

UNOLS DEep Submergence Science Committee

Carriage House, Woods Hole Oceanographic Institution
Woods Hole, MA
May 31, June 1-2, 1995

Meeting Minutes

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PREFACE: Over the past year a sequence of events have transpired relating to the Deep Submergence Support Ship (DSSS) conversion. These events are outlined below and the correspondences referenced in the outline are included in [Appendix Ia](#). We encourage you to refer to [Appendix Ia](#) prior to reading these minutes. The correspondences will help bring you up to date on the status of the conversion options and schedule.

1. Pre-December 1994: KNORR is the designated platform for DSSS conversion. WHOI working with The Glosten Associates and the DESSC KNORR Conversion Subcommittee prepare a preliminary design package.
2. February 9, 1995: KNORR Conversion Subcommittee Chair, Karen Von Damm, sends a letter to WHOI and the community. The letter reviews plans for the KNORR Conversion and provides the operator with community input and recommendations, see [Appendix Ia](#).
3. February 27, 1995: Jeff Fox, Mike Perfit and Dick Pittenger meet with NSF, ONR and NOAA in separate meetings to present the proposed KNORR Conversion plans.
4. March 1995: Agencies advise WHOI and DESSC that the planned 1996 conversion KNORR will be delayed approximately six months. The delay will allow KNORR to conduct science operations on its return trip from the southern oceans in the first half of 1996. Additionally, the delay allows the agencies to explore alternative options for the DSSS Conversion.
5. April 6, 1995: Jeff Fox sends a letter to the community advising them of the delay in planned conversion of KNORR. He requests input on areas of interest for ALVIN diving in 1996, see [Appendix Ia](#).
6. April 1995: ONR requests NAVSEA to assess feasibility of converting AGOR 25, ATLANTIS, to handle DSRV ALVIN.

7. April 24-25: At the UNOLS Council Meeting, Mike Perfit reviews community interest in ALVIN diving in 1996. Agencies, WHOI and UNOLS discuss DSSS Conversion issues, options and schedule.
8. May 31, June 1-2: DESSC Meeting is held at WHOI. DSSS conversion issues are deliberated. The meeting summary report follows.
9. June 2, 1995: DESSC sends letter to agencies recommending preferred DSSS conversion options, see [Appendix Ia](#).
10. June 2, 1995: NAVSEA provides ONR with results from their study to assess the feasibility of converting AGOR 25 to a handling platform for ALVIN. Study indicates that this option is feasible subject to further design and analysis.
11. June 28, 1995: Mike Perfit, DESSC Chair, sends letter to Deep Submergence Research Community providing a status of DSSS conversion efforts. The letter also offers projected 1996/97 operating areas for ALVIN and ROV/Towed vehicles. This correspondence is provided as the **Cover Letter** to these meeting minutes.

Wednesday, 31 May:

I. WELCOME, INTRODUCTIONS AND MEETING GOALS: Jeff Fox, DESSC Chair, called the meeting to order at 8:30 a.m. The agenda was reviewed and is included as [Appendix I](#). These minutes reflect the order in which items were addressed. A list of meeting participants is included as [Appendix II](#). Jeff noted that Mike Perfit's appointment as the new DESSC Chair was endorsed by the UNOLS Council.

II. ACCEPT MINUTES: The minutes of the December, 1994 DESSC meeting were accepted as written.

Bob Gagosian, Director of WHOI, welcomed the DESSC. He stated that WHOI is dedicated to the support of the National Deep Submergence Facility. WHOI is willing to do everything they can to help with the transition of the submersible platform from KNORR to ATLANTIS if this is the preference of the agencies. WHOI will do what they can to help the community through this process. WHOI is also dedicated to the future of both submersible and ROV/towed vehicle operations.

STATUS REPORTS

III. REPORT ON WHOI/DESSC MEETINGS WITH NOAA/NSF/ONR: In February Mike Perfit, Jeff Fox and Dick Pittenger met with NSF, NOAA and ONR. The objective of their meeting was two-fold: 1) To make one agency the lead agency for the deep submergence facility. This agency would be responsible for maintaining the funding for the facility. The agencies response to this concept was that they are dedicated to supporting the deep submergence facility, but they do not wish to change the structure of the Memorandum of Agreement (MOA). In other words, they do not support the concept of a lead agency at this time. 2) The second objective of the meeting was to present plans for conversion of KNORR to a deep submersible support platform. Under the Woods Hole plan, KNORR would return to Woods Hole and begin the conversion in the early part of 1996. This would mean that the ship would have to transit directly back from Kenya. The agencies did not support this time schedule and indicated that KNORR would have to work its way back to Woods Hole. WHOI also proposed to provide the funding to begin the conversion. They could be reimbursed by the agencies when funding was available. The agencies had not budgeted for the conversion and therefore did not have the funds to start the conversion in 1996. The agency response was to delay all plans for six months. ATLANTIS II would return to Woods Hole in August 1996. During the six month delay, the agencies would look at all of the options for providing a submersible platform for deep submergence. The feasibility of making AGOR 25 the submersible platform would be explored.

In April, Jeff Fox wrote to the community and gave them the status of the KNORR conversion plans. He asked that the community generate letters of interest for ALVIN work that might be able to be accomplished in 1996.

Mike Perfit continued with a summary of the DESSC report from the UNOLS Council Meeting. The Council and agencies stated that they were very concerned with the future utilization of the large ships in

the UNOLS Fleet. NSF had been asked to develop budgets for a reduction of 20% by the year 2000. Their priorities are first, people; second, instruments and third, infrastructure/facilities. It was also noted at the Council meeting that overall ship use by agencies other than NSF is down. The budget does not appear to be able to support the conversion of KNORR along with the operation and maintenance of the other large ships in the UNOLS fleet. Don Heinrichs presented his "modest proposal" which shows retirement of ATLANTIS II in mid 1996 and some realignment and downsizing of the fleet (See Section V). The near term future of ALVIN operations was unclear. If ALVIN were available for science in 1996, proposals would need to be submitted and funded. Depending on which vessel is selected to be the ALVIN support ship and the timing of construction, ALVIN could potentially be out of service for a period of 18 months. During the Council meeting, Mike Perfit stressed that the initial response to the DESSC's request for letters of interest for ALVIN use in 1996 was very high. Additionally, Mike voiced concern over the potential for an ALVIN down period of 18 months, indicating that this could impact the future stability of the National Facility and deep submergence science programs.

