Interface

The newsletter of the University-National Oceanographic Laboratory System Research Vessel Technical Enhancement Committee Volume 2 Number 1

Update from the Chair

Rich Findley, University of Miami, RSMAS

As we wind up our proposal negotiations, it's time to renew our enthusiasm for the RVTEC projects we started in the fall. Now that we are in our second year, we can reflect on the first, as the year that we addressed organizational issues. This year we are more focused on technical issues, and I am excited about the possibilities of our collaborative efforts.

Calendar of Events:
The date of the RVTEC 1994 Annual Meeting has been set for October 19 through 21 in Miami. Tentative plans call for a tour of NOAA-AMOL, RSMAS, RV COLUMBUS ISELIN, and General Oceanics on the 19th. More details, maps, etc. will follow in the next newsletter. Please suggest agenda items for our Annual Meeting via UNOLS RVTEC.

Progress on Several Fronts:
In this issue of Interface, Mark Willis (OSU) has provided a report about standardized data formats and I have contributed an article about RSMAS Marine Technology Group experience to date with CD-ROM recording. Our next task will be to integrate both of these technologies.

I have been working with Andy Maffei (WHOI) to set up a GOPHER site. This site will be used as a repository for the equipment inventories and technician profiles we have already collected.

Inside the Winter 94 Issue

Preliminary Report of the RVTEC Data Interchange Subcommittee

Marc Willis, Oregon State University

Subcommittee Members: Marc Willis (OSU, Chair); Dave Nelson (URI); Martin Mulhern (NOAA); Steve Poulos (UH)

DISCLAIMER: The information and suggestions presented herein are just that, information and SUGGESTIONS!! None of this

should be construed as establishing a standard for the fleet, nor even suggesting that there be one. I will be the last person to suggest such a thing.

Background: At the annual RVTEC meeting in 1993, the Data Interchange Subcommittee was established to evaluate some of the file formats available for data logging, and to suggest a common format which might be used on ships. The charge to the Subcommittee was not to establish a standard, but to make a suggestion around which interested institutions could cooperate in building utilities and conventions for dealing with shipboard data. The purpose of this exercise is to make it easier to deal with the increasing volume of shipboard data being logged, but not to affect the form of the product delivered to the end user.

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Exploring the interface of technology with science at sea.

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Publisher: Annette DeSilva
UNOLS
UNOLS.OFFICE (Omnet)

Published semi-annually.
Volume 2 Number 1
Winter 1994

Evaluation Criteria:

Space Criteria

- at least as space conscious as any present format, and save space over other commonly used formats;
- capable of accommodating data of many types from many sources.

Network Criteria

- readable across platforms and operating systems;
- network friendly ,

User Transparency Criterion

- should be readily transformable from its native form to other forms which are easily read and manipulated by end-user groups.

Operational Criteria

- should be self-describing;
- should allow extensive descriptors in several fields;
- should be expandable, allowing addition of calculated or new variables without disrupting the basic structure of the file.

The Subcommittee took as its charge to evaluate some commonly-used data formats and suggest a format for use by interested parties. Based on the background work that Rich Findley had done prior to the meeting in September, I concentrated on two promising formats, HDF and netCDF.

One can get pretty geeked-out evaluating the similarities and differences between these, but the upshot is that, for purposes of flexibility and expandability, it appears that netCDF is best suited to our uses. Further information on netCDF is available from the Unidata project at NCAR (ftp at < unidata.ucar.edu > , also available via GOPHER). Any system using netCDF must use the standard netCDF library. Unidata maintains the basic library, and has made available some ports of the library for PC-DOS, Mac, etc. The library is available in C or FORTRAN.

Has this been tried in the oceanographic fleet? At OSU, we have been using netCDF as our logging format for two years, first on PCs, now on SUN workstations. NetCDF is also the logging format for IMET systems.

For those interested in pursuing netCDF in their own applications, you can get a copy of the netCDF documentation from Unidata (filename: < guide-2.3.2.ps.Z > in < /pub > area of unidata.ucar.edu). The guide will explain what netCDF is. There are also files which show how to get started with netCDF. There is a netCDF news group (mail to < netcdfgroupadm@unidata.ucar.edu > and ask them to put you on the mailing list). The news group is a forum for questions and answers about netCDF. There is an archive

of mail and news in the netCDF area of < unidata.ucar.edu > which you can browse if you are interested in catching up on all the dweeby stuff.

