants to obey the parking rules, as the Parking Police are "ruthless". He provided a campus road map to help us find our way. John Freitag, University of Rhode Island (URI) thanked Woody and Annette DeSilva, University National Oceanographic Laboratory System (UNOLS) for their efforts in organizing the meeting and handed the podium over to Bob Knox (SIO), the recently elected chair of UNOLS, who gave the official Welcome to RVTEC members. John Freitag then outlined the INMARTECH meeting to follow RVTEC and asked for feedback from RVTEC members, reminding us of the great opportunity it was to have the international meeting held at SIO. The meeting agenda (***Appendix I***) was followed in the order as recorded in these minutes.

Participant Introductions - Participants introduced themselves. (See ***Appendix II*** for a list of participants).

Acceptance of Minutes - A reading of the Minutes of the 1997 RVTEC meeting was waived by consent as all members had a copy in their meeting documents. A Motion to accept the minutes was made by Marc Willis (Oregon State) and Seconded by Rich Findlay. The motion was passed and the minutes accepted into the record.

UNOLS Reports - A summary of UNOLS activities was given by John Freitag, who immediately got a blank screen courtesy of modern computer technology, which was quickly rectified. John discussed the Fall **UNOLS Council** meeting, and RVTEC liaisons with other UNOLS Committees.

Ship Scheduling Committee - R/V KNORR (WHOI) is planned for a lay-up in 1999. A total of 5355 ship days are scheduled in 1998. R/V EWING, Lamont-Doherty Earth Observatory (LDEO) and R/V ENDEAVOR, University of Rhode Island (URI) had originally been slated for lay-ups in 1998. However, ENDEAVOR was able to schedule a major NOAA fisheries program which resulted in 158 days. EWING contracted private work and ended up with a schedule of 245 days.

The **Fleet Improvement Committee (FIC)** met to discuss their long-term agenda; in addition they discussed the impact of new regulations on intermediate vessels. The estimated cost to build a new intermediate vessel is $18 million. Approximately $800,000 of this cost would be to bring the vessel to the new standards. The question of whether it is an impossible goal to bring the existing ships to compliance with the new standards is asked? The status of various other research vessels under construction or in design was presented. The National Oceanic and Atmospheric Administration (NOAA) has indicated a need for six new fisheries research vessels at $46 - $55 million each (these are 65m [213ft] vessels). The FIC is working on Science Mission Requirements (SMRs) for an ALPHA HELIX (University of Alaska) replacement and an east coast coastal vessel. In the coming years, FIC will look at the future of R/Vs KNORR (WHOI) and MELVILLE (SIO), and the OCEANUS class of vessels. A progress report on the new AGOR 26 SWATH design ship for the University of Hawaii was given.

The **Arctic Icebreaker Coordinating Committee (AICC)** reported that Icebreaker HEALY would begin outfitting in January in New Orleans. The actual delivery date would likely slide four to six months. Presently, the Vessel was scheduled to begin its Arctic Science in January 2001. It is anticipated that HEALY will be funded in a manner similar to the UNOLS vessels. A more detailed report on HEALY is slated for later in this meeting. Decisions have not been made yet on Ship of Opportunity proposals. The next meeting was scheduled for spring 1999 in New Orleans.

Annette gave a summary of the **Research Vessel Operators' Committee (RVOC)**. The next RVOC meeting is scheduled for 4 - 6 November 1998 in Hawaii. On the agenda are the National Science Foundation (NSF) ship inspection system, the use of American Bureau of Shipping (ABS) Marine Services, ISM Codes, Safety Committee, an update on Research Vessel Safety standards, BLUEFIN replacement and CALANUS replacements. Florida Institute of Oceanography (FIO) is to replace SUNCOASTER with a 120ft vessel. SUNCOASTER is 40 years old (1962) and was originally a supply ship. University of Connecticut is constructing a 76ft vessel. WHOI commented that they were going ahead with model tests of their SWATH design, but need funding to proceed into the construction phase. The RVOC safety video was shown. There followed a Round Table discussion soliciting views on UNOLS and technical support. Some participants did not know about the UNOLS equipment WEB page. Annette asked for ideas from RVTEC for the page. Tom Wilson, State University of New York (SUNY) maintains links to R/V Web sites. He has no data on the number of "hits" on the sites but said

that the new server has been up for nine months and that the volume is "tremendous". Questions were asked on how many scientists hit these sites. The address is www.gso.uri.edu\unols\rvtec\rvtec.html

The **DEep Submergence Science Committee (DESSC)** - SEACLIFF has arrived at Otis Air Force Base and has been officially handed over to WHOI from the Navy. SEACLIFF has a titanium sphere. Barrie Walden, (WHOI) comments that WHOI has been funded to study how to utilize SEACLIFF. The problem goes beyond SEACLIFF to ALVIN. Now that TURTLE is decommissioned, ALVIN offers the only manned deep submergence option for the US. It is not yet known what to do with SEACLIFF. Dan Schwartz, University of Washington, cited the National Academy of Sciences (NAS) study. If either TWA or Swissair (two recent commercial airliner crashes where the wreckage was on the sea bottom) had gone deeper, they would have needed ALVIN to locate them.

In conclusion of the UNOLS report, it was noted that there are widely perceived problems with ship scheduling. New scheduling procedures will be tried in 1999 for 2000 schedules. They call for the ship scheduling committee to meet as a group in mid-July after most funding decisions are known and schedules can be made more firm.

Agency Reports:

National Science Foundation (NSF) - Sandy Shor explained the hierarchy of the Division of Ocean Sciences. The NSF Budget was signed by President Clinton only one day before this meeting. There was an increase of almost 9%, a very good development. It may not trickle down to Ocean Sciences at the same rate but will certainly help. Things are "looking up".

New Proposal Guidelines have been sent out to Principal Investigators (PI's) for their feedback. The main changes in Technical Services, are the elimination of project-specific support and user fees, and a new optional section for Specialized Instrument Support. Spare parts can be included in Oceanographic Instrumentation. Sandy will discuss these changes in detail this afternoon. Fiscal 99 is expected to fund more proposals. The National Fleet Review Committee will review UNOLS fleet operations and management. Two meetings have been held and a third will be in December. Sandy reported on Dick West's retirement two weeks ago and said how he would be missed. Sandy will take over the UNOLS Office proposal and Shipboard Scientific Support equipment (winches).

The NSF has decided to directly administer the **Ship inspections** contract which is presently administered out the UNOLS Office. Inspections under the present contract to Jamestown Marine have been going on for one year with three more to go.

The **Instrumentation** proposals have came in. There is now a formal sub-program called "miscellaneous". **Shipboard technician** proposals are still coming in. Questions were asked regarding the Guidelines. The **Major Instrumentation** program has a 1 January 1999 deadline.

Office of Naval Research (ONR) - Today is Tim Pfeiffer's third day on the job at ONR; hence he is still learning the ropes. The Department of Defense (DOD) program for major instrumentation is soliciting proposals for instrumentation with a price tag of $50,000 minimum, but not more than $500,000. Agency cost-sharing will be required. The program is called Defense University Instrumentation Program (DURIP). Rich Findlay (Miami) asked how do you submit joint proposals. Information is on the web at:

www.onr.navy.mil/sci_tech/special/onrpgafm.htm

National Oceanographic and Atmospheric Administration (NOAA) - No formal report was provided.

Naval Oceanographic Office (NAVOCEANO) - The Naval Oceanographic Office Report will be given later in the meeting.

United States Coast Guard (USCG) - Jon Berkson gave the USCG report. The present news on HEALY is that a 30 June 1999 delivery from Avondale shipyard is scheduled. The USCG appreciates John Freitag's help with the proposed Sea Trials. They are concerned that without coordinated planning with the research community, not enough work will be found for HEALY. Sandy Shor reported that the NSF Office of Polar Programs (OPP) requested a substantial increase in funding ($22M). They reported to Congress on how they plan to spend the funds. They requested increase of $22M but got half (still substantial). Sandy reported on the 30m Coring system at WHOI. Woody Sutherland asked a question regarding 30m coring on the necessity for hull strengthening. A discussion followed on the increase from 12m to 30m coring. Experiments could require deploying one from the stern, and the other from the starboard. Sandy said that the issues have been resolved. John Freitag ended the discussion by retorting that this was a "Side Issue". (laughter).

As there was some time before the break, some other issues were brought to the table:

Dale Chayes (LDEO) reported on a workshop two weeks ago on the access of US Navy nuclear Submarines to collect data in the Arctic Ocean. A memorandum of Agreement (MOA) was established in 1994 to provide science opportunities on nuclear submarines each year for five years. The final cruise under the MOA is planned for spring of 1999. He was pleased to hear that RADM Ellis (the new Oceanographer of the Navy) is supportive of using the submarines for science. We won't have access to the 37m class subs as they are rapidly disappearing. There were five working committees in this workshop. The original proposition was "non-interfering science programs" using no people (i.e. "blind data" acquisition programs). To sail science packages in this mode would present a challenge. Denmark and Norway have approached Navy inviting them into their waters.

Shipboard E-Mail - John Freitag opened a discussion on shipboard email (see ***Appendix III***). All (of us) have wrestled with the problem of shipboard email. John says that now, 90% of the email is

personal. Dale questioned John on the source of this statistic. It was John's estimate. It was commented that it is important to make email transmissions as efficient as possible. Often there are one or two users who deserve a whopping bill, while there are many who don't deserve a bill at all. Sandy commented that it was a good idea, but much better not to do it at all. Built in to Sandy's proposals is a certain amount for communications. There are problems with the Chief Scientist paying personally and collecting later. There followed a discussion on the pros and cons of personal versus institutional paying the bill. The COMSAT bill for R/V THOMPSON "went out of sight" until dollar restrictions were put in place. This prompted a lively discussion. There was disagreement over personal versus official mail, especially from WHOI. A similar disagreement arose over paying for email versus getting it for free. WHOI is now maintaining web sites via e-mail. Also it was reported that cell phones do not work nine out of ten times. Woody will demonstrate their system on MELVILLE for INMARTECH. E-mail costs vary from $2,000 to $40,000 month.

Break (10:45am)

The meeting resumed at 11:00am.

