

# Pre-Cruise Planning

- In general went very well
  - Well-coordinated
  - *Sentry* team very communicative
- Despite extensive pre-cruise discussions for one cruise, inadequate pre-cruise testing resulted in significant problems

We always try to test to the maximum extent that funds and ship time will allow. In this case, no opportunity for full at-sea testing was available.

# Mob/Demob

- Generally went well, even under difficult circumstances
- Some communications issues with ship resulted in delay in mobilization for one cruise
- Wrong crane sent for demob of one cruise caused delay

Neither issue affected science operations but better communication is always appreciated

# Operations - Vehicle

- Vehicle performance was good for 2 cruises
- Multiple operational problems with *Sentry* and USBL nav on one cruise resulted in significant loss of time. *Science objectives were not met.*

Problems were depth related. We have since done 14 dives to same depth with adequate tracking and no depth related failures.

- PHINS calibration issue

New procedures in place

- Glitch in mission planning software

This was a midwater dive. No midwater dives were planned that trip.

- Telepresence worked well, thanks largely to efforts of NDSF personnel

We welcome any and all future opportunities to conduct telepresence ops

# Operations – NDSF-provided equip

- USBL -- generally fine, but problems during deep water ops:
  - Apparent limitations of USBL
  - Acoustically noisy ship (?)

Has been improved to provide navigation adequate for map making. Sonardyne providing free equipment next spring that should be even better.

- Multibeam
  - Worked (extremely) well

# Operations – NDSF-provided equip

- Sidescan
  - Worked well
- Sub-bottom Profiler
  - Worked well
- Magnetometers
  - Data noisier than on ABE
  - Apparent interference from DVL

We identified general electrical noise and DVL noise. General electrical noise has been dramatically reduced, DVL noise is unavoidable. Building shields for magnetometers now.

# Operations – NDSF-provided equip

- Cameras

- Overlap of adjacent photographs disappointing during some dives, but software glitch identified and fixed before end of cruise

Brand new capability for 2x rep rate, worked on engineering dive tests but problems on longer missions. Workaround available first dive after problem identified, full fix before end of cruise.

- For geologists & some biologists, existing camera resolution was fine for meeting science objectives, but resolution not adequate for some detailed biological investigations

Working on 11MP camera now – see upgrade slides

- Lighting was good

# Operations – User-provided equip

- Eh sensor
  - Noisy data on one cruise (electrical noise)
  - Fine on subsequent cruise

We have systematically reduced electrical noise on *Sentry* which has benefited the Eh and all other systems

# Data Handover

- Generally fine
- During 1 cruise - more data acquired than expected – almost not enough media

Would have been OK except half of normal equipment was on shore for telepresence, and we suffered a major leak in the lab. Ongoing upgrades underway to handle much higher expected volumes in the near future.

- Data consistently delivered in a timely manner
- Team was flexible accommodating needs with formats sent ashore
- Telepresence data transfer and processing workflow worked very well



# Recommendations

- NDSF vehicle upgrades should include *requirement* of post-improvement set of engineering tests before the vehicle is used for a funded science program

We welcome the opportunity to test whenever possible. In this case, no funded opportunity was available.

- Implement training schedule to strengthen operational team

Underway, see upgrade slides

- User-friendly science interface accessible throughout ship for tracking mission status

Proposal declined. Will continue to look for funding – maybe 2013 NDSF budget or elsewhere.

- *Sentry* should be equipped with “park” mode (like ABE had) – anchor on seafloor and await acoustic command for recovery

Conceptual design underway - see upgrade slides

# Recommendations

- A more systematic approach to file naming (including version number) for *ALL Sentry* files.

## Underway

- *Sentry* can delivery the right sensors to the right part of the ocean to conduct cutting edge research, but the quality of some data (e.g. maggie/Eh/electrical noise) could be improved

Already substantial electrical improvement;  
working more on the maggies

# **ROV Jason / Medea**

## **de-brief summaries – 2011/2012 - one year**

### **1. Pre-Cruise Planning:**

**All PIs felt that pre-cruise planning went well in general with only one remark:**

- Failure at the planning stage (Science or UNOLS operator) to obtain diplomatic clearance for the locations where moorings were located - Clearance for Bajan waters but nor for Trinidad & Tobago or Venezuela.