For those interested in seeing an implementation of netCDF in the real world, I can make available the cdl (descriptor) files for WECOMA data files, as well as the code generating the files. If interested, please email < willis@oce.orst.edu > . If there is enough interest, I can make the files and code available for anonymous ftp on our server.

A second issue which I have just started looking at is the standardization (oops, that word again) of the tags or descriptors for the variables, and what each variable should include in its description. Some of the questions are:

- What variables or parameters should be standard on all ships?
- What should be logged with the raw data? For example, sensor type, calibration data and dates, serial numbers, conversion information. What else?
- Should there be a standard list of identifiers (i.e. NMEA-0183) for various parameters?

I would welcome any input from the rest of the RVTEC community on these issues.

Field Reports: Sea-Bird Carousel Water Sampler

Editor's note: Doug Bennett of Sea-Bird provided a list of the users of the Carousel sampler and I faxed letters to them asking for a description of their first experiences with the system. They both responded over the Internet, one from a vessel at sea in the Antarctic. Many thanks to Dominique Tailliez and Johan Blindheim for taking time to send us these reports.

From the R/V ANTARCTICA

R/V ANTARCTICA is the polar sailing ship of Dr Jean-Louis Etienne, launched in 1989 for the International Transantarctica Expedition. Since that time, she has covered more than 80,000 miles around the world and is now serving on a new expedition in Antarctica with the main objective of exploring Erebus Volcano on Ross Island. Concurrently, some oceanographic jobs are conducted, one of them being to study antarctic bottom water formation in Ross Sea. For that we use a SBE-911plus CTD and the new SBE Carousel with twelve 5-liter bottles.

Engaged by Dr. Jean-Louis Etienne as oceanographer, I have probably more than three thousand CTD casts to my credit and by this fact I am a little bit experienced with CTD and Rosettes or other water samplers. Ordered in April 1993, i.e. before marketing of the product, the design had been specially studied to agree with short dimensions of the gantry installed on ANTARCTICA and this probably explains the compactness of SBE Carousel. From this point of view, the result is perfectly successful. Since we received the Carousel one day before our departure from Hobart in December 93, we had only enough time to install it and no time to test it. Fortunately, it was easy to assemble, in spite of the number of pieces, screws and others parts in the box (the advantage being that the Carousel takes no space when it is dismounted). Sea-Bird uses two cages for their Carousel: one for bottles, and these are completely protected from shocks, and one below for the CTD which is horizontally mounted inside. This presents the advantage that the CTD is very easy to access if it needs to be worked on. On ANTARCTICA, because space onboard is very limited, the carousel remains always on the deck. But, we mount and dismount the CTD each time we use it to avoid freezing the sensors and to protect them from southern rough seas. The operation takes only five minutes (the only problem is that we must heat the connectors with a hair drier before we plug them!). The cages are epoxy painted which is certainly good for proper sampling (but the coating is perhaps too fragile).

Opening the bottles is now a very easy task which needs no special tool. This is

greatly appreciated under very rough conditions (one hand for the ship, and one hand for himself, as we say in French) and for those like me who have the habit of not unclipping the bottom end-cap lanyard. Also, the edge of the top adapter plate has to be beveled to avoid wearing the lanyards. There are two modes of firing: sequential or user defined (in this case, it is possible to close bottles in any order). Delay of closing is shortened to 2 seconds and, if precise depth is not required, it is now possible to fire a bottle without halting the profile.

Surely, the main advantage of the SBE Carousel is that there is no rotating part that can bind up under pressure or for any other reason. So, for the first time I am sure of the closure depth, that we close only one bottle at a time, and that there is no shift in the sequence. It is very comfortable.

Because of our very recent experience, we can't say what happens in case of trouble and the operating manual is quite silent about that. But at this time we have not had any problems.

Onboard R/V ANTARCTICA, McMurdo Sound, February 1st, 1994.

