DEEP SUBMERGENCE SCIENCE COMMITTEE PLANNING MEETING MINUTES

DECEMBER 14, 1996

Moscone Center, Room 256
San Francisco, CA

APPENDICES

WELCOME, INTRODUCTORY REMARKS: The Fall Deep Submergence Science Committee (DESSC) Planning Meeting was held on December 14, 1996 in Room 256 of the Moscone Center, San Francisco, CA. The meeting was called to order at 8:30 a.m. Mike Perfit, DESSC Chair, welcomed the meeting participants and introduced new DESSC members Marv Lilley and Patty Fryer. He also noted that Dan Orange, Jim Bellingham and Bob Collier had been asked and agreed to serve on DESSC for second, three year terms. Mike reviewed the meeting agenda, ***Appendix I*** and summarized the major issues that have concerned DESSC during the past year. The list of meeting participants is included as ***Appendix II***.

1996 SCIENCE REPORTS: PIs who conducted science cruises using deep submergence assets over the past year were invited to present brief overviews of their science programs along with critiques of the facility operations. Viewgraphs presented by the PIs are included in ***Appendices III*** through ***VIII***. A brief review of each program is provided below.

Paul Johnson reviewed his September 1996, geophysical investigation of two new eruption sites on the Juan de Fuca and Gorda Ridges (see ***Appendix III***). The goals for the 1996 program were to pick up the

sea floor magnetometers, repeat previous magnetic surveys of New Flow, deploy a thermal blanket on young crustal rocks, recover additional rock samples from eruption sites, survey ten-year-old flows in the same area, and investigate a January 1996 eruption on Gorda Ridge. Scientific results showed that the magnetization seems to be decreasing. The CoAxial New Flow has a very low density and high porosity. Jason and ABE were used during Paul's cruise. Jason completed 84 hours of continuous operations on the bottom during one lowering. Jason's elevators were used with great success allowing for almost unlimited payload. Other functions carried out by Jason included recovery and deployment of magnetometers, several deployment/recoveries of the heat flow blanket, rock sampling, Mesotech surveys, CTD data and video imaging. Paul remarked that Jason is a mature, reliable vehicle.

ABE also worked very well. It flew a pre-determined course with great accuracy. ABE acquired magnetometer, CTD data and photographs using Hi8 video captures. Paul provided samples of the ABE surveys. He characterized ABE as now being a working research vehicle.

Dan Scheirer reported that he had just returned from MELVILLE on the Sojourn leg II cruise to 17°S on the East Pacific Rise. Rachel Haymon and Ken MacDonald were the PIs; their cruise plan is included as ***Appendix IV***. The primary purpose of the cruise was to survey the narrow axial zone of the ultrafast-spreading EPR at 17° 18'-42' using the Argo II near-bottom optical/acoustic system and the DSL-120 sonar system. The cruise took place from October 28 through December 13, 1996. Dan carried out an ancillary study of magnetics during the cruise using a magnetometer mounted on Argo, and analyzed high resolution bathymetry collected with an Imagenix sonar mounted on the Argo sled. They also collected CTD and transmissometer data using instruments mounted on the Argo sled and on the towing cable. The first two and half cruise days used DSL-120. There were some problems associated with processing the DSL-120 sonar phase bathymetry which were resolved by the end of the cruise. Dan Fornari mentioned that the new sonar acquisiton and processing package funded by NSF will eliminate the problems encountered on this cruise. The new acquisition hardward and software will be integrated with the DSL-120 system by mid-1997.

- Dan Scheirer provided a list of positive highlights of the cruise and recommendations: The color zoom camera and HMI lights worked very well (downward-looking). Dan recommend getting another one of the same color zoom cameras for forward-looking observations.
- The tail on Argo II and the two new, horizontal thrusters helped prevent crabbing. The ESC also worked well.
- One of E. Baker's MAPR self-contained CTD units was used on the wire above Argo-II and the DSL-120 sonar vehicle. It worked very well and collected good data and should be considered for routine use on towed instrument deployments for collecting water properties data.

