Alvin de-brief summaries - 2010-11

Four cruises

Juan de Fuca
Cascadia
Gulf of Mexico

Alvin de-brief summaries - 2010-11

Pre-Cruise Planning:

All PIs satisfied with planning in general with only a few issues.

Juan de Fuca, Cascadia, and Hydrate Ridge work continues to require complex planning due to multiple programs occurring in the area during the short weather window. This will likely continue for many years due to multiple initiatives there and will need continued close attention. In spite of this planning, conflicts continue to occur.

Issues with the new HDTV cameras that were due to be installed on Alvin during this period were flagged as a problem well in advance and mitigation was attempted – but with little success.

Alvin de-brief summaries - 2010-11

Mobilization/Demobilization:

This all went very well. This was all at US ports making it easy.

The ability to get on-board ship 2 days in advance of the cruise was noted and much appreciated by all PIs.

Alvin de-brief summaries - 2010-11

Operations - Vehicle:

No significant problems were reported.

Batteries were reported to be in good condition with power only limiting dives with exceptionally long transits.

One dive was lost to problems with the variable ballast system and a half dive to a thruster problem.

Alvin de-brief summaries - 2010-11

Operations - NDSF Equipment:

Navigation generally worked well and USBL reported to be as good or better than LBL. However there was a problem with the navigation computer in Alvin throughout one cruise resulting in significant chunks of dive time being lost.

There were a few minor equipment failures early in the series (cameras, recorders, framegrabber system, pan & tilt, …) but all were corrected by the following dive.

The *Alvin* CTD appeared to be significantly out of calibration on the last dive series.

The HDTV camera that was provided as a stand-in for the new NDSF camera was inadequate and problematic. This was a major setback for two of the dive series.

Alvin de-brief summaries - 2010-11

Operations - User Provided Equipment:

Numerous instruments (mass spec, optical modem, in situ GC, pressure sensors, etc.) were successfully interfaced directly to *Alvin* and other seafloor instruments were interfaced using ICL loops or other connectors.

The only problematic gear was a brine trapper that had been built based on pre-cruise discussions with *Alvin* personnel. It turned out to be too heavy and required at-sea modifications to make it useable in a limited mode. It is essential that the PI work 1-on-1 with the Expedition Leader for their cruise when designing a new piece of equipment that will be interfaced with *Alvin* (or any NDSF vehicle).

Alvin de-brief summaries - 2010-11

Data hand-over:

This went well but it was noted that there may be a need for improving the imaging transfer as HDTV becomes the norm.

Hard drives now being used for data transfer which is proving much more efficient. If multiple copies are required, scientists should bring their own drives.

Alvin de-brief summaries - 2010-11

User Recommendations:

The PIs who used both *Alvin* and *Sentry* could not emphasize enough the merits of using them together.

As part of sustaining a credible night program, the ship should become more aware of issues associated with running CTD-rosette operations without contamination. Specific issues:

- **When to pump and not pump sewage outboard (PIs were told that sewage release is continual – which is problematic)**
- **Deck painting**
- **Hosing decks and causing organics/nutrients to be washed overboard**

Alvin de-brief summaries - 2010-11

User Recommendations (continued):

Although a long-term supporter of *Alvin*, one PI left a cruise with a strong feeling that he would prefer working with *Jason* because of the following important advantages:

- **Live video feed to the ship allows a wider number and variety of scientists and other personnel to be actively engaged in each dive, in real time.**
- ***Jason*'s longer endurance means that science doesn't have to be foreshortened because of lack of daylight hours available.**
- **The level of expertise in how to get the most out of the NDSF cameras seems stronger in the *Jason* team than with *Alvin*.**
- **All in all, more science can be accomplished during the same amount of time with *Jason* than with *Alvin*.**

Jason de-brief summaries - 2010/11

1 cruise prior to the upgrade interval over the winter

Summary includes 5 cruises in 2010:

NE Pacific - Juan de Fuca (pre-IODP)

June/July 2010

NE Pacific - Hydrate Ridge (pre-OOI)