USCG HEALY Science Systems Testing Discussion - John Freitag informed the meeting about the latest developments, see ***Appendix IV***. Avondale is still holding the 28 February 1999 delivery date but it is unlikely that this cannot be met. The "unofficial" revised date is 1 July 1999 based on the percent completion of the required testing procedures. This will heavily impact the testing sequence because there are seasonal weather considerations in the Arctic, which come into play. The first testing sequence will be the Warm Water test cruise which is mainly for Sea Beam calibration and will be conducted off the East coast, probably out of San Juan, PR. After transit to the ice, level ice testing will begin. This will include testing of a propulsion ice performance and limited science testing. This would be followed by the science ice trials. This leg would have a chief scientist and a group of technical experts. There followed several questions and comments. WHOI asked about funding for the testing cruises to NSF. There were questions on the makeup of crew and the training of crew and crew rotation. Rich spent a week on the USCGC Polar Sea. The operation worked "fairly well". A new crew rotated in and had to be trained on the operation of the Autosal laboratory salinometer and the CTD. It was questioned whether the science party would be running winches? The USCG answered in the negative: as this is a dedicated (science) ship and the crew will not be pulled from science ops to do other things. There was a question on how to obtain a 30m cores with 9/16" cable " [I] will not be on deck when the core is pulled out of mud".

The meeting was adjourned at 12:00 noon for **Lunch**

The meeting resumed shortly after 1:00 pm.

Naval Oceanographic Office (NavO) Ship Programs - SIO has been the coordinating data processing

for UNOLS institutions for most of the NavO work. Woody Sutherland reported on the 1998 NavO Program and the 1999 schedule (434 ship days at $5,761,000). All in all it is considered to be highly successful and Woody gave details of the operations in which SIO was a participant. A discussion ensued on coring techniques including the virtues of coring from the fantail and the use of chain use as a cradle for the core bomb.

Bob Knox (UNOLS Chair) reminded the group that we should not think that NavO work is going on forever. Some operations are one-time only and some are repeat (i.e. CTD work). But it is not an "ad infinitum funding source like NSF". The Physical Oceanography program is pretty much finished after 1999. But NavO is interested in continued coastal work. The Navy vessels can do "military surveys" in other country's territorial waters without requesting clearance, whereas UNOLS vessels come under the definition of Research Vessels and must receive clearance from any country in which they conduct operations within the 200-mile EEZ. As a result, UNOLS vessels have not participated in NavO operations in foreign EEZs.

The **UNOLS Ship Inspection Program** status was given by Greg Beers, Jamestown Marine Services. He gave a background on the Inspection Program and his background. Bob Dinsmore (WHOI) has been retained as an advisor. Since the inspections began in September 1997, JMS has inspected 17 vessels. Some points and suggestions were offered;

- Test vessels' crane, winch and weight handling equipment to 125% of SWL (Safe Working Load) every two years.
- Devise weight tests that research vessel operators can do themselves
- Winch wire logs should record wire out and maximum tension.
- GFCI (Ground Fault Circuit Interrupter) receptacles are recommended for all R/Vs
- International Safety Manual (ISM) should be consulted.
- Radioisotope safety issues were discussed. Sandy brought up the point that NSF has funded the University of Miami to conduct swab surveys on all UNOLS vessels upon request after Radioisotope use on board. This is at no cost to the requesting vessel operator.

Questions and comments: Sandy pointed out that [all should] benefit from this program. It is appropriate for program operators to consult with the company on problems with their vessels slated for inspection. Inspections are a good way to justify equipment/instrumentation replacements and improvements.

SeaNet Update - Dale Chayes provided a report on SeaNet, "Extending the Internet to the Oceanographic Fleet," see ***Appendix V***. He listed the SeaNet partners and described the award process. Eight proposals were received from operators and five ships were selected for SeaNet installations. Installation is in the early stages. Dale reviewed the operating modes and tentative billing model for Inmarsat HSD. Lastly, future plans were discussed.

Shipboard Technical Support Proposal Revisions were reported on by Sandy Shor (NSF). Only one change on Instrumentation proposals has been made in the proposed new guidelines: now spare parts are not prohibited. There was a question on spare kits when purchasing new equipment. These would be allowed, but should generally be included in the original funding request. Technical Services Proposal changes include Specialized Instrument Support v/s Basic Services. Specialized instruments may need extra personnel at-sea, but this will be provided by the Technical Services award and not via individual research grants. There was a discussion on the new ship time request form. Technical groups need the information provided by Part B of the form. Part B is to be completed by the PI after receipt of funding. Part B is still in development and is in draft form only at the moment. Sandy noted that the proposal revisions are due mainly to prevent, say Physical Oceanography departments from getting a new CTD for their general use rather than for UNOLS shared equipment use.

2:30 pm. **Break**

The meeting reconvened at 2:45pm for

Salary Survey Discussion - Annette reported that she only received information from three institutions with 13 surveys completed. This was a low response. She asked for a show of hands for those who wished to continue the survey and seven or eight responded. Annette will send out reminders to all via email to respond to the survey request.

Subcommittee reports:

Long Range Instrumentation Planning - Rich Findlay discussed the complex varieties of Digital Video Disks (DVD's), as in the future, Compact Disk Read Only Memory's (CD-ROMs) will be replaced in all PCs. There are:

- DVD-R (Digital Video Disk Recordable)
- DVD-RAM (Digital Video Disk Random Access Memory)
- DVD-ROM (Digital Video Disk Read Only Memory)

DVD ROM will read CD-ROMS but not Compact Disk Recordables (CD-Rs). One must look for a "multiread" designation.

Rich also told the meeting about the "Ultimate Ship of Opportunity": a super cruise liner that would incorporate various sensors for recording oceanographic/meteorological parameters along the liner's cruise tracks. Royal Caribbean Cruiselines is inviting U. Miami to provide help in outfitting the ship for science. There were many volunteers to help Rich with this project and a question was asked regarding the possibility of having a future RVTEC meeting aboard. The ship is scheduled for an Atlantic delivery cruise in 2000.

Tom Wilson reported on **Database Subcommittees and On-line Resources Subcommittee** - The SUNY Marine Sciences Research Center (MSRC) Ocean Instrument Lab web site is coming soon (Check http://kilroy.msrc.sunysb.edu/welcome.html). He gave a report on the "Seven steps to crash-proof [PC] system and an automatic rebooting program. There were comments that Windows NT is a better platform for reliability. There was some concern about the advisability of rebooting four times a day. Sandy Shor said that there are appropriate sources of funds if needed.

In answer to a question regarding bubble free water for instrumentation, Tom Wilson (SUNY) described his debubbler, a device to go in-line with pure sea water lines to provide a bubble-free flow through water supply for fluorometers, transmissometers, etc. He has two on the shelf at the moment. Price tag $550+. A 20 l/min flow is typical.

Next up was the **Data Interchange Subcommittee** report presented by Steve Poulos, University of Hawaii. The main topic was the network Common Data Format (NetCDF). Steve commented that it's about time it was implemented. NetCDF is a standard method for storage and retrieval of data in the form of arrays. Dale suggested that it is time for a proposal in which two or three people could collaborate for a few weeks to implement this as a method of exchange for UNOLS data. This cannot be done as a volunteer effort. Rich Findlay moved to form a committee to write a proposal to get funded to do the job. The motion was seconded by Carroll Baker, Skidaway Institute of Oceanography. The motion carried. Steve Poulos (UH), Dale Chayes (LDEO), Tony Amos (UT), and Kalin Huang (WHOI) agreed to be on this Committee. A meeting needs to be set.

The **Wire and Cable Subcommittee** reported next. John Alberts (WHOI) is to take over as coordinator of the cable pool. A new chair of the Wire and Cable Subcommittee is needed as Don Moller (WHOI) retired at the end of the year. Don has served in that capacity for many years. A discussion followed on replacing the standard CTD cable with a single conductor cable. The Committee felt that it needed a bigger cast of players than this forum [RVTEC]. Rich Findley was appointed as chair of the Wire and Cable Committee for the next year. Mike Webb will continue to serve on the committee. It was suggested to ask Tom Althouse to be on the committee. John Freitag will also be on the committee.

Nominations Committee Report: Election of Chair - The committee reported that for the position of RVTEC Chair, there were two candidates: Woody Sutherland, (SIO), and John Freitag, (URI). No other candidates were nominated from the floor. It was decided by voice vote that it should be a paper vote and that UNOLS (Annette) should oversee the mechanics of the election. Only one vote per institution would be allowed. John Freitag was elected as Chair, the two-year term to begin at the adjournment of the meeting.

Rich Findlay moved to reappoint Tom Wilson as chairperson of the On-Line Resources Subcommittee, Dale Chayes seconded the motion which was carried by voice vote.

New Business

The only new business item was the selection of next year's meeting site. The Chair noted that we have traditionally alternated coasts for our meeting venues and that we had altered that pattern this year in view of the unique constraints set by INMARTECH. There was a short discussion during which Alaska and Hawaii came under discussion. Tony Amos (UT) volunteered to have the meeting at his institution in Port Aransas, Texas. This was received well by the attendees and accepted with a voice vote.

Thanks to the hosting institution and Woody Sutherland and his crew for the hard work and preparation for the meeting were offered by the Chair. Thanks were also given to Annette and Mary from the UNOLS office for their work in making arrangements.

Rich Findlay moved to adjourn, Dale Chayes seconded. The motion was passed by voice vote and the meeting adjourned at 5:00 pm.

RESEARCH VESSEL TECHNICAL ENHANCEMENT COMMITTEE

OCTOBER 19, 1998
Scripps Institution of Oceanography
La Jolla, CA

October 1, 1998

Agenda

Monday, October 19:

8:30 am Informal Networking

9:00 am Meeting Called to Order

- Welcome by Woody Sutherland (SIO)
- Introductory Remarks by John Freitag, Chair

9:15 am Participant Introductions

9:30 am Accept Minutes

- Accept the 1997 RVTEC Annual Meeting Minutes

9:35 am UNOLS Reports

- Summary of UNOLS Activities
- RVTEC liaisons with UNOLS Subcommittees:

FIC
AICC (HEALY Science Systems Testing to be discussed later)
RVOC

10:00 am Agency Reports:

- NSF
- ONR
- NOAA
- NAVO
- USCG

10:45 am Break

11:00 am USCGC HEALY Science Systems Testing Discussion - John Freitag will report on the status of developing science system test programs for USCGC HEALY.