Dominique Tailliez
Internet: tailliez@ccrv.obs-vlfr.fr

On R/V Antarctica, my Internet address is jle13@calvacom.fr. I will return to France in mid-March.

Dr. Jean-Louis Etienne, Expedition leader

From the R/V JOHAN HJORT

Your letter to Hans P. Knudsen regarding experiences with the Carousel has been handed over to me since I was in charge of the cruise on which it was used. The Carousel was applied during a four-week cruise with the R/V JOHAN HJORT to the Nordic Seas in November-December 1993. During the cruise some 110 CTD lowerings were made. We used five liter Niskin bottles belonging to PMEL, Seattle, because a research party from PMEL/Brookhaven National Laboratory participated to observe CFCs (Fred Menzia, PMEL and Craig Neil, Brookhaven). These bottles had quite high tension on the end caps and lanyards (we did not have equipment onboard for accurate tension measurements). At the start of the cruise we had trouble with the tripping of the bottles as only about 50-70 percent of the bottles closed when they were fired. The reason was high friction in the stainless steel parts of the release mechanism. After some adjustments to both the lanyard tension and the lanyard arrangement, the Carousel worked perfectly for most of the cruise, but toward the end of the period, releasing failures again increased. Now some bottle positions became outstanding as failure positions, 3-4 positions out of 12. To my understanding, the reason for this was increasing friction in the release mechanism during the cruise. In what way, I do not know. Sea-Bird was very helpful and responded immediately to our faxes and gave us the advice that we could reasonably request. They are also working on a modified release mechanism which we will get on a no cost basis in the near future.

In summary, The Carousel worked about as we expected, taking into consideration that it is a new piece of equipment (in my most pessimistic moments before we ordered it, I feared it would be worse). In practical use it is very convenient to load. My general impression is that after having passed these "children's diseases" it will be okay. I hope this information meets your requirements.

Sincerely,

Johan Blindheim
<johan@smtplink.imr.no>

Editor's note: Doug Bennett's initial letter to me mentioned the problem of tripping under high lanyard tension. He says that a design refinement of the release mechanism has been completed and that it now reliably handles tensions up to 50kg.

WECOMA Mid-life Refit Update

Marc Willis, Oregon State University

As of this writing (14 Feb), WECOMA is back in the water after having her transducer compartment enlarged as on ENDEAVOR. All structural work is complete. Major structural work was done on the stern (lengthened 8 feet), labs (wet lab widened and new electronics lab added), reefer spaces (new chill box and freeze box), and forward storeroom (rearrangement in conjunction with reefers). We have added a new anchor windlass, new hydrographic winch, and a new A-frame. During the refit, new cableways were installed throughout the lab spaces, and thinnet wiring was pulled for shipboard networking (couldn't afford that fiber just yet!). Major changes to clean power distribution were made, doubling our clean power capacity. The ship is at MCI shipyard in Bellingham, WA, and is scheduled for delivery on 15 March, with her first science cruise beginning on 7 April.

Ken Palfrey, OSU Marine Superintendent, and I visited ENDEAVOR at Newport, RI on 3 Feb. Congratulations, URI, on a job well done! The new ENDEAVOR is beautiful. OCEANUS is currently undergoing her refit in Jacksonville, FL.

Technician Training Sub Committee

Steve Rabalais writes that he is looking for suggestions on programs for the next meeting. He asked for thoughts regarding having representatives of CTD manufacturers there; data acquisition systems, both large and small systems; satellites and remote sensing. Send your comments to: Steve at s.rabalais.lumcon on Omnet.

NSF's 1994 Budget for Instrumentation and Technical Support

Lisa Rom, NSF

The Fiscal Year (FY) 1994 budget has yet to be finalized, however, the initial allocation to the Division of Ocean Sciences is $188.9 million or a 6.3% increase over FY 1993. Much of this increase was allocated to the Ocean Sciences Research Section. The Oceanographic Centers and Facilities Section received an increase of $990,000 or 2%.