Dolly Dieter responded to Mike Perfit's report of the Council Meeting by indicating that with NSF bracing itself for a 20% reduction by the year 2000, the option of amortizing the KNORR Conversion would not be feasible. Presently, NAVSEA is conducting a study on the feasibility of outfitting ATLANTIS (AGOR 25) as the support ship for ALVIN operations. Woods Hole was concerned that through this support ship transition phase, the ALVIN team must be kept viable. Ways to keep the pilots trained must be addressed. DESSC was also concerned with the effects of ALVIN downtime on science programs and time-series work. Dolly pointed out that NSF has always included a submersible support ship in their future fleet plans. She also noted scheduling for the large ships was looking grim because of the decrease in funded science.

IV. NATIONAL DEEP SUBMERGENCE FACILITY OPERATIONS AT WHOI:

A. 1995 Deep Submergence Field Programs: Completed and Scheduled -

1. ALVIN/ATLANTIS II - Barrie Walden gave the update on ALVIN/ATLANTIS operations in 1995, see [Appendix III](#). The year began with a standown in Woods Hole. Operations resumed with a Jeff Karson dive program. Unfortunately, power problems were experienced during the first half of his cruise because the batteries were not charging adequately. Problems with the CTFM were also adversely affecting the science objectives. However, Jeff was able to complete most objectives of the cruise despite the problems. The engineering dives prior to the Karson cruise did not encounter the battery and CTFM problems and it was not until actual diving that the problems were revealed. Compounding the situation was the difficulty in troubleshooting the problem both onboard and at WHOI. It was felt that additional engineering dives may have revealed the problem sooner, and lessened the impact on the science program. DESSC recommends that the agencies be asked to fund more deep-water engineering dives after standowns.

Following Karson's cruise, work continued in the Atlantic with dives for Von Herzen, Becker and Schultz at the MAR-TAG site before transiting to the Pacific. In April, there was a Mullineaux/Fisher cruise at 9o-10oN in the early part of the month. The month ended with ten dives off California by Smith and Druffle. In May, ALVIN had a two week stand-down period in San Diego. In 1995, 170 ALVIN dives are planned, corresponding to 317 ATLANTIS II operating days. 47 dives have been completed as of 25 May, with one day lost to weather. It was noted that NOAA funding for operations in 1995 has been received at WHOI.

2. Tethered Systems - Andy Bowen provided the status of tethered systems at WHOI, see [Appendix IV](#). Proposal interest using DSOG unmanned vehicles appears to be growing. The first viewgraph shows the proposals submitted by agency for the years 1992 through 1995. He continued with a review of 1994 and 1995 operations for JASON/MEDEA, ARGO II and DSL 120.

JASON/MEDEA underwent dock trials from August through December of 1994. Additional dock trials are planned for July through September of 1995. Dock trials are for proof of concept work for Dana Yoerger and Ken Stewart programs. Maintenance and upgrades were conducted during the first five months of 1995. In June, JASON/MEDEA operations are planned off of R/V ENDEAVOR in support of

GLOBEC. Manipulator improvements have been conducted and will continue throughout 1995.

ARGO II and DSL 120 were used in operations at the Mid Atlantic Ridge TAG site in June of 1994. A second cruise is planned for the last two months of 1995. Both ARGO II and DSL 120 received maintenance and upgrades in July of 1994.

B. Equipment/Instrumentation Upgrades and Improvements -

1. DSOG Unmanned Vehicle Status - Andy Bowen continued his report with the status of upgrades and improvements planned for the unmanned vehicles, see [Appendix IV](#). Plans for JASON/MEDEA include rewiring the control van, finding a MEDEA replacement, telemetry debugging and continued manipulator testing. Plans for ARGO II include improving the obstacle avoidance forward looking sonar, analyzing video camera focus problems, upgrading thrusters, resolving LBL transducer noise and performing single van operations. The ARGO II operations planned this year off R/V ENDEAVOR will be from a single van. DSL 120 improvements include replacement of the depressor, low speed tow dynamics refinement, design and installment of a weight dropper and examining potential surface processing upgrades. Documentation for all unmanned systems will be developed.

2. ROV - JASON Manipulator Program - Andy Bowen provided the status of the JASON manipulator improvement program, ([Appendix IV](#)). As of June 1995, fiber optic connector mating/unmating has been demonstrated. Operational pressure tests of the arm have been completed. The gripper is being redesigned to achieve more gripping force. There is 7 pounds force now, and the goal is to get 20 pounds force. At full extension JASON's manipulator can lift 60 lbs. DSL has been working to identify a hydrothermal fluid sampler trigger mechanism. Development of mechanical and electrical documentation is ongoing. DSL is also working to identify samplers to demonstrate the manipulative capabilities during the dock test program. Prior to the end of the year, they hope to complete installation and testing of the new gripper. DSL will implement polar coordinate control. Additional dock trials are planned. JASON with the manipulator installed will be pressure tested to 6,000 meters at the Navy's David Taylor facility. In November, the manipulator will be installed on ALVIN and tested during a science cruise to the EPR at 9°50'N.

3. Video System: Pan and Tilt Camera; New 3-chip Video - Andy reported that WHOI has studied the present 3-chip market and technology. They have analyzed present 3-chip performance and specifications and have monitored the MBARI 3-chip development effort. Specifications and a Request for Quote (RFQ) for compatibility with both ALVIN and JASON have been developed. The new camera is planned to be installed during the 1996 overhaul period.

A survey of pan and tilt commercial vendors has been conducted. Remote Ocean Systems (ROS) has been identified as the preferred vendor and a quote has been obtained. The performance history of the ROS units has been discussed with the users. The pan and tilt will be installed during the 1996 overhaul period, ([Appendix IV](#)).

