UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

DSRV ALVIN REVIEW COMMITTEE
April 23-24, 1979
NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C.

CONTENTS

JUNE 1979

ALVIN REVIEW COMMITTEE

Minutes of Meeting
April 23-24, 1979
National Science Foundation, Room 321
Washington, D.C.

GENERAL: The meeting came to order at 0915 and the Draft Agenda was adopted. The numbered paragraphs below are keyed to the agenda items. See Appendix I for Draft Agenda.

Members of the Review Committee and observers present are listed in Appendix II.

1. OPENING REMARKS: R. Corell gave a brief welcome to those present. Discussion developed on Committee voting procedures; the verbal method used in past years proving unsatisfactory. It was decided to use NSF review panel flash cards, which enable the user to signal his vote to the recorder without being prejudiced by other voters as in the case when conducted verbally.

2. FIFTH ANNUAL MEETING REPORT: The Report of the Fifth Annual Meeting, held March 1978, was accepted as written.

3. REVIEW OF 1978-79 OPERATING SEASON: J. Donnelly, ALVIN's manager, gave an illustrated presentation of the highlights of the 1978 and 1979 (to date) dive seasons. His remarks can be found in Appendix III.

J. Corliss stated the water sampling apparatus developed at OSU for use with ALVIN had been turned over to Woods Hole.

Continuing the discussion on recent ALVIN technology, Donnelly mentioned the new rock crusher was actually not ready for use, that additional time and money were required to make it operational.

J. Edmond commented the recent rehabilitation of LULU had produced a significant improvement in habitability.

A 20-minute videotape of the "biology" surrounding the volcanic vents off the Galapagos was shown. This tape was recorded by the new TV system and is a new technique employing a charged-coupled device color video camera, and was very impressive in its resolution.

4. COMMENTS BY AGENCY REPRESENTATIVES:

NSF - D. Frankenberg, Dir., NSF, Div. of Ocean Sciences discussed the status of the FY80 budget which had gone forth from NSF, projecting a 9.3% increase for ocean sciences. The coming year will see phase-out of IDOE projects, but NSF through its Cooperative Ocean Research & Exploration Section (CORES) will continue similar programs as was recommended by NACOA. He mentioned an in-house study of interagency funding of ocean research was underway.

ONR - K. Kaulum stated Navy was projecting $26M as a base level for research in 1979. Their share of the ALVIN agreement was provided for, as well as their portion of the upcoming submersible science study. Presentations of various budget categories are being made currently to Radm. A.J. Baciocco, Jr., Ch. of Naval Research and his staff.

NOAA/MUS&T - D. Beaumariage stated that due to their budget cycle their portion of current ALVIN funds reach into FY81, which presents special problems for his office.

5. REVIEW COMMITTEE REPLACEMENTS: The terms of Drs. R. Corell, M. Gregg, and D. Hayes are due to expire in June. By the terms of the UNOLS' Charter all are eligible to serve another 3 year term. In the ensuing discussion it was agreed that the various disciplines should continue to be represented among Committee members. Discussion concluded with the proposal that R. Corell remain as chairman, M. Wimbush (URI) would replace M. Gregg and R.N. Anderson (L-DGO) would replace D. Hayes. These names will be submitted to the Advisory Council which may endorse them; if so, they will be offered for ratification at the May Annual Meeting of UNOLS.

6. RESEARCH SUBMERSIBLE FACILITY REQUIREMENTS STUDY: S. Toye stated proposals to host the project office had been received from Florida Inst. for Oceanography, Lamont-Doherty and Texas A&M. She estimated the reviews would be in by May and that the award could be made by August.

The work statement for this study specifies that the Science Assessment Panel members be recommended by the Advisory Council and members of the Task Force be recommended by the ALVIN Review Committee. Accordingly, a list of names was developed with alternates, to meet the stated requirements: one each from an academic institution, government lab and industry, plus three with design and/or construction expertise with research submersibles. Final appointments will be made by the UNOLS Executive Committee.

7. ROLE OF LULU & SUPPORT VESSEL: R. Dinsmore reviewed some of the interface problems the ALVIN group faces with the variety of escort vessels in recent use. Increased demands by users have resulted in pushing LULU to her limit and has necessitated the development of cruise duration definitions. These are shown in Appendix IV.