July / August 2010

Axial Seamount

August / September 2010

Gulf of Mexico

October / November 2010

W Florida Slope / E Coast of Florida

November 2010

(Hawaii May / June 2011 *not reported on here)*

Jason de-brief summaries - 2010/11

1. Pre-Cruise Planning:

All PIs felt that pre-cruise planning went well in general with only some issues:

- Jason came out of a planned maintenance period to substitute for Alvin in the NE Pacific. This unexpected early mobilization impacted 2 later cruises.
- Early on the NDSF HDTV camera was damaged during transport to the ship and had to be replaced by the Lange prototype HDTV camera. There were issues with this 'place holder' camera from the time it was delivered until the latest cruise reported on here, for which the final NDSF camera still had not been delivered
- Late confirmation of ports and dates by NOOA caused a rushed planning and uncertainties for 2 cruises
- The information concerning the new HDTV imaging that was to be provided was confusing, the details on what would be available/expected for recording the HDTV camera video-data kept changing

Jason de-brief summaries - 2010/11

2. Mobilization/Demobilization:

- The unexpected early mobilization of Jason meant that the cruise had to be delayed by 2 days to allow the Jason team time to perform a dunk-test in port. Yet, the PIs very much appreciated the help they received to prepare their science gear.
- For one cruise it was decided not to conduct a system dunk-test in port because of concern that this would leave an oil-sheen on the surface of the water, which has to be reported. The dunk test was postponed until ship arrived at the first station. -> Concern that the Ops team is unable to troubleshoot any problems in advance.
- A transformer failure on a previous cruise led to even greater work load for the Jason team -> PIs thought that the team seemed to be below strength for the volume of work required prior to sailing.
- The new Reson sonar was not working on one cruise, which was not critical for that particular cruise yet no survey data could be collected.

Jason de-brief summaries - 2010/11

3. Operations - Vehicle:

In general operations went well and small issues were solved at sea

- At the very end of one cruise the vehicle suffered a failure of all power and telemetry due to a fault that was traced to a junction box between the winch and the Jason control vans.

Manipulators

- There were hydraulic failures of the manipulators on two dives of one cruise.
- A ground fault in the starboard manipulator cause an on-going problem on a different cruise

Jason de-brief summaries - 2010/11

3. Operations - Vehicle *(continued)*:

Working schedule

• On one cruise the PIs found that the rigid cycle of 16h dives and 8h turn-arounds is not the best possible use of the vehicle.

• On a different cruise the PIs found that the strict daily schedule for dives (12h in water 12h on deck) starting at 8 am did not work well. The vehicle was most often in the water later than 8 am with bottom hours more like 6-7 (EL required vehicle to be recovered by daylight - delay in launch in the morning shortened the dives)

Problems in strong currents

On one cruise it took Jason ~ 3 hours to descend in only 500m deep water because of strong currents. The targets were often missed and there were issues moving Jason/Medea and the ship back to the planned position.

Jason de-brief summaries - 2010/11

4. Operations - NDSF Equipment:

Navigation went well except for some issues

- Toward the end of one cruise, there were problems with the vehicle maintaining bottom lock with the DVL
- There is significant wandering of navigation when Jason is on the bottom taking samples (due to loss of DVL bottom lock), which produces errors in the recorded sample positions
- For one cruise the PIs felt discouraged from using LBL for their Jason based mapping efforts in favor of USBL. Post cruise, they are concerned that they would have been better advised to have used LBL in concert with USBL for their data acquisition and processing.

Other Equipment

- On one cruise the multi-chamber suction sampler was used extensively but was often clogged.
- The PIs on one cruise felt that the water column sensing equipment provided by Jason/NDSF is below satisfactory.