The Instrumentation and Technical Support Program budget for Fiscal Year 1994 is currently set at $6.7 million. The program includes funding for the shipboard technician proposals and the oceanographic instrumentation proposals. Funding for the shipboard technician program will be held at the FY 1993 level of $4.2 million. Fleetwide the actual funding for shipboard technician programs is expected to increase due to the new requirement to charge all ship users for technical services. Figures included in the FY 1994 proposals indicate that the broader base of funding for technical services has generated an increase in the overall funding level for the fleet's shipboard technician programs. In spite of the broader base, funding requested from NSF for technical support services still exceeds the FY 1994 budget by a total of $380,000.

Funding for the oceanographic instrumentation program will increase from $1.3 million to $2.5 million in order to make up for a $400,000 decrease in funding between FY 1992 and FY 1993. Total funding requested from this program in FY 1994 is $3.7 million.

News From the UNOLS Office

Annette DeSilva, UNOLS Office

Following the RVTEC Meeting in September, UNOLS held their Fall Council Meeting immediately followed by the 1993 Annual Meeting in Washington, DC. Dr. D. James Baker, Undersecretary for Oceans and Atmosphere, National Oceanic and Atmospheric Administration, was this year's keynote

speaker. He provided an insight of the current Administration and their interest and concern for the environment. Dr. Baker believes that collaboration and partnerships are the way to operate in the existing climate and he sees NOAA opening new doors for cooperation.

In RVTEC related activities, the UNOLS membership voted at the Annual Meeting to adopt the RVTEC By-Laws as Annex V to the UNOLS Charter. Copies of the By-Laws can be obtained by contacting the UNOLS Office (Omnet: UNOLS OFFICE or Internet: unols@gsosun1.gso.uri.edu). Other highlights of the Annual Meeting included a special report from Dr. Ted DeLaca of the University of Alaska on the first scientific cruise aboard a Navy nuclear submarine. Dr. DeLaca was the scientific coordinator on the 1993 submarine cruise to the Arctic and provided the UNOLS membership with a first hand report of this exciting cruise. Details of this cruise along with all other agenda items are included in the Annual Meeting Summary Report which was distributed by the UNOLS Office.

In December, UNOLS hosted the annual Deep Submergence Science Committee Planning Meeting in San Francisco. Immediately following the meeting, the UNOLS Office assembled an informational booth at the AGU Fall Conference. In preparation for the exhibit, two videos were produced by Woods Hole Oceanographic Institution along with three posters. One of the videos provides a general overview of the UNOLS organization and includes video footage provided by twelve of the UNOLS Operator Institutions. The film shows examples of shore facilities, UNOLS vessels, and various science operations. The other video features operations of the manned submersibles, ALVIN and JOHNSON SEALINK, along with operations of the ROV system, JASON. We found that many of the visitors to the booth were interested in using the videos as a learning tools for their students. The UNOLS Office is in the process of organizing a system for loaning the videos to the community. Thanks goes out to Marc Willis (OSU) for helping out at the UNOLS booth and representing RVTEC.

Shallow Water, Near Surface Current Meter Mooring

Tim Deering, University of Delaware

During the spring of 1993 Delaware's Technician group was asked to participate in a shallow water mooring project which required both near bottom and near surface current meter readings. The moorings were to be set at the entrance to Delaware Bay, a high traffic area. We were concerned both about the performance of the meter near the surface and the possibility of loosing the surface buoys.

We started with a surface buoy and hung an S4 current meter directly below it. A counterweight, big enough to half sink the surface buoy, stabilized this section of the mooring and kept the S4 vertical. The wire from the counterweight to the first sinker was slack, about one and a half times the depth, and a small subsurface float helped to keep that section from working against the sinkers. A long ground line led to the second sinker where a near bottom current meter was placed just above a release. Finally, midwater current meters were placed between the bottom meter and the large subsurface buoy.

Deployment started with the surface end of the mooring being put on the ship's trawl winch and the mooring and groundline wound on all the way to the release. The release was attached to the sinker and to the subsurface section which was assembled on deck. The subsurface buoy was deployed first. Then the first sinker was lowered using the ground line. A D-ring placed at the end of ground line allowed the second sinker to be shackled in without opening the mooring line. The second sinker was lowered until it hit the bottom. The surface buoy, meter, and counterweight were shackled to the end of the mooring line, the trawl warp was disconnected, and everything was pushed overboard.

