

Project Number: 200103

Project START: Jan 1, 2003 **Project Duration (in years):** 1

Project Manager/PI: Mike Burczynski

**Project Title: Core CTD Data -
MDUC**

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1) Abstract (new and continuing projects)

CTD data collected using MBARI ROV, underway and profiler CTD systems have been designated as core data streams. Support for the maintenance, operation, calibration and configuration of the instruments, electronics and related support hardware as well as support for the processing and archiving of the data, is provided on an institutional basis rather than through individual projects or divisional budgets.

Continuing from 2002, the primary elements of this project for the year 2003 are:

- Operations of MBARI CTD vertical profiler and underway mapping systems.
- Maintenance, configuration and calibration of MBARI CTD instrumentation and all associated system hardware.
- Maintain measurement accuracy and reliability required for core CTD data.
- Data processing, archiving and dissemination through the BOG database.
- Data validation through Science data “champions”, Reiko Michisaki for the Profiler CTD, Bruce Robison for the ROV CTD and Gernot Frederich for the Underway CTD, monthly status reports to be given to MDUC.
- Improvements to data processing and loading techniques via enhanced scripts.

The project budget will include expenses for instrument maintenance and calibration, related hardware and electronics, system upgrades, related tools and consumable supplies, CTD Technician time for maintenance, data processing, and data integrity issues and minimal IAG time for software support and development. Additionally, efforts will continue to purchase additional sensors for use as spares in the calibration rotation standardize instruments of a given type and replace obsolete instruments with the best alternative. The Instrumentation Technician or resources within IAG will accomplish improvements to the data path processing.

New elements for 2003:

- Maintenance and calibration of AUV CTD sensors will be considered CORE; the data stream will not be considered core at this time.
- Testing and intermittent use of the SBE911 profiler CTD system aboard the Zephyr utilizing the new Point Lobos winch.
- A replacement altimeter for the Western Flyer CTD profiler is needed. The current Datasonics unit has become unreliable and is reaching the end of its life span. The purchase of the same model unit that is used on the Point Lobos CTD profiler will be proposed.
- Procurement of a smaller general use CTD rosette. In 2002, several scientific parties requested the use of the SBE911 CTD profiling system on extended missions without providing bunk space for a trained CTD operator. On these missions, CTD profiling operations are not primary objectives but would be beneficial to the scientific mission. Because of the complexity and costs associated with maintaining the SBE911 system, and the risks associated with having untrained personnel operate this system, the requests have been denied. A more basic and nonessential CTD profiling system that could be utilized in such situations will be proposed. This type of equipment capability should be endorsed by scientific users at MBARI, before proceeding.

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2) Proposal

MBARI has designated as ‘core’ the most mature, accurate, reliable and important measurements of its scientific instrumentation platforms. The purpose of this project is to continue to maintain and support the CTD and related data streams that have been designated as core.

MBARI has designated the following as core data streams:

- **ROV CTD** (Tiburon and Ventana), Conductivity, temperature, pressure, dissolved oxygen and light transmission measurements are considered core.
- **Profiler CTD** (2 SeaBird 911 + 12 position 10 liter system) Conductivity, temperature, pressure, dissolved oxygen, light transmission and fluorometer measurements that are made with MBARI maintained CTD instrumentation on MBARI sponsored and funded cruises are considered core.
- **Underway CTD** (Point Lobos and Western Flyer) Conductivity, temperature, fluorometer, light transmission and navigation position data obtained with MBARI maintained instrumentation is considered core.

Core, core-related and non-core equipment. All core data support hardware and electronics are to be maintained with the same level of commitment, under the same budget and by the same individual as the actual core sensors. These systems must all operate in order for the data stream to maintain its integrity; thus it seems logical to lump them into the same pool of support. These systems are in essence core-related equipment. This includes items like computers, cables, pumps, CTD housings and frames, terminations, etc. Additionally, this budget will cover some items that are not themselves part of the core data stream, however they are so closely related to the rest of the systems that it only makes sense to manage the items in this project. This includes the following items: Niskin CTD bottles, Altimeter, PAR sensors, and vessel and ROV related CTD infrastructure.

New elements for 2003:

1. AUV CTD sensors – The AUV CTD systems utilize the same model Temperature and Conductivity sensors that are used on all MBARI CTD rosettes. These Seabird SBE-3 and SBE-4 sensors will be pooled together with the MDUC CTD units and maintenance of them will be considered core. It will be the Instrumentation Technicians responsibility to provide the AUV group with calibrated temperature and conductivity sensors.
2. Zephyr CTD operations – Delivery of the new Point Lobos CTD winch is projected for September 2002. The unit’s smaller overall size will accommodate the space limitation of the Zephyr. The feasibility of using the SBE911 profiler system aboard the Zephyr will be tested.
3. Altimeter for Western Flyer CTD rosette - The current Datasonics unit has become unreliable and is reaching the end of its life span. The purchase of the same model unit that is used on the Point Lobos CTD profiler is proposed.
4. Smaller CTD rosette which is detailed in the Budget Justification section.

