

Alvin de-brief summaries - 6/09

Four cruises for 44 dives

Cary	Nov 2008	EPR
Teske	Dec 2008	Guaymas
Wheat	Feb 2009	Costa Rica
Levin	Feb 2009	Costa Rica

Note: Only the 2 Costa Rica cruises are presented here

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Overview:

All the PIs were very satisfied with their Alvin experience and felt that their scientific goals were all met or exceeded. These were repeat users of the facility and many noted significant improvements from previous years.

All personnel from Captain to deck crew, Expedition Leader, pilots, and engineers were at various times singled out for praise. The Alvin team was universally praised for its professionalism.

The following is an overview of some of the issues that came up during the cruises. Some of these are problems that have or will require some sort of corrective action while others are issues beyond the NDSF's control but presented here for their educational value to future users.

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Overview (continued):

The main point of these interviews is to track recurrent issues and make sure there is followup and ultimately that there are no recurrent issues. We are finding that we are achieving that goal. Problems are being dealt with in a timely manner and equipment is being repaired/ replaced/ updated as fast as is practical or budgets allow. The only truly recurrent issues seem to deal with navigation (which will likely never be totally satisfactory), mobilization/demobilization/agent issues, and, of course, dives lost to weather.

Alvin de-brief issues - 6/09

Pre-Cruise Planning:

All PIs satisfied with planning in general with only a few issues. These were experienced PIs who put a lot of effort into planning.

Despite the advance planning, operating in and out of Costa Rica (Puntarenas) proved difficult:

Lack of docking - use of water taxi

Immigration issues came up in spite of extensive pre-cruise checks

Alvin de-brief issues - 6/09

Mobilization/Demobilization:

Most gear was loaded and unloaded in Long Beach.

The ship was anchored off Puntarenas, requiring a ~30 minute ride by water taxi. This made things difficult for gear transfer but would have been much worse if Long Beach had not been the next port.

It was new for these PIs to be able to get on-board ship 2 days in advance of the cruise and much appreciated. Not only did this allow the science party to prepare thoroughly but it also allowed the Alvin group to process all the scientists through their pre-dive briefings before leaving port – a distinct advantage when the first dive site was only 8 hours away. This was a huge advantage over previous operations, especially out of Costa Rica, and a significant change for the better.

There was insufficient time for making data disk copies during the short transit and demobilization.

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Operations - Vehicle:

Overall, the PIs thought Alvin was operating close to its very best and that Alvin and Ship operations were very well integrated.

The batteries on the sub worked well throughout such that the key limitation to bottom-time was the ascent and descent times. Dives were as deep as 4400m, close to Alvin's operating limit.

One dive was lost due to weather which the PI considered was a conservative call. The report that the Captain had in-hand was for the wrong area leading to a decision not to dive. Recommendation arising: Subscribe to "Commander's Weather" as both Jason and ABE/Sentry do. It is a private service delivered by email and with predictions for 3h periods in forthcoming days that seems accurate even in remote locations.

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Operations - NDSF Equipment:

LBL transponder-navigation grids were laid for this work and generally worked very well. Two problems did arise: An outdated sound-velocity profile caused a 100m offset. Two transponders were set up to operate at an identical frequency.

Navigation was hindered by the loss of the forward-looking sonar which failed early on and remained inoperative throughout the remainder of the dive-series and the following cruise. This proved a big setback because this sonar is relied on heavily for target location.

A further concern was that the Homer Pros used routinely with Alvin at other sites are not rated for use at 4500m so they could not be used either. This was particularly noticed when trying to locate free-fall deployed packages.

Alvin de-brief issues - 6/09

Operations - NDSF Equipment (continued):

Cameras: On at least 1 dive there was no still camera working. On one dive the right hand video was not working properly and on subsequent dives the only way to record video was by having to take the overlays off.

There were also problems generating usable data from the CTD on-board. Sean and Mike worked to resolve this – eventually – but this is something that ought to be streamlined to become more user friendly.

A PI recommended adding an oxygen sensor to Alvin with the same dynamic range as used on a CTD (0.04 to 2 mL/L)

One item of concern was over the incident that occurred with Anton when he was servicing a transponder. The transponder effectively exploded in the hydro-lab, hurling Anton across the room and knocking him unconscious.

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Data hand-over:

This is always put off until the end of the cruise and became a problem here when there were only 6 hours between the last dive and disembarkation. Often there is a significant amount of data copying required after handoff but before disembarkation. Can this be done as the cruise progresses rather than all at once?

The hand-held HD camera was used from within the sub on two dives but when the tapes were handed over at the end of the cruise, the tape from one dive was found to be blank. If these tapes had been duped and handed-over right after the dive like normal dive-tapes the PI would have had the opportunity to try and rectify this.

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User Recommendations:

There should be a back-up for the Sonar on Alvin. It is too important of a tool to have to cope without it.

The ship should also maintain the 2 days prior to departure for set-up and ALVIN-related meetings (e.g., briefing, exterior, in-hull) because that greatly enhances the ability to make full use of precious science time on-station once the ship sails.