4. Electronic Still Camera for JASON, ARGO II and ALVIN - Andy reviewed the vital and desirable characteristics for the Electronic Still Camera (ESC), see [Appendix IV](#). The selected system must be adaptable to both ALVIN and ROV power and telemetry. WHOI has used a system from a local vendor, but decided that this would not be the most desirable unit. Cost of that system is prohibitive and performance spotty. Vital characteristics include analog display, time stamp, real-time control, high dynamic range and resolution, capability of data telemetry to the surface, minimization of custom software and hardware and a standard data format. Real-time control of focus, zoom and viewfinding are desirable. It is also desired to have image processing and mosaic capabilities. Presently, high quality mosaics have largely been generated at WHOI although other software packages are under development (e.g. University of Hawaii - Dr. M. Edwards). DESSC endorsed the need for electronic still camera capability for ALVIN and JASON in order to permit routine digital image mapping of seafloor sites.

5. Navigation Proposal Status - Jim Bellingham gave the status of the navigation proposal, see [Appendix V](#). He began by outlining the features of the proposed system. It utilizes the Pelagos navigation software (Windows-based), has a mission replay capability, and can utilize customized software. The in-

hull navigation can be satisfied by a Pentium-based computer and flat panel displays. The recommended surface ship hardware is the Nautronix 916 USBL/LBL. This system will be provided on the new AGORs. If KNORR is to be the new ALVIN support ship, a Honeywell 906 could be acquired from the Navy, then upgraded to a 916 system. Other aspects of the navigation upgrade include purchasing intelligent transponders and implementing a Doppler Velocity Log (DVL) for dead-reckoning in ALVIN.

Jim reviewed the list of constraints that had been imposed at the last DESSC meeting. All constraints can be met with two exceptions. The in-hull interface upgrade will require the present system to be disabled. Also, the constraint that the present system not be disabled until the new system is functioning will need to be relaxed if the volume and power are to stay within the present system envelop in-hull. WHOI plans to perform the in-hull modifications while ALVIN is undergoing its overhaul. A number of navigation upgrade concerns have been identified and are in the process of being addressed. Some of the concerns can be resolved by additional documentation.

Long BaseLine (LBL) upgrades and transponderless navigation were also addressed by Jim Bellingham and are included in [Appendix V](#). Common hardware/software across ALVIN's surface and in-hull navigation and ROV/AUV navigation is planned. The software upgrade will be accomplished through a cooperative effort between a commercial vendor and WHOI. A free post-processing tool set will be provided for scientists. WHOI will need to ensure that the navigation software supports integration of the new systems and that users are provided with clearly presented documentation. Well documented data files with raw data will be provided. The merging of surface and in-hull data files still needs to be addressed.

DESSC noted that excellent progress had been made on the navigation upgrade proposal by Jim Bellingham, Dana Yoerger, Andy Bowen, and Dudley Foster. They are ready to go to the agencies with a proposal for the upgrades. The next step in the proposal process will depend on which ship is selected to be ALVIN's support platform. There are still a number of uncertainties, but WHOI is ready to go ahead as soon as the support ship issue is resolved. DESSC recommends that the upgrade on ALVIN be complete when it comes out of its overhaul period. The navigation upgrade will be compatible with the unmanned systems and should be available on the unmanned vehicles for 1996 operations.

C. Plans/Options/Issues for 1996-1997 Operations -

1. ALVIN Overhaul: Scope and Timing - Barrie Walden provided an overview of the ALVIN overhaul and inspection schedule performed since 1989, see [Appendix VI](#). Hull inspections should be performed every five years, the last one was done in 1989. The ALVIN hull inspection is overdue and needs to be performed in 1996. NAVSEA has indicated that they will entertain waivers to extend the ALVIN hull inspection date past August 1996.

Barrie reviewed the work tasks planned for ALVIN's next overhaul period, see [Appendix VI](#). The tasks include the hull inspection, frame inspection and repair, testing of the VB/HP air spheres, navigation upgrades and items necessary for ALVIN to be compatible with the support ship conversion. Under ideal conditions, WHOI likes to perform the overhauls over the winter, so that it falls into two calendar years.

2. Support Ship: WHOI Perspective - Dick Pittenger began the discussion by reemphasizing Bob Gagosian's words from the morning; WHOI is dedicated to the National Deep Submergence Facility. Also, Dick stated that although various options are presently being explored for the future submersible support ship, the option of converting KNORR should be kept alive.

WHOI is prepared to move forward with KNORR's conversion as stated in their April 1991 proposal to operate AGOR 25. They have downsized their original KNORR Conversion plans presented to the agencies in February to one that would be no cost to the agencies but still complies with the spirit and letter of the April 1991 proposal. The new plan would still allow KNORR to be a capable support ship for submersibles. An overview of the KNORR Conversion features is included as [Appendix VII](#). The A-frame would be along the center-line of the ship versus offset to port. This is less expensive and uses less main deck lab space, but would require more deck space. The traction winch would be located on deck, versus below decks, and the crane would be moved off the main deck. Weight storage and handling

would be as on ATLANTIS II. Navigation upgrades would be proposed separately per the DESSC subcommittee. Dick reviewed sketches of the proposed modifications. It was noted that this plan significantly differs from the original KNORR Conversion plan and has not been reviewed by the KNORR Conversion subcommittee chaired by Karen Von Damm. The Von Damm committee needs to continue to look at the effects of the proposed changes. Dick gave a comparison chart of the features of the past two WHOI support ships with that proposed for KNORR. It appears that KNORR would certainly have some benefits over the present ship, almost doubling the lab space. There was discussion regarding the fly-away capabilities of the tethered systems and overlap in expertise between ALVIN/ROV group members.

Short term objectives for WHOI include maintaining science support continuity and excellence, keeping ALVIN and ROVs viable, minimizing the impact on marine crews and minimizing the cost to agencies. The long-term objective is to build a first class national facility.

3. Timing Options for Deep Submergence Operations - Dick reviewed the schedule for implementing the revised KNORR modifications should it be selected as the support platform. Phase II design would be completed by late 1995. An RFP could then be issued in February of 1996. Long lead time material would be delivered by mid-1996. In October 1996, ATLANTIS II would return to Woods Hole for retirement and ALVIN would begin its overhaul. KNORR would enter the shipyard in November 1996 to begin the conversion process. KNORR with ALVIN would be ready for science by May 1997.

