communications
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TRIP REPORT – NOAA R/V RONALD H. BROWN

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Science Team

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Background

The software was upgraded in Madeira to work with the new ARC board after both old ARC boards were possibly not working. During the cruise from Madeira to St. Maarten, the system exhibited several problems that were not encountered during dockside tests in Madeira. These were:

Data artifacts: Two lines parallel to the ship track, one either side of the vertical, in which the bottom appeared shallow than the surrounding beams. From gridded data, they appeared to be approximately 60 meters shallow in a 4000 meter deep area, or 1.5% shallow. They were also evident in areas that were not flat.

Several beams on the port side became very deep in depths exceeding about 5000 meters, pulling the range gates with them. This was eliminated by narrowing the half swath angle, but before Madeira this had not been necessary.

The system stopped pinging periodically, requiring a reboot. From the error messages received, the hard disk in the Echo Processor was suspected to be the cause of this. Eventually, the system would not boot due to a DSP cable error.

Two M-O disks were brought to Madeira and an additional copy was made there. The original disk eventually failed to boot (presumably after several crashes), going to the 167BUG> prompt. Copy A was used after that until the system failed to run due to the DSP cable.

The terminal attached to yellowlegs could receive data but not send data to yellowlegs. Thus it was impossible to do a proper shutdown unless the system booted fully and another device could remote shell to yellowlegs.

Summary of Operations

Repair / Remediation

1. Replaced noisy muffin fan in Data Logger with one from ship spares
2. Replaced defective DSP cable C17

3. Replaced hard disk in Echo Processor with spare
4. Removed software switch (-e flag) in initialization files used for testing with simulated echo from all 3 M-O disks (original, copy A and copy B)

Dockside Tests

1. Verified that all 3 M-O disks booted, ping cycled and displayed simulated data from internal echo simulator (before removing –e flag)
2. Verified proper DSP operation with new cable
3. Verified system stability through extended operation in SURVEY mode writing to both the SMS and hard drive, and running multiple data displays at the Operator Station. System did not stop pinging
4. Verified power amplifiers
5. Verified projector currents and leakage
6. Verified hydrophone capacitances, dissipation factors and leakage
7. Checked proper operation of spare hard disk
8. Checked receiver using receiver test and verified no change from measurements in Madeira

Survey / At Sea

The system was stable during the 3-day survey. The only time it stopped was during one power switchover. The EP has been connected to a UPS in the adjacent rack instead of the SeaBeam supplied one. The LO BATTERY and AC FAIL signals from the SeaBeam UPS are connected to the EP to allow it to run. When power switched over, the other UPS did not switch to battery operation, and power was lost to the EP. We had put the system in IDLE mode prior to the switchover, and no harm came to the hardware. The system did a file system repair at bootup and went back on line with no problems.

The "railroad track" artifacts are absent, and there is no problem at the port swath extreme as were observe after Madeira, so the –e flag was apparently the source of the observed artifacts. Bill Danforth has seen some railroad tracks as well as roll artifacts in previously collected data. These are more subtle than the artifacts seen after Madeira and may still be present – they require his data visualization tools to see.

The scientists noticed a discrepancy of about 100 meters across the swath between data taken on this survey and data taken in February 2003 in the same area. After the survey was completed, we noticed that the system was running in Apparent Depth mode. This mode outputs true position, but depth is processed to reproduce that taken by a vertical echo sounder that assumes a uniform 1500 m/s. sound velocity through the water column. The data can be corrected to true depth by applying sound velocity correction in a vertical path; no ray bending is required as Apparent Depth mode preserves true position of soundings.

The power was switched at one point during the survey, and the UPS attached to the Echo Processor did not switch to battery backup. The SeaBeam supplied UPS is not being used, except to provide the feedback signals necessary to allow the system to operate. This setup needs to be addressed.

Action Items

1. Provide USGS with the procedure used to generate Apparent Depth from True Depth and sound velocity profile, to allow them to confirm their conversion from Apparent Depth back to True Depth
2. Specify a UPS for NOAA to purchase that will fulfill the requirement for the Echo Processor both now and after the upgrade (it may be best to power the Echo Processor from existing UPS capability as is done for the Operator Station now)
3. Establish with NOAA whether a spare hard disk is desired for the interim period until the upgrade