Dan Fornari gave reports on three dive programs. **Bill Martin & Fred Sayles** had an ATLANTIS II/ALVIN cruise in June/July 1996 on the NW Atlantic continental margin at 70°W. The purpose was to use benthic flux measurements to estimate the recycling rates of organic and inorganic carbon and nitrogen at the sea floor, see ***Appendix V***. They successfully used ALVIN to deploy the OSPRE (in situ O2 microelectrode profiling instrument) and the SQUIRTs (in situ benthic flux chambers).

The second report provided by Dan was for **Greg Ravizza's** field work at hydrothermal vents on the EPR. Greg participated on the Legacy Cruise cruise to 9°50'N EPR. Vent fluids were studied for Os and other elements, and a graph of the vent fluid data is provided as ***Appendix VI***.

Dan Fornari reported that the Lucky STRike Exploration 1996 (LUSTRE '96) cruise (he and S. Humphris were coPIs), to Lucky Strike Seamount on the Mid Atlantic Ridge went very well. The cruise took place from 26 June through 8 August on KNORR. All three vehicles were used; Jason, **Argo and DSL**-120. They surveyed a 16 x 10 km section of ridge crest with DSL-120 and carried out detailed mapping and sampling with Argo and Jason. Jason collected excellent water samples at hot vents using majors and gas tight Ti bottles and real-time inductively coupled link temperature probes. ***Appendix VII*** **gives an operational summary of the LUSTRE 96 cruise along with some examples of the survey data.**

Richard Lutz reported on his NSF/GEOMAR funded cruise using ROPOS in the Gulf of Alaska in July.

Their first dive lasted 17 hours and was very successful. Unfortunately, the ROPOS cable collapsed ending their ROV work. Prior to the collapse, they were able to video a clam community. Richard showed slides of the images obtained. He reported that ROPOS had excellent navigational capability, many samples were collected, and the 3-chip camera performed very well. All of the cruise objectives were met.

Peter Rona provided a report on his dive series, Acoustic Imaging of Hydrothermal Plumes, using SEA CLIFF at the MonoLith vent on the northern segment of Juan de Fuca. Engineering testing of Mesotech 971 sonar was completed. The sonar would be used to measure flow rates and water temperature fluctuations of black smoker's buoyant plumes. Peter reported that he would like to first standardize the plume imaging sonar as a submersible tool, secondly adapt it as a towed vehicle tool and third integrate it as part of a bottom mapping system.

Cindy Van Dover reported that she participated in two ALVIN cruises and two ROV cruises during 1996. In April, Cindy had an ALVIN cruise with Alan Chave to the northern East Pacific Rise. This was followed by a NOAA/NURP funded ALVIN cruise with Fred Grassle to Dump Site 106 in the Atlantic in early June. In late June through early August, Cindy participated in the LUSTRE'96 program on KNORR. Jason was used to collect muscle samples. Cindy's last cruise was on MELVILLE with Dan Scheirer. Cindy reported that she and A. Chave are now in the process of building the Ambient Light Imaging and Spectral System (ALISS), which will be deployed using Alvin at several vent sites in 1997-1998.

Cindy Van Dover continued by providing reports for two other dive programs. **Colleen Cavanaugh** conducted an ALVIN program on the Northern East Pacific Rise in April to study the molecular and biochemical basis for stable carbon isotope ratios in hydrothermal vent communities. A summary of her science results are included in ***Appendix VIII***. **Craig Cary and Jeff Stein** also conducted an ALVIN dive program in April on the northern East Pacific Rise. Their research involved determining the functional role of opibiotic bacterial microflora associated with the pompeii worm, Alvinella pompejana.

John Delaney reported on his ROV ROPOS cruise aboard THOMPSON to the Endeavour Segment of the Juan de Fuca Ridge. Four discrete hydrothermal vent fields were investigated: Salty Dawg, High Rise, Maine Endeavour and Mothra. The areas were two football fields in size each and 2-3 Km apart. Sidescan views were obtained. John was very pleased with the data collected.