8. SAMPLE & DATA ARCHIVING POLICIES: J. Corliss had continued his effort over the past year to develop a comprehensive policy relative to the curation and disposition of samples collected from ALVIN.

The committee read over, amended slightly, and subsequently unanimously passed the following:

MOTION: That the "Interim Procedures for Curation & Distribution of Samples Collected from ALVIN" (Appendix V) be implemented for a one-year trial.

Regarding data archiving, R. Dinsmore stated the ALVIN budget could not stand the costs associated with duplication of all videotapes, B&W and color films for investigators' personal use, particularly if there was to be an archival copy as well. Estimates range from $10-40K for duplication of a season's data of these sorts.

J. Corliss proposed copies be made at the P.I.'s expense. It was obvious that a P.I. should be allowed access to the data so that only what was actually wanted would be copied at his expense. Woods Hole currently has the facilities to do the photographic processing.

Further discussion resulted in the following motion, which was carried with one abstention.

MOTION: Duplicate sets of photographic films and videotapes will be provided at the request of an investigator and at his expense.

There is also the case of the adventitious sample collected incidently by ALVIN. The group felt that these should not be lost particularly if of a perishable, biological nature. R. Turner agreed to write up a simple statement setting forth preservation procedures which would be carried aboard LULU with suitable supplies for implementation.

It was generally agreed that these various sample and data archiving policies should be given wide distribution to users and others interested so that users would be prepared to provide funds for duplication.

9. ALVIN FLYER FOCUS: Discussion of research areas following the 1980 season (largely Atlantic) centered on returning to the Pacific in 1981, with possibility of picking up some Atlantic work on the way. A. Maxwell voiced some concern with another Pacific season because of cost and personnel concerns which become acute when ALVIN operates so far from home base.

Before the annually revised flyer advertizing ALVIN's research capabilities is sent out, Woods Hole will investigate the feasibility of such operations.

10. REVIEW OF PROPOSALS & 1980 SCHEDULE: Proposals were considered by the Committee over the two-day meeting and a summary of them, with a brief note as to action, appears as Appendix VI.

Regarding work proposed by various investigators for 1981, no specific commitments were made. Letters will be sent to all those whose proposals were considered.

A rough, tentative 1980 schedule was developed after the meeting and appears as Appendix VII. It attempts to take account of the Committee's recommendations as modified by such practical considerations as weather, distance, logistics, etc. It is emphasized that it has only preliminary approval from the agencies, and that it implys "use days" which do not guarantee an equal number of dives.

11. OTHER: D. Rhoads raised the question of how Committee recommendations regarding the addition of personnel to projects already "full" should be handled. It appeared several of the proposals under consideration would benefit from the addition of other disciplines.

It was pointed out that often both LULU and the escort vessel were full with the P.I.'s party leaving no room for additional personnel. No specific action was taken, except the suggestion that such notice could be made in the letter to the P.I. informing him of the Committee's action.

Note was taken of the suggestion that next year the Committee examine proposals the first day of the meeting so that a rough operating schedule could be developed while the Committee was still assembled.

R. Corell suggested holding a workshop to acquaint the various P.I.s with ALVIN operations and each other's projects prior to the year in which they were scheduled. There appeared to be no great enthusiasm for this and no action was taken.

Adjourned 1330
April 24, 1979

Thomas Stetson
Executive Secretary, UNOLS

The Committee wishes to thank Drs. M. Gregg and D. Hayes for their service to the Committee.

Appendix I

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

An association of Institutions
for the coordination and support
of university oceanographic facilities

UNOLS Office
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

ALVIN REVIEW COMMITTEE MEETING

0900, April 23-24, 1979, Room 321
National Science Foundation, 1800 G Street, NW
Washington, D.C.

DRAFT AGENDA

1. Opening Remarks and Review of Agenda - R. Corell
2. Accept Report of Fifth Annual Meeting
3. Review of 1978-1979 (to date) Operating Season - J. Donnelly
4. Comments and Discussion of Program by Agency Representatives
5. Suggestions for ARC Replacements for Drs. Corell, Gregg, Hayes, to be Submitted to UNOLS Advisory Council and for Annual Meeting Ratification. (All eligible to serve another term)
6. Research Submersible Facility Requirements Study - An Update - R. Corell
7. Role of LULU Vis-A-Vis Major Support Vessel - R. Dinsmore
8. Sample and Data Archiving Policies
9. Develop Work Area Focus for Flyer
10. Review of Proposals for 1980 and Beyond
11. Other

March 20, 1979

PARTICIPANTS

The following were present for all or part of the meeting.

