

Summary of Post-Cruise Debriefs

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Summary of 2019 *Jason* Debriefs

Solomon, Hikurangi/New Zealand (Jason) Jan-Feb 2019

Cordes/Demopoulos, DeepSearch (Jason) Apr 2019

Orcutt, NE Pac Corks (Jason) May 2019

Kelley/OOI, Axial (Jason) Jun-Jul 2019

Webb, Alaska (Jason) Aug 2019

Collins, Cascadia (Jason) Aug-Sep 2019

Kelley/Kawka/Solomon/Vardaro, Pythias Oasis (Sentry/Jason) Sep-Oct 2019

Jason Debrief – Overview

High praise for Pilots and Team, including (new) Expedition Leaders, team members, and 2 women now part of Jason Team

Improvement throughout the year

Multiple people were called out as being superb by different cruises

Difficult tasks involving heavy lifting and high current were accomplished

Jason Debrief – Overview

The diversity of science supported, cross cutting many disciplines, and divergent challenges surmounted is impressive

Pre-cruise, post-cruise, and MOB and DeMOB in general were all points where the NDSF were viewed as strengths (in some cases helping beyond what was expected.)

Jason Debrief – Operational Issues

AFX power supply led to one aborted dive and multiple disruptions across several cruises.

Level line resulted in recovery issues on one cruise

Niskin systems were not 100% reliable

USBL on non-standard ship in high currents were a challenge

Weather calls made on the basis of unreliable forecasts, rather than at-sea conditions led to lost days.

High demand for global class ships led to working in not ideal weather window and 50% lost dives on one cruise

Jason Debrief – Vehicle equipment

There are some questions around values coming from NDSF supplied heat-flow probe; this is presumed to be a probe issue, but seafloor conditions for this particular area couldn't be ruled out.

CTD and Slurp on one cruise were either not present or delayed on being installed.

Camera system (Sulis) not capable of broadcast quality, white balance was a challenge (*new controller installed during cruise season)

Non-redundant recording system of video led to loss of highlights

The new Sealog system was praised for ease of use and capability at sea; Access post cruise and to non-sailing participants (to SeaPlay) a current area where improvement is needed/possible

Jason – Team Operations.

Launch/recovery and shift changes led to lost time; consider switching to 12on/12off for dives with short dive schedules.

One expedition was substantially impacted by shipping delay in getting winch and other components required for Jason ops to New Zealand, however, these were largely beyond NDSF control.

Data handling flexibility and delivery during cruise and hand-off at end of cruise was very good. R2R delay (from ship) can cause issues with reporting.

Overall, the terms “no problem”, “excellent”, “Impressed we got what we did” supported a really strong team with direct science success impacts.

Jason – Recommendations from users

Increased training/ better camera chip in Sulis (especially white balance issues)

The 1 body systems was excellent and use beyond 3.5 km would be a great move forward

Increased access to SeaLog post-cruise and make available to non-sailing scientists post cruise.

Potentially 1 arm per pilot for complicated tasks using 2 manipulators

Redesign Niskin system (frequent problem on ROVs)

During difficult lifting tasks, calibrated weak links could be helpful to make sure that breaking points are as expected

A 'Jason' on every cruise.

Summary of 2018-2019 *Sentry* Debriefs

Cordes, Costa Rica Seeps (Alvin/Sentry) Oct-Nov 2018

Teske, Guaymas Basin (Alvin/Sentry) Nov 2018

Fornari/Gregg/Perfit, EPR (Alvin/Sentry) [ECS] Dec 2018

Dick, Marion Rise (Sentry) Feb-Mar 2019

Kelley/Kawka/Solomon/Vardaro, Pythias Oasis (Sentry/Jason) Sep-Oct 2019

Valentine/Treude, Santa Barbara Basin (PCAR-only) Oct-Nov 2019

Sentry Debrief Highlights – Sensors and Tech

Mostly positive reviews of *Sentry*'s performance and capability to meet science goals.

“*Sentry* enabled the scientists to see the seafloor in a new way, which was spectacular. Mapping was a huge success.”

But also experienced significant technical challenges with sonar systems impacting the ability to conduct one cruise

Methane sensor and temperature sensors integrated with *Sentry*. The *Sentry* team did integrations and the science party was happy with the resulting data

Sentry Debrief Highlights – Sensors and Tech

Sentry used for targeted multibeam mapping on most cruises with varying results

Two cruises reported full satisfaction, and one even had an extra dive

Reson sonar drop-outs on one dive but that data was collected on the next dive

Malfunction on first half of cruise caused significant problems meeting cruises objectives on one cruise

Sentry Debrief Highlights – Team

Mostly praise for the ability and conduct of the *Sentry* team during the cruises.

Zac Berkowitz “has ability to read scientists minds” in a good way

Justin Fujii stepping up into a leadership role

One cruise reported that the EL was “hard to find”

One cruise reported first *Sentry* dive ended up as a combined engineering-science dive, because engineering time had been lost due to schedule changes.

Zac Berkowitz improved the data documentation and it made it easier for Science to locate what they needed. He included detailed descriptions of what is there, how to find it, and what software to use to look at it.

Sentry Pre-cruise Recommendations

Participate proactively on the pre-cruise planning calls and meetings

Use the pre-cruise to ensure clarity on what science systems will be available, what the back-up systems are, and how the science systems will be pre-tested.

For one cruise, delivery of processed sub-bottom data agreed upon in pre-cruise discussions was not accomplished at the end of the cruise.

Mobilization in U.S. ports (when possible) and with input from experienced science users typically produces best outcomes

Sentry Ops Recommendations

Wave Glider allowed ship to carry out a whole separate program during Sentry dives and even allowed Sentry team to catch a DR error during a dive when the ship was out of acoustic comm range

Sentry ops were conducted every other night to accommodate other programs and limited personnel (Sentry team of 4 rather than 5).