Veronique Robigue reported on the educational component of the cruise carried out from THOMPSON. Each year, the state of Washington provides funds to support 45 days of transit and/or education ship time on THOMSPON. In 1996, these funds were used to support the Research and Education: Volcanoes - Exploration - Life (REVEL) 1996-1997 pilot program. The program provides an opportunity for science teachers to gain hands-on experience in oceanographic research aboard THOMPSON. The recent 1996 cruise explored the submarine volcano systems in the Northeast Pacific using the Canadian robotic submersible ROPOS. Eight science teachers from grades 7-12 from Washington schools took part in the research cruise (which included K.Juniper and C. Fisher as PIs) to the Juan de Fuca Ridge on 11 August through 27 August. Veronique reported that the group was very enthusiastic. They hope to be able to continue the program on a regular basis and perhaps expand it to other states in the future. For additional information on the REVEL program, you can visit the Web site: ***http://www.ocean.washington.edu/revel/***

Robert Embley reported on his SEA CLIFF/ATV cruise to the Juan de Fuca and Gorda ridges on 19 August through 2 September. The purpose of the cruise was to investigate various processes at Blanco Depression and to map lava flows at Gorda Ridge. Bob noted that ATV is a very large, capable vehicle; however, during his cruise problems occurred with the vehicle and with weather. When on the bottom, ATV worked well. The heat flow measurements were successful. Bob remarked that the vehicle needs upgrading for navigation improvements.

NATIONAL FACILITY OPERATOR'S REPORT: Dick Pittenger began the Operator's presentation with an introduction of the Deep Submergence team. He noted that over the past few years they have come a long way in improving and expanding the deep submergence vehicle capabilites for science with the support of funding from the federal agencies. Over the past year, the ROVs have been operated from MELVILLE, THOMPSON and KNORR.

Status of R/V ATLANTIS and Delivery Schedule - Dick reported that ATLANTIS' construction is nearing completion and the vessel will be a very capable support ship for ALVIN and ROVs. ATLANTIS Builders Trials have been completed. The ship will be delivered to WHOI on 25 February 1997. In March, the ship will undergo a fitting-out period in Pascagoula for various science equipment before transiting to Woods Hole. In April and May, the ship will continue outfitting in Woods Hole. ALVIN will be placed on board and certification dives are planned for late May/June**.** Viewgraphs for the National Facility Operator's report are contained in ***Appendix IX***.

1996 Operational Statistics (see *Appendix IX*):

ALVIN Cruises in 1996 - Rick Chandler began the report by reviewing ALVIN's dives lost versus completed statistics for the past 12 years. In 1996, nearly all dives were successfully completed. ALVIN operating costs for the year were close to $1.8M. 1996 was a short operating year with only five ALVIN cruises scheduled. ATLANTIS II was taken out of service in July after completing operations. ALVIN began its overhaul period. In 1996, ALVIN had 86 days at sea. The average bottom time was 4.7 hours.

ROVs Cruises in 1996 - In 1996, there were three ROV cruises. The LUSTRE '96 cruise used DSL-120, Argo II and Jason from KNORR on the Mid-Atlantic Ridge. Dan Fornari and Susan Humphris were the PIs. The next ROV cruise was conducted by Paul Johnson and Maurice Tivey using Jason from THOMPSON on the Juan de Fuca Ridge. The last ROV cruise was on MELVILLE on the Southern East Pacific Rise. The PIs were Rachel Haymon and Ken MacDonald using DSL-120 and Argo II.

1997 Tentative Deep Submergence Vehicle Schedules (see *Appendix IX*) - ALVIN is scheduled to begin science operations in late June. The first cruise will be on the Mid Atlantic Ridge. In late July/August, ATLANTIS will transit through the Panama Canal. Work will continue in August off California. ATLANTIS is scheduled to begin a Post Shipyard Availability (PSA) in September through mid October in San Diego. In the Fall, ALVIN will resume operations on the northern East Pacific Rise. At the end of the year ATLANTIS/ROV operations are planned on the Southern EPR. There are a number of funded programs on the Southern EPR and there is potential for some additional work. Conducting ATLANTIS' PSA period in September opens the schedule allowing the ship to remain at the Southern EPR to complete all funded programs.