ARC Members (with terms)

R.W. Corell, Ch., UNH	7/76 - 6/79
J.B. Corliss, OSU	7/77 - 6/80
J.M. Edmond, MIT	7/78 - 6/81
D.C. Rhoads, YALE	7/78 - 6/81
R.D. Turner, Harvard	7/77 - 6/80
A.E. Maxwell, WHOI, *ex-officio*	2/75 - 6/79

Absent:

M.C. Gregg, U. of WA	7/76 - 6/79
D.E. Hayes, L-DGO	7/76 - 6/79
K.C. Macdonald, Scripps	7/78 - 6/81

OBSERVERS

D.C. Beaumariage	NOAA/MUS&T
E.A. Finkel	NOAA/MUS&T
F.R. Alexander	NSF/OCE
R.B. Elder	NSF/OCE
Dirk Frankenberg	NSF/OCE
M.K. Johrde	NSF/OCE
S.D. Toye	NSF/OCE
R.W. Baier	NSF/OCE
B.T. Malfait	NSF/OCE
D.E. Holt	NSF/OCE
E.M. Davis	NSF/OCE
D.F. Heinrichs	NSF/OCE
R.E. Wall	NSF/OCE
R.S. Carney	NSF/OCE
Keith Kaulum	ONR
R.P. Dinsmore	WHOI
J.D. Donnelly	WHOI
W.M. Marquet	WHOI
T.R. Stetson	UNOLS

HIGHLIGHTS 1978

ALVIN Overhaul - Frame
LULU Overhaul - Improvements
4000M Operating Depth
Mid Atlantic Ridge (AMAR)
ALS Recovery
GLOMAR Hole
24 Dives in 30 Days of November
Navy Recovery
New Bottom Station

1978 SUMMARY

ALVIN spent the first four months of the year in overhaul. During this period the new titanium frame was installed as were several replacement components also fabricated from titanium. The new frame differs from the old by design to increase payload and structural integrity. These differences necessitated the hand fitting of mountings for existing equipment and extensive modification of the fiberglass outer skin.

R/V LULU had an extensive overhaul during this same period. The work was directed toward correcting discrepancies and to improve habitability. That this effort was a step in the right direction is readily agreed by users familiar with the before and after.

The initial voyage of 1978 was to the Bahamas where 5 dives were devoted to test, pilot requalification, and material certification. Dive 801 to a depth of 4007 meters resulted in the Navy granting material certification to a new operating depth of 4000 meters.

Two series of geology dives were conducted en route from the Bahamas to Woods Hole.

Fifteen dives were made in AMAR 78. A failure in the propulsion system during dive 822 necessitated return to Ponta Delgada for repairs. The overall schedule for AMAR was readjusted to minimize the impact of this breakdown.

The transit from the Azores to Bermuda was slowed by unseasonal North Atlantic storms. News stories, as you may recall, reported that even QUEEN ELIZABETH II had a rough westbound transit during this early September period.