We recovered the moorings by simply picking up the surface buoy and reversing the deployment sequence. One surface buoy carried away. We tripped the release and picked up the mooring from the subsurface end. We were fortunate that the mooring parted between the meter and the surface buoy so all we lost was the buoy. If the release had failed we planned to grapple for the long ground cable between the two sinkers.

This mooring design worked well. We were able to get the near surface data and we were able to recover from the loss of one of the surface buoys. This project took place during the spring and Summer months with mild weather, so we don't know how the surface buoys would do during a winter storm.

RSMAS CD-ROM Recording Experience to Date

Rich Findley, University of Miami

First a brief review of the ISO 9660 CD-ROM recording process. An ISO formatter program is used to transfer user selected files into a container file. While transferring the files into the container file, the file names and directory structure are checked for compliance with ISO 9660 naming convention (valid ISO 9660 filenames may only contain uppercase alpha characters A through Z, numeric characters 0 through 9, and the underscore and the directory depth cannot exceed 8 levels). The container file is then copied to the recordable CD-ROM. We purchased a Sony CDW-900E CD-ROM drive in January of 1994. The Sony drive and a 1.2 gigabyte hard disk were connected with an Adaptec SCSI card to a 33 mHz 386 PC with 8 megabytes of RAM. The Sony drive came with Sony ISO Formatter version 2.0 software. The computer was then networked with shore-based VAX computers using Pathworks (DEC's PC network software).

The first problem encountered was that with all the device drivers needed to put the PC on the network there wasn't sufficient memory for the formatter software to fit into conventional memory. A work-around to this problem was developed. The files to be recorded on the CD-ROM were copied from the network to the local PC hard-drive. The PC was rebooted standalone and the formatter software could then be used to write the container file. The container file was then copied to the CD-ROM. The first disk to write was a group of about 800 bitmap files. These files are for a PC based navigation program. An immediate problem was that the filenames did not meet ISO 9660 specifications as they contained a "-" (dash) in the filename and that is not an allowable character for ISO 9660. The filenames couldn't be changed because the software was expecting filenames with the dash.

There is an option in the formatter software to turn off ISO 9660 filename checking which was exercised. The first CD-ROM was then recorded. With much anticipation we inserted our first CD into a standard CD-ROM drive. It worked!

Flushed with success we were NOW ready to write disks for all our cruises from 1993. We then realized that many of our filenames did not meet the ISO 9660 filename convention. Undaunted, we wrote a whole series of command procedures to rename all of the files. We also had to modify all of our data collection and post-processing software to use the new filenames. Now we were ready to record all of our 1993 data. Except one small problem was left to conquer. All the bottle data from the CTD casts was in a spreadsheet format from our VAX and most users would not be able to do anything with it. The desired course of action would be to write a macro to export all of that data in tabular ASCII format.

About mid-February we were finally ready to record all of last year's data onto CD ROM. The process actually went smoothly and at this point about 20 CD-ROMs were produced. We have since been able to successfully read the disks from PCs, VMS, UNIX, and Macintosh computer systems. So far, we have not had any complaints about errors getting the data from the CD-ROMs. However, we have distributed over 6 gigabytes of data and I don't believe

that it has all been examined yet.

While we are able to successfully write ISO 9660 CD-ROMs the process is a bit awkward. It is our intention to evaluate other PC formatter software in hopes that it will be more user friendly. The possibility also exists to directly connect the CD-ROM recorder to a VMS or UNIX workstation which eliminates the need for a PC and its attendant memory limitations. DEC has unofficially stated that it will release its own ISO 9660 formatter software and that it should be available by June.

Finally, the acid test will be to write CD-ROMs in the at sea environment. We will probably try to do some at sea tests in March-April. I will keep you posted regarding our progress.

Summary: CD-ROM recording of scientific data is a viable means of distribution. It works as advertised though it is not as user-friendly as one would like. It is readable on a multitude of platforms which is a necessity in our realm. Finally, the scientists have been pleased with the product they have received and that is the desired end product.