The ROVs have a full schedule in 1997. ROV operations are planned in the western Pacific (Mariannas), Juan de Fuca, the Mediterranean Sea and the Southern East Pacific Rise. The systems are currently scheduled to be used from three different platforms: THOMPSON, C. CHOUEST and ATLANTIS.

1998 Schedule Preview - In 1998, there are ALVIN and ROV programs funded on the Southern East Pacific Rise, Northern East Pacific Rise and in the Equatorial Pacific (Hess Deep), see ***Appendix IX***.

INTEGRATED DEEP SUBMERGENCE MANAGEMENT AND OPERATIONS PLAN: Dick Pittenger reviewed WHOI's proposed Integrated Deep Submergence Plan, see ***Appendix X*** for all view graphs on this topic. The plan outlines the integrations of ALVIN and ROV programs. It provides a plan for shore based and shipboard operations that accomodates various operational scenarios. Lastly the plan addressed communications within DSOG and with PI's planning to utilize DSOG facilities. Dick began by describing the Deep Submergence Facility which consists of ATLANTIS, ALVIN and the ROVs (Argo/Medea/Jason/DSL-120). An overview of the WHOI Deep Submergence Organization was provided along with the functional relationships between DESSC, WHOI and funding agencies.

- **Management Issues -** Dick reviewed the management issues relating to an integrated facility. In summary, these are:
- Advanced planning and scheduling of the vehicles is necessary.
- There are cost benefits in operating from ATLANTIS; however, maintaining a "fly-away" capability will ensure flexibility.
- Well established protocols between federal funding agencies, UNOLS and WHOI are required.
- Long-range planning for vehicles and equipment should be factored into the continued support structure for the Deep Submergence Facility.

Operational Issues - Next, Dick reviewed the operational issues of an integrated facility, these in summary are:

- A 24 hour switch-over period has been estimated to be required between ALVIN and Jason use at sea. This time period is an initial, conservative guideline that includes consideration of switching personnel/watch schedules from 24 hr/day ROV ops. to Alvin ops. an vice versa. WHOI will continue to evaluate this as operational experience is gained during use of closely timed submersible and ROV operations during the same cruise.
- ROV and tethered vehicle switch-over time at sea has been estimated at 12-18 hrs, depending on which vehicles are being used and in what sequence.
- Special vehicle and science sensor requirements for cruises must be indicated by PIs early during the planning process prior to the field program.
- ROVs and tethered vehicles of the National Facility should NOT be considered "night-time" survey vehicles.

Cruise Prep and Science Liaison - Dick reviewed the Deep Submergence Facility (DSF) contacts for shore and at-sea support. WHOI's operation plan centralizes cruise preparation and science liaison. PIs would contact the Marine Operations Coordinator, Don Moller, who in turn would communicate with the appropriate ROV, ALVIN and/or SSSG coordinator(s). The concept proposes a single point of contact. Coordination would stay with the marine operations coordinator through all stages of a cruise. The entire marine operations cruise preparation sequence was reviewed. It begins with assembling funded and proposed deep submergence science work and concludes with cruise demobilization.

WHOI Marine Ops Communication Path - Rick Chandler reviewed the Marine operations communication path. It would begin with investigators browsing the WHOI web site ***<http://www.marine.whoi.edu>*** and submitting their cruise planning questionnaire to Don Moller via the web. Don Moller would receive and process the information between scientists, shipboard ops groups and shoreside engineers. Rick reviewed the Marine Ops web pages including the request form. The communication tools to be used include the World Wide Web and Lotus Notes.

WHOI Archives - Dick Pittenger reviewed the WHOI preservation program, see ***Appendix XI***. The goal is to preserve and digitize DSOG media and make electronic retrieval of the information readily available and useful to the science community. Dick reviewed the WHOI projects underway to repair and archive media from the past. He reviewed WHOI's current archive policy. For ALVIN, all original film from the external 35mm cameras is archived along with original tapes from the primary video source. WHOI will also archive copies of other sources at the discretion of the Expedition Leader. This sparked a discussion on what and when media should be archived and available to the public. It was pointed out that steps need to be taken to protect the PI's interests, but at the same time make the data available to the community. It was suggested to consider password protection for archived data. The recommended action was for WHOI, DESSC and the Funding agencies is to review the current archive policies and draft revisions.