Data Quality Specifications. We will continue to evaluate our accuracy estimates for the core CTD and related data. Pre and post use calibration information will be analyzed to determine the accuracy of each of our core instrument types. The present instrument accuracy quotes from the manufacturer will be reviewed and modified if needed. The present specifications are, 0.1-dbar pressure, 0.01 salinity, 0.01 C temperature, 0.1 ml/l dissolved oxygen and 1% light transmission.

Data processing, archiving, dissemination, and quality control. The data processing scheme will operate much the same way as in 2002. The DMO Instrumentation Technician will serve to maintain and archive the SeaBird processing scripts for the Profiler and Underway CTD data acquired with MBARI core instruments. The new Sea Bird CTD data acquisition and processing software has been test and is being used on all Seabird systems. The current processing and loading techniques will continue to be evaluated and improved as necessary. The DMO Instrumentation

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technician will serve to interface with external data users, train others to run the CTD systems, maintain the MBARI procedures for running the CTD systems, and train others to use the CTD processing software. IAG will provide similar support as last year – modifying as required and maintaining the Unix processing and logging jobs for the data streams. The data champions are requested to present the results of the monthly data verification and quality control checks to the MDUC committee.

Instrument calibration/maintenance database. The Access database containing all the instrument calibration and model information will continue to be maintained, updated, and developed by the DMO Instrumentation Technician.

Labor Resources.

- 200 days – DMO Instrumentation Technician (Mike Burczynski, Project Manager)
- 5 days – Research Scientist (Gernot Friederich, Data Champion for Underway CTD)
- 10 days – Research Specialist (Reiko Michisaki, Data Champion for Profiler CTD)
- 5 days – Research Scientist (Bruce Robison, Data Champion for ROV CTD)
- 20 days – Research IAG, standard core data stream maintenance
- 15 days – Research IAG, script improvements (outlined below)

Improvements to automated ROV CTD data processing. We are requesting 15 additional days of IAG time in 2003 to improve the quality of the plots that are used for ROV CTD data validation. These plots are used daily by the DMO Instrumentation Technician to determine the health of the ROV CTD sensors. The new plotting system should continue to automatically generate quick-look plots as image files and also allow users to view the plots interactively in an applet or application. The interactive display will allow zooming and modification of the colors. The scripts that were written in PV-WAVE will most likely have to be replaced with a new system based on a different plotting library. We will take advantage of IAG development efforts for SSDS visualization and use the development time listed in this project for any customizations necessary for the presentation of ROVCTD data.

Project Team. The Core CTD data team includes:

- Mike Burczynski (Project Manager, Instrumentation Technician, DMO)
- Gernot Friederich (Data Champion for Underway CTD, Science)
- Reiko Michisaki (Data Champion for Profiler CTD, Science)
- Bruce Robison (Data Champion for ROV CTD, Science)
- David Caress (MDUC Chair, Science)
- Rich Schramm (IAG)

Project Lab Space. The DMO Instrumentation Lab will be fully utilized for all operations associated with this project. Additional work, staging, and storage space is located directly outside the lab.

3) Budget Justification (new and continuing projects)

Science users and/or Marine Advisory Committee will be polled on the purchase of smaller, less complicated CTD. A more basic and nonessential profiler, the Seabird sbe19plus, can be obtained at a fraction of the cost of the current sbe911plus system. This unit would be much more compact allowing it to be carried as a spare on CTD profiler missions or as a backup system on ROV missions. Its smaller size would also make it easier to handle on vessel decks during launches and recoveries. On CTD missions where lower accuracy data was acceptable, such as when water

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collection was the primary objective, using such a smaller rosette would be highly advantageous. The instrument package on such a profiler would be far less complicated. The temperature and conductivity sensors are integrated into the housing of the main unit and the profiler would carry a fraction (or none) of the auxiliary sensors that our current sbe911plus system does. This makes the profiler much easier to maintain, operate, and troubleshoot than the large and complex sbe911plus system. Training someone to be a fairly proficient operator of such a rosette, someone who could readily identify problems with the system and have the ability to fix problems in the field, could be achieved in a relatively short amount of time.

4) Milestones (new and continuing projects)

	Milestone 1	Milestone 2	Milestone 3	Milestone 4	Milestone 5	Total Resources ¹ for each resource category for all milestones listed here
Milestone date						
Milestone description						
EE						
SE						
ME						
IAG						
Machine Shop						

¹ This number should be same as the number you entered on the resource requests for this particular resource