AUV facility debrief and recommendations

Hedy Edmonds, June 2008

Specific comments

- ABE team deserves high praise for a successful cruise, including difficult conditions
- The shear pins on ABE thrusters appear to provide only a failure mode rather than a protection function
- The ABE team should procure a better radio direction finder for recoveries
- Compared to prior experience (2003) the PI could identify no obvious difference in how this ABE cruise was conducted from those conducted previously (pre- to post-NDSF incorporation)

AUV needs/recommendations

- Formal pre-cruise planning procedure
  - This year's cruise involved a PI with previous ABE experience; not all will
  - Operation as a facility will probably mean less direct involvement of the AUV group in the proposal-writing stage
  - On the science side, science needs to either provide good bathy to AUV group ahead of time for dive planning or allow for collection of multibeam data as part of cruise plan
    - First dive(s) should be planned pre-cruise
- Pre-cruise mobilization
  - Allow adequate time in port
  - Operation as facility should hopefully allow for more between-cruise maintenance

AUV needs/recommendations

- Working from different platforms
  - AUVs are even more portable than *Jason II* and will encounter more issues with ships' handling systems, crew experience, etc.
  - This requires even greater attention to the two other recommendations
  - Is there some means by which platforms can be vetted?
    - In other words, is it valid to assume that AUVs are infinitely portable?

Feedback Response - *ABE*

Tasmanian Seamounts – Adkins/Thresher – Jan 2008

Areas needing attention:

1) Pre-cruise planning

2) Mobilization

3) Pre-cruise preparation for working on an unfamiliar ship

4) Specific issues

Feedback Response - *ABE*

Pre-Cruise Planning

- **Organize pre-cruise meeting using format similar to *Jason* & *Alvin***
- **Update web-based resources with a pre-cruise planning questionnaire designed more specifically for AUV operations**
  - Provide better information on AUV capabilities
  - List instrumentation options and how use affects the vehicle's performance (e.g. power consumption)
  - Query user about expected work site, depth, terrain and special features. Planning is enhanced by having bathymetry provided when possible.
  - List instrumentation to be mounted on the vehicle and other science tools that impact vehicle performance
  - Provide AUV navigation options and impact on cruise objectives

Feedback Response - *ABE*

Mobilization

Typically 2 days are planned for mobilization onto a ship.

This proved insufficient for the Adkins cruise for several reasons:

- Our personnel arrived in Hobart the day prior to mobilization
- The *Southern Surveyor* was having some problems and was not ready to load. It was not able to load the container until just before sailing. The AUV & equipment were unloaded from container while it was on the dock and small lifts were made to get them onto the ship.
- Delayed loading inhibited vehicle preparation and thus more of the mobilization occurred at sea, in rough weather, on a “lively” ship.

Where we erred: One of our group should have arrived a day or two earlier to make sure all was ready. Phone conversations sometimes are not enough. By arriving early, the state of readiness of the ship and equipment could have been assessed and our needs negotiated face to face.

Feedback Response - *ABE*

AUV Ops on Unfamiliar Ships

- The informal process of vetting the ship's capabilities for AUV operations employed in the past utilized research of published specifications and communication with the operator – often a lot of communication.
- Formalizing the requirements and issues to be resolved will help identify solutions earlier in the process.
- Pictures of the ship are great, but are short on detail. We have only made a visit to a ship to resolve operational issues once in the past, but it was very effective. Perhaps this should be done for any "new to us" vessel.

Feedback Response - *ABE*

Specific Issues

- **Thruster failure**

  On this cruise we had trouble with thrusters breaking the shear pins. Evaluation proved that the cycling of forward and reverse thrust on the shaft roll pins were breaking them on the outside wrap and then the crack was propagating around the wraps until final failure.
  Solution: Replacement with solid titanium pins is in progress.
  Also, with maintenance funds now available in the NDSF budget we can be more proactive in our maintenance program.

- **Radio direction finder inadequate**

  Solution: We will try to procure a better system in next year's budget, but borrow or enhance our current system if possible for the upcoming 2008 cruises.