

Jason Debrief

1) Appreciated improvements:

- New control vans & increased vehicle payload
- Two Kraft arms & excellent vehicle reliability
- Prototype HD video camera & frame-grabber
- Virtual Van now available as stand-alone DVD
- More flexibility with dive schedules & turn-around times
- Better communication & cooperation



Jason Debrief

2) Software issues:

- Better training for renav & mosaicing software?
 - Improvements underway, e.g. training for all data processors
 - Better tools in development (ongoing)
- Multibeam sonar processed by mbsystem?
 - Yes!
 - New Reson MB sonar for 2010
 - NSF funded NDSF-wide software system improvements for processing MB sonar data
 - SM2K will be phased out



Jason Debrief

3) Is it possible to expand the weather window for launch & recovery?

- NSF funding to develop a new LARS system
- Important implications wrt shipping, deck loading, and fitting on the future Ocean class vessels
- Expect to report to DESSC at Spring meeting on preferred direction



Jason Debrief

4) HD Video

- Improved control system & pan-and-tilt for HD video camera (known issue being addressed)
 - Integration Phase Funded Sept 2009 expect completion 2nd qtr '10
- What is the best HD format(s) that balance high quality with accessibility for science?
- Maybe best to have option of multiple formats, including compressed recording to hard disk
 - WHOI's AIVL: determining best HD motion recording methods for Alvin and Jason



Jason Debrief

- **5) Navigation**
 - USBL tested but some problems with drift & positions dependent on ship's heading
 - Potential causes identified to be evaluated on 2010 engineering dives – still learning
 - Future need: processing of non-LBL navigation
 - Integration of USBL data into DVLNAV underway in '10



Jason Debrief

6) Issues for community feedback

- Do we still need a digital still camera (DSC) with HD camera frame grabs?
 - High quality DSC provides better still image than the HD
 - DSC requires strobe illumination
 - HD stills require post processing
- Would it be better to have a DSC mounted in the basket for close-up imagery?
 - Would improve image
 - Would use up basket space
- Do we really need 3 cameras recorded to DVD?
 - Some science parties want to record >3!
- Is there a preferred HD video format 4 science?
 - Study underway to determine best format(s)



SENTRY Debrief

Sentry not really ready

- System interface programming was more extensive than expected and was not completed during pre-cruise testing.
- Lost ½ day of mobilization due to fuel leak and thus worked into the early morning to do dunk test while dock side.

Testing at sea with damage/repairs

- We deployed Sentry in ~ 80 meters water depth with an umbilical connected in an effort to get better settings for the Reson Multibeam sonar. Sentry was damaged by impact to the hull requiring a wing to be repaired, a new cable run and all to be tested. We managed this with in 24 hours.



SENTRY Debrief

Dive weight release problems

- Investigation back at WHOI with more than 48 hours continuous time in the test well found no problems. After several days of testing under cold conditions an un-commanded release was witnessed. An IC was found to function out of spec when certain timing conditions were met and it sent a very brief power surge to the release motor.

Camera Problems: unexpected shut-off, focus, strobe synchronization and inadequate lighting system?

- Lack of appropriate test and integration time prior to deployment resulting in lost data
 - Strobe sync improperly implemented
 - Data logging bug
 - Improper test specification and procedures at the camera vendor
 - New strobe system being designed and fabricated



SENTRY Debrief

Failure of the Phins INS

- Major component not spared (\$100k+)
- Significant improvisation at sea required to overcome this failure
 - All NDSF assets either need full spares or well tested techniques and procedures for how to overcome failure and continue operating

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SENTRY Debrief

Camera Problems: unexpected shut-off, focus, strobe synchronization and inadequate lighting system?

- We anticipated that the Sentry camera would be a backup to the MacDonald Drift Camera, but unfortunately the winch on the Brook McCall failed and the Drift Camera could not be used.
- The new camera was received shortly before shipping Sentry and although tested for function, it was indeed not fully integrated and tested in field operations. We tested it in the well and ran the system overnight in the shop.
- We lost data early in the cruise due to a strobe sync problem, which we found and fixed. We also had a system software bug that resulted in the image acquisition program being terminated by the operating system a few hours after the topside network was disconnected. This was found and fixed.
- The camera was aligned, focused and tested at the vendor's facility but during field operations it was found that the images were soft on the edges. A new lens installed after the cruise solved the problem.
- Inadequate lighting is being addressed by a new LED strobe system in fabrication.



SENTRY Debrief

MRU system down on one cruise

- The Phins, Inertial Navigation System, failed early in the Fisher cruise leaving us without an accurate attitude measurement unit. Using data from the past several dives while the Phins functioned, deviation corrections to the flux-gate compass were determined and applied to the navigation controls. This worked adequately.
- To correct for the inaccuracies of using the compass a method was then developed to send an acoustic command to “jog” the track lines back over the study site. Thus Sentry’s track was moved N, S, E or W by 10 or 50 meters at a time to correct for the compass drift. This worked well and has been incorporated into our working capabilities.
- Other than the time lost to engineer the fix, this problem resulted only in a moderate reduction of data quality.



SENTRY Debrief

Summary: The SENTRY system was sent to sea before it was fully ready.

- We acknowledge this, although the weight droppers and INS, which caused the bulk of our problems, had been run on 16 previous science dives. We underestimated the time and effort required to integrate the command and control system with our system control and suite of new instruments, which resulted in some loss of time.
- Our experience gained developing ABE and transitioning it from a prototype to a reliable vehicle occurred over many cruises and dives in many different conditions. Sentry is also a complex vehicle that did not have the luxury of being corrected in real time by human interaction and thus must “learn” to handle new conditions.
- Sentry has matured quite rapidly since the cruise in the Gulf (See results from our Valentine cruise). It is a vehicle with much greater capabilities but more importantly it has room to grow.



ALVIN Debrief

In response to post cruise de-briefings

- 1 Spare 600 Khz ADCP to improve mapping capabilities through higher bottom lock altitudes above bottom.
- 1 Spare plug and play external digital still camera and end cap (no pressure housing).
- 2 Spare forward looking SeaKing Tritech Sonar
- 2 Spare Sonardyne Deep Homer Probes for full *ALVIN* depth capabilities.
- 2 New internal digital HD hand held video cameras c/w ship board duplication decks.
- 2 Spare DSP&L Multi SeaCams (pencil cams).
- 4 Spare DSP&L LED lights.
- 6 McLane 4 ball float sets for elevator work.



ALVIN Debrief

In addition to the equipment listed above, the following general improvements have been made

- Digital still camera have been installed on it's own pan and tilt
- All transponders have now been fitted with vacuum ports to increase sealing reliability.
- The Sonardyne USBL can now transmit data back and forth between the support ship and sub via acoustic modem.

