Peter Girguis – Alvin Verification Cruise (SVC); May 7 – May 27, 2013.
Voyage: AT 25-02
Pre-Cruise Meeting 02/06/2013

Mission Objectives:
Over the past four years, HOV Alvin has undergone a suite of enhancements including a new pressure hull with improved visibility and ergonomics, new digital imaging and data acquisition systems, a novel basket that accommodates greater payloads, and numerous improvements to the vehicle's command and control systems. The new pressure sphere has been certified to 6500m. Future upgrades to the submarine's batteries and other major subsystems will ultimately make this HOV capable of operations at 6500 m.

Completion of the sea trials, expected in March 2013, will result in Alvin being recertified for operations to 4500m. However, there are aspects of vehicle operation and performance that are critical to science but not necessarily included in the certification process as defined by the US Navy's NAVSEA protocols. Consequently, a science verification cruise (SVC) will be conducted to assess the research capabilities of the vehicle. The specific objectives of the cruise will include: 1) involvement of experienced users to ensure operational components and scientific sensors on the vehicle are working properly, 2) pursuit of various science projects and opportunistic exploration, and 3) education of early career scientists who plan to conduct deep submergence field science using HOV Alvin.

Science Activities
The SVC will conduct operations in the following two regions: 1) on the Florida escarpment, committing ~5 dives to work around brine seeps and potentially other habitats in this area (pending the applicant pool as well as unforeseen issues, e.g., weather), and 2) at the Cayman Rise, committing ~5 dives to work around hydrothermal vents and potentially other habitats in this area (pending the applicant pool as well as unforeseen issues, e.g., weather).

Evaluating the Science Capabilities of the new HOV Alvin.

1. Chief Scientist (s):
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Identify operating area:
Cayman Rise (Von Damm site): 18°- 22' – 26"N // 81° - 47' – 54"W

Florida Escarpment: 26° - 01' – 48" N // 87° - 54' – 42"W

3. Voyage Info:
NUMBER: AT 25-02
MOB: March 27 – 29: Preload in WHOI // May 4 – 6 Mob in St. Georges Bermuda
DEPARTURE: May 7, Bermuda – transit direct to Von Damm vent site
Mid Cruise port stop: May 19, Key West Fl**.** *Arrive & Depart same day*
ARRIVAL: ST. Petersburg FL. May 27
DEMOB END: May 29.
- **There will be a public media event May 29. *Time is TBD.***

4. Schedule Notes:
-Science can move aboard May 5th

5. Science party (size) : ____

Pre-cruise and Administrative:

1. Diplomatic clearance requirements for operations in EEZs: Yes, Bermuda.

2. Financial responsibility: WHOI Project Numbers? Set up separate Purchase Orders?

3. Personnel forms*: 1 month prior to cruise. Kim Grodzki is POC.*

4. Berthing Plan: male & female ratio

5. Any Special Food Requirements (Kosher, Allergy, Vegetarian, etc)

Instrumentation & Technician Support *:*

1. **General Duties of Marine Technician :**
SSSG Technicians (WHOI SSSG) Allison Heater and Tina _____ from UNOLS tech pool.
WHOI sssg techs do not stand watches. But are available 24/7 to train and to assist in operations.

2. **WHOI general use equipment required for cruise :**

Deck Equipment

DI Water
Fume Hood
Nitrogen Generator
Science Seawater System
Mulitbeam
HiSeasNet – Skype or Video Conferencing requested
CTD with dual T/C sensors
Gravity corer
Multicorer
Walk-in Freezer
Walk-in Refer
-70, 25 cu ft freezer
-70degree, 3.2 cu ft freezers
Refrigerator, 8.6cu ft

MET Sensors

3. Science Party Supplied Equipment

Special Electrical Power Requirements in lab spaces?

Winches:
.322 – CTD winch – for CTD work
.25" Hydro winch – for possible net tows
Trawl winch with 9/16" wire – for coring

VANS:
Radioisotope Van
Chemical storage will be in smaller locker (s).

