NDSF Vehicle Imaging

Imaging Status and Plans

- Project History
- Recent Experience
- Current Status
  - *Jason*: initial delivery, issues and resolution
  - *Alvin*
- Recording Formats & Deliverables for 2011

NDSF Vehicle Imaging

Project History

- NDSF recommendation to use AIVL system for hybrid motion/still HDTV capabilities
- Prototype used on multiple *Alvin* and *Jason* expeditions
  - Camera/housing/optics
  - Topside gear
- At Spring 2010 DeSSC, NDSF described plans for fielding the system on both *Alvin* and *Jason* in 2010 season
- Big system integration challenge

2010 *Jason* Timeline

23 July	Start mobilization in Seattle for Delaney/Kelley
24 August	End Delaney/Kelley
26 August	Start Chadwick et al
8 September	End Chadwick et al, equipment to WH
10 October	Start of Fisher/Cordes mobilization
4 November	End Fisher/Cordes
9 November	Start Ross
30 November	Gear back to Woods Hole

Jason Implementation

- Initial integration planned for spring maintenance period, cut short by immediate need to support Cowen cruise. This caused schedule difficulties for AIVL in supporting integration/fielding for Delaney/Kelly cruise
- System was integrated in Seattle by *Jason* personnel

Jason Implementation

- System arrived in Seattle with a broken optical corrector. Original system was returned to AIVL; insurance claim pursued (successfully) for shipping damage.
- AIVL shipped prototype housing, optics, and camera to Grey's Harbor for cruise use.
- Van/topside gear stayed aboard. No major changes to this equipment were necessary as a result of the use of the prototype.

NDSF Vehicle Imaging

NDSF-Identified Issues

- Broken optics
- Connectors on housing in poor location (difficult to fit on P&T)
- Topside hand box and lens control system was poorly designed and implemented, in both a hardware and software sense. Multiple issues.
- Camera control and still image acquisition software was incomplete, apparently untested, and awkward. Multiple issues.
- Camera setup was extremely difficult and settings were not saved between power cycles.
- HD-SDI output “flicker”, interrupting recording
- Camera low light performance was poor, requiring maximum gain settings to obtain any image at all
- Insufficient documentation
- Data product generation incomplete and undocumented
- Camera performance: when set up correctly, high quality motion and stills were obtainable

Resolution of Issues

- Broken optics: *prototype camera/optics used for 2010, AIVL will provide replacement*
- Connectors on housing in poor location: *prototype camera/optics used for 2010, AIVL will correct*
- Topside lens control system was poorly designed and implemented, in both a hardware and software sense. Multiple issues. *Many software changes made. New hardware provided by AIVL. User feedback is positive, but zoom is still too fast. This is also being adjusted by AIVL.*
- Camera control and still image acquisition software was incomplete, apparently untested, and awkward. Multiple issues. *Many software changes made. System is improved, but some real-time capabilities are still outstanding.*

Resolution of Issues *(cont.)*

- HD-SDI output of system frequently “flashed”, interrupting recording. *Bad connector/cable found, problem resolved.*
- Camera low light performance was poor, requiring maximum gain settings to obtain any image at all. *Topside CL/HDSDI converter found to be incorrectly set up. When fixed, sensitivity improved, but camera still requires more light than expected. New LED lighting is being purchased; use of HD will place a premium on pointing the camera at well illuminated areas.*
- Insufficient documentation. *More documentation has been provided, but subsequent cruises show that more user documentation, as well as technical documentation is necessary*
- Data product generation incomplete and undocumented. *NDSF has produced interim processing scripts, but color still imagery should be generated and displayed in real time, obviating the need for these scripts*

NDSF Vehicle Imaging

PI Assessments

- Many of the factors described previously were observed by PIs
- Improvements to the system made during the initial cruise, as well as operator (and PI) familiarity with the system, resulted in a characterization of better performance on subsequent cruises
- AIVL troubleshooting and new software resulted in much better appraisal of performance after Woods Hole maintenance period. PIs documented 14 useful points in post-cruise debrief.