12:00 pm Lunch

1:00 pm Naval Oceanographic Center (NAVO) Ship Programs - Woody Sutherland (SIO) will lead a discussion to review 1998 NAVO cruise programs. Recommendations for next year's operations will be discussed.

1:20 pm UNOLS Ship Inspection Program - Status and Feedback

1:40 pm SeaNet Update - Discussion on the status of installing SeaNet Systems on UNOLS vessels (a full technical report will be provided during the INMARTECH '98 Symposium on Thursday, 22 October.)

2:00 pm Shipboard Technical support proposal revision in procedures - Sandy Shor NSF/OCFS Program Manager will provide an update on new procedures for writing the Tech Support proposals and requests for ancillary services.

2:30 pm Break

2:45 pm Salary Survey Discussion - An update on where we stand at this point and a discussion of possible mid- coarse corrections to the survey still in progress.

3:00 pm Subcommittee Reports

- Database Subcommittee; Tom Wilson
- Data Interchange Subcommittee; Steve Poulos
- Long Range Instrumentation Planning Subcommittee; Rich Findley

- Wire and Cable Specifications Review Subcommittee

4:00 pm New Instrumentation Presentations/Show and Tell

4:30 pm General Business

- Report form the Nominations committee and election of Chair
- Updating of Action Plans

4:50 pm New Business

Adjournment

Preregistered Attendees
RVTEC - 1998

Name	Organization
David, Blake	British Antarctic Survey
Arrants, Dwight	D/UNCOC
Walker, Robert	FL Institute of Oceanography
Beers, Greg	Jamestown Marine Services
Dartez, Steve	LA State University
Chayes, Dale	LDEO
Muller, Rich	Moss Landing Marine Labs
Glydewell, Jimmie	NAVO
Somers, David	NAVO
Shields, Dennis	NOAA
Shor, Alexander	NSF
Fayler, Linda	Oregon State University
Willis, Marc	Oregon State University
Knox, Robert	SIO
Smith, Stu	SIO
Williams, Robert	SIO
Baker, Carroll	Skidaway Inst. Of Oceanography
McKissack, Travis	Skidaway Inst. Of Oceanography
Amos, Anthony	TAMU
Hartz, Steve	Univ. of Alaska
Deering, Timothy	Univ. of Delaware
Pfeiffer, Timothy	Univ. of Delaware
Poulos, Steve	Univ. of Hawaii
Findley, Richard	Univ. of Miami
Martin, William	Univ. of Washington
Schwartz, Daniel	Univ. of Washington
White, George	Univ. of Washington
D'Andrea, Mary	UNOLS
DeSilva, Annette	UNOLS
Freitag, John	URI
Orvosh, Thomas	URI
Szelag, Jan	URI
Albrough, John	USCG
Hutchison, David	USCG
McFadden, Eldridge	USCG
Vaughn, David	USCG
Akens, John	WHOI
Maffei, Andrew	WHOI
Martineau, Barbara J.	WHOI
Walden, Barrie	WHOI

Shipboard E-mail A nightmare in the making?

11/22/99

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Author: Maffei

INMARTECH '98

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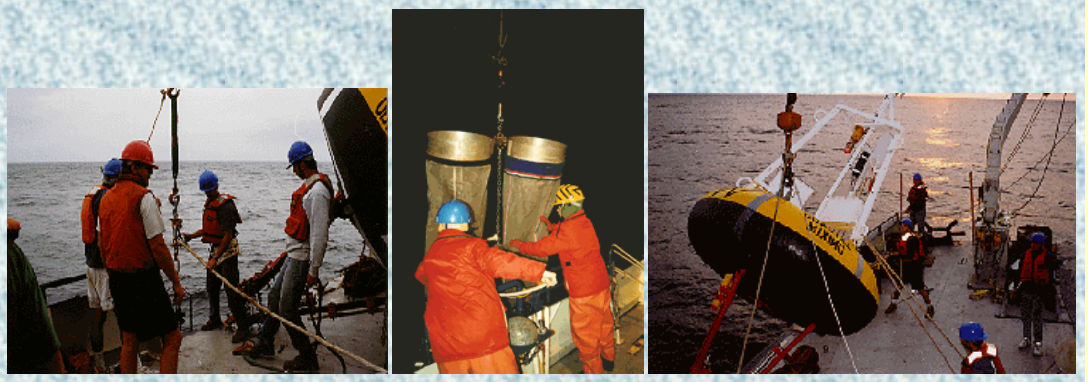
Comments and Questions?
Please contact the UNOLS Office with any questions regarding INMARTECH '98:
office@unols.org

INMARTECH '98

International Marine Technicians Workshop



Scripps Institution of Oceanography
La Jolla, CA USA
October 20-22, 1998

R/V OCEANUS photos (l to r): Instrumented mooring launch, night bongo-net work, and surface buoy launch. All photos by Christopher Griner, Woods Hole Oceanographic Institution.

This page is best viewed with Netscape 3.0 or greater

INMARTECH '98
Scripps Institution of Oceanography
La Jolla, CA
October 20-22

Welcome to INMARTECH '98!

To help make your stay in La Jolla a pleasant one, the following logistical information is provided:

v Shuttle Buses v

Shuttle buses will run daily between the Radisson and Empress Hotels and Scripps Institution of Oceanography (SIO) campus. The first morning shuttles will leave the hotels at approximately 07:30 am, with additional trips every 15 to 20 minutes. The shuttles will pick-up passengers outside the hotel lobby doors. The first trip back to the hotels will begin immediately following the end of each day's sessions.

v INMARTECH '98 Check-In v

Participants can check in for INMARTECH '98 at Sumner Auditorium on SIO Campus starting at 07:45 a.m. on Tuesday, 20 October.

v Ticketed Events v

The activities in the program agenda denoted by asterisks "*" are ticketed events. Payment for these events must be made prior to the meeting. You will receive your tickets for the pre-paid meals and events at check-in.

v Meeting Locations v

The concurrent technical sessions will be held at Sumner Auditorium and Hubbs Hall. The program agenda indicates the session site. Signs will be posted to direct foot traffic between the two rooms and a SIO campus map will be distributed during check-in.

We hope that you enjoy INMARTECH '98!

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v INMARTECH '98 AGENDA v

Tuesday 20, October, 1998

07:30 *Start of shuttle service between INMARTECH hotels and SIO campus.*

07:45 Check-In at Sumner Auditorium

08:30 WELCOMING SESSION - Sumner Auditorium

- INMARTECH '98 Opening Remarks and Welcome to Scripps Institution of Oceanography - Mr. Woody Sutherland, Manager, SIO Shipboard Technical Support

- Overview of Ship Operations and Shipboard Technical Support – SIO & UNOLS - Dr. Robert Knox, Associate Director, SIO and University-National Oceanographic Laboratory System (UNOLS) Chair
- SIO International Activities - Dr. Lisa Shaffer, SIO
- Technician and Instrumentation Support for Seagoing Science by the U.S. National Science Foundation - Dr. Alexander Shor, Program Director, NSF Instrumentation and Technical Services Program

09:45 Coffee Break

10:00 Technical Workshop (Sumner Auditorium)

UNDERWAY SAMPLING SYSTEMS - Mr. Anthony F. Amos (University of Texas), Chair

- ***An Interactive Shipboard Scientific Log for Research Vessels*** - Mr. Anthony F. Amos, University of Texas Marine Science Institute
- ***IMET - Improved METeorology - Instrumentation*** - Mr. David Hosom, Woods Hole Oceanographic Institution
- ***Data - Sensor Calibrations and Data Quality Analysis*** - Mr. R. Williams, Scripps Institution of Oceanography
- ***Underway Data Collection System on Board RV PELAGIA; Considerations and Design of a New System*** - Mr. J. Derksen, Netherlands Institute For Sea Research

12:00 Lunch (SIO Pier) *

13:00 Technical Workshops (Concurrent Sessions)

GEOPHYSICAL TECHNOLOGIES (Hubbs Hall) - Mr. Paul Henkart (Scripps Institution of Oceanography), Chair

- ***Seismic Sources in the UNOLS Fleet*** - Dr. John Diebold, Lamont-Doherty Earth Observatory of Columbia University
- ***Sound Receivers*** - Dr. Graham Kent, Scripps Institution of Oceanography
- ***Chirp Sonar Design for In-Hull Applications*** - Dr. Lester LeBlanc and Dr. Steven Schock, Florida Atlantic Institution
- ***An Overview of Swath Bathymetry*** - Dr. Dale Chayes, Lamont-Doherty Earth Observatory

ROV AND TOWED VEHICLES (Sumner Auditorium) - Mr. Marc Willis (Oregon State University), Chair

- ***A Typical Cruise with the ROV Jason*** - Mr. Robert Elder, Woods Hole Oceanographic Institution
- ***Recent MPL Deep Tow Group Seagoing Work*** - Dr. Fred Spiess, Scripps Institution of Oceanography
- ***Tiburon: MBARI's ROV for Science Research*** - Dr. William J. Kirkwood, Monterey Bay Aquarium Research Institute
- ***A Comparison of Single Body and Two Body Shallow Towed Vehicles***- Mr. Mark Rognastad, University of Hawaii
- ***SeaSoar Metamorphosis*** - Dr. Lindsay Pender, CSIRO Marine Research

17:00 *Shuttle Buses return to Hotels*

18:00 Reception and Poster Session at Birch Aquarium * - Parking ($3 per vehicle) is available at the Birch Aquarium

Wednesday, October 21, 1998

07:30 *Start of shuttle service between INMARTECH hotels and SIO campus.*

08:30 Technical Workshops (Concurrent Sessions)

BOTTOM SAMPLING TECHNIQUES (Hubbs Hall)

- ***A Large Diameter Piston Corer for Use on UNOLS Research Vessels*** - Dr. Peter Kalk, Oregon State University
- ***MultiCoring*** - Mr. Richard Muller, Moss Landing Marine Laboratory
- ***Glass Coring and Rock Dredging*** - Mr. Ronald Comer, Scripps Institution of Oceanography

ACOUSTIC, DOPPLER, CURRENT PROFILER (Sumner Auditorium) - Dr. Eric Firing (University of Hawaii), Chair