4. **Lab use and lab layouts:**
To be submitted by Science party

ALVIN requirements, activities and objectives:

: (It is most important to communicate with Pat Hickey directly and to refer to the Alvin manual published on the WHOI website: www.marine.whoi.edu)

1. General work description – # dives? ~ 10 total at 2 different sites

2. Requirements for US Navy dive clearance –

3. Number of instruments to recover and their most accurate positions

4. Other sampling from Alvin

5. Alvin Equipment Required

a. Major Water Samplers (X)
b. Large Capacity Slurp Pump, (X) Single Chamber ( ) Multi-Chamber
c. Small Capacity Slurp Pump (X)
d. Bio Collection Box (X) 12”X 12”X 12” (X) 12”X 12”X 24”
e. Push Cores ( )
f. Box Cores ( )
g. Scoop Nets (X)
h. High Temperature Probe (X)
i. Low Temperature Probe (X)
j. Heat Flow Probe ( )
k. Magnetometer ( )
l. CTD (X)
m. External digital Survey Camera, (X) Oriented Forward ( ) Down-Looking
n. Search Sonar ( )
o. Profiling Sonar, ( ) Imagenex ( )SM2000
p. Homer probe and receiver

6. Sub navigation requirements, charts – USBL Nav, Doppler/GPS Nav

7. Transponders

8. A complete description of science gear on bottom.

a. Safety issues

b. How recover, handle, photo/video, etc.
c. Hazardous Material

9. Identify science gear to be deployed, if any - Mullineaux bioboxes (for block collection) - Bright Bioboxes (40 cm high, 20 cm x 25 cm)

10. Hazardous Material to be deployed, recovered or utilized

11. Review dive profiles

12. Data/sample deliverables (Backups, Media, Duplicating Station)

13. Testing of science provided equipment to be used on board Alvin
14. Targas adapter for laptops inside sphere
15. PIT Dives
16. Elevators (YES)

a. How many deployments during the cruise – need info to load enough weights
b. How many elevators will they need
c. What is the payload water weight on each deployment
d. Will they have more than one elevator deployed at once

Navigation and Data Collection

Assess navigational capabilities as necessary, including ease of adding science-supplied bathymetric underlays and waypoints, evaluating the results and assessing the accuracy and precision of the navigation and data logging systems.

Assess "routine" processing software designed to enable scientists and onboard technicians to verify the quality of navigation and other relevant data streams produced by contextual sensors on the submersible.

Determine if submersible data streams (e.g., time, altitude, depth, heading, navigation, and other science-oriented sensors) are readily accessible to the user in standard formats;

Determine if data storage and data access systems on board RV Atlantis are compatible with submersible data streams;

Establish the functionality of the frame grabber system; determine that this system operates -at a minimum- to enable rapid assessment of operational and scientific data post-dive; assess the ease of incorporating this metadata into the R2R data system being developed for all UNOLS vessels.

Power, Speed, and Duration Capability

Assess realized transit speed of Alvin near bottom and in the water column (The Alvin group will work with the scientists to appropriately tabulate power consumption during various operations, and compare these data to expected power consumption in order to provide the user community with reasonable expectations

for dive duration and on-bottom times, and to develop better operating procedures for users).

Seafloor Mapping

Undertake and evaluate near-bottom multibeam mapping in flat and rough terrains, including assessment of artifacts, protocols for data acquisition, and shipboard capabilities for post-dive data processing and production of gridded data acceptable for field use in planning dives.

Undertake and evaluate the reproducibility of mapping (i.e., repeat mapping of an area, including comparison to pre-existing near-bottom bathymetric data).

Work with NDSF to develop a 'best practices' document to provide both NDSF staff and the user community with protocols for high-resolution multibeam mapping using the submersible (including coordination with mapping operations for other NDSF vehicles – ROV Jason and AUV Sentry)

Lighting and Imaging

Assess whether illumination and its areal coverage is appropriate for obtaining "high quality" still and video imagery with the HD cameras in their standard configuration.

Verify operations and "ease of use" of recording systems, including in-hull controls, focus/zoom performance, pan/tilt adjustments and aperture settings for each camera.

Assess the ease of producing copies of video and still image data for science and archives, and quality/operational efficiency of duplicate imagery produced by onboard image duplication systems.

