

MTM4 Lessons learned and Major Bug list.

Rev.

1.0 24FEB06 – initial release mrc

2.0 17 JUL06 – Updated after Surface and Benthic (phase1) deployment. Mrc

3.0 03OCT06 – Updated after Surface Cans swap.

4.0 18JUN07 – Updated after SHELF BIN swap.

Need to add:

1) Change sample rates for engineering items before performing invasive manipulations on network.

Category 1 – These items are considered potentially fatal bugs and should be fixed before the phase 2 deployment scheduled for September 27 – October 4.

Category 2 – These items are considered potentially serious bugs and should be fixed as soon as resources and budget are available. Some of these items need to be fixed before the next major surface deployment or turn-around.

Category 3 – These items are design changes for new builds, enhancements to improve reliability or maintenance and general project lessons learned. It is anticipated that some of these items will be included in the project plan for 2007. At the end of this category are general items in the “lessons learned” spirit.

Category 1.

1. Computing and telemetry system.
 - a. Medusa card failure to reboot on watchdog reset.
 - b. Medusa card loop-back causing network failure – inability to reliably operate passive optical loop-back.
2. SIAM application software.
 - a. Aquadopp summarizer needs revision.
3. Cable and cable laying sled.
 - a. Need improved cable for benthic lay.
 - b. Need DVL software modification to get true distance-along-track.
4. General items.
 - a. Need pre-dive checklist for BINs (Fluorometer cap!). All needs to be ready to go 1 day before planned launch.
 - b. Need organized and labeled cable collection.
 - c. Need preconfigured Freewave stash with cables, antennas and configuration guide.
 - d. Need to run through checklist 2-3 days before deployment – not the night before!
 - e. Need safety belt in go-to-sea equipment.
5. Operational items.
 - a. Need pre-dive consultation with mooring team before diving ROV within watch-circle to double-check mooring location and verify mooring cable is not a significant risk.

Category 2

1. Computing and telemetry system.
 - a. Jump to boot loader on any console transition during booting.
 - b. Satellite connection algorithm improvements (immediate retry?).
 - c. Boot loader on boot-up bug (if ANY character is received at console).
 - d. NV ram corruption bug (not confirmed).
 - e. Upgrade to wider envelope Globalstar antenna.
 - f. Medusa card loop-back, need continuous or near continuous readout of optical power when cable laying instead of intermittent readings.

2. Power system.
 - a. Control logic/component failure on BIN power board can keep back-up power supply on, increasing power consumption.
 - b. Switch control logic in BIN can glitch and turn on switch channels uncommanded.
3. SIAM application software.
 - a. Globalstar communications algorithms need improvement for greater efficiency. Using too much satcom time for amount of data sent. Connection times are often short and long downloads are interrupted. Retry after delay needed.
 - b. Need data moving scheme for parceling out data archives on mooring system on available memory.
 - c. Need to streamline BIN shutdown procedure. Need to make it easier to “safe” ADCP.
4. Cable and cable laying sled.
 - a. Need fail-safe lock-out on storage drum rotation so that will not payout if overboarding sheave stops.

Category 3

1. Computing and telemetry system.
 - a. Wake-up fails after broadcast storm on network.
 - b. Nodes lock-up on occasion for no known cause.
2. Every micro-processor subsystem needs to be on a global reset line and also have the internal watchdog enabled – even if just a simple implementation.
3. All software/firmware should have a way of confirming version number without having to reload software image.
4. When estimating number of PCB’s needed for complex systems (like SideARM and Medusa) make sure and take into account that the build and test yield is NOT 100% (more like 60-70%)!
5. Cable arrived from JDR damaged – again. MUST be packaged so that it can not be damaged by improper forklift lifting. If it can happen it will. Lagging needs to allow forking from any lifting direction.
6. Coilcords were defective but each vendor blamed the other. In the future one vendor needs to be responsible for the whole article. A factory visit when the cable is being run wouldn’t be a bad idea either.
7. Watchdog timer bug came in right at the end. Watchdog was being “fed” when system went to sleep. Why it was not caught earlier?
 - a. A functional test on the full system was not done. It was scheduled but not completed when planned and was pushed back. Fortunately a PG&E power failure a week before closed can exposed it.
 - b. The lab test system where the testing was conducted was not running the same code and did not replicate the deployed system as it was supposed to. Because the development systems were used to build the lab test rig, development continued on this system rather than having it running the current release. The watchdog was not tested in a sleep-enabled environment!
8. Cable laying sled and cable laying.
 - a. Stripes on benthic cable and horizontal bars would improve ability to visually judge payout speed/distance. Cable should be marked.
 - b. Good rubber jaws for manipulator arm would make cable handling with the arm easier.
 - c. A level-wind on the cable laying sled would allow cable recovery if necessary (buoyancy a big issue with this).
 - d. Payout reel motor drive should be able to run backwards so cable can be reeled in if necessary without taking cable from overboarding sheave.
 - e. Guides to make it impossible for cable to jump off drum.
 - f. Would “steel-lite” be more suitable for subsea cable laying?
 - g. Should always have cutter available that can cut any section of the cable being laid to salvage the connectors.
9. BIN assembly.

- a. Need contrasting colors between ROV-mate connector paddles and “window” holders.
- b. Should choreograph placement of BIN cables in “window” holders before dive so movements are not adhoc during dive.
- c. BIN lift point needs to be improved. Pilots prefer hard tubing with solid ring at the balance point.
- d. ROVmate “T-handle” paddles should be modified to have just a tab protruding upward.
- e. Need portable full BIN test set-up with HV power supply, optics and ROV-mate connector.

10. Miscellaneous.

- a. Need to make certain GF testing is performed on deployment hardware as part of final integration.
- b. Need to make sure GF scanning is disabled on non-primary power-connected nodes.
- c. Spares of computing systems, tested and in housings.
- d. Spares of water sensitive surface equipment in case of dunking.
- e. Buoy lift point needs to be higher.
- f. Label everything!
- g. "ShutdownPort" should force shutdown if comms are lost.
- h. Be very conscious of which way the BIN cables are wrapped prior to deployment. Cable should wrap so that RA connectors fit easily into the holders.
- i. Make sure BIN is always ballasted correctly – even if all the instruments are not in place.