Dick continued by reviewing the AGOR 25 post-delivery schedule. Delivery is scheduled for April 1997 to be followed by a series of tests and a fitting-out period in July 1997. A post shakedown availability period is scheduled for the first two months of 1998. Ship construction funds run out in April 1998. Dick has a number of concerns regarding the AGOR 25 conversion to DSSS. Interfacing with the shipyard under the present contract could present difficulties. Dick ended his presentation with a summary of possible scenarios for deep submergence operations for 1996 and 1997, see the timelines included in [Appendix VII](#).

V. UNOLS: Jack Bash provided a brief summary of the activities of the UNOLS Council meeting held in Monterey, CA on 24-25 April 1995. Jack's report was confined to those issues that were germane to the DESSC. The UNOLS meeting was dominated by a discussion on potential changes for the UNOLS fleet as a result of declining budgets. Don Heinrichs made the point that the funding shortfall was due primarily to declining support from other agencies. NSF has increased its budget over the past three years by 22% while all other funding combined decreased by about 23%. Don said that projected funding would not be adequate to support the entire fleet when the two new AGORs come on line. NSF has been asked to develop plans for level funding for the next three years, to be followed by a one year 3% reduction, and then a 2% reduction per year for three years. With this gloomy outlook and no great influx of non-NSF funding on the horizon, Don predicted that the UNOLS fleet would be facing a reduction in size. He presented a strawman "modest proposal" which called for the retirement of five ships (ATLANTIS II, COLUMBUS ISELIN, GYRE, ALPHA HELIX and MOANA WAVE). This proposal further suggested the realignment of two ships, MELVILLE to Hawaii and OCEANUS to Alaska. Don also said that it is possible to require the retirement of one of the present active large ships. These dire predictions stimulated significant discussion.

In other UNOLS matters, the University of Miami is negotiating with Harbor Branch to combine their ship operations. This includes the technician organization of University of Miami operating from Harbor Branch ships as well as academic collaboration between the two institutions. COLUMBUS ISELIN has been repaired and is at the dock at Harbor Branch. The ship has no 1996 schedule and has been offered for sale.

Jack reported that Barry Raleigh of SOEST attended the UNOLS Council meeting and informed the group that SOEST would not be pursuing the acquisition of a SWATH ship as a replacement for MOANA WAVE. NOAA's Jim Baker met with Barry and suggested that an academic institution may be considered as the operator of the new NOAA AGOR and that Hawaii could be a candidate. Barry suggested that SOEST was interested and that they would envision a 50/50 NOAA/UNOLS operation with the AGOR. Barry also said that they would accept the transfer of MELVILLE if that decision were

made.

VI. AGENCY REPORTS:

A. National Science Foundation (NSF) - Dolly Dieter gave the report for NSF. She began by reviewing the NSF budget for FY95 and the request for FY96, see [Appendix VIII](#). The total Ocean Science Division budget for FY96 is \$205.6M. This may represent a 6.3% increase over FY95. The feeling is that may see an increase of 2% at most, but level funding is highly probable. Level funding means there is not enough money to keep all of the big ship's funded. There does not appear to be any financial help available from ONR or NOAA in the near future either. The future potential funding restraints are fleet wide and not just for ALVIN. NSF would prefer to see the older ships in the fleet tied-up if faced with lay-ups. NSF's future large ship requirements include:

- 1 MCS/MGG Ship
- 1 Deep Submersible Support Ship
- 3 General Purpose Ships.

The six ships that Don Heinrichs' "modest proposal" slated for retirement won't reduce NSF's budget as much as many perceive. NSF's support for these ships this year is approximately:

- ISELIN = \$250K
- GYRE = \$0
- MOANA WAVE = \$1.5M
- ATLANTIS II = \$3-4M
- ALPHA HELIX = \$800K

Dolly pointed out that since Navy owns ALVIN and most of the large ships, they will need to be a player in any decisions regarding realignments and lay-ups.

NSF is also concerned with the potential for a long hiatus in ALVIN operations and the effects it might have on crew/pilot stability. DESSC noted that with the 15 August proposal deadline quickly approaching, they need to be ready to provide guidance to the community. Agencies will meet to discuss the MOA within the next three months.

B. Office of Naval Research (ONR) - Jim Andrews provided the report for ONR. The change in ONR's course over the years has changed the amount of use of ALVIN. ONR does not have plans to support ALVIN cruises in the next few years.

The CNO Executive Board is scheduled to meet in June. They will look at the future of the Navy and its potential for taking the lead in oceanography. Hopefully this will have positive influences on blue water science and deep submergence asset use.

ONR, NAVSEA and Halter Marine, Inc. (HMI), the shipyard constructing AGOR 25, plan to meet in June to discuss HMI's interest in making AGOR 25 a submersible support ship for ALVIN. An initial study by NAVSEA indicated that it is feasible and will be at lower cost than converting KNORR. AGOR 25 can provide the community with a long term solution for submersible handling. ONR is aware of the short term problems that may be associated with making AGOR 25 the support ship. They would like to work in cooperation with DESSC and WHOI in this transition if AGOR 25 becomes the preferred platform. Jim noted that these conversion plans have not yet been approved at the highest levels of ONR. If HMI will outfit AGOR 25 as a submersible support ship during construction, there may be a window of opportunity for ALVIN operations in fall 1997. These operations would need to be relatively close to Woods Hole since this would fall within the warranty period for the ship. It was noted that any AGOR conversion time table was very "soft" at this time.

In other issues, ONR's Research Facility Program budget appears to be level funding for next year.

