



# *Alvin* Debrief Summary - 2010



## Seven Cruises for 91 dives

Southern California  
Juan de Fuca  
Costa Rica  
Guaymas Basin  
Galapagos



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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 both new and repeat users of the facility.

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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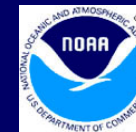


## Pre-Cruise Planning

- All PIs satisfied with planning in general with only a few issues.
- Juan de Fuca work required complex planning due to multiple programs occurring in the area during the short weather window. This will likely continue for many years and will need continued close attention.
- On-line pre-cruise planning survey only allows a single study area. Needs changing/improving.
- Advice to PIs: ALL participants need to bring passports, passport renewals need to be reported, and PIs need to have up-to-date passport information for all participants.



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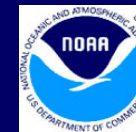


### **Mobilization/Demobilization**

- Most gear was transferred at US ports making this easy. The ability to leave gear on board until a US port is reached was greatly appreciated.
- The ability to get on-board ship two days in advance of the cruise was noted and much appreciated by all PIs.
- The ship did not have clearance to operate at Guaymas. This was mostly an issue with Mexican authorities but the absence of clearance was not noted until the Friday before the first dive on Sunday. Two dive days were lost.



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### Operations – Vehicle

- No significant problems were reported except during 2 cruises.
- A 6-week layup before one cruise resulted in the sub's batteries consistently underperforming throughout the cruise. This resulted in 0.5-1 hour reduced bottom times and needs paying attention to if *Alvin* is going to be “laid up” at sea again.

*Looking at possibility of having 1-2 crew ride the ship during non-diving legs to maintain batteries and run sub systems. This will be based on available personnel. We have also ordered a complete new set of batteries for delivery in June.*



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### Operations – Vehicle

- *Alvin* seemed to be suffering from numerous faults on one cruise:
  - On the 1st dive, the ground detector switch broke and the pilot had to come up with a work-around to continue the dive

*Modifying ground detector so that a spare system will be plug and play.*

- On the 3rd dive, there was an electrical fault

*There is a periodic maintenance schedule to mitigate faults.*

- On all of dives 1-4 there seemed to be issues with ballasting the vehicle correctly

*Found and fixed problem with VB system flow control valve.*

- On two dives the vehicle was launched late due to hydraulic oil leaking from the manipulators

*There is a periodic maintenance schedule to mitigate problems.*

- PI felt like about one dive lost in total to failures and delays



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### Operations - NDSF Equipment

- Navigation worked well throughout. USBL reported to be as good or better than LBL and all navigation was best ever.
- USBL and LBL precise but offsets between them of 10-15m

*These systems use totally different methods for calculating position so there will always be offsets.*

- Framegrabber software needs updating to incorporate USBL

*In-hull software needs to be updated and pre-cruise checks will ensure correct navigation is getting to overlays and Framegrabber.*

- Camera and lighting worked well. One PI strongly suggests 3 handheld cameras in the ball, one for each person.

*All hand-held video and digital still cameras were recently upgraded or replaced. NDSF can plan to acquire a third camera.*



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### Operations - NDSF Equipment

- Sonar and Reson worked well - Reson data pipeline needs to be automated so it can be used in the same manner as on *Sentry*.

*NDSF is working toward automated scripts that will be applicable to Alvin.*

- Elevator floats failed on one deployment. Can we switch to syntactic foam?

*Syntactic flotation is extremely expensive, but ALOPS can request funding for flotation replacement based with science community support.*





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### Operations - User Provided Equipment

- No problems reported. Numerous instruments (mass spec, micro-profiler, fish catcher, etc.) were successfully interfaced directly to *Alvin* and other seafloor instruments were interfaced using ICL loops or wet-mate connectors.
- Up to 600m strings of gear were deployed and recovered at boreholes using a system of floats - a very impressive task.



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### Data Hand-Over

- One PI noted that this has been improving over previous years, particularly when there were only a few hours between the last dive and disembarkation.
- On one cruise the DVD copier became unreliable. This seemed to be remedied on later cruises but the process remains slow and time consuming.
- PIs are now typically bringing large external hard drives for data transfer which is proving to be much more efficient.



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### User Recommendations

- The ship's IT system is showing its age – updating some computers is recommended.

*Computers were upgraded in early 2010.*

- Maintain multibeam data onboard *Atlantis* for at least the commonly visited sites so it is available for dive planning.
- The PIs who used both *Alvin* and *Sentry* could not emphasize enough the merits of using them together. They also expressed confidence that *Sentry* was ready for adoption into NDSF.
- The use of elevators is an excellent way to overcome limitations in the payload of *Alvin* and scientific users should take better advantage of this.

*Elevators are available for use. The crew regularly deploys and wire line navigates elevators to within +/- 20m of target.*



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### User Recommendations (cont.)

- The functionality of *Alvin* could be greatly enhanced – perhaps doubled – if an ability to transmit images from the seafloor acoustically were implemented as has been done routinely, for more than a decade, with *Shinkai*. The ability to confer with scientists on deck would greatly enhance the capabilities of *Alvin*.

*Implementation of this would greatly degrade the navigation because of time/bandwidth requirements to send video frame grabs through the water to the surface – something like 5–10 minutes per picture depending on resolution.*



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### User Recommendations (cont.)

- One PI wondered whether there should be a special “Latin America” advisory issued to inexperienced PIs to warn them against likely pitfalls – e.g. shipping by sea whenever possible to minimize chances for things going astray or fouling in internal-to-Mexico (or other nation) complications.  
*We advise PIs on the best way to ship equipment on a case-by-case basis, depending on the port and the quantity and contents of equipment.*
- Two PIs had various problems with the ship’s agent for Central America, including failure to follow through on hotel bookings and consistently raising the asking prices for services between when they are offered and delivered. This is a recurrent issue.  
*Prices quoted can change depending on adjustments in the number of people being assisted.*



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### User Recommendations (cont.)

- One PI who had not used *Alvin* in the past 10 years was pleased to note a complete transformation in the ethos at sea in terms of both the ship's crew and even the cleanliness aboard ship. Everybody aboard ship, including both the ship's crew and the entire *Alvin* team seemed genuinely interested in the science being carried out.