ALVIN AND JASON REPORTS:

ALVIN Overhaul Status - Dudley Foster provided an overview of the ALVIN Overhaul Status, see ***Appendix XII***. He reported that during ALVIN's overhaul, some of the ALVIN team has been participating in ROV operations. Activities of the overhaul have included:

- frame repair,
- variable ballast repair,
- manipulators rebuild,
- emergency transponders rebuilt and aligned,
- personnel and VB/HP air spheres inspected,
- pressure test all implodables, and
- hydraulic components rebuilt.

WHOI is still waiting for approval from the Navy for explosive bolt replacement. ALVIN component re-installation has begun.

A number of ALVIN upgrades have been implemented during the overhaul period. These include:

- Wiring for a 3rd battery,
- Pan and tilt installation,
- New 1-chip video camera,
- New motor controllers,
- Pelagic pump motors for slurps, and
- New in-hull Nikon cameras.

Jason - Derbyshire Survey Cruise Preparations - Andy Bowen gave a brief history of M/V DERBYSHIRE. In 1980, the ship and all hands were lost in a typhoon in the Western Pacific. The location of the wreck has been determined to be 400 nm east of Okinawa. The U.K. has requested a complete forensic survey of the vessel. The 47-day survey will deploy DSL-120, Argo II and Jason vehicles from THOMPSON, see ***Appendix XIII***. Preparations for the cruise have included:

- Installation of an HDTV camera and associated telemetry, display and recording subsystems.
- Installation of digital high resolution color video camera.
- Installation of stereo video system.
- Upgrade to existing mosaicing capability.
- Refinement of DSG data reduction and processing capabilities.

Andy continued by reviewing upgrade plans for the ROVs. These include upgrading the DSL 120 real-time display and processing. A request for quotes has been sent out. Plans also call for improving Jason's ascent/descent weight dropper to increase its speed. Using internal WHOI funds, a "smart" elevator will be developed. Through a telemetry link, the elevator could be steered during its descent. Video telemetry upgrades for Jason and Argo-II are planned to increase capacity by more uplinks. Other upgrades include increasing Jason's payload and replacement of Jason's neutral tether cable. The full list of planned upgrades is included in ***Appendix XIII***.

AGENCY REPORTS:

National Science Foundation (NSF) - Don Heinrichs provided the report for NSF, see ***Appendix XIV***. He began by reviewing personnel changes at NSF. Sandy Shor has been heading the Marine Technician Program while Lisa Rom is on leave. He continued by reviewing the NSF Ocean Sciences Division budget. Overall, the Division budget had an increase of approximately 4%. The Oceanographic Centers and Facilities budget increased 6.8% from 1996. However, most of the facilities budget increase ($4.5M) will be directed to support a new initiative, Major Research Instrumentation. The Ship Operations budget is approximately level at $31.4M.

Don reviewed UNOLS operations support trends since 1993. NSF continues to be the major contributor. In 1997, the biggest increase in ship support came from "other" non-traditional support. This increase was largely due to the introduction of NAVOCEANO's ship time. International support for the Derbyshire cruise was also a major "other" contributor. NSF predicts that if fleet support returns to the traditional sponsors only, a probable reduction of the fleet size would be necessary. Support from traditional sponsors has declined in recent years. New ships have been added to the fleet, increasing costs by approximately $4.8M in 1997. Outside support in 1997 from NAVO and the UK may not be available in future years. NSF predicts that all of these factors make the future of the large ships vulnerable. Don provided quotes from the 1992 Ocean Studies Board report, "Oceanography in the Next Decade - Building New Partnerships". He noted that a disproportionate share of funds is provided by NSF and that resources for PI grants could be reduced if other agency funding is not obtained. Ken Johnson reported that over the past year, UNOLS has had some success in building new partnerships. NAVO has scheduled ten programs on UNOLS ships in 1997. Additionally, NOAA is interested in bringing its new research vessel, RON BROWN, into the UNOLS scheduling process. Support for BROWN operations would be provided by NOAA. In addition, NOAA plans to use $2.6M of UNOLS ship time in 1997.