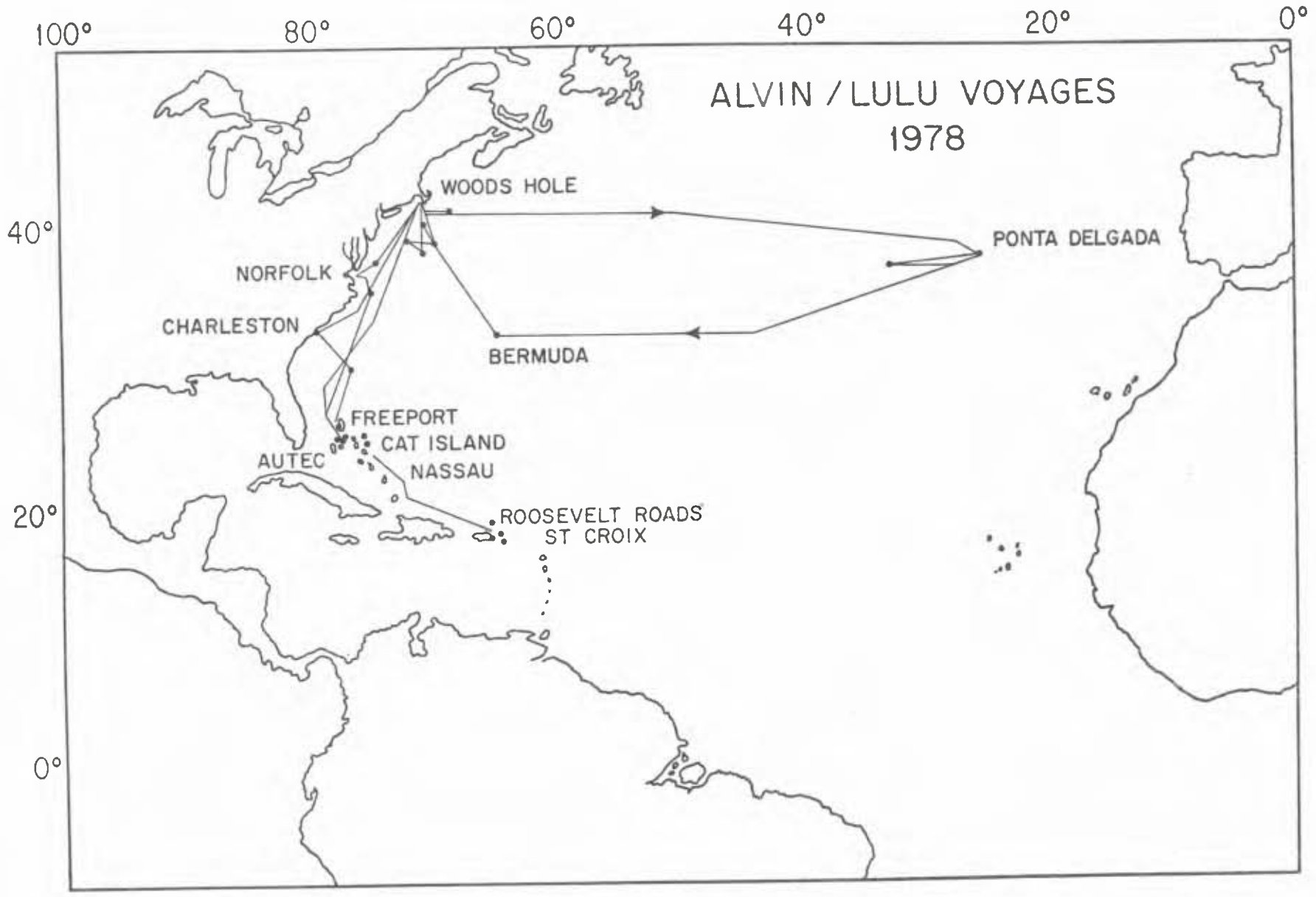
A brief maintenance period in October was to prepare ALVIN and LULU for the initial legs of the deployment away from Woods Hole.

ALVIN made a successful recovery of the Autonomous Listening Station east of Florida. This prototype unit had failed to release on command; therefore recovery was important for the data recorded and to determine the cause of release failure. This dive was conducted as a part of the transit from Woods Hole to the Bahamas.

Twenty-four dives were made during the month of November on four separate cruises in the Bahamas. While revisiting the Deep Ocean Biology Station in the Tongue of the Ocean, initial tests were conducted with a new underwater color TV camera developed for ALVIN by RCA, National Geographic and Benthos. A science party from Lamont-Doherty visited GLOMAR CHALLENGER hole number 98. This was photographed and marked with a five year transponder.

A new deep ocean bottom station was established in December north of St. Croix. Biological samples were placed here for Turner and Grassle. It is expected that this station will be periodically revisited for long term studies. It is marked with a five year transponder. One dive off the west end of St. Croix for the Navy resulted in the recovery of two portable underwater tracking transponders.

ALVIN and LULU were moored at Roosevelt Roads Naval Station for Christmas and New Year vacation period. All but three personnel were brought home for leave.