- ***Fundamental Components of Shipboard and Lowered ADCP Systems*** - Dr. Eric Firing, University of Hawaii
- ***Routine Shipboard ADCP Operation: Benefits, Problems, Methods*** - Dr. Eric Firing, University of Hawaii
- ***Lowered Acoustic Doppler Current Profiler: From an Experimental Instrument to a Standard Hydrographic Tool*** - Dr. Martin Visbeck, Lamont-Doherty Earth Observatory Columbia University, NY
- **Acquisition of Vessel-Mounted Narrowband and Broadband ADCP Data using a Sun Logging System on ORV FRANKLIN, FRV SOUTHERN SURVEYOR and RSV AURORA AUSTRALIS** - Dr. Helen Beggs, CSIRO Marine Research

12:00 Bus from SIO Campus to SIO Marine Facility (MarFac)

12:30 Bar-B-Que at MarFac *

- Tour of SIO Marine Facility (R/V MELVILLE, FLIP, etc.)
- Underway Sampling System Demonstrations (on R/V MELVILLE) - SIO Oceanographic Data Facility and Shipboard Computer Group personnel
- Multibeam Processing Demonstration (on R/V MELVILLE) - Mr. Stuart Smith, Scripps Institution of Oceanography

17:00 *Bus back to Hotels*

Evening is Open

Thursday, October 22nd

07:30 *Start of shuttle service between INMARTECH hotels and SIO campus*

08:30 Technical Workshops (Concurrent Sessions)

DECK OPERATIONS AND ONBOARD SAFETY (Hubbs Hall) - Mr. Woody Sutherland (Scripps Institution of Oceanography), Chair

- ***Oceanographic Research Vessel Deck Safety*** - Capt. Daniel S. Schwartz and Mr. George White, University of Washington, School of Oceanography
- ***Small Research Vessel Deck Operations*** - Mr. Steve Hartz, University of Alaska
- Fiber Optic Cable
- UNOLS Safety Video

SHIPBOARD NETWORKING AND SEANET (Sumner Auditorium) - Mr. Barrie Walden (Woods Hole Oceanographic Institution), Chair

- ***Data Collection and Distribution*** - Mr. Barrie Walden, Woods Hole Oceanographic Institution
- ***SeaNet*** - Extending the Internet to Oceanographic Research Platforms - Mr. Andrew Maffei and Mr. Steve Lerner, Woods Hole Oceanographic Institution
- ***Sensor Data Acquisition and Display via the Ship Network*** - Mr. Dennis Shields, National Oceanographic and Atmospheric Administration
- ***E-mail on the Woods Hole Oceanographic Ships*** - Mr. James Akens, Woods Hole Oceanographic Institution
- ***Direct Connection Network Sensor Interfaces*** - Mr. Richard Findley, University of Miami

12:00 Lunch (SIO Campus) *

13:00 Technical Workshop (Sumner Auditorium):

CTD PACKAGES - Mr. Woody Sutherland (Scripps Institution of Oceanography), Chair

- **WOCE Operations** - Mr. Frank Delahoyde, Scripps Institution of Oceanography
- **Seabird CTD Data Processing in Coastal Waters** - Ms. Kristen Sanborn, Scripps Institution of Oceanography
- **Data Evaluation and Quality Control for Routine CTD/Hydrographic Data** - Dr. James Swift, Scripps Institution of Oceanography
- **Marine Instrument Calibration "You Know it Makes Sense"** - Mr. Paul Ridout, Ocean Scientific International Ltd.
- **Insitu Pressure Calibration** - Mr. Sven Ober, Netherlands Institute For Sea Research

14:30 INMARTECH '98 - WRAP-UP SESSION

Adjourn Shuttle Buses return to Hotels

18:30 Mexican Dinner at SIO Campus *

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v INMARTECH '98 ABSTRACTS v

Tuesday 20 October 1998
Wednesday 21 October 1998
Thursday 22 October 1998

Tuesday 20, October, 1998

Tuesday
10:00 Technical Workshop

UNDERWAY SAMPLING SYSTEMS

Sumner Auditorium

Mr. Anthony F. Amos (University of Texas), Chair

v ***An Interactive Shipboard Scientific Log For Research Vessels*** - Mr. Anthony F. Amos, The University of Texas Marine Science Institute

Daily logs have been kept on sea-going vessels of all types for centuries. In the relatively short history of the purely research vessel, the idea that data of a more scientific nature be logged started in the notebooks of the "naturalists" and now continue in the data banks of shipboard computers. The author has devised a scientific log that incorporates some of the needs of a ship's log with that required by the onboard scientists. A few decades ago, all members of the scientific and technical crew were required to stand a daily watch to oversee the equipment such as precision depth recorders, magnetometers, etc. This practice has largely disappeared on research vessels that are often engaged in multidisciplinary programs where different expertise is required in each discipline's specialized equipment. Underway

environmental data is recorded along with positional data at a rapid rate on modern vessels, making the production of a log from these data impractical. This software system runs continuously, acquiring and displaying underway data, as usual, but allowing the input of information on cruise events such as station numbers, equipment calibrations, special observations, and comments that are appended to the data line. It also automatically calculates sunrise, sunset, and Local Apparent Noon and records those at the instant of their calculated occurrence. It also displays information on time and distance to the next station. At the end of each day, a summary log of the day's events, mean and extreme environmental conditions, and station positions is produced as well as a graphical representation of conditions and a daily cruise track. The log can be provided to the scientific party in hard-copy form or electronically. The system is semi-automatic, but still requires a watch-stander and the cooperation of parties on board in entering the data pertinent to their operations. On our cruises, the CTD watch usually oversees the underway system.

v ***IMET - Improved METeorology - Instrumentation*** - Mr. David Hosom, Upper Ocean Processes Group, Woods Hole Oceanographic Institution

The ocean is critical to inter-decadal climate variability because of its ability to store and transport heat and fresh water and release them to the atmosphere through sensible and latent heat fluxes. Knowledge of various properties at the sea surface is essential to monitoring, understanding, and developing the ability to predict climate change. Vertical exchange across the air-sea interface of horizontal momentum and of buoyancy couples the ocean and atmosphere. The sea surface is the interface through which heat, fresh water, momentum, gases, and other quantities are exchanged. It is the bottom boundary of the atmosphere over approximately 70% of the earth's surface and the top surface of the very large oceanic reservoirs of heat and other properties. Observing this coupling is a fundamental need if we are to both understand ocean variability and its interrelation to climate. This requires the observation of surface wind velocity, humidity, air temperature, sea temperature, barometric pressure, incoming shortwave radiation, incoming longwave radiation and precipitation.

In planning for WOCE (World Ocean Circulation Experiment) it was recognized that moored buoys and ships would provide especially attractive platforms from which to make accurate in-situ measurements of the basic surface meteorological observable parameters required to investigate the air-sea fluxes of momentum, heat, and mass. Accuracy's of 10 Watts per meter squared were sought in estimates of the mean values (averaged over monthly and longer time scales) of each of the four components of the total heat flux (sensible, latent, shortwave, and longwave). Accuracy's of approximately 1 mm per day were sought in evaporation and precipitation.

Woods Hole Oceanographic Institution (WHOI) was funded to evaluate and choose sensors capable of meeting the WOCE goals and to develop the IMET system as a flexible data collection system. Each sensor was incorporated into a module with built-in intelligence that responds to polled commands from the central computer and data recording unit. Each module interfaces to an ADDB (addressable digital data bus) consisting of +12vdc power and RS485 serial ports. A key component of IMET accuracy is that the calibration constants are stored in the module so that the serial digital output is in calibrated units. The calibration constants from each unit are polled and stored on the data file with the data from a specific time period. Modules having non-linear algorithms will output both calibrated and raw data to permit later corrections.

IMET systems are now in use on eight UNOLS ships, six WHOI buoys, one USF (University of Southern Florida) buoy, one NOAA ship and the Rutgers University Field Station. These systems have proven themselves over the last eight years and now provide the baseline for climate quality data. This paper will discuss IMET, data accuracy and Volunteer Observing Ships (VOS) climate data acquisition.

v ***Data - Sensor Calibrations and Data Quality Analysis*** - Mr. R. Williams, Scripps Institution of Oceanography

v ***Underway Data Collection System on Board RV PELAGIA; Considerations and Design of a New System*** - Mr. J. Derksen, Netherlands Institute For Sea Research

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Tuesday
13:00 Technical Workshops

GEOPHYSICAL TECHNOLOGIES

Hubbs Hall

Mr. Paul Henkart (Scripps Institution of Oceanography), Chair

v ***Seismic Sources in the UNOLS Fleet*** - Dr. John Diebold, Lamont-Doherty Earth Observatory of Columbia University

Ever since seismic refraction and reflection profiles were first acquired (in the 1930s and 50s, respectively) active seismic techniques have played an important role in marine geophysical data acquisition by the US fleet. Since their invention in the 1960s, airguns have supplanted the original explosive sources, first in reflection work, and more recently, in refraction profiling. Airguns require a significant initial investment ($30 - $40K ea) and expensive compressors are needed as well. However, they are cost-effective in the long run, are more efficient, and much safer. For example, a single shot by EWING's full 8,500 cu. in. 20-gun array provides as much energy in the seismic band as a single 2,000 LB TNT charge. Considering that explosives typically cost between $1 and $2 per pound, and that the airguns can be fired every 20-seconds for an entire 40-day leg, it is difficult to justify using explosives at all, except in cases where very large or deep shots are required.

