Ranger III Instrumentation

INTRODUCTION

The Ranger III carries park visitors to and from Isle Royale National Park twice weekly between May and September, providing an ideal platform for regular time-series data collection. The information collected would greatly benefit climate, ecological, and biogeochemical research on Lake Superior. A major problem in studying large ecosystems such as Lake Superior is the need for spatial coverage to complement time-series data from weather buoys. Presently, time series data for only a few parameters are collected in offshore waters. Synoptic spatial surveys of the lake are limited to a few variables measured by satellite or infrequent ship based surveys. The Ranger III would cross a central basin, providing both time series measurements as well as spatial coastal and deep-water coverage.

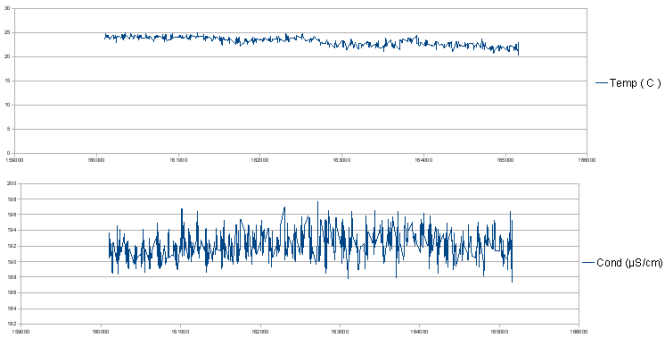

Figure 1. Sample Data (calibrated)

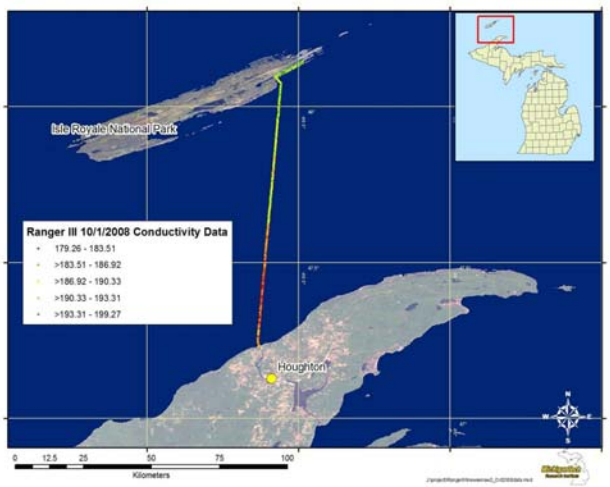

Figure 2. Conductivity Data

Figure 3. Ranger III in port

ACCOMPLISHMENTS

The most desirable design would meet these requirements:

- Minimal changes to the ship or ship systems
- Distributed instrument packages and displays
- Extensible to other sensors without modification
- Easy adaptation to other vessels and sensing missions

The system meets all of its intended goals:

- Integral Internet in every package makes them very modular
- Local logging of data in every package make data recovery robust, even in the presence of various system component failures
- Single-button operation for ease of use
- Integrated web-server and collection software for logging and outreach
- Current sensor head can be replaced directly by a YSI 6600 once data utility has been demonstrated

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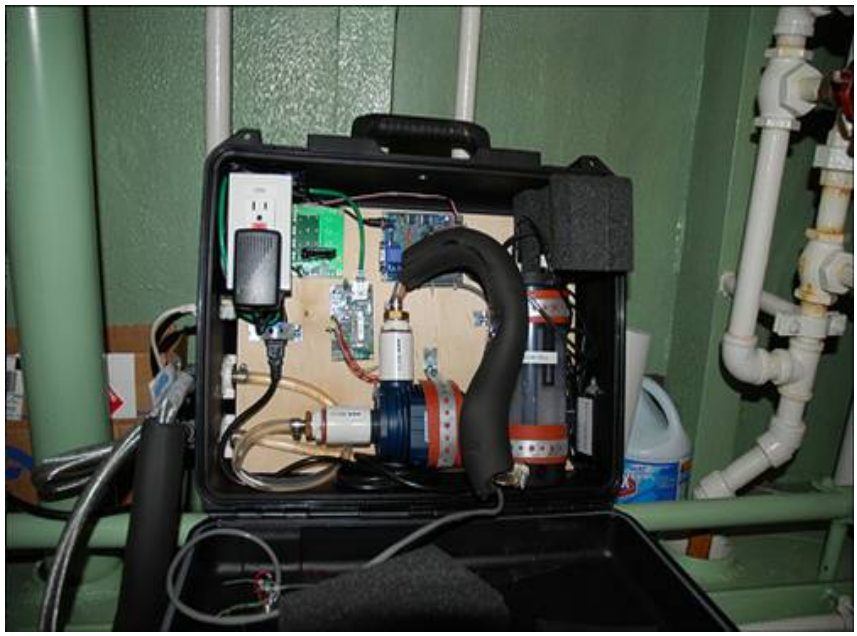

Figure 4. Water Sensor

Figure 5. GPS Sensor

NEXT STEPS

The system is under test on the Ranger III at this time. At the end of the current season, the instrument will be recovered. Based on the observations of its performance, changes will be made to the design to improve its performance, and to accommodate an upgraded sensor head containing pH, DO, turbidity, and chlorophyll sensors. The refined sensor package will be reinstalled on the Ranger III for the 2009 season.

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