ALVIN / LULU VOYAGES
1978
100°
80°
60°
40°
20°
0°
40°
20°
0°
WOODS HOLE
PONTA DELGADA
NORFOLK
CHARLESTON
BERMUDA
FREEPORT
CAT ISLAND
AUTEC
NASSAU
ROOSEVELT ROADS
ST CROIX

1978

ALVIN LULU SUMMARY

Days At Home Port (Woods Hole)	155
Days Away From Home Port	210
Port Days Other Than Woods Hole	23
Days At Sea	187
ALVIN Use Days	155
Miles Steamed	15830

DIVES

Certification	4
Test and Training	2
Radwaste Survey (Drum Recovery)	5
Equipment Recovery	2
Biology	20
Geology	48
TOTAL DIVES	81
Aborts Due to ALVIN	2
Cancels Due to Weather	9

USE DAYS

NSF	88
ONR	23
NOAA	35
EPA*	8
Navy (St. Croix Range)*	1
	155

*Separately Funded

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time Dive	Time Surf	Time Sub.	Depth M/Ft.	Remarks
	5/2/78	796	Woods Hole Harbor	Joint Agreement Testing	R. Hollis	G. Ellis	1700	1740	0-40	5'	Post overhaul test
98-2	5/16/78	797	Autec Harbor	Joint Agreement Certification	D. Foster G. Ellis	L. Hills	1130	1156	0-26	15'	
"	5/17/78	798	24-46.7N 77-46.3W	Joint Agreement Certification	D. Foster	A. Shapiro D. Lester	1030	1251	2-21	895m	
"	5/18/78	799	24-53.8N 77-40.25W	Joint Agreement Certification	R. Hollis D. Foster	G. Ellis	1540	1857	3-17	1996m	
"	5/21/78	800	24-53.2N 77-40.25W	Joint Agreement Certification	L. Shumaker D. Foster	G. Ellis	1521	1033	4-48	2033m	
"	5/22/78	801	25-30.5N 77-05.5W	Joint Agreement Certification	D. Foster L. Shumaker	D. Johnson	0909	1459	5-50	4007m	
98-4	5/29/78	802	35-03.2N 75-01.6W	Joint Agreement Geology	R. Hollis	P. Rona D. Stanley	0918	1915	9-57	2334m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time Dive	Time Surf	Time Sub.	Depth M/Ft.	Remarks
98-4	5/30/78	803	35-02.3N 74-59W	Joint Agreement Geology	D. Foster	P. Rona D. McGrail	1333	1937	6-04	2443m	
"	5/31/78	804	35-05.9N 75-01W	Joint Agreement Geology	R. Hollis	D. Stanley D. McGrail	0932	1730	7-58	1297m	
"	6/1/78	805	34-58N 75-12.5W	Joint Agreement Geology	D. Foster	P. Rona D. Stanley	0915	1502	5-57	915m	
"	6/2/78	806	34-30.5N 74-38.5W	Joint Agreement Geology	R. Hollis	P. Rona D. McGrail	0925	1902	9-37	3573m	
98-5	6/7/78	807	37-06.5N 74-27.2W	Joint Agreement Geology	D. Foster	A. Malahoff R. Embley	0912	1636	7-24	1337m	
"	6/10/78	808	37-02.1N 74-33W	Joint Agreement Geology	R. Hollis	A. Malahoff D. Fornari	0923	1715	7-52	1237m	
"	6/11/78	809	37-02.2N 74-27.2W	Joint Agreement Geology	D. Foster	R. Embley D. Fornari	0915	1702	7-47	1574m	
"	6/12/78	810	37-01.2N 74-07.5W	Joint Agreement Geology	R. Hollis	A. Malahoff R. Embley	0851	1730	8-39	2330m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
98	6/13/78	811	37-22.5N 74-25W	Joint Agreement Geology	D. Foster	A. Malahoff D. Fornari	1429	1840	4-11	1041m	
99	6/23/78	812	37-50.1N 70-36.3W	EPA Radwaste	R. Hollis	R. Dyer D. Hanselman	1012	1943	9-31	3958m	