Taken as a class of tools, airguns are very flexible, in that they can be applied to a broad range of seismic problems. Of the three types of airgun generally available, however, each is somewhat more limited in its range of applications. The 20 Bolt airguns in the EWING's array, for example can be configured to produce a good source for large-scale refraction work (with offsets well in excess of 100 km), deep penetration multichannel reflection profiles, and medium resolution reflection profiles, but they are not appropriate for high resolution work. Two other types of airgun; the sleeve gun (Western Geophysical/Haliburton) and the "GI" gun (Seismic Systems, Inc.) are better suited for the shallow towing necessary to obtain the bandwidth needed for high temporal resolution. The GI gun, in particular, is well suited for use on small and medium-sized vessels, and those with limited compressor capacity, since a single GI gun, with its ability to cancel bubble reverberation, creates a "tuned" signature, which requires an array of sleeve guns. We discuss these, and other tradeoffs that ship operators should be aware of when planning or proposing seismic work for the academic community.

v ***Sound Receivers*** - Dr. Graham Kent, Scripps Institution of Oceanography

v ***Chirp Sonar Design for In-Hull Applications*** - Dr. Lester R. LeBlanc (Presenter), Professor of Ocean Engineering & Dr. Steven G. Schock, Associate Professor of Ocean Engineering, Florida Atlantic University, Department of Ocean Engineering

The Chirp Sonar is a linear FM sonar that was developed to support the objectives of remote acoustic classification of seafloor sediments. It is a calibrated wideband digital frequency modulated sonar that provides quantitative high-resolution low noise images. It can be operated, either using a tow-vehicle, or using an in-hull mount. Since the Chirp Sonar system can precisely transmit a specified waveform with wide bandwidth, and its digital receiver is calibrated, the data can be processed to estimate the acoustic impulse response of the seafloor sediment, and sediment attenuation. The processed chirp pulse is designed to provide low temporal sidelobes and nearly constant resolution with depth. Because the system is wideband, the resulting beampattern has nearly no sidelobes. All of these factors combine to make the Chirp Sonar an outstanding tool for sea floor exploration.

v ***An Overview of Swath Bathymetry*** - Dr. Dale Chayes, Lamont-Doherty Earth Observatory

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Tuesday
13:00

ROV AND TOWED VEHICLES

Sumner Auditorium

Mr. Marc Willis (Oregon State University), Chair

v ***A Typical Cruise with the ROV Jason*** - Mr. Robert Elder, Woods Hole Oceanographic Institution

A description of the unmanned vehicles operated as part of the U.S. Deep Submergence Facility will be given. A typical deployment of the ROV Jason will be presented with particular attention to support vessel requirements. A launch and recovery sequence along with operating methods will be discussed. The presentation will also include a look at some of the data products that can be generated with an ROV such as Jason.

v ***Recent MPL Deep Tow Group Seagoing Work*** - Dr. Fred Spiess/Dr. John Hildebrand/Dr. Christian de Moustier, Scripps Institution of Oceanography

The MPL Deep Tow Group operates several vehicles, two of which have been used in major NSF-funded operations in 1998. The first operation of the year (January and February) was the Ocean Seismic Network Pilot Experiment (OSNPE - Ralph Stephen of WHOI, Chief Scientist) in which the JOI/MPL wireline reentry Control Vehicle (CV) was the primary work platform. This load-carrying ROV was used to make four entries, including seismometer downhole installation, in ODP hole 843 in 4.4 km of water about 100 miles south of Oahu. The CV was also used in the placement and installation documentation for seismometers placed on or in the sea floor in the same experiment. The site was revisited in June and the CV used to retrieve all three seismometers and their data recording packages.

The second operation was a 45 day expedition (May - June) utilizing Deep Tow Fish 6 to carry out an extensive near bottom magnetometer and sidelooking sonar survey oriented to the east Pacific Rise in the tropical Pacific with Dr. Jeff Gee of SIO as Chief Scientist. We will show data from the Gee operation as well as TV clips of operational aspects of the OSNPE, and comment on operations using other vehicles during the year.

v ***Tiburon: MBARI's ROV for Science Research*** - Dr. William J. Kirkwood, Monterey Bay Aquarium Research Institute

Tiburon is MBARI's Remotely Operated Vehicle (ROV) which has recently begun operations for science and exploration of the Eastern Pacific. The vehicle was specified and built by MBARI's technical staff to address missions defined by the science staff. Reviewers from various institutions (Scripps, MIT, ISE, IFREMER and others) modified the specification and system concepts for Tiburon. The ROV is completely integrated with MBARI's SWATH vessel, R/V WESTERN FLYER. The integrated system has been performing science missions concurrently with engineering tests.

The 1997-1998 year of operation has brought a variety of experiences and issues. Some aspects of the system's performance have yielded better than anticipated results. Other aspects have shown potential but require fine-tuning. The overall architecture has proven to be robust, but has also shown vulnerability when efforts are not coordinated. Experience with the integrated system has added knowledge that needs to be applied towards improving and maximizing the system's utility.

The R/V WESTERN FLYER has functioned for more than a year as the platform for supporting Tiburon operations. The control room was designed explicitly to assist in the efficient operation of science missions. Concepts about Pilot to Chief Scientist communications and coordination with the ship crew have been tested and validated. Support systems for the ROV and coordinated control have been accomplished at the rated depth of 4000 meters. Transects over several kilometers in excess of 3000 meters depth have been successful using the R/V WESTERN FLYER's dynamic positioning system in conjunction with Tiburon's controls.

This presentation discusses the original specification, decisions about architecture and system trades, and how Tiburon (along with the R/V WESTERN FLYER) have performed against that specification.

v ***A comparison of Single Body and Two Body Shallow Towed Vehicles-*** Mr. Mark Rognastad, University of Hawaii

In 1995 the National Defense Center of Excellence for Research in Ocean Science (CEROS) began funding Raytheon Corp. (then Alliant Techsystems, later Hughes Naval and Maritime Systems) and the Hawaii Mapping Research Group (HMRG) of the University of Hawaii to conduct a series of experiments in synthetic aperture sonar. The first experiment, a proof of concept test, utilized the HAWAII MR1 sonar system together with a hydrophone array provided by Raytheon. These results were promising, and a purpose-built tow vehicle was then funded, and has been tested in several configurations.

The HAWAII MR1 is a two body system, with a tow vehicle weighing 3500 lbs. in air, but ballasted to be between 50 and 100 lbs. positively buoyant in water, connected with a neutrally buoyant tether to a depressor with 2000 lbs. of negative buoyancy. In typical use, this depressor is towed at a depth of 100 meters, attached to the towing vessel by a steel armored electromechanical cable, at speeds of 7 to 10 kts. A drogue line and buoy are fastened to the after end of the tow vehicle, both to improve vehicle stability and to aid recovery in the event of loss. Launch and recovery of the vehicle and depressor is accomplished using a mechanical system designed by Sound Ocean Systems and subsequently modified by HMRG.

The synthetic aperture testing required speeds of 2 to 5 kts. and depths of 15 to 25 meters; several modifications were made to the MR1 system to improve its performance at slow speed. The buoyancy of the vehicle was reduced, and the drogue line shortened to 30 meters. Small (10 cm diam.) drogue chutes were added to the drogue line to increase drag. With these modifications, the MR1 system performed well.

The initial design for the purpose-built tow vehicle was based on an existing design created at Raytheon, the result of a significant effort on hydrodynamic simulation and model tank testing. The Raytheon vehicle had been used for similar synthetic aperture experiments in Lake Washington and Puget Sound with good results. It is a single body design, towed from the upper midpoint of the vehicle, and weighs roughly 2300 lbs. in water.

v ***SeaSoar Metamorphosis*** - Dr. Lindsay Pender and Mr. Ian Helmond, CSIRO Marine Research, Hobart, Tasmania, Australia

Over the past 13 years, we have progressively changed the characteristics of our SeaSoar to improve its performance. In this presentation, we will discuss the current configuration, its performance, and the rational behind the changes we have made. We will discuss the replacement of the standard hydraulic wing control unit with a low maintenance, low torque electric drive. In order to implement the low torque drive, new wings were developed and an aileron roll stabilization scheme implemented. These changes resulted in an increased depth range and improved roll stability.

We will also discuss ships wake avoidance, communication, and our system control software, which includes real time bottom avoidance. The developments outlined can be readily applied to other actively controlled towed vehicles.

Wednesday, October 21, 1998

Wednesday
08:30

BOTTOM SAMPLING TECHNIQUES
Hubbs Hall

v ***A Large Diameter Piston Corer for Use on UNOLS Research Vessels*** - Dr. Peter Kalk, Oregon State University

This presentation covers a brief history of marine sediment sampling leading to Kullenberg's invention of the piston corer and subsequent modifications to the original. A large diameter piston corer as used today is examined. UNOLS vessel equipment needed for long piston corers and problems encountered with today's corers are reviewed.

v ***MultiCoring*** - Mr. Richard Muller, Moss Landing Marine Laboratory

v ***Glass Coring and Rock Dredging*** - Mr. Ronald Comer, Scripps Institution of Oceanography

A history of dredging and glass coring using SIO systems. A discussion of the pros and cons of each system and when to utitlize each system as compared to geologic setting, time constraints, effectiveness, costs, and sampling goals.

Wednesday
08:30

ACOUSTIC, DOPPLER, CURRENT PROFILER

Sumner Auditorium

Dr. Eric Firing (University of Hawaii), Chair

v ***Fundamental Components of Shipboard and Lowered ADCP Systems*** - Dr. Eric Firing, University of Hawaii

Shipboard and lowered ADCP systems include the following subsystems: the platform or frame; the profiler itself; a GPS receiver; attitude sensors; the data acquisition system; and data processing software. Among these, the least troublesome is the GPS receiver. Each of the other components can limit the accuracy of the profiles of water velocity relative to the earth. Choices and problems associated with two of the subsystems will be emphasized here: the profiler and the attitude sensors. Profiler issues include coded versus uncoded pulses and phased array transducers versus a single element per beam. Attitude sensor issues include the status of GPS attitude sensing and the possible advantage of using pitch and roll sensors in shipboard systems; and the vulnerability of lowered systems to poor compass performance.

v ***Routine Shipboard ADCP Operation: Benefits, Problems, Methods*** - Dr. Eric Firing, University of Hawaii

The costs of operating a shipboard ADCP are mainly fixed--they are the same whether the unit is on or off. Benefits of a policy of routine ADCP operation are of two sorts. First, the observations can be highly valuable even if they are not central to the science of a particular cruise. Second, routine operation makes it much more likely that the system will work correctly on those cruises for which it is crucial. Problems of routine operation--or of maximizing the benefit of routine operation--range from the diplomatic (clearance issues) through the organizational (procedures for instrument operation, checking, and data transfer) and technical (shortcomings of the instrument systems themselves) to the financial (funding for processing and analyzing the data).

v ***Lowered Acoustic Doppler Current Profiler: From an Experimental Instrument to a Standard Hydrographic Tool*** - Dr. Martin Visbeck, Lamont-Doherty Earth Observatory Columbia University, NY

During the last decade lowered acoustic Doppler current profiler (LADCPs) have matured from an experimental instrument to an almost off-the-shelf standard tool for deep hydrographic programs such as WOCE (Firing, 1998). The first LADCP profile was taken in 1989 at a site near Hawaii by Firing and Gordon (1990). The way the LADCP system works is that it relies on the fact that short current profiles can be 'pieced together' to obtain a full ocean depth velocity profile (Fig. 1). The initial results were not too encouraging since systematic errors of the order of 10 cm/s were expected, much too large to be used for quantitative purposes such as top to bottom transport calculations. However, proof of concept was given and some first steps towards a useful processing algorithms were realized. A year later in 1990, Fischer and Visbeck (1993) used a similar system during a cruise in the equatorial Atlantic. They had the advantage of simultaneous LADCP and Pegasus velocity profiles. The Pegasus is an acoustically tracked free-falling float that can be used to accurately measure top to bottom ocean transports; however, it requires bottom mounted and navigated acoustic beacons. Consequently each station takes several hours of extra ship time plus the expense of a pair of acoustic beacons to obtain one Pegasus velocity profile. In comparison the LADCP is much more

attractive: no extra ship time is required and the running costs per station are minimal. However, when care was taken during the data processing of the LADCP system both velocity estimates agreed. In particular the close comparison allowed us to develope a method to compute the barotropic mean flow given accurate GPS ship navigation.