Reson issues (*a thing of the past?* 😊)

One cruise had minor Reson problems (drop-outs) during one dive; next dive able to fill those gaps.

One cruise was severely hampered by Reson sonar problems during first half of cruise.

Sentry Data Recommendations

Simplified “ReadMe” for the Sentry data structures would be helpful to scientists unfamiliar with the deliverables.

Some science parties do this independently based on their specific data

Add a directory on the local (ship’s) server with data products that the Chief Sci would want frequently during the cruise.

Processing pipeline for the Chirp SBP should be reviewed by Sentry team.

Summary of 2018-19 *Alvin* Debriefs

Cordes, Costa Rica Seeps (Alvin/Sentry) Oct-Nov 2018

Teske, Guaymas Basin (Alvin/Sentry) Nov 2018

Fornari/Gregg/Perfit, EPR (Alvin/Sentry) [ECS] Dec 2018

Sylvan, EPR (Alvin) Mar-Apr 2019

Drazen, SoCal (Alvin) Apr-May 2019

Alvin Debrief Highlights

Alvin's 5000th dive was fantastic- "most impressive hydrothermal mound in all Guaymas Basin"

Overall, PIs were pleased with the performance and capabilities of the Alvin, including at least one new user as Chief Sci, with most of the objectives accomplished.

Extensive use of elevators with Alvin enabled full biogeochemical characterization of the targeted seeps

New user didn't realize how efficient Alvin operations could be, "Even with 6 hours on the bottom, we were able to accomplish as much as in 24 hours with Jason."

Alvin Debrief Highlights

Impressed with the Alvin group overall, their professionalism, enthusiasm, attention to detail, and superb pilots

During Danik Forsman's first expedition as a full Alvin pilot, he performed exceptionally well and is a great addition to the group. Great job communicating with observers, providing suggestions to enable efficient operations to help achieve science objectives.

Alvin PIT Drew Bewley has advanced significantly in his confidence and skill. He was actively engaged with the science party and had a leadership role on Alvin EE questions.

Pilot Jefferson Grau did a great job training the scientists during short moke and transit

Pre-cruise and Mobilization

Pre-cruise planning was generally complete and very well done

Planning included discussions of extensive push coring and Alvin group ensured there were sufficient core assemblies for the mission

New user remarked that the Alvin group provided important guidance on efficient operations

Discussed required training of scientists in the use of major samplers, but the training did not get completed.

Operations –vehicle performance

Vehicle performed very well, dived at every opportunity

Bottom times were great, very efficient operations

2 dives were shortened due to repair required for Navy qualification

One dive aborted due to failure variable ballast system, which was resolved during a short surface interval.

Operations –vehicle performance

One cruise had an extra dive (12 planned, 13 executed), with a nighttime recovery which may provide good practice for future longer dives with the 6500m vehicle sub.

Issues with manipulators on a few dives impacted completion of mission objectives

One dive had a battery issue, but no bottom time was lost because the sub was ballasted to optimize for ascent rate that offset the delay

Operations- NDSF-provided equipment

4K camera on the sub produced great imagery.

The HD camera controls can behave erratically occasionally, but overall worked fine.

Go Pros worked well overall and provided important perspective (wider view) of entire dive.

Other controllers (e.g., video game controllers) should be investigated and/or users may require more practice prior to diving

Major samplers and ICL comms were not consistent. ICL did not record temperature in the Alvin data stream.

Heat-flow probe experienced a fault and had to be secured. On one dive, the temperature probe was used instead of aborting the dive. Overall, the heat-flow probe operated without problems on 8 of the 10 dives.

Operations- NDSF-provided equipment

Bioboxes need repair and maintenance (only 3 of 5 were usable)

Event logger (seaLog) and dive review (SeaPlay) were used successfully. Scientists commented that the digital log helped post dive review and preparation of dive reports.

While elevators worked well for one dive series, another cruise had issues because the elevators lacked an acoustic release and EL was hesitant to use them because of time required to locate them on the seafloor. They were not used, limiting planned sampling collections

Clear hose to visualize what is being slurped would be an improvement on the existing suction hose

Operations- User-provided equipment

Temperature lancers (UNC provided) worked
In situ microprofiler lacked pressure certifications
and was not used

O₂ probe also lacked appropriate pressure
certifications for the target depths, which could be
resolved by better pre-cruise communication on
tests/planned depths in the future.

Exposure chambers deployed without issue

General Recommendations

Room for improvement in clarifying the chain of command for decision making. There were examples of the EL making judgement calls at the last minute that changed what had been discussed the prior day or overruled instructions given by others (e.g., the launch coordinator). While this generally didn't impact science, it introduced uncertainty into how and when decisions were being made.

At sea, EL focused on safety considerations, including potential issues with a microprofiler with housings that lacked pressure certifications. A focus on – and follow up – on pressure certs during pre-cruise would be helpful.

Improved communication regarding use of sampling gear throughout the planning process (e.g., majors) and follow through to ensure training occurs

General Recommendations (cont.)

Short port stop for one expedition created a challenge for ensuring all pre-dive training could be accomplished. Suggestion was made to factor in port stop and transit duration to enable training required.

Event loggers used well by one PI. Broader use by future PIs could be facilitated by pre-cruise training/discussion during cruise planning. Also, one user suggested incorporating voice recording into SeaLog.

Cameras should not allow digital zoom because this results in poor image quality

Improved network pipeline to the main lab for Alvin data access

Alvin bio boxes need to be ready prior to sailing

Navy approval should have been completed during port stop prior to departure to avoid lost dive time

Replace suction hose with a clear tube