**Recommend UNOLS address this in ship request system.**

### 3. Operations - Vehicle

**In general Jason performed very well, except for:**

- Introduction of the new LARS system was achieved over the course of the first cruise after some initial integration issues.
- The ship's winch was damaged during transfer from the R/V Thompson to the R/V Langseth, the ship came into port mid-cruise for repair, part of the science team left without accomplishing their cruise goals.

SIO portable winch was damaged during demob from TGT and tested by *Jason* manager and SIO winch pool tech and deemed in good working order. Problem only manifested itself after deep water dive.

- For one cruise the A/C in the control van was not sufficient – problems with overheating.

A/C in the control van is overworked in hot weather and especially when van occupancy is high. A remote station will help alleviate the problem; researching A/C upgrade.

## 4. Operations NDSF - provided equipment

**Navigation** (USBL and LBL) worked really well in general

- On one dive it took 6h until anyone noticed that the underlay ingested into the dive was actually from the wrong ship's multibeam (a completely different site!)

**NDSF relies on the science party to provide map underlays and this is particularly important in new locations.**

- On one cruise, there were increasing discrepancies between predicted locations and where the instruments were found by Jason. -> This indicated that there was an increasing problem with the accuracy of the Jason navigation.
- Will pursue this with PI, but if there was a problem with the USBL it did not reoccur on subsequent 2012 cruises.

## 4. Operations NDSF - provided equipment *cont.*

**Lighting and Cameras** worked well in general

- The HDTV science camera showed limitations in comparison to the pilot's camera: at full-zoom, the NDSF camera did not deliver as much detail, zoomed-out it provided a wider field of view but the lighting was insufficient.
- The NDSF HDTV camera was found to be less effective than the pilots InSite Mini-Zeus for science use

The Advanced Imaging & Visualization Lab has provided a way to double the zoom of the NDSF HD camera. This will be tried on the next engineering dive.

- Mapping using the **Reson multibeam system** has been used to good effect on 4 cruises over the reported year, *except that*
- The Reson multibeam system did not work in the brine pool.

Prior experience suggested it would not map under a brine pool, and it was left on board to allow use at non-brine sites on the same dive. In response to this emerging need, we have identified tests that *may* lead to techniques capable of imaging both the surface of a brine pool and the underlying seafloor. This would be highly experimental.

## 8. Data hand-over:

Data hand-over went well, except for one remark:

- The PI found that 6 of 51 DVDs reviewed were in fact blank disks with no data.

For video DVDs, the protocol is for the data processor to check first recordings from each dive and then to make random checks of following recordings. Problems with procedures or equipment are corrected as they are encountered. In real time two recordings are made simultaneously, one for archives and one for science, and when found bad recordings are replaced by a copy of the simultaneous recording. This PI has asked that we only pursue this course after they have reviewed their other ~50 DVDs of interest.

We continue to use DVDs for lack of a replacement technology. DVDs are economical to record, post-process, and store. We are actively developing a system to replace DVDs; since early summer 2012 data packages have included a nascent product from a prototype system. However, the prototype requires additional features before it can be used operationally. A pending internal WHOI proposal has been submitted to develop advanced features. Other funding is being sought including via the 2013 operating budget

## 10. User Recommendations

- The practice of establishing a standard pattern of both generating a dive-plan ahead of each dive and talking that through with the Expedition Leader is probably worth considering.

**NDSF agrees and a more formal process is in development.**

- UNOLS should invest in a better planning tool for ship-time requests/cruise planning that ingests the planned field operational areas showing nations' EEZ boundaries to ensure diplomatic clearance.
- The ROV Jason team should work on developing a better “repeater” station, outside the control van which has both higher quality video-feed and uses more screens to project that information in the main lab.

**NDSF agrees and is working to accomplish this.**

- For such shallow work, the standard-configuration Jason ROV was probably ‘overkill’. It might be worth considering how to develop a shallow-water option for the National Facility.

Cancellation of the Thompson cruise has led to the total loss of one year of data from one osmosis-sampler and represents a loss of \$0.5 million in research-effort costs and has also impacted 2 PhD students working with the PI.