C. National Oceanic and Atmospheric Administration (NOAA) - Hank Frey gave the report for

NOAA. He gave the recent history of FY95 funding woes regarding support for NURP. NURP was not included in the original NOAA 1995 budget, but Congress appropriated \$18M. NURP then awarded three of their six centers one year grants for support. On February 27th, Congress recommended a rescission of the \$18M for NURP. Later this rescission was reduced to \$3.5M. The three centers that did not receive their annual support are being funded month to month. The plan is to fund these centers through September, reduce spending at the National Office, pay off all obligations and distribute what ever may be left over among the National Office and the Centers. There will be no NURP/Navy operations coordinated from the National Office this year. Had there been funding, the operations would have been carried out on DOLPHIN.

One of NURP's top priorities is to continue support for ALVIN operations, but at what level is unclear. Jim Baker and Department of Commerce put NURP in the FY96 budget, but OMB removed it. An authorization bill is needed for NURP. The Centers are encouraging support from Congress. Funding in FY96 will depend on the success of the NURP Centers.

VII. NOAA and U.S. Deep Submergence Operations:

A. NOAA/HURL Program - Hank Frey gave the report for Alex Malahoff who regretfully could not attend the DESSC meeting. He prepared a paper describing HURL's Project Unity, see [Appendix IX](#). Project Unity was developed in response to HURL's rectification review of June 1994. The project concentrates on the completion and full integration of the ship, submersible and ROV into a smoothly operational 2000 meter diving system. Alex's paper addresses each element of the integration. Tests of the integrated system are planned for the spring of 1996 with a full science program in the summer of 1996. It is unclear what funding will be available for 1996. Western Pacific operations will be delayed for at least 2 years.

VIII. Recommendations on 1996 Operations at the National Facility:

A. Assessment of Letters of Intent and Tally of Funded Programs - A summary of ALVIN and ROV letters of intent were provided to DESSC and are included as [Appendix X](#). It was noted that this summary was compiled from all messages received at the UNOLS Office in response to Jeff Fox's memo to the community dated 6 April 1995.

The summary also included letters of intent, proposals, and ship time requests received by the UNOLS Office for ALVIN and ROV work. It was noted that some of these letters may no longer be current and as a result the total dives for each operating area may be a bit high.

Dolly Dieter commented that in the future, DESSC should consider moving the DESSC meeting back a bit. The NSF panels just met last week. As a result, the science program managers may not have had an opportunity to contact PI's proposing to use ALVIN on the outcome of their funding decisions. In reviewing the summary of letters of intents and proposals, Dolly can not give the status of specific proposals submitted. Additionally, it was also pointed out that the UNOLS Ship Scheduling Meeting may also need to be moved back a few weeks, since that meeting often constrains when DESSC needs to meet.

Annette DeSilva reviewed the summary and based on the latest information, it appears that approximately 65 funded dives are planned for 1996. This can be broken down to 26 dives in the Atlantic, 20 dives in Eastern North Pacific, four dives along the North East Pacific Rise and 15 dives on the Southern EPR. NERC-BRIDGE (British) has shown interest in using ALVIN in the Atlantic in 1996 and 1997. Purchase of some submersible time from US and French submersible operators is being considered by BRIDGE. Although the 15 August 1995 and 15 February 1995 NSF proposal deadlines are intended for 1997 operations, Dolly encouraged DESSC to prompt the community to submit proposals for 1996.

ROV science programs were reviewed. There are currently three funded field programs which will utilize ARGO II and the 120 kHz sonar, two of those programs will also utilize JASON. One program is on the Mid-Atlantic Ridge, one is on the Juan de Fuca Ridge, and the third program is on the southern East Pacific Rise near 17.5oS. The first two programs will be fielded in 1996 and the southern EPR program will likely occur either in late 1996 or early 1997 depending on logistics in mobilizing the ROV and

towed vehicle equipment. Proposal pressure for ROV/towed vehicle programs continues to be good with approximately 5-7 proposals having been submitted to the last three NSF target dates. WHOI is working with potential PIs in helping them prepare proposals for use of ROVs. In DESSC's guidelines to the community, towed unmanned system's availability in 1996 and 1997 must be stressed.

To end the discussion for day one, it was emphasized that we need to develop a means for keeping the National Facility strong through this transitional period. It appears that there is some funded work in 1996 to put together a limited AII/ALVIN schedule. DESSC will request confirmation from NSF regarding additional support for 1996 and 1997 and the possibility that ALVIN/ROV proposals declined in June be allowed to be resubmitted in August. The timing for these operations will depend on a number of factors: The overhaul of ALVIN, ATLANTIS II inspection schedule and the support ship conversion schedule.

Day 2 - Thursday, June 2, 1995

US NAVY/NOAA Programs - CDR John Green provided the US Navy deep submergence presentation with a sequence of view graphs which are included as [Appendix XI](#). John started with the operational activities of the Advanced Tethered Vehicle (ATV) and DSV-3 TURTLE. These vehicles worked in the Catalina Basin from 29 April to 8 May in a very successful operation with Craig Smith studying whale-fall communities. TURTLE made three dives for a total of 24.7 hours and ATV made seven dives for a total of 69.3 hours in the water. From 8 to 14 May these platforms supported a successful cruise at the San Diego Trough for Gordon Hendler of the Natural History Museum of Los Angeles in a study of deep-sea brittlestar fish. TURTLE accomplished four dives for a total of 23.9 hours, and ATV made five dives for a total of 58.6 hours. Military operations were conducted in the fall of 1994 through March 1995 logging over 200 hours of ROV bottom time and recovering over \$50M in hardware. Future operations include an 18 to 21 day operation off Hawaii with ATV and TURTLE to search for a Navy delivery system. LANEY CHOEST and the systems should be back in San Diego by 2 July. In August and September, approximately 20 days of scientific operations are planned using ATV and SEA CLIFF. Investigators Paul Dayton and Eric Vetter will study submarine canyons off the southern California coast. Cindy Lee Van Dover will investigate hydrothermal vents on the main Endeavor Field and Martin Fisk will conduct operations on the Mendocino Ridge.

John reviewed some of the recent projects and upgrades to their deep submergence vehicles. This included the acquisition of 3-chip CCD cameras for TURTLE and SEA CLIFF and the unmanned vehicles. They completed a lighting upgrade for the ATV and TUVVs. A Micro-laser scaling system was installed and navigational upgrades made. Improvements were made to the support ship's Sea Beam post processing and their e-mail capability. SCORPIO received a depth upgrade to 20,000 feet..