Jason de-brief summaries - 2010/11

4. Operations - NDSF Equipment (continued)**:**

There were significant problems with the new NDSF HDTV camera (replacement prototype Lange HDTV camera) on all cruises:

- There was a consistent problem with 'flickering' that was also recorded in the video
- Lighting for the camera is too weak, lighting was adequate for the pilot's camera but NOT for the Science HDTV
- Overall: Lack of sufficient and well-balanced lighting impacted the science team's ability to achieve good performance in terms of focus, zoom and depth of field.
- Controls for the new camera are poorly designed
- Setting up the camera before a dive (by the Jason team) is complex and requires many software settings – this invites error
- There were consistent issues with focusing - is the camera truly parafocal - maintaining focus over the entire range?
- Frame grabs collected when the camera appeared to be in focus were not focused
- There is a lack of automatic white balance
- It is difficult for science users to oversee the quality of a captured image
- Frame grabs are of lower resolution than from the DSC cameras
- Recording to DVDs has to be monitored to avoid excessive data
- PIs recommend a best practice 'manual' for inexperienced users

Jason de-brief summaries - 2010/11

5. Operations - User Provided Equipment:

Most of the equipment worked well, there were only some issues

- On one cruise there were problems with the PI's InSite Zeus camera in form of a small leak that caused fogging, which could not be solved
- On a different cruise there were problems with instruments brought by two inexperienced participants. The instruments were not sea ready, which added workload the Jason team, scientists were not made aware of the severity of the problems.
- On one cruise there were issues with the CTD due to ground faults.

Jason de-brief summaries - 2010/11

6. Data hand-over:

Data hand-over went well for the majority of cruises except for one, where the PIs were not completely satisfied; they felt the processing pipeline did not work well

7. Demobilization

Nothing to report - all went well

Jason de-brief summaries - 2010/11

8. User Recommendations:

- With more IODP related cruises coming up for Jason, one concern is how well it can cope with down-hole instrument strings of the kind that Alvin has previously been able to manipulate well *(more a comment)*.
- WHOI examination required of NDSF management to ensure best practices (operations at sea, data delivery) also to avoid sending vehicles to sea without the proper preparation
- More effective method of pilot training needs to be established
- More attention has to be paid to the cameras and, specifically, their lighting. => This is the major data collecting device and high quality video and still photos are critical.
- Clear guidelines need to be provided for the new HDTV camera
- For the water column sensing equipment it would be useful to add a fluorometer, a dissolved oxygen sensor and a turbidity sensor and to provide a real-time display for the sensors.

Sentry de-brief summaries - 2010-11

Seven cruises

- 4 cruises on UNOLS vessels
- 3 cruises on non-UNOLS vessels
- 3 included TowCam Operations
- 1 included Jason Operations
- 2 included Alvin Operations

Sentry de-brief summaries - 2010-11

Pre-Cruise Planning:

- Overall NDSF pre-cruise planning went very well, special needs identified and accommodated.
- WHOI on-line pre-cruise planning should only allow for more than one study area to be entered so they can be accommodated
- One PI had requested an overview document specifying vehicle capabilities prior to the cruise. It was delivered, but not in a particularly timely fashion.
- Last minute ship scheduling (non-UNOLS) and contract complicated one cruise, but WHOI/NDSF personnel ensured all was on track
- Many PIs had previous experience with NDSF assets which helped with pre-cruise planning

Sentry de-brief summaries - 2010-11

Mobilization/Demobilization:

- This all went very well
- No significant issues - even under difficult circumstances leading up to cruise (e.g. delays with truck causing late delivery)
- Demob completed within ~ 1.5 days

Sentry de-brief summaries - 2010-11

Operations - Vehicle:

- Overall vehicle performed very well
- Sentry cannot easily accommodate short dives in quick succession, which may be desirable based on science objectives
- When there were problems they were overcome quickly and skillfully:
    - Hard drive stack failure (first instance)
    - Abort time for one mission set too early ending dive too soon
    - Shear pin failures

Sentry de-brief summaries - 2010-11

Operations - NDSF Equipment:

- Navigation
  - USBL+DVL
  - Quality was good, often ‘impressive’
- Reson Multibeam sonar
  - Data quality very good, meter to sub-meter resolution
  - Water-column mode very useful for plume mapping
  - Need for tide corrections
  - Incorrect sound velocity during acquisition several dives to diagnose and then several days to establish appropriate post-processing to address in data already collected.
  - Catastrophic failure of two units on one cruise

Sentry de-brief summaries - 2010-11

Operations - NDSF Equipment:

- Camera/Lighting
    - Adequate, but could be improved esp. for biology
- EdgeTech Sidescan sonar
    - Quickly integrated to compensate for lack of MB
    - Performed well, but final data products still pending after cruise
    - Needs a standard data processing pipeline and products
- EdgeTech Subbottom Profiler
    - When used, provided quality data
    - Needs a standard data processing pipeline and products

Sentry de-brief summaries - 2010-11

Operations - User Provided Equipment:

- Numerous instruments were successfully integrated:
  - NOAA ORP sensor
  - Eh Sensor
  - Fluorometer
  - Mass Spectrometer
- In later dives during one cruise an issue was noted that during the last line of each mission and during the ascent, a series of false Eh and Aquatracka anomalies were recorded – the source of this had not been resolved by cruise end.

Sentry de-brief summaries - 2010-11

Data hand-over:

- Overall went fine
- Large data volumes made duplication difficult in some cases
- Google Earth visualizations were useful
- EdgeTech sidescan data (initial use of sonar when MB failed) not delivered at end of cruise.

Sentry de-brief summaries - 2010-11

User Recommendations:

- "Best efforts" basis not suitable for all expeditions
- WHOI needs to match the commitment to success, made in good faith by the PI and funding agencies, to ensure the final data sets are delivered in a timely fashion.
- Clear set of policies should be provided including the type of ships that are recommended for Sentry operations (DP, twin screw, single screw + bow thruster), and at what sea states the vehicle can be launched or should be recovered

Sentry de-brief summaries - 2010-11

User Recommendations (continued):

- Methods for improving sensor reliability at sea should also be considered, including the provision of key spares for critical operations.
- Both the lighting and Sentry camera should be upgraded to meet science needs of biologists, in particular.
- Improve rates of data download from vehicle and data duplication for dissemination during cruise

Alvin de-brief summaries - 2010-11

Four cruises

Juan de Fuca
Cascadia
Gulf of Mexico

NDSF Response

Alvin de-brief summaries - 2010-11

Pre-Cruise Planning:

All PIs satisfied with planning in general with only a few issues.

Juan de Fuca, Cascadia, and Hydrate Ridge work continues to require complex planning due to multiple programs occurring in the area during the short weather window. This will likely continue for many years due to multiple initiatives there and will need continued close attention. In spite of this planning, conflicts continue to occur.

Issues with the new HDTV cameras that were due to be installed on Alvin during this period were flagged as a problem well in advance and mitigation was attempted – but with little success.

This will be addressed in a later slide.

Alvin de-brief summaries - 2010-11

Mobilization/Demobilization:

This all went very well. This was all at US ports making it easy.

The ability to get on-board ship 2 days in advance of the cruise was noted and much appreciated by all PIs.

Alvin de-brief summaries - 2010-11

Operations - Vehicle:

No significant problems were reported.

Batteries were reported to be in good condition with power only limiting dives with exceptionally long transits.

One dive was lost to problems with the variable ballast system and a half dive to a thruster problem.

All vehicle systems are being reworked during the overhaul period to improve reliability, however it must be also pointed out that the vehicle itself has been operating almost continuously for 5 years since the last overhaul in 2006.

Alvin de-brief summaries - 2010-11

Operations - NDSF Equipment:

Navigation generally worked well and USBL reported to be as good or better than LBL. However there was a problem with the navigation computer in *Alvin* throughout one cruise resulting in significant chunks of dive time being lost.

The upgraded vehicle will feature redundant computer systems capable of providing backup navigation functions.

There were a few minor equipment failures early in the series (cameras, recorders, framegrabber system, pan & tilt, …) but all were corrected by the following dive.

Alvin de-brief summaries - 2010-11

Operations - NDSF Equipment:

The *Alvin* CTD appeared to be significantly out of calibration on the last dive series.

The Alvin CTD is carried for the convenience of science but typically only calibrated when specifically requested. This requirement was not specified during pre-cruise phone meetings. Pre-cruise planning in the future will include specific questions regarding calibration.

Alvin de-brief summaries - 2010-11

Operations - NDSF Equipment:

The HDTV camera that was provided as a stand-in for the new NDSF camera was inadequate and problematic. This was a major setback for two of the dive series.