Office of Naval Research (ONR) - Sujata Millick provided the report for ONR. The ONR budget is basically level at $80M. There were no ONR funded ALVIN operations in 1996 and none are planned for

1997. One reason is that their deep submergence research directions have shifted to shallower water research. Also, the Navy's interests have been in unmanned development efforts. They are interested in the ability to obtain larger quantities of data at high speeds. The Navy's directions are towards smaller, autonomous and ROV tools and vehicles.

NOAA's National Undersea Research Program (NOAA/NURP) - Gene Smith and Barbara Moore were unable to attend the meeting; however, Gene sent an e-mail message to Mike Perfit reporting on NURP activities. Mike read the e-mail message, see ***Appendix XV***. It is a NURP priority to continue support of deep submergence science and the National facility. NURP is undergoing a reinvention and there will be changes in the way funds are allocated. The changes are being developed to better integrate NURP's research priorities with NOAA's research and management needs. A NURP National Advisory Council and National Review Panel is being formed to make recommendations regarding allocation of funds. The first panel meeting is planned for 19 December. The Panel includes representatives from NOAA, ONR and NSF. Ray Highsmith, Director of the West Coast NURP center, shared his views on this new procedure. In his opinion, the NURP proposal review process has worked fine and these new changes are unnecessary.

FACILITY UPGRADE STATUS AND PLANS: Mike Perfit provided a brief history of the evolution of the facility upgrade proposal. In June 1995, the DESSC realized the potential opportunity to upgrade ALVIN systems during its 1996/97 overhaul period. Dan Orange and Cindy Van Dover solicited the community for input, then compiled a prioritized list of ALVIN upgrades. After a series of meetings and discussions with the operator and funding agencies, the list was revised.

DESSC Upgrade Priority List - Dan Fornari reviewed the prioritized list of upgrades, see ***Appendix XVI***. WHOI/DSOG will soon submit a proposal to fund implementing these upgrades. If funded, the upgrades would be installed between 1997 and 1999. The top three upgrades are: (1) datalogger/video upgrades, (2) additional foam, and (3) ALVIN power management. The datalogger/video upgrades are intended to maximize signal quality and standardize data between systems. As part of the ALVIN power management upgrade, a plan to monitor power through a Web-based "virtual" ALVIN model, is being considered. The system would be used by pilots and scientists to estimate power usage and devise ways for operating more efficiently. The remaining list of upgrades in priority order were:

4. (tie) Obtain dual head scanning sonar

4. (tie) Obtain 4 slurp pumps with chambers

5. Laser ring gyroscope

6. Image infrastructure

7. Improve the in-hull 35 mm cameras

8. Homer Probes

9. Pencil cameras

10. (tie) Obtain an improved CTD pump 10. (tie) Obtain a flat LCD monitors

11. Obtain a new set of push cores with core catchers

Along with the community list of upgrades, WHOI will include additional operator recommended upgrades in their proposal. These include upgrades to the VB system, navigation, digital imaging for ALVIN/Jason/Argo, remote data and temperature logging, and ALVIN thermistor probes.

Dan concluded by reporting that the upgrade proposal will be submitted to NSF after the holidays. (Note: Since the DESSC December Meeting, the upgrade proposal was submitted to NSF (as the lead agency) in January)

Third Party Tool Guidelines - Dan Fornari reviewed the Third Party Tool Guidelines status. The guidelines are still in agency review. The definition of "third party tools" was discussed. After agency review, the guidelines will be put on the Web for community review.