Navy plans to convert from a multimode cable to a single mode cable for ATV. This tether should have the same life as the vehicle. It will take approximately four months for the manufacturer to make the cable plus extensive conversion efforts before the new cable is ready for use. The conversion may begin in December.

The scientific operations presently carried out by the Navy's deep submersible assets are made possible through an MOA between NURP and Navy. Navy is in the process of developing another MOA with EPA for environmental monitoring operations. John commented that if NURP is disbanded, an MOA with another organization would be necessary to continue science operations.

B. Recommendations for a 1996 Schedule of Operations - Don Moller started this segment by providing a 1996 schedule for ATLANTIS II based on the information available which included 50 dives, (excluding Southern EPR funded work), see [Appendix XII](#). His schedule had ATLANTIS II returning to Woods Hole in late 1995 and standing down for six months while ALVIN is overhauled. The ship departs Woods Hole in July 1996 to start engineering dives and operations in the Atlantic. It then transits to the Pacific in September for work in Guaymas Basin, off California and the Northern EPR. The ship and ALVIN would complete the year in the Panama area permitting it to return to Woods Hole or continue operations into 1997 in the Pacific.

C. Implications for 1997 and Beyond - Dick Pittenger presented possible options and schedules for ALVIN's support ship conversion. These options and schedules are provided as part of [Appendix VII](#). Dick pointed out that ATLANTIS II must complete a USCG inspection as well as an ABS inspection by November of 1996.

NSF is willing to consider extending AII's operating schedule, but the final decision will depend on the timing of the DSSS conversion, budget and proposal pressure. Since AII is scheduled for retirement at the completion of operations, the added maintenance expense plus inspections and dry-dock to extend operations into 1997 is a major consideration.

NSF will explore entertaining proposals for 1996 operations in their 15 August submittal deadline. They do not wish to see a long hiatus in ALVIN operations. WHOI will need to provide NSF with cost estimates for the ALVIN overhaul and the ATLANTIS II maintenance and inspections. DESSC endorsed the 1996 operating schedule presented by Don Moller which shows ALVIN's overhaul in the first half of 1996. They felt that PIs would have a better chance of getting their work fielded by the end of the year.

The DESSC summarized the constraints facing the future ALVIN schedule and support ship conversion:

1. ALVIN requires a major overhaul (six months)
2. KNORR will work its way back to WHOI from the southern oceans.
3. ATLANTIS II will require ABS certification and USCG inspections in 1996.

D. Guidelines to the Community - DESSC reviewed the characteristics of ATLANTIS and noted features that would make it an attractive submersible handling platform. The Committee agreed to write a letter (see [Appendix Ia](#)) to the federal agencies with their recommendation and concerns regarding the conversion of a ship to be the submersible handling platform. It was the consensus of the Committee that the conversion of ATLANTIS (AGOR 25) would be the overall best option for the community. On the plus side, this ship is new and therefore has a longer anticipated life. The ship offers more science berths, more lab space and more deck space. Also, the traction winch is located below deck. DESSC noted a few concerns with designating ATLANTIS as the support ship. The effectiveness of ATLANTIS' bow thruster for use in ROV operations needs to be explored. The other potentially problematic aspect of going with ATLANTIS is the timing of its entrance into the fleet. With ATLANTIS II scheduled to be retired in 1996 and ATLANTIS not available until 1997 or 1998, there could be a long hiatus in ALVIN operations. With these concerns noted, DESSC felt that ATLANTIS would provide long term health for Deep Submergence Operations. DESSC's letter to the agencies would emphasize the need to maintain the integrity of the National Facility through these transitions. Also, DESSC would recommend to the agencies that the option to convert KNORR should be kept alive until the concerns regarding ATLANTIS can be adequately addressed. A subcommittee of Mike Perfit, Jeff Fox, Dan Fornari and WHOI personnel was formed to draft the letter. A copy of the letter, dated June 2, 1995, is included in [Appendix Ia](#).

It was pointed out, that a new guideline at NSF prohibits PIs from resubmitting proposals for the next panel following original submittal. In light of recent events and the potential for ALVIN operations in 1996, DESSC would like NSF to reconsider this rule for the 15 August panel. They will include this request in their letter to the agencies.

DESSC plans to send a letter to the community regarding future deep submergence plans. However, they will wait a few weeks until they have further guidance from the agencies and information regarding the ABS certification. The intent of their letter will be to keep the community informed while also giving them some guidance on the timing for proposal submittal and potential geographic areas of operation. At this time, it appears that work along the southern EPR and the western Pacific will be postponed until after the deep submersible facility is integrated on a new support platform. (Note: This letter has been written and sent to the community. It is included as the **Cover Letter** to these minutes.)

IX. Third Party Tool Review:

A. Finalize Announcement for Third Party Tool Policy - A draft Third Party Tool Policy was sent by Barrie Walden and Jeff Fox to Don Heinrichs and Lisa Rom for review. A copy of this is included as

[Appendix XIII](#). The intent of the policy is to coordinate the community's efforts in developing third party tools. It also will provide a structure for prioritizing use of the assets. The policy addresses DESSC's role and the process of developing tools.

The tool policy was reviewed and endorsed by DESSC and will be distributed appropriately. Mike Perfit, Hugh Milburn and Dan Fornari were tasked with drafting an Announcement to the community relative to the 3rd Party Tools Policy. It was decided that an ad-hoc committee will be assigned to address third party tool issues as needed. Dan Fornari will start compiling a list of third party tools.

B. Status Stakes/Holloway Drill - Debra Stakes provided an e-mail message providing a status report on the on-going development of the Stakes/Holloway drill, see [Appendix XIV](#). They continue to maximize capabilities for use with ALVIN. Efforts include modification and addition of valves. Also, where possible, aluminum components have been replaced with titanium. The drill is planned for use on Rodey Batiza's cruise this October. Debra Stakes conveyed to the Committee her concern about the issue of insurance for the Stakes/Holloway drill. Obtaining insurance by the party making use of the drill has proven to be very difficult. The committee discussed the issue and recommended that WHOI investigate purchasing insurance for the drill and other future third party tools. If insurance is purchased by the operator, the cost would be passed on to the user. Lisa Rom noted that the government considers itself to be self-insured and therefore will not purchase insurance. It was also pointed out that the cost of replacing the drill may actually be less expensive than insuring it. NSF indicated that they will entertain a proposal for replacement of the drill.