ALOPS acknowledges that the HD system was not up to par. Unfortunately, due to a dome failure of the same camera type used by Jason, the camera which would have normally gone onto the submersible could not be installed due to a certification/safety issue. An alternative camera was installed at the last minute. Playback capability was limited so the problems occurring with the camera were not detected until late in the Joye cruise.

Alvin de-brief summaries - 2010-11

Operations - User Provided Equipment:

Numerous instruments (mass spec, optical modem, in situ GC, pressure sensors, etc.) were successfully interfaced directly to *Alvin* and other seafloor instruments were interfaced using ICL loops or other connectors.

Alvin de-brief summaries - 2010-11

Operations - User Provided Equipment:

The only problematic gear was a brine trapper that had been built based on pre-cruise discussions with *Alvin* personnel. It turned out to be too heavy and required at-sea modifications to make it useable in a limited mode. It is essential that the PI work 1-on-1 with the Expedition Leader for their cruise when designing a new piece of equipment that will be interfaced with *Alvin* (or any NDSF vehicle).

The PI and engineer did visit the ship prior to this leg and meet with both the Expedition Leader and the Operations Manager concerning this equipment. The original concept for the equipment was deemed unsuitable for the submersible, and the design as delivered was still overly large and heavy. In an ideal world having access to and working one-on-one with the Expedition Leader is desirable, but the reality of schedule commitments usually makes this impossible. ALOPS engineers, experienced in equipment design, are available to the science user prior to any cruise.

Alvin de-brief summaries - 2010-11

Data hand-over:

This went well but it was noted that there may be a need for improving the imaging transfer as HDTV becomes the norm.

Operational criteria for post-dive, as well as post-cruise, image editing, duplication, and data handover of the HDTV media are in development as the upgraded video system is built and tested.

Hard drives now being used for data transfer which is proving much more efficient. If multiple copies are required, scientists should bring their own drives.

Alvin de-brief summaries - 2010-11

User Recommendations:

The PIs who used both *Alvin* and *Sentry* could not emphasize enough the merits of using them together.

As part of sustaining a credible night program, the ship should become more aware of issues associated with running CTD-rosette operations without contamination. Specific issues:

- **When to pump and not pump sewage outboard (PIs were told that sewage release is continual – which is problematic)**
- **Deck painting**
- **Hosing decks and causing organics/nutrients to be washed overboard**

Alvin de-brief summaries - 2010-11

User Recommendations (continued):

Although a long-term supporter of *Alvin*, one PI left a cruise with a strong feeling that he would prefer working with *Jason* because of the following important advantages:

- **Live video feed to the ship allows a wider number and variety of scientists and other personnel to be actively engaged in each dive, in real time.**
- ***Jason*'s longer endurance means that science doesn't have to be foreshortened because of lack of daylight hours available.**
- **The level of expertise in how to get the most out of the NDSF cameras seems stronger in the *Jason* team than with *Alvin*.**
- **All in all, more science can be accomplished during the same amount of time with *Jason* than with *Alvin*.**

NDSF vehicles have unique capabilities that make them suitable for specific tasks. Choice of a vehicle should depend on the tasks to be accomplished.

Jason de-brief summaries - 2010/11

1. Pre-Cruise Planning:

All PIs felt that pre-cruise planning went well in general with only some issues:

- Jason came out of a planned maintenance period to substitute for Alvin in the NE Pacific. This unexpected early mobilization impacted 2 later cruises.

Responded to this in December, most delays can be traced to science gear integration. See later slide

- Early on the NDSF HDTV camera was damaged during transport to the ship and had to be replaced by the Lange prototype HDTV camera. There were issues with this 'place holder' camera from the time it was delivered until the latest cruise reported on here, for which the final NDSF camera still had not been delivered

Responded to this in December, system has been upgraded and is in much better condition now.

- Late confirmation of ports and dates by NOAA caused a rushed planning and uncertainties for 2 cruises

Agreed, this caused issues in shipping Jason and preparation for the cruise.