During those first years self-contained ADCPs, typically used for moored applications, were mounted on the CTD/ rosette frame. Most of the early designs replaced two bottles in favor of the large ADCPS. In particular the narrow band 150 kHz full ocean depth system was very difficult to mount and handle due to its weight of app. 140 pounds.

The next generation of broad band technology ADCPs promised much increased single ping accuracy, however, the range of useful data was reduced despite an effort to boost the power level of the transducers. The instruments themselves were more compact and easier to handle, however, the power requirements increased by almost an order of magnitude. Consequently a rechargeable battery pack hat to be added to the system in order to run an intense hydrographic program without unmounting and opening the ADCP every few days. Better rosette designs emerged that were able to accommodate the new ADCPs in the center of the package. Such configurations were used throughout the WOCE and provided a wealth of useful top to bottom velocity profiles.

The latest generation of ADCPs are much smaller instruments with a frequency of either 300 kHz. The new instruments have no internal batteries and hence are extremely compact with a dimension of only 9x8 inches and a weight of 30 pounds. Moreover, the price dropped dramatically and one can now purchase two transducer heads for the price of one of the traditional 150 kHz BB systems. In order to make up for the reduced range of the higher frequency systems we have recently started to mount two heads on one CTD frame, one looking upward and one looking downward. This LADCP2 system has several other advantages (Visbeck, 1998): no complete loss of data when the CTD is close to the bottom, view of sea surface for an improved initial depth estimate and some built in redundancy. While mounting an upward looking system is not always easy to do, the small size and much reduced power requirements make the new LADCP system very adaptable to small CTD frames and towed vessels. Today there are two commercial vendors who both have promised to sell complete LADCP2 systems in the near future. Over the years the community has learned how to process the data, and we are beginning to understand how instrumental and system errors affect the final velocity profiles. We have discovered regions in the worlds ocean with dramatically reduced instrument range due to low abundance of acoustic scatters. One of the surprises on the way was, that what initially seemed to be the hardest problem, i.e. to obtain the vertical mean velocity, turned out to be a very robust estimate for reasonably deep (long) CTD stations. We have learned how to use the 'water' bins for acceptable bottom tracking (Visbeck, 1998). We still have not fully understood why sometimes the up and down cast velocity profiles differ dramatically, which ADCP beam angles are most versatile and what the tradeoff between accuracy and range is.

We envision that in the very near future the LADCP system will be available on most hydrographic vessels. In conjunction with an easy to use processing software this will allow even the inexperienced user to obtain full ocean depth velocity profiles at every CTD station.

PRODUCTS from the LADCP system:
· full ocean depth relative velocity profile
· with GPS full ocean depth absolute velocity profile
· accurate absolute velocity profiles within 300m of the ocean floor
· profiles of acoustic back scatter
· pitch, roll and heading of CTD/rosette
· absolute position in X, Y and Z of CTD/rosette
· measure distance of CTD/rosette of the bottom

References:

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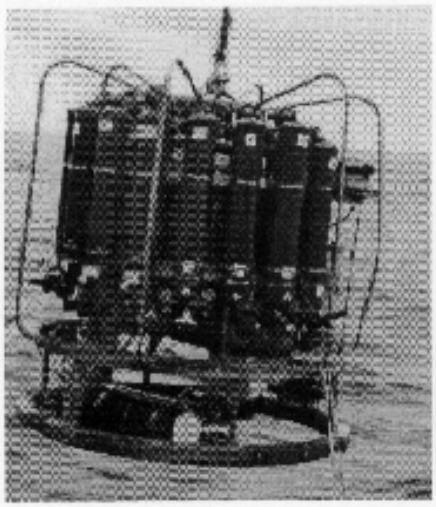