LONG RANGE PLANNING:

1998 and Beyond - Letters of Interest Summary - Mike Perfit reviewed the areas of interest for ALVIN and ROVs for 1997 through 1998. This year, letters of interest were submitted to the UNOLS Office via the Web. Considering that it was the first time using this procedure, response was good. Areas of interest included the Atlantic, Mediterranean, Gulf of Mexico, Juan de Fuca, California borderland, NEPR, Guaymus Basin, Equatorial Pacific, SEPR, Hawaii, Western Pacific and the Indian Ocean, see ***Appendix XVII***. With the exception of one cruise to the Hess Deep, all funded 1997 programs have been scheduled. In 1998, there are funded ALVIN and ROV programs on the Northern and Southern East Pacific Rise and an ROV funded program off of Hawaii. In 1999, there are already two funded programs which plan to use both ALVIN and the ROVs. These programs are planned for the Gulf of Mexico and the Northern East Pacific Rise.

Global Deep Submergence Science Initiatives - Mike reported that Global heroes have been recruited to coordinate work in the non-traditional ALVIN work areas. Patty Fryer is the hero for the Western Pacific. She has indicated that a joint program with JAMSTEC is planned for the year 2000. Other heroes and their respective global areas include:

- Marv Lilley - Southern East Pacific Rise
- Cindy Van Dover - Indian Ocean
- Dan Fornari - Mediterranean
- Dan Orange - Polar regions

It was pointed out that consideration for time series work in the traditional areas of research will need to be addressed if the facility assets are to be sent to non-traditional areas.

Programmatic Ties to other National Programs - Karen Von Damm, RIDGE Chair, reported that a three year RIDGE program is planned for 9°N on the North East Pacific Rise. The program will require surface ship and deep submersible platforms. Long-range InterRIDGE plans include work on the SW Indian Ridge. The FARA RIDGE program has been completed and a any follow-up program plan is, as yet**,** undetermined.

Future Deep Submergence Vehicle and Facility Requirements - Mike Perfit reported that the Navy plans to retire TURTLE at the end of FY97 and SEA CLIFF at the end of FY98. In early October, ONR requested DESSC's input regarding utilization of the Navy's deep submergence assets and an assessment of deep submergence research objectives for the next few decades. Mike reviewed the actions taken by DESSC in response to the Navy's letter requesting input, see ***Appendix XVIII***. A working group has been formed to address the deep submergence needs (directions and facilities) of the future. The group includes PIs with experience in the deeper parts of the ocean. The members are Kier Becker, Jim Bellingham, Bob Embley, Dan Fornari, Jeff Fox, Patty Fryer, Paul Johnson, Jeff Karson, Mike Perfit, Eli Silver, Peter Lonsdale, and Karen Von Damm. On 11 October, Navy representatives met with WHOI-DSOG to discuss the costs and efforts required to transition SEA CLIFF into the National Facility. In December, DESSC prepared a preliminary response to ONR's request for input. A questionnaire is being developed and will be distributed to the community. The working group will review responses to the questionnaire in March. They will report to ONR in April.

Mike summarized DESSC's preliminary response. The preliminary response in its entirety is included as ***Appendix XIX***. The preliminary response points out that given the current federal funding constraints and the level of technical knowledge necessary to operate deep diving submersibles, it would not be prudent at this time to consider developing additional National centers for operating deep submergence vehicle facilities. The response also recommends that vehicle depth capability should be to approximately 6,000m to allow for research over the widest range of tectonic, sedimentologic and geographic environments that will be investigated in the decades to come. DESSC suggests that the federal agencies, WHOI operators

and DESSC evaluate the feasibility of integrating SEA CLIFF or its components into the National facility so that improved submersible facilities could be available to the science community as well as the Navy.

OTHER FACILITY OPERATIONS AND STATUS:

Navy Deep Submergence Operations - Commander John Green reported on SEA CLIFF/ATV science operations in 1996, see ***Appendix XX***. Four science programs were conducted:

- 19 Aug - 2 Sep: Bob Embley - Blanco and Gorda Ridges
- 03 Sep -15 Sep: Peter Rona - Juan de Fuca Ridge
- 15 Sep - 1 Oct: Chris Goldfinger - Southern Oregon Margin
- 21 Oct - 28 Oct: Craig Smith - Southern California

There were 25 total days on station for the four cruises (nine days were lost to weather). The depth operations ranged from 2,826 to 12,300 feet. There were 26 dives/333 hours of ATV and SEA CLIFF time. The total bottom time was 225 hours. CDR Green also provided a summary of recent military operations.