- The information concerning the new HDTV imaging that was to be provided was confusing, the details on what would be available/expected for recording the HDTV camera video-data kept changing

Responded to this in December, is now much improved.

Jason de-brief summaries - 2010/11

2. Mobilization/Demobilization:

- The unexpected early mobilization of Jason meant that the cruise had to be delayed by 2 days to allow the Jason team time to perform a dunk-test in port. Yet, the PIs very much appreciated the help they received to prepare their science gear.

Jason requires 4 days to mobilize, not aware of any delays to ship departure.

- For one cruise it was decided not to conduct a system dunk-test in port because of concern that this would leave an oil-sheen on the surface of the water, which has to be reported. The dunk test was postponed until ship arrived at the first station. -> Concern that the Ops team is unable to troubleshoot any problems in advance.

Agreed, ship operators often oppose a dip test because of concern about oil leaks. This puts Jason ops in a bind. We need a dunk prior to departure for every cruise. We use mineral oil, some small amounts may cause a sheen, but it is harmless.

- A transformer failure on a previous cruise led to even greater work load for the Jason team -> PIs thought that the team seemed to be below strength for the volume of work required prior to sailing.

The transformers were not replaced until after completion of the 2010 season. Jason was fully prepared when it was mobilized. Late arriving, poorly designed and incomplete science gear caused excess work for the Jason ops team, as we built from scratch three separate systems of science gear during the Jason MOB.

- The new Reson sonar was not working on one cruise, which was not critical for that particular cruise yet no survey data could be collected.

The Reson has had issues that we're working with the manufacturer to resolve.

Jason de-brief summaries - 2010/11

3. Operations - Vehicle:

In general operations went well and most issues were solved successfully at sea

- At the very end of one cruise the vehicle suffered a failure of all power and telemetry due to a fault that was traced to a junction box between the winch and the Jason control vans.

This issue has been resolved and resulted in no lost time on the following cruise.

Manipulators

- There were hydraulic failures of the manipulators on two dives of one cruise.
- A ground fault in the starboard manipulator cause an on-going problem o a different cruise

There is an unresolved depth related ground issue in the Kraft manipulator. Subsequently it was found to be grounded below 3 km, but fully operational at any depth. We're working on resolution and will operate the arm with the ground until resolved.

3. Operations - Vehicle *(continued)*:

Working schedule

• On one cruise the PIs found that the rigid cycle of 16h dives and 8h turn-arounds is not the best possible use of the vehicle.

We have adapted our policy over the last few years and regularly do vehicle turn around in 4-8 hours and on some occasions much less, i.e. 44 minutes! We will continue to strive to be flexible with in the constrains of personnel and equipment safety.

• On a different cruise the PIs found that the strict daily schedule for dives (12h in water 12h on deck) starting at 8 am did not work well. The vehicle was most often in the water later than 8 am with bottom hours more like 6-7 (EL required vehicle to be recovered by daylight - delay in launch in the morning shortened the dives)

There could be a communication issue -- the EL reports that there were delays to at least 3 launches because of weather and or vehicle issues. EL offered to adjust the schedule to allow for more flexibility and longer dives, but the Chief scientist desired to stick to the 12-hour schedule to facilitate transits and non-ROV operations.

Problems in strong currents

On one cruise it took Jason ~ 3 hours to descend in only 500m deep water because of strong currents. The targets were often missed and there were issues moving Jason/Medea and the ship back to the planned position.

Prior to this cruise, the Jason manager and ship Master warned the PIs that we felt the desired operations would be impossible in the strong currents anticipated. The result was that Jason was put in danger on several launches and had difficulty pushing through these strong currents. Jason should not be asked to work in currents this strong in the future.

Jason de-brief summaries - 2010/11

4. Operations - NDSF Equipment:

Navigation went well except for some issues

- Toward the end of one cruise, there were problems with the vehicle maintaining bottom lock with the DVL
- Significant wandering of navigation when Jason is on the bottom taking samples (due to loss of DVL bottom lock), which produces errors in the recorded sample positions

DVL looses lock close to the sea floor. We are making changes to the Nav system to gate out these fixes and eliminate bad fixes.