C. Other Systems - Hugh Milburn described the new NOAA manifold sampler which is still in the development stage. The old manifold has been used quite a bit in the past on ALVIN. There are also requests for its use on SHINKAI and ROPOS. Development of the new manifold is progressing along. They are experimenting with a new material "PEEK", a plastic with a high temperature rating. The major samplers on the manifold will have electric actuators, replacing the hydraulic actuators now used on ALVIN. The new manifold is planned to be modular and will be adaptable for use on ROPOS, ATV and possibly JASON. Other systems under development include WHOI's new temperature probe and water bottle system. WHOI is also in the early stages of developing a fiber optic data link that could pass data through an ALVIN view port eliminating the need for a through-hull penetration.

D. DUMAND Request for ROV Assets - DOE is funding a program, DUMAND Neutrino Astronomy Project, off the Island of Hawaii that has need of an ROV. The DUMAND Project spokesman and director, John Learned, has sent an e-mail to DESSC with a description of the DUMAND Project, a description of the ROV services needed, and a request that DESSC determine whether or not NSF ship and ROV time can be arranged, see [Appendix XV](#). The proposed use of the ROV is outside of oceanography and is intended to service the DUMAND system. Since DUMAND provides a means for interesting science, DESSC endorsed the principal and nature of the application of JASON. However, the issue of funding is out of the realm of DESSC. Learned indicated that funding for ROV and ship time had not been included in their budget. They would like NSF to support the facility time. NSF has indicated that since it is a DOE funded science program, DOE should pay for the ship and ROV time. DESSC will respond to John Learned's correspondence reflecting the above view.

E. SONNE Program - Dan Orange brought the Committee's attention to the German funded SONNE program which plans the use of JASON and DSL 120 for investigation of cold seeps discovered in the Aleutians last year. The program would be a two leg operation in July and August, 1996, with a total of 47 funded ship days and 20 days of tethered vehicles. The German, GEOMAR principle investigators are Edwin Suess and Peter Linke. They are looking for U.S. support to fund the ROV time. Rich Lutz would be the main contact for the U.S. A science proposal for the U.S. participation in this project has not yet been submitted. The Committee enthusiastically endorsed the project providing it does not conflict with other JASON scheduling.

X. DESSC Discussion and Recommendations on Development Upgrades:

A. ALVIN Power - Dudley Foster provided the Committee with the history of ALVIN batteries. His view graphs, [Appendix XVI](#), provide a comparison of on-bottom time for ALVIN, NAUTILLE, CYANA,

SHINKAI, 2000 and SHINKAI 6500. Also provided was a comparison of battery characteristics and cost factors. ALVIN and NAUTILLE both utilize Pb acid batteries. SHINKAI 6500 uses AgZn batteries. Although they have a very high power capacity, the AgZn batteries only get approximately 75 dives per set and are very expensive (approximate cost is \$2 million per set).

Dudley showed a viewgraph of ALVIN's estimated bottom times over ten years, 1985 to 1995. Dan Fornari provided a graph showing the data used to generate these statistics. Over the ten years and nearly 1500 dives covered by the data used for this study, ALVIN's bottom time has shown a general decrease of approximately 45 minutes, however, there have been dives recently which have had bottom times as long as nearly six hours, which is equivalent to some of the longest dives in previous years. Compared to NAUTILLE and SHINKAI, on average ALVIN has had longer bottom time and costs much less per dive. Dudley reviewed the long and short-term variables affecting ALVIN power and bottom time, see *Appendix XVI*. Dudley suggests that this trend is primarily attributed to an increase in power needs for the installed equipment. In an effort to improve battery life, WHOI is: a) continuing to monitor the battery market, b) continuing to optimize the charge cycle, c) continuing to optimize battery maintenance, d) increasing pilot efficiency training and e) continuing electronic monitoring development, and f) educating users on efficiency of power use. It was noted that pilots who astutely manage power use get significantly more time out of the batteries. John Green stated that the Navy had a study on NiCad batteries for SEA CLIFF and would share this report with WHOI.

Dudley and Barrie sent a fax to Jeff Fox dated 10 May, that reviews the status of ALVIN batteries and the hydraulic system. This fax is provided as *Appendix XVII*. DESSC thanked Barrie, Dudley, Dan Fornari and Rick Chandler for their efforts in researching the battery issues. Dan Orange and Jim Bellingham offered to provide DESSC with some battery calculations. These are provided as *Appendix XVIII*. The Committee suggested that the design of ATLANTIS should be investigated to determine if a new battery handling system could be accommodated.

B. Other - ALVIN continues to use the older hydraulic motor controllers which have proven reliable, however, use more power. MBARI has worked with MOAG, the manufacturer of the new pressurized motor controllers, for over a year and seems to have worked out the problems. It was suggested that WHOI continue to follow the progress of MBARI. Other items mentioned by the community that need improvement are the hand-held camera and the submersible's tape recorders. DESSC will continue to compile a list of equipment that the community needs.

The Committee suggested that WHOI develop and implement a strategy for improvements to ALVIN. With ALVIN's overhaul planned for 1996, this could offer the perfect opportunity for integrating improvements.

XI. DESSC DISCUSSION AND RECOMMENDATIONS ON CALIBRATION OF SCIENCE

SENSORS: Barrie Walden began the discussion of the science sensors. He indicated that there is a need for a calibration schedule for routine equipment. Many scientists have requested calibrations before or just after cruises. Lisa Rom indicated that the policy is if scientists want equipment calibrated more than once a year, they need to pay for it out of their science budgets. Regardless, there is still the issue of scheduling calibrations. Lisa commented that WHOI should have a marine technician that coordinates this whole process. Other institutions routinely handle calibration scheduling and implementation through their marine technician programs. Additionally, the ALVIN manual should be modified to state that calibration of the CTD is performed once a year. If the scientists wish to have it done more often, they will have to pay for it.