Miscellaneous upgrades are planned for ATV. These include upgrades to the tether and telemetry, a new graphics computer system, tracking improvements, imaging sonar, two additional HMI lights and a new responder system. Additionally, Winphrog and Nautronix 916 installation is planned. The Navy's deep submergence master plan calls for retirement of NR-1 in 2003, TURTLE in 1997 and SEA CLIFF in 1998. The vehicles RCV-225, two TUWVS, DSILO, and ATV will stay on line.

MBARI/ROV Operations - Debra Stakes provided a review of MBARI's ROV operations, see ***Appendix XXI***. Debra presented a specification sheet on the ROV VENTANA which listed the structure and ballast features, navigation instrumentation and video/still camera systems. VENTANA normally operates about four days a week. It has an 1800m depth capability. Debra provided viewgraphs showing the datalogger with borehole instruments that can be used with VENTANA. The borehole instruments include seismometers, tiltmeters and an osomotic sampler. A chart of Monterey Canyon showing instrument deployment sites in 1995 and 1996 was presented. WESTERN FLYER, MBARI's new SWATH vessel, is now at their home port in Moss Landing. It is a very stable platform and has a 15 knot speed capability. TIBURON, MBARI's newest ROV, has a 4000 m capability, dual 3-chip cameras, six HMI lights and customized tool sleds. In-water testing is being conducted on the vehicle. Mid-water dives are planned by the end of the year. Operating areas for the ROV might include the NEPR and Hawaii as well as the Juan de Fuca Ridge.

ROPOS/ROV Operations - Larry Mayer provided an update on the ROPOS ROV, see ***Appendix XXII***. ROPOS was lost in October from R/V THOMPSON while diving at Middle Valley when rough weather was encountered. ROPOS was insured and a decision has been made by Canada to replace the vehicle with the insurance money. The replacement will most likely be built by ISE. The estimated rebuild time and sea trials is 16 weeks. The NOAA manifold sampler was also lost with ROPOS during the storm. Vector (fiber optic cable manufacturer) has agreed to supply a new cable for the ROV. Their original cable experienced a massive failure during a ROPOS dive in July. Delivery of the new cable is planned for April 1997. ROPOS may be available in the Atlantic in the late summer of 1997, following dive operations on POLARSTERN from 1 July through 15 August. The POLARSTERN cruise will involve diving under the ice in the Arctic Basin to depths of 4400m.

Scripps Deep Tow - Fred Spiess reported on the specifications for the Deep Tow Wireline Re-entry/Control Vehicle. Deep Tow has an operational depth of 6,000m. It has a suite of video equipment, including a Sony black&white CCD Camera, 2 axis pan and tilt with compass and tilt sensor, a Sony 8mm VHS VCR and a 256x256 video display at the surface every 0.7 seconds. Sonars include a 23.5kHz narrow beam up-looking sonar, a 23.5 narrow beam down-looking sonar and a 325kHz sector scanning sonar. A full list of Deep Tow's specifications are included as ***Appendix XXIII***.

OTHER BUSINESS:

Oceanography in Space - John Delaney reported on the recent finding of ice on Europa. Questions are being asked: If there is ice, is there water under the ice? If so, should we investigate it? How would oceanography in space be conducted? What tools would we need to probe? John suggested that the community keep up-to-date with this recent finding.

Marine Board Publication - Mike Perfit reported that the National Research Council (NRC) has published a report, "*Undersea Vehicles and National Needs*". Charles Bookman, NRC Director, has sent letters to Jack Bash and Mike Perfit indicating that members of the NRC would be willing to meet with DESSC and UNOLS representatives to discuss the findings of their report. Mike will try to arrange a meeting.

The meeting was adjourned at 5:30 pm.