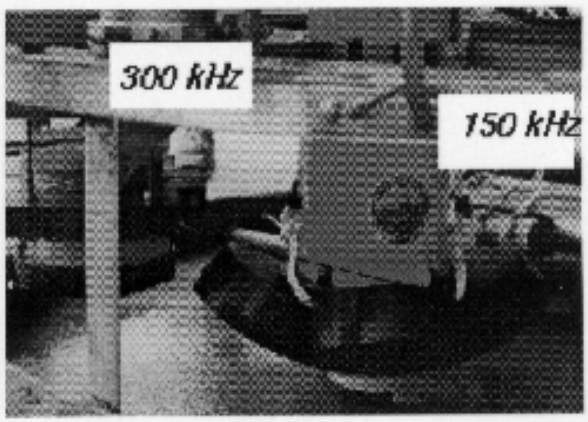

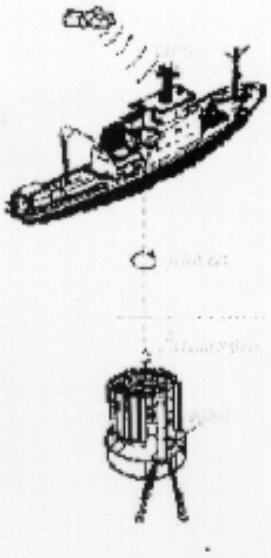

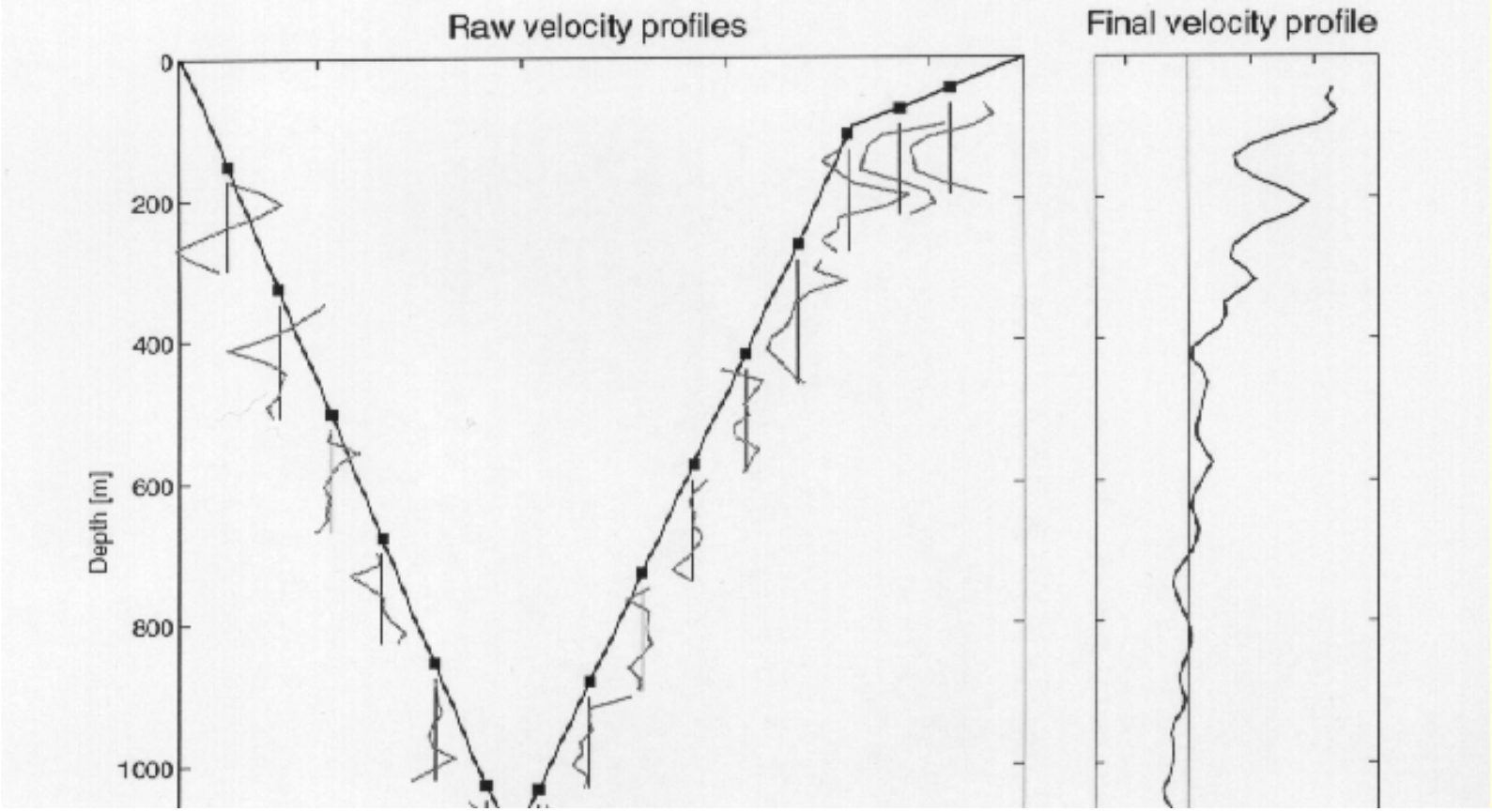

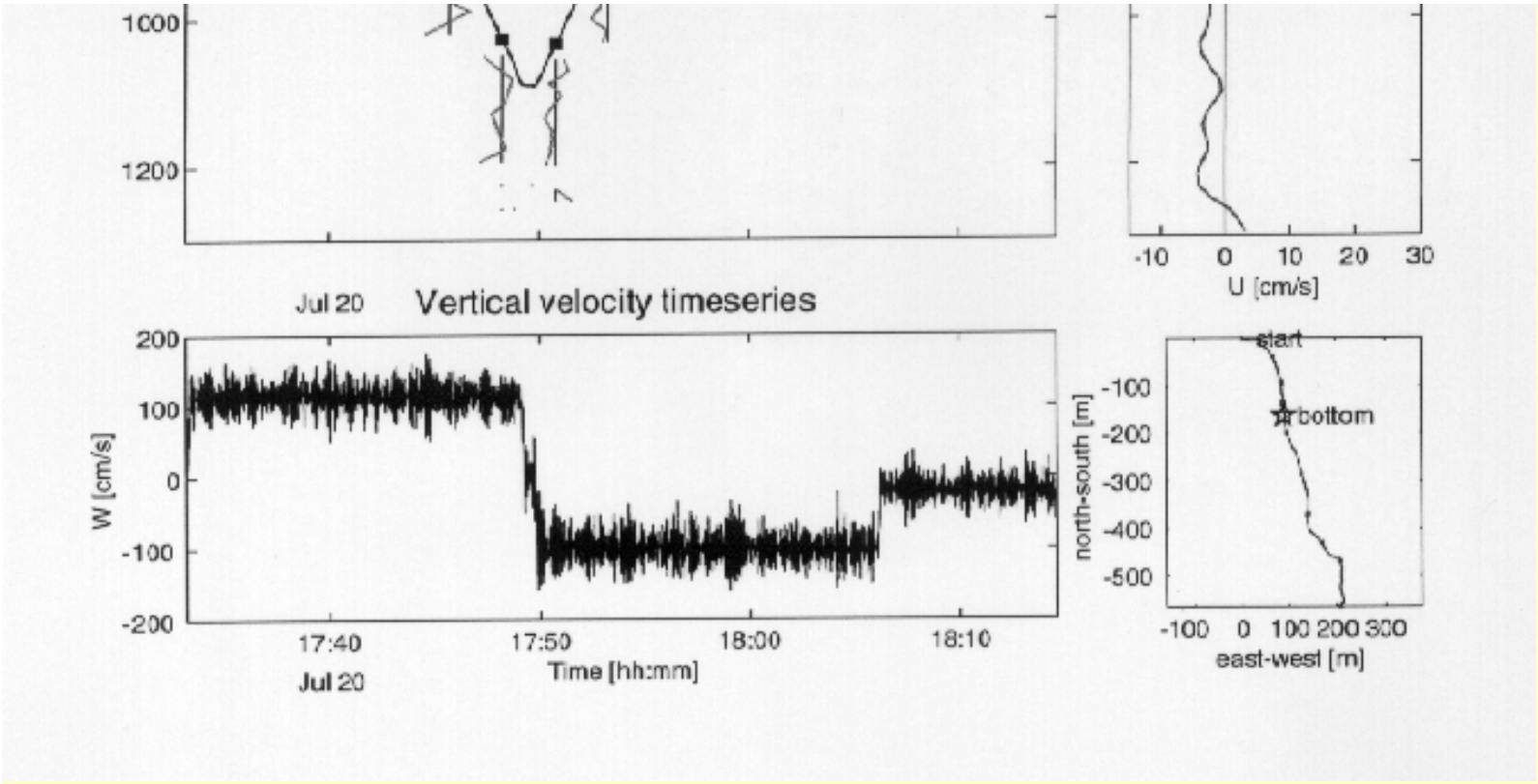

v ***Acquisition of Vessel-Mounted Narrowband and Broadband ADCP Data using a Sun Logging System on ORV FRANKLIN, FRV SOUTHERN SURVEYOR and RSV AURORA AUSTRALIS*** - Dr. Helen Beggs, CSIRO Marine Research, Hobart, Tasmania, Australia

In early 1998 an RDI broadband ADCP and Ashtech 3DF ADU2 GPS were installed on CSIRO's FRV SOUTHERN SURVEYOR. The existing RDI narrowband ADCP acquisition software from the ORV FRANKLIN Data Collection System (FDCS), written in C for a Sun, was modified for a broadband ADCP and installed on the FRV SOUTHERN SURVEYOR Sun computers. The RDI ADCP data acquisition code ("Transect") was installed on a PC and used for testing the ADCP.

During the presentation I will describe the Sun-based FDCS data acquisition system as it relates to logging ADCP data, and briefly compare it with RDI's Transect ADCP acquisition software. The quality of data and performance of the broadband ADCP on the FRV SOUTHERN SURVEYOR will be compared with the narrowband ADCPs on the ORV FRANKLIN and RSV AURORA AUSTRALIS.

The following table summarizes the differences between the ADCPs mounted on vessels used by CSIRO Marine Research:

	ORV FRANKLIN	**RSV AURORA AUSTRALIS**	**FRV SOUTHERN SURVEYOR**
ADCP TYPE	150 kHz RDI narrow-band	150 kHz RDI narrow-band	150 kHz RDI broad-band
PURCHASED	1985	1994	1998

MOUNTED	moon pool- flush with hull	behind acoustic window	moon pool- 1.5m below hull
NAVIGATION	Ashtech differential GPS	Ashtech 3DF GPS	Ashtech 3DF GPS
ATTITUDE SENSOR	gyrocompass	Ashtech 3DF GPS	Ashtech 3DF GPS
PITCH/ROLL SENSOR	none	Ashtech 3DF GPS	Ashtech 3DF GPS
SYNCHRONISED?	no	yes	yes
INTERFERENCE	none	interferes with echo sounders	interference from fish sonar
TYPICAL LONG-TERM ERROR PER m/s OF SHIP SPEED	0.6-1.1 cm/s	1.0 cm/s	1.0 cm/s

ADCP range on all three vessels is reduced when the ship is underway, possibly due to bubbles under the hull. The FRANKLIN narrowband ADCP gives the greatest range in any sea state, suffers least from interference from other acoustic devices on the ship, and the data quality suffers least in rough weather. The AURORA AUSTRALIS narrowband ADCP has a smaller range than the FRANKLIN narrowband ADCP, both when the ship is steaming or stationary. This may be due to the acoustic window over the transducer or bubbling underneath the hull.

Data collected during a two-ship cruise of the SOUTHERN SURVEYOR and AURORA AUSTRALIS into the Southern Ocean in March 1998, indicated that in moderate to rough seas the SOUTHERN SURVEYOR broadband ADCP (set to Mode 1, medium-band) had about 90% of the range of the AURORA AUSTRALIS narrowband ADCP. In calm seas, the SOUTHERN SURVEYOR broadband ADCP (set to Mode 7) matched or exceeded the range of the AURORA AUSTRALIS narrowband ADCP.

Thursday, October 22nd

Thursday
08:30

DECK OPERATIONS AND ONBOARD SAFETY

Hubbs Hall

Mr. Woody Sutherland (Scripps Institution of Oceanography), Chair

v ***Research Vessel Operators' Committee (RVOC) Safety Video*** - A recently completed 20 minute safety video will be viewed. The film was developed by the RVOC Safety Committee and will be distributed to each of the UNOLS research vessel. It is intended for viewing at the start of a science cruise to provide important shipboard safety information to the science party. The film, with an introduction by Dr. Robert Gagosian, was shot on board R/V ENDEAVOR with special effects and graphics provided by Jamestown Marine.

v ***Oceanographic Research Vessel Deck Safety*** - Capt. Daniel S. Schwartz and Mr. George White, University of

Washington, School of Oceanography

The large oceanographic research vessels are away from homeport for extended periods, often operate independently in remote areas away from shipping lanes (and assistance), and travel great distances. Science packages and instruments deployed in all types of weather from these vessels are unique and varied; often heavy and/or bulky. Science operations may require small boat operations, working all times of the day and night, and are physically and mentally fatiguing. Many researchers are on board a vessel for the first time. These parameters make safety on board research ships a critical-indeed primary-shared responsibility of the ship's crew, technicians and the researchers. The commercial fishing industry has the highest rate of on-the-job fatalities of any occupation: higher even than coal mining. The similarities, at least with respect to exposure to hazard while working on deck, between fishing vessels and research vessels far outnumber the differences. Humanity, not to mention exposure to unwanted litigation and expensive liability claims, demands we strive to achieve the lowest possible rates of injury and loss of life. In addition, safety is cost effective and contributes to mission accomplishment, while avoiding loss of expensive or irreplaceable scientific instruments and equipment. While there will be no attempt to provide an exhaustive inventory of hazards and safety procedures for research vessel deck operations, this talk will attempt to outline some of the recurring areas of concern and ways we as a community should be addressing them.

v ***Small Research Vessel Deck Operations*** - Mr. Steve Hartz, University of Alaska

v ***Fiber Optic Cable***

Thursday
08:30

Shipboard Networking and SeaNet

Sumner Auditorium

Mr. Barrie Walden (Woods Hole Oceanographic Institution), Chair

v ***Data Collection and Distribution*** - Mr. Barrie Walden, Woods Hole Oceanographic Institution

The instrumentation on oceanographic research vessels has passed beyond stand-alone equipment and now frequently requires sophisticated inter-connectivity. The problem of linking sensors to recorders remains but the “recorder” is likely to be a computer having strict time synchronization requirements, demanding additional data from various sources and, with appropriate connections, having the ability to display results in multiple formats on numerous media. To make matters more interesting, the scientific requirements keep changing and the level of technology continually increases in an attempt to keep pace.