Effort should be made to improve communications between the SSSGs and the Alvin Group.

More attention should be paid to the still cameras on Alvin. This is where the best publication output from having an HOV comes from yet it never seems to be operating at an optimal level.

Multibeam mapping from the Atlantis should be improved. First, it could probably do with an update. Second, it should be made easier for the science party to be able to make use of.

Alvin Debrief Issues

Wheat et al, Costa Rica -- NDSF-provided equipment

- Navigation was conducted using LBL for the first dive to the wellhead but a 100m offset from reality was introduced because the system had an inaccurate sound velocity profile that needed updating. Added to that, two of the transponders supplied were set up to operate at an identical frequency – this was not helpful!

NDSF Response:

The Expedition Leader stated that the offset was caused by the initial survey more than a bad SVP. The transponder frequency issue involved the elevator transponders where only one frequency was available -- the wire releases and the sub emergency transponder were using the other available frequencies so 7.0/9.0 was the only set available.



Alvin Debrief Issues

- Navigation was also hindered by the loss of the forward-looking sonar which failed on Dives 2 & 3 and remained inoperative throughout the remainder of the dive series.

NDSF Response:

We have requested quotations for a second spare. An alternative from Sea King is also being considered.

- The homer probes used routinely with *Alvin* at other sites are not rated for use at 4500m so they could not be used. This was particularly noticed when trying to locate the packages that were free-fall deployed from the surface ship.

NDSF Response:

We have priced a deep probe but the cost is significant, almost 3x the cost of a regular beacon. Economics and our normal dive locations dictated that we purchase four general-use shallow beacons instead of a single deep beacon. Perhaps ODP or the PI could purchase a few deep beacons for use at well heads?



Alvin Debrief Issues

Levin et al, Costa Rica -- Vehicle Operations

- One dive was lost due to weather which the PI considered a conservative call. Winds picked up from flat calm to 20-25 knots and the forecast the Captain had was for the wrong area, leading to a decision not to dive.

NDSF Response:

We are sorry that the PI considered this a conservative call, but neither WHOI nor NDSF management will second-guess the Master/Expedition Leader where safety of personnel or equipment is concerned.

- Both *Jason* and *ABE/Sentry* subscribe to a private email service providing predictions for 3-hour periods that seems accurate even in remote areas. Called Commander's Weather -- worth considering as a good investment for *Alvin* operations too?

NDSF Response:

Navy mandates 24 hr forecast not 3 hr but we will look into this agency.



Alvin Debrief Issues

NDSF-provided equipment

- The sonar on *Alvin* was broken for the whole cruise and this proved a big setback because this sonar is relied on heavily for identifying the hard-grounds that form around the cold seeps and, hence, are extremely valuable for target location.

NDSF Response:

Same response to the issue as during the Wheat leg.

- On at least one and maybe as many as three dives there was no still camera working. No explanation was provided to the PI why this was so.

NDSF Response:

Again, because of an equipment failure. This camera was eventually sent to the manufacturer for a total camera replacement. A spare camera quotation has been requested and the cost is in the \$25K range.



Alvin Debrief Issues

- On one dive the right-hand video was not working properly and on subsequent dives the only way to record video was by having to take the overlays off which has the potential to cause confusion when working up results from dive-tapes later.

NDSF Response:

That problem was eventually fixed over several nights during the leg. Only other alternative would have been to stop diving operations to repair.

- The hand-held HD camera was used in the sub on two dives but when the tapes were handed over at the end of the cruise, the tape from one dive was found to be blank. By that time it was too late to collect more material – if these tapes had been duped and handed over earlier – e.g. right after the dive like normal dive-tapes – the PI would have had the opportunity to try and rectify this.

NDSF Response:

Tapes from this camera are normally checked post-dive and this will be done on all future legs.



Alvin Debrief Issues

- The Reson was on board and collecting data but the PI did not know it was available. Had they been aware they could potentially have made use of it. Further, the SSSG did not seem to be aware that they were responsible for copying this data.

NDSF Response:

The Reson sonar is brand new and is still a work in progress. If post-dive maps are required the Imagenex sonar would be installed to meet that requirement. We hope to be considerably further along this year in having the ability to do post-dive maps.

- There were also problems generating usable data from the CTD on board *Alvin* that require more than just processing what *Alvin* collects using standard SeaBird software. Sean and Mike worked with Vicky Orphan from the science party to resolve this – eventually – but this is something that ought to be streamlined to become more user friendly.

NDSF Response:

Unit was sent to Seabird for refurb and it should now be more user friendly



Alvin Debrief Issues

- The PI would also like to see an oxygen sensor added to *Alvin* with the same dynamic range as used on a CTD (0.04 to 2 ml/l).

NDSF Response:

Plans for the overhaul upgrade are to include this.

Estimated spares cost:

Sonar	\$74K
DSC Camera	\$20K
Deep Homer Beacons (2)	<u>\$22K</u>
Total	\$116K