Sample images follow

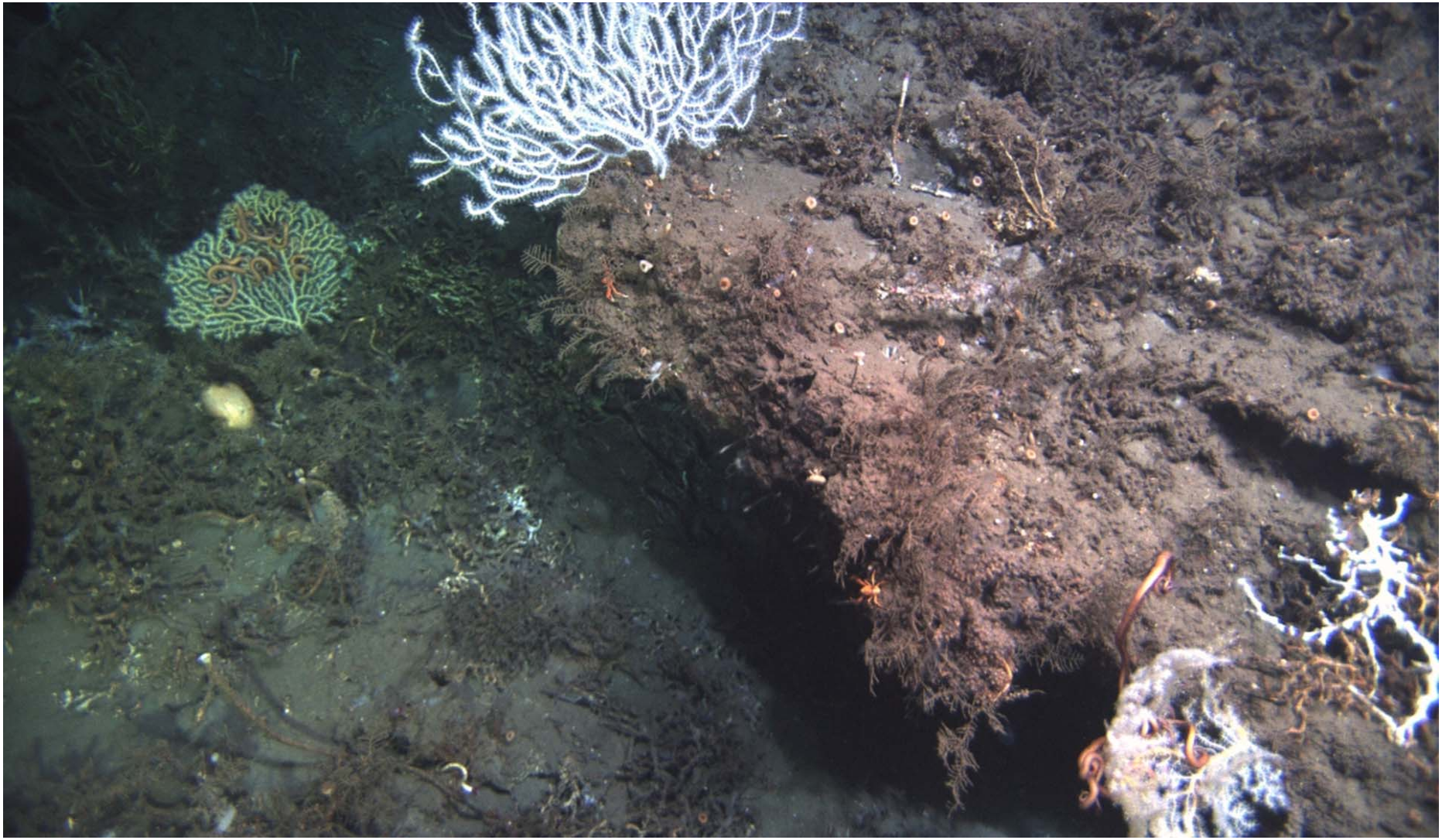
Imagery credit: Lophelia II 2010 Expedition, NOAA-OER/BOEMRE

NDSF Vehicle Imaging

Imaging Status and Plans

NDSF Vehicle Imaging

Imaging Status and Plans



NDSF Vehicle Imaging

Imaging Status and Plans

Plans for 2011 (*Jason*)

AIVL has committed to:

- Delivery of camera/optics/housing for *Jason* (replacement of prototypes)
- Correction of lens zoom speed
- Software updates
- Provision of hardware/software/user documentation
- First *Jason* cruise ships in March. NDSF and AIVL anticipate resolution of these issues before shipment.

NDSF Vehicle Imaging
***Alvin* System**

- Optical Glass Dome Problems
  - Spalling of glass dome under pressure
  - Still under investigation/remediation
  - Prevented use of camera on Alvin
- AIVL provided NDSF with replacement HD capability for the Joye and Fisher cruises
  - No real time stills
  - Positive feedback from science users (Joye)

NDSF Vehicle Imaging

Recording Formats and Deliverables for 2011

- AJA Ki-PRO hard disk for highlight/selective data
  - ProRes 422LT (~53 GB/hr) codec
  - Data transferred to USB hard drives
- SD quality data for continuous recording. Current plan is for DVD recording
- Still images (48 bit 1920x1080 TIFF, ~12.5 Mbytes/image)
- Logging of camera parameter changes, etc.