- For one cruise the PIs felt discouraged from using LBL for their Jason based mapping efforts in favor of USBL. Post cruise, they are concerned that they would have been better advised to have used LBL in concert with USBL for their data acquisition and processing.

These were very senior PIs. It was assumed they could adequately decide which navigation system to use, but we will discuss these options more thoroughly with PIs prior to each cruise and are formalizing the pre-cruise questionnaire.

- On one cruise the multi-chamber suction sampler was used extensively but was often clogged.

This occurs when the desired item is in proximity to debris. We will look at ways to prevent clogging of screens, e.g. larger mesh prescreen at inlet.

- The PIs on one cruise felt that the water column sensing equipment provided by Jason/NDSF is below satisfactory.

We currently provide a standard Seabird CTD, and are happy to install any other sensors provided by the science party, and are open to expanding our sensor suite, funds permitting.

Jason de-brief summaries - 2010/11

4. Operations - NDSF Equipment (continued)**:**

There were significant problems with the new NDSF HDTV camera (replacement prototype Lange HDTV camera) on all cruises:

Being addressed by Jon Howland.

Jason de-brief summaries - 2010/11

5. Operations - User Provided Equipment:

Most of the equipment worked well, there were only some issues

- On one cruise there were problems with the PI's InSite Zeus camera in form of a small leak that caused fogging, which could not be solved
- On a different cruise there were problems with instruments brought by two inexperienced participants. The instruments were not sea ready, which added workload the Jason team, scientists were not made aware of the severity of the problems.

Jason ops personnel are often called upon to build/modify science gear during our MOB This often takes away from preparations of the core Jason system. We always attempt to 'get it done', but may need to re examine the pre-cruise process to help ensure complex equipment arrives more prepared than is sometime the case..

- On one cruise there were issues with the CTD due to ground faults.

This was a science-provided CTD which is grounded to its case internally, resulting in a ground on Jason. The Jason CTD was fully functional, but does not provide additional sensors.

Jason de-brief summaries - 2010/11

6. Data hand-over:

Data hand-over went well for the majority of cruises except for one, where the PI's were not completely satisfied, they felt the processing pipeline did not work well.

Dealt with in December. We are addressing these shortcomings as part of an ongoing effort to provide a better service the science.

7. Demobilization

Nothing to report - all went well

Jason de-brief summaries - 2010/11

8. User Recommendations:

- With more IODP related cruises coming up for Jason, one concern is how well it can cope with down-hole instrument strings of the kind that Alvin has previously been able to manipulate well.

Verbal feedback from the PIs was that we were successful with these operations. Jason Ops welcome further input on how to overcome perceived limitations in such areas.

- WHOI examination required of NDSF management to ensure best practices (operations at sea, data delivery) also to avoid sending vehicles to sea without the proper preparation

We are continuously examining these issues and making improvements where appropriate.

- More effective method of pilot training needs to be established

Agreed, we suggest 4 hours per 24 hours for training.

- More attention has to be paid to the cameras and, specifically, their lighting. => This is the major data collecting device and high quality video and still photos are critical.

Addressed separately by Jon Howland.

- Clear guidelines need to be provided for the new HDTV camera.

Dealt with since December DESSC, and is much improved at this time.

- For the water column sensing equipment it would be useful to add a fluorometer, a dissolved oxygen sensor and a turbidity sensor and to provide a real-time display for the sensors.

Jason Ops will pursue an upgraded CTD, funds permitting.

Sentry de-brief summaries - 2010-11

Pre-Cruise Planning:

- WHOI on-line pre-cruise planning should only allow for more than one study area to be entered so they can be accommodated – PI's are advised that the area requested (used for Navy clearance when the cruise is *Alvin/Sentry*) should encompass *all* areas of interest in a single (large) block. Sub-blocks can be worked out during cruise planning.
- One PI had requested an overview document specifying vehicle capabilities prior to the cruise. It was delivered, but not in a particularly timely fashion. – We are working on both website and content. Existing/new documents include: (i) *Sentry* data products (ii) *Sentry* ship requirements, (iii) *Sentry* operations guide. We welcome suggestions for other needed documents.