Optional: Assess the vehicle's capabilities to collect image series for photomosaicing (with the photomosaics to be made by the science party).

Sampling Capability

Verify the ease of using the variety of standard NDSF HOV sampling systems and instruments (http://www.whoi.edu/page.do?pid=21075).

Assess both manipulators for delicate manipulation and fine-scale collections of sediments, rocks and organisms.

Use a range of basket configurations and payloads to assess basket flexibility, accessibility by the manipulators, and payload capacity

Verify mid-water capabilities, including the ability to maintain neutral buoyancy and collect samples of water, particles, and – if possible- organisms.

Instrument Interface

Assess the capability to interface user-provided equipment/sensors to the vehicle, including power and communications and basket integration (Note: these instruments must be compliant with HOV safety requirements).

Evaluate the ability of the vehicle to interact with elevators to transport samples/equipment to/from the seafloor.

Ergonomics and Habitability

Evaluate the ergonomics in Alvin, specifically how users interact in the personnel sphere with viewports, seating, camera and video controls and monitors, voice recording, other equipment and each other.

Evaluate the ease of outfitting and dismantling the Alvin basket before and after each dive.

*** This cruise will be done in 2 legs. May 7 - May 19 Bermuda to Key West = LEG I // May 29 - May 27; Key West to St. Petersburg FL. = LEG II**

Ship *[Other Requirements][Shipboard Equipment/Nav] :*

1. Science/Ship Operations ***:***
    a. Instrument Deployment / Recovery Procedures:
    b. Over boarding Equipment (ISM)
    c. Vans: 1 radioisotope van
    d. Night Operations: Yes

2. **Deck Safety – Safety Shoes (X),** Experience (x)
    a. Science personnel have Training/Experience to operate/deploy gear?

3. Lab Safety – PPE (X),

4. Hazardous Material**:** Batteries YES. Chems YES. Gases? Isotopes YES

5. Policies: (speed, departure/arrival times, moving aboard, etc.)
   11kts

6. Communication (voice, fax, e-mail, Blog)
   Skype?

Logistics *[Notes]*

1. Shipping gear to and from vessel
   Load list

   a. US Customs (forms and AMS): NEEDED for items loaded at WHOI. Need US Custom form 4455 by March 28 to Eric Benway

   b. Berthing plan:
   10 Alvin / DSL + Science _____?

   c. Use of ship's agent or local facilities (financial responsibility)
   -cc; ebenway@whoi.edu and kheywood@whoi.edu on all agent communications

Post-Cruise:

1. Actions departing ship

2. UNOLS cruise evaluation [Chief Scientist & Master]

3. Reports to foreign government/State Department [required for work in EEZs]

4. Data delivery [shipboard] USB Hard drive for Shipboard Data. Alvin Data handled by Pat Hickey and Bruce Strickrott.

5. Data archiving policy
   All data on a WHOI Cruise Data Distribution (which includes all underway data) will, by default be considered publicly available once a copy of it has been delivered to the chief scientist at the end of the cruise. Please review the Cruise Assignment of Data Access Protection

As of January 1, 2011, the default treatment for underway data from Woods Hole Oceanographic Institution (WHOI) research vessels is:
1. Cruise data files are copied by a WHOI SSSG Technician to the distribution media. One copy is delivered to the cruise Chief Scientist, the other is delivered to WHOI's Data Library and Archives. Please note that the distribution of cruise data to other scientist is the responsibility of the Chief Scientist.
2. The **default** access status for the cruise instrument datasets is that they will be immediately accessible by
the public. If something other than this default protection is desired, the Chief Scientist must assign alternate protection as indicated below. For cruises funded by the National Science Foundation ,the maximum protection is two years, for non-NFS cruises, other guidelines may apply.
3. WHOI maintains a local copy of the cruise shipboard data distribution at its Data Library and Archives, which also honors access moratorium periods. If the cruise Chief Scientist wishes to modify the data

protection assignments made in this pre-cruise document upon cruise completion, they should contact the
WHOI Data Library and Archives at dla@whoi.edu, or the SSSG Data Manager at
sssgdatamgr@whoi.edu