XII. REVIEW OF USER COMMUNITY ASSESSMENTS OF THE NATIONAL FACILITY: Mike

Perfit and Jeff Fox surveyed the users of ALVIN for the past year and reported on their comments. All were pleased with the operations and reported noticeable advancement. Many cited the professionalism of the ALVIN pilots and crew. Dan Fornari's efforts were reported as being very positive. Several users expressed their concern with the morale of the pilots and the stability of this vital group. Also of concern was the lack of pre-cruise coordination. There has been difficulty in getting responses for planning questions in that there are so many different persons to deal with at WHOI. Users do not see logical, coordinated and responsive shore support. A more comprehensive brochure and users manual would

assist in this matter.

Mike listed some of the operational concerns:

1. Navigation is off by 10's of meters when transferring between transponders.
2. Overlays are needed for the 3-chip camera.
3. Pan and tilt cameras are needed.
4. More time should be devoted to engineering dives.
5. Strobes and hand-held cameras did not work 50% of the time.

Jeff Fox echoed Mike's comments about the supportive sea operations and the positive trend of improvement with the AII and ALVIN crews. Jeff also noted that delayed maintenance to ATLANTIS II was beginning to show.

XIII. RECOMMENDATIONS FOR DESSC MEMBERSHIP: Three members of the DESSC have terms expiring. Gary Taghon has just completed his second term and is ineligible for another. DESSC recommended potential candidates with benthic biology backgrounds for replacements. Carl Wirsen and Hugh Milburn both completed their first terms and have agreed to serve second terms. DESSC also discussed increasing their membership by one to have representation from someone with background in remote systems use. Potential candidates were identified. Mike Perfit will contact the candidates recommended by DESSC to determine their willingness to serve.

XIV. Other DESSC Issues:

A. DESSC and the Millennium - Two issues were discussed in regard to DESSC in the millennium: 1) the Memorandum of Agreement (MOA) and 2) deep submergence needs in the next century. A number of questions arose: Do we need a manned presence in the next century? If so, how would we like it to be characterized? How will AUVs and ROVs be folded into this picture? What will be the suite of instruments? It was noted that the Abyss Report had been widely distributed throughout the community, but there has been relatively little feedback.

From the agency reports, it was learned that initiating a new MOA is presently on hold. They would like to determine who the partners will be in the next agreement before proceeding. At that time, they will begin to identify the facilities that will be included as part of the facility. There was general agreement between the agencies that the agreement will be a partnership. The MOA will not identify a lead agency for the National Facility. It was noted that many times facilities and programs can gain better backing when supported through partnerships.

Dick Pittenger sketched a timeline depicting the deep submergence assets in the future from 1996 through the year 2020. It showed ATLANTIS coming on line in 1997 and operating beyond 2020. In 2005 ALVIN will be forty years old. The need for manned submersibles continues, but the characteristics of a new or replacement platform are unclear. The need for ARGO and JASON/MEDEA continues into the next century with next generation ROVs coming on line periodically. AUVs and other deep submergence tools also will be integrated into the deep submergence suite of assets. Dick also pointed out that the Federal Agencies have shown a long term dedication to deep submergence by designating ATLANTIS as the new support ship. Perhaps consideration of deeper diving manned submersible should begin to be considered.

There was a discussion on what assets should make up the National Facility. Barrie pointed out that the National Facility provides a means for the community to gain access to expensive assets. The less expensive items should not be included in this facility since they can be accessed relatively easy. The National Facility provides assets and services that other institutions cannot provide. This does not mean that just because some assets are not part of the National Facility they should not exist. Agencies should not be discouraged from funding other facilities just because they are not part of the National Facility.

DESSC's responsibility is to serve as an advisory/focal group on deep submergence issues for the community. The National Facility comprises a major component of their responsibilities. However,

DESSC needs to continually look over the horizon and see where technology is going. If DESSC is to speak for the whole deep submergence community, they must encompass all elements. This will include being informed about happenings at other deep submergence activities such as HURL, MBARI and Navy. DESSC strengthens their voice if they welcome the views of all other assets. It is to DESSC's advantage to bring in ancillary groups to learn what they are doing so that we can maintain our National Facility to the highest standards. Communication links are important.

DESSC continued the discussion on the MOA and what they would like to see as elements of the MOA. The agencies have indicated that only the agency partners will be involved with drafting the agreement. DESSC believes that the MOA is necessary because of the specialized nature of the National Facility. The manned submersible should continue to be the main focus; however, sophisticated ROVs and AUV platforms should be considered. Research and development should be considered an integral part of our plans for the future. Ways of integrating smaller operations within the infrastructure with viable funding means needs to be addressed. Also, it was recommended that DESSC should begin to look forward with respect to ALVIN becoming older. Innovative funding sources to support the possible replacement of ALVIN in the long term should be considered. DESSC also discussed the future of JASON and modifications to the funding process. They recommend that the funding should be transparent to the other science programs as it is with ALVIN.

DESSC will request a meeting with the agencies at the appropriate time to provide them with an important prospective on science issues and future needs for consideration while developing the MOA. Prior to the Fall AGU Conference, DESSC will begin to communicate on the characterization of DESSC in the millennium.

XV. MEETING PLANS: Mike noted that a meeting may be necessary prior to the annual fall Planning Meeting at AGU. It appears that the September time frame in Washington, DC might be the best time and site if the additional meeting is necessary. In the mean time, DESSC will communicate via e-mail regarding upcoming agency decisions, ALVIN future operations, and the submersible support ship. As in the past, DESSC will hold their annual planning meeting on the Sunday prior to the AGU Conference in San Francisco. If necessary, arrangements can be made for the DESSC to convene on Saturday afternoon prior to the planning meeting.

Farewell to Jeff - The DESSC, UNOLS and WHOI extended their deep appreciation for Jeff Fox's dedication and long hours of support for the Committee and promotion of the National Deep Submergence Facility. They wished him well in his new venture.

The meeting was adjourned at 11:00 a.m.