Sentry de-brief summaries - 2010-11

Operations - Vehicle:

• *Sentry* cannot easily accommodate short dives in quick succession, which may be desirable based on science objectives - This is a problem that has only arisen with the improved battery capacity of *Sentry* vs ABE, such that the rate-determining step is now availability of personnel. Would need (1.5 – 2x the standard *Sentry* at-sea operations team to meet the expanded level of pre-dive mission planning and preparation as well as post-dive data download and processing, to achieve this.
We can investigate options for improvement with normal NDSF staffing levels but, if flagged at pre-cruise planning, we can also investigate staffing/other options in context. This can be facilitated by our expanded depth of ops team *and* improved cross-training.

Sentry de-brief summaries - 2010-11

Operations - NDSF Equipment:

Reson Multibeam sonar

• Need for tide corrections – We are now using the OSU tide correction model. This is significantly improving tidal correction for most parts of the world.

• Incorrect sound velocity during acquisition several dives to diagnose and then several days to appropriate post-processing to address in data already collected. – This error resulted from ingestion of XBT data incorrectly provided from ship's SSSG. NDSF can protect against recurrence by relying, instead, on automated ingestion from *Sentry*'s own quality-controlled CTD data.

• Catastrophic failure of two units on one cruise – We are working with Reson to help them with design improvements. We are keen to provide *Sentry* with suitable spares and provide training to NDSF personnel in key aspects of at-sea instrument repair.

Sentry de-brief summaries - 2010-11

Operations - NDSF Equipment:

• Camera/Lighting

Adequate, but could be improved esp. for biology - Plans for a new COTS strobe already in place. We hope to fully execute this during a 2012 maintenance period. Options for a replacement COTS camera camera can be prepared for Dec 2011 DESSC meeting and prepared for including in 2012 budgets.

• EdgeTech Sidescan sonar

Needs a standard data processing pipeline and products

• EdgeTech Subbottom Profiler

Needs a standard data processing pipeline and products - Both are new instruments to *Sentry* in the past 12 months and standard data processing for both is actively being pursued – see later presentation by Dana Yoerger, dedicated to this important topic.

Sentry de-brief summaries - 2010-11

Operations - User Provided Equipment:

- In later dives during one cruise an issue was noted that during the last line of each mission and during the ascent, a series of false Eh and Aquatracka anomalies were recorded – the source of this had not been resolved by cruise end.

– This problem only arose on the most recent cruise and only occurs as a transient event during the initial phase of ascent (1-2 minutes) rather than during the entire ascent. The cause of the problem has not yet been resolved, but one working (and testable) hypothesis is that in Gulf of Mexico, seep-rich settings, release of drop weights my stir up bottom/pore-waters rich in chemically reducing fluids. Investigation will continue to resolve whether this is the case.

Sentry de-brief summaries - 2010-11

Data hand-over:

- Large data volumes made duplication difficult in some cases - The planned upgrade to Ubuntu 10.04 plus new data scripts used late in the most recent Sentry cruise should resolve this.

Sentry de-brief summaries - 2010-11

User Recommendations:

• Clear set of policies should be provided including the type of ships that are recommended for Sentry operations (DP, twin screw, single screw + bow thruster), and at what sea states the vehicle can be launched or should be recovered - Ship selection guidelines were provided and used to help select the ship for the most recent (CSA/Gulf of Mexico) cruise. Additional detail is still needed. It is unlikely that we can a-priori define acceptable weather conditions for ships/crews which we have not previously had significant experience with. We can make some general notes about operational concerns related to weather.

Sentry de-brief summaries - 2010-11

User Recommendations (continued):

• Improve rates of data download from vehicle and data duplication for dissemination during cruise – We purchased a managed switch which should provide some relief immediately. The new housing includes fiber penetrations. This will not resolve the problem, but is a necessary first step towards resolution. Additional efforts will need to be directed at faster hard drives and computer hardware in the vehicle and at adding fiber optic infrastructure on both sides of the penetrations. These items are on the tentative list for 2012 but cannot be accomplished this year. Other more difficult steps are likely to be required to fully resolve all aspects of this but the above steps should provide a significant initial improvement.