Meeting today’s requirements is not difficult if you have a lot of money and you’re not concerned with anything past builder’s trials. However, if you live in the real world where funding is always an issue and “maintainability” is not somebody else’s problem, development of a versatile, reliable, instrumentation installation requires careful planning and considerable thought. This presentation will outline the methods employed on the ships operated by the Woods

Hole Oceanographic Institution. All of the installations have been made within the past five years and the system on R/V ATLANTIS is still "under construction". These systems are not perfect but they work well and provide insight into which areas need careful attention.

v ***SeaNet - Extending the Internet to Oceanographic Research Platforms*** - Mr. Andrew Maffei and Mr. Steve Lerner, Woods Hole Oceanographic Institution

The SeaNet Collaborative has been funded to provide hardware, software, and the network infrastructure support necessary to connect several US research vessels to the Internet. The high cost of satellite links has had a strong influence on the design of this system. A status report on the SeaNet effort, currently being undertaken by Woods Hole Oceanographic Institution, Lamont Doherty Earth Observatory, the Naval Postgraduate School, Omnet, Inc. and Joint Oceanographic Institutions, Inc as well as associated corporate partners will be given. Funding is being provided by the US NOPP program.

v ***Sensor Data Acquisition and Display via the Ship Network*** - Mr. Dennis Shields, National Oceanographic and Atmospheric Administration

The talk will provide a description and demo of the Scientific Computer System (SCS) that is presently installed on ten NOAA vessels. This system acquires data from a wide variety of ship sensors either directly or through the network. The network is also used to provide users real-time access to the data, displays and graphs via a client server architecture. SCS is based on the Microsoft Windows NT operating system and is written in C++ for pentium PC's.

v ***E-mail on the Woods Hole Oceanographic Institution Ships*** - Mr. James Akens, Woods Hole Oceanographic Institution

This will be a discussion of the e-mail system used by Woods Hole Oceanographic Institution Ships. This system is Linux based and uses no proprietary software. The code is written in Perl and Expect. Topics to be covered include: initial installation, administration, maintenance tools, billing tools and the overall cost of operation. Particular emphasis will be given to a discussion of the message filtering system. This allows control of recipients and message size from either the ship or shore.

v ***Direct Connection Network Sensor Interfaces*** - Mr. Richard Findley, University of Miami

Making high accuracy measurements from an analog sensor is difficult in a shipboard environment. There are line losses and radio frequency interference problems. Multiple systems may need immediate access to data from the same sensor simultaneously. Conversion from raw values to engineering units and the application of calibration constants must be accomplished - in real time.

To solve these problems the University of Miami Marine Technology Group is implementing the use of commercially available high accuracy sensor interfaces directly connected to the ship's computer network.

A description of available interfaces and specifications will be given along with a live demonstration using these interfaces with a graphical programming language.

Thursday
13:00 Technical Workshop

CTD PACKAGES

Sumner Auditorium

Mr. Woody Sutherland (Scripps Institution of Oceanography), Chair

v ***WOCE Operations*** - Mr. Frank Delahoyde, Scripps Institution of Oceanography

v ***SeaBird CTD Data Processing in Coastal Waters*** - Ms. Kristen Sanborn, Scripps Institution of Oceanography

The SeaBird CTD Data Processing in Coastal Waters presentation will address:
I. The importance of calibrations of the sensors.
II. Problems encountered with the SeaBird Processing Programs and programs STS/ODF have developed to augment the SeaBird Programs.
III. Proper documenting of problems that are encountered at sea to aid the final data processing.
IV. Changes STS/Oceanographic Data Facility have made to the SeaBird method of data acquisition.

v ***Data Evaluation and Quality Control for Routine CTD/Hydrographic Data*** - Dr. James Swift, UCSD Scripps Institution of Oceanography

Data quality assessment of routine CTD /hydrographic data is learned over years of practice. Some simple aspects of practice do, however, lead to improved reliability and documentation of data. These include:

wfor water sample data:
verification of the collection depth and unambiguous association of that depth with a unique sample identifier,
knowing the degree to which the water which issued from the sampling spigot matched the characteristics of the water from the collection level,
verification that all data values associated with a water sample are correctly matched to the water sample identifier, and determination if the values for each parameter are correct.
w Data evaluation must begin at sea. This is often the only time all involved personnel and all records are together. Also, it is often possible to correct repetitive problems before they can further degrade the data.
w The care of the data analyst and access to complete records is more important than any specific scheme of data evaluation.
w The analyst must determine if the values for each parameter are correct overall. This has to do mostly with the degree to which the appropriate standards were met by the bulk of the data. Emphasis should be placed on adherence to proven, documented methodology over agreement with historical data.
w The analyst also determines which individual data values are suspect. This is partly a matter of identifying outliers and assessing their severity and cause, or verifying by absence of cause or coincidence with other data that the anomalies are likely genuine.
w Suspicion of a data problem based on a data value alone, without probable cause for an erroneous value, should not

of itself be cause to demote the quality of a value.
- Apparent problems should be corrected if possible.
- The analyst's report and a report of subsequent actions must be archived.

v ***Insitu Pressure Calibration*** - Mr. Sven Ober, Netherlands Institute For Sea Research

v ***Marine Instrument Calibration "You Know it Makes Sense"*** - Mr. Paul Ridout, Ocean Scientific International Ltd.

The need for harmonization of marine scientific data has increased with our involvement in international collaborative studies. Instrument calibration is the key to data quality and, this presentation covers the practical details of the operation of the marine instrument calibration facility at Ocean Scientific International Ltd. (OSIL) in the UK.

OSIL operates their facility to WOCE standards for CTD and are the European service, repair and calibration centre for Applied Microsystems and Guildline Instruments. Calibrations of other manufacturer instruments (e.g. SeaBird, FSI, Chelsea Instruments and General Oceanic) are regularly performed for clients in Europe.

Detailed descriptions are provided for our techniques employed in temperature, conductivity and pressure calibrations including laboratory conditions, equipment used, transfer standards, primary standards, uncertainties, documentation and reporting. Our operation of the IAPSO Standard Seawater Service is also covered.

The OSIL facility is certified to ISO 9002 which performs an essential role in the quality control of documentation. Details of the ISO 9002 system are provided. Whilst the calibration of the CTD is well established, other parameters such as nutrients, chlorophyll, CO2 and oxygen are not so well defined. Development of techniques to calibrate sensors for these parameters is also presented.

Tuesday Evening - 20 October

Birch Aquarium
Reception and Exhibits

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v INMARTECH '98 PARTICIPANTS v

INMARTECH '98 Exhibitors

British Antarctic Survey
ESI
Knudsen Engineering

Markey Machinery
MATE
NIOZ
Ocean Innovations
Ocean Instruments
Seatex
SIOSEIS
Sunwest Tech.
UNOLS

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The Purpose of INMARTECH '98 is to provide a forum for international exchange of knowledge and experiences between marine technicians.

INMARTECH '98 Steering Committee

Annette DeSilva, UNOLS Office
John Freitag, UNOLS Research Vessel Technical Enhancement Committee (RVTEC) Chair

Ken G. Robertson, Scientific Superintendent, NERC, Research Vessel Services
Dr. Alexander Shor, National Science Foundation
Woody Sutherland, Scripps Institution of Oceanography
Cok van Bergen Henegouw, NOIZ, Netherlands Institute for Sea Research

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INMARTECH '98

Registration Information Request Form

THIS FORM IS NO LONGER ACTIVE AND CANNOT BE SUBMITTED

All meeting participants for INMARTECH '98 will need to register in advance for the meeting. Registration forms and meeting information packages can be obtained from the UNOLS Office.

***To obtain a registration form*, please provide the information below and submit the form to the UNOLS Office by clicking the"SUBMIT" button at the bottom of the page. You should receive your registration package within three weeks of submission.**

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1) Name:	
2) Title:	
3) Organization:	
4) Address:	
5) City:	
6) State or Province:	
7) Country:	
8) Zip/Postal Code:	
9) E-mail Address:	

If you have comments or questions regarding registration for INMARTECH '98, please contact Annette DeSilva at the UNOLS Office:

UNOLS Office
Attn: Annette DeSilva
P. O. Box 392
Saunderstown, RI 02874

Tel: (401) 874-6825
Fax: (401) 874-6167
Email: unols@gsosun1.gso.uri.edu

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INMARTECH '98 - Hotel Information

INMARTECH '98 participants are responsible for making their own hotel reservations.

Arrangements for reduced room rates have been made with two La Jolla hotels. *You must identify yourself as part of the "INMARTECH '98" group at the time of making the reservations* in order to be eligible for the special rate. Only a limited number of rooms are available at the reduced rates and you are encouraged to make your reservations early.

Shuttle bus services to and from the SIO meeting sites will be available at these two hotels.

Radisson Hotel La Jolla

3299 Holiday Ct.,
La Jolla, CA 92037
www.radissonlj.com

The Radisson Hotel La Jolla is located five minutes from beaches and shopping in the village of La Jolla. Guestrooms feature one King or two Queen sized beds, coffee makers, hairdryers, iron and ironing boards, refrigerators, VCR players with on-demand movies and video games. The hotel offers a heated pool, whirlpool and free exercise facilities. For dining and entertainment, Humphrey's La Jolla Grill and Shooter's Lounge are located on site. An Enterprise Car Rental office is located in the lower lobby of the hotel.

- **Special Reduced Room Rates: $109 + tax - single and double occupancy**
- **For Room Reservations Call:* (619) 453-5500 or Toll Free (800) 333-3333**
- **Parking at the Radisson: Free**
- **San Diego Airport Shuttle Service daily 6:00 am to 11:00 pm: Free - Guests should contact the hotel upon arrival to schedule a pick-up.**
- **Distance from hotel to SIO: Approximately 2 miles**

*** When making reservations, indicate you are with "INMARTECH '98" to receive the reduced room rates.**

The Empress Hotel of La Jolla

7766 Fay Avenue,
La Jolla, CA 92037
www.empress-hotel.com

The Empress Hotel of La Jolla is located in the heart of the village of La Jolla, surrounded by shops and restaurants. Guestrooms include coffee makers, hairdryers, refrigerators, iron and ironing boards. The hotel offers a spa, sauna, and exercise room. Fine dining is offered just off the hotel lobby.

- **Special Reduced Room Rates: $89 + tax**
- **For Room Reservations Call:* (619) 454-3001 or Nationwide (888) 369-9900**
- **Continental Breakfast: Complimentary**
- **Parking at the Empress Hotel: $5.00 per night**
- **Shuttle service to and from the San Diego Airport: $10.00 each way**
- **Distance from hotel to SIO: Approximately 5 miles**

*** When making reservations, identify yourself with "INMARTECH '98" to receive the reduced room rates.**

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