"	6/24/78	813	37-50.2N 70-36.3W	EPA Radwaste	D. Foster	R. Dyer D. Hanselman	1040	2021	9-41	3983m	
"	6/25/78	814	37-50.5N 70-35.6W	EPA Radwaste	D. Foster	P. Colombo	0812	1455	6-43	3970m	Drum recovery
"	6/26/78	815	38-25.7N 72-06.2W	EPA Radwaste	R. Hollis	R. Dyer S. Williams	1303	2025	7-22	2816m	
"	6/27/78	816	38-26N 72-05W	EPA Radwaste	D. Foster	R. Dyer S. Williams	1102	1651	5-49	2812m	
"	6/29/78	817	38-19.8N 69-37.0W	Joint Agreement Biology	R. Hollis	H. Jannasch S. Molyneaux	0909	1813	9-04	3635m	DOS 2
100 2	7/30/78	818	36-57.1N 33-24.7W	AMAR 78	L. Shumaker	R. Ballard K. Macdonald	0945	1909	9-24	2650m	
"	7/31/78	819	36-51N 33-29W	AMAR 78	R. Hollis	T. Atwater C. Hopson	1102	1714	6-12	1563	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
100 2	8/1/78	820	36-52.4N 33-22.9W	AMAR 78	D. Foster	K. Macdonald D. Stakes	1024	1713	6-49	2586m	
"	8/2/78	821	36-45.9N 33-16.9W	AMAR 78	R. Hollis	T. Atwater C. Hopson	1016	1757	7-41	2558m	
"	8/3/78	822	36-44.5N 33-20W	AMAR 78	D. Foster	K. Macdonald D. Stakes	0957	1953	9-56	2422m	Propulsion failure
100 3	8/13/78	823	36-49N 32-58W	AMAR 78	R. Hollis	K. Macdonald C. Hopson	0937	1906	9-29	1603m	
"	8/14/78	824	36-45.2N 33-17W	AMAR 78	D. Foster	R. Ballard T. Atwater	0916	1837	9-21	2546m	
"	8/15/78	825	36-36.5N 33-47W	AMAR 78	R. Hollis G. Ellis	B. Luyendyk	0924	1923	9-59	2612m	
"	8/17/78	826	36-28.6N 33-41.1W	AMAR 78	D. Foster	R. Ballard C. Hopson	1207	1851	6-44	2536m	
"	8/18/78	827	36-27N 33-37W	AMAR 78	R. Hollis	K. Macdonald C. Hopson	0936	1932	9-54	2500m	
"	8/19/78	828	36-27N 32-42W	AMAR 78	D. Foster	T. Atwater D. Stakes	0913	1940	10-27	2542m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
"	8/20/78	829	36-25.9N 33-38.5W	AMAR 78	R. Hollis	C. Hopson P. Johnson	0924	1912	9-48	2670m	
"	8/23/78	830	36-44N 33-19.5W	AMAR 78	D. Foster	K. Macdonald K. Crane	1108	1906	7-58	2582m	
"	8/25/78	831	36-26N 33-39.7W	AMAR 78	R. Hollis	T. Atwater C. Hopson	0906	1919	10-13	2667m	
"	8/26/78	832	36-47.9N 33-20.3W	AMAR 78	D. Foster G. Ellis	K. Macdonald	0818	1632	8-14	2650m	
1005	9/17/78	833	38-18.4N 69-35.6W	Joint Agreement Biology	R. Hollis G. Ellis	C. Berg	0839	1845	10-06	3635m	
"	9/18/78	834	39-45.9N 70-41.4W	Joint Agreement Biology	D. Foster	F. Grassle C. Berg	0932	1704	7-32	1906m	
101	9/24/78	835	40-21.1N 68-08.2W	Joint Agreement Biology	R. Hollis	J. Uzmann P. Valentine	1329	1745	4-16	690m	
"	9/25/78	836	40-17.7N 68-07.4W	Joint Agreement Biology	L. Shumaker	J. Uzmann S. Cobb	1331	1801	4-30	1295m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
101	9/26/78	837	40-27.4N 68-08.9W	Joint Agreement Biology	R. Hollis	J. Uzmann S. Cobb	1623	1929	3-06	354m	
"	9/27/78	838	40-11.1N 68-04.7W	Joint Agreement Biology	L. Shumaker	J. Uzmann P. Valentine	1101	1729	6-28	1857m	
"	9/28/78	839	40-25.0N 68-08.5W	Joint Agreement Biology	R. Hollis	J. Uzmann P. Valentine	1106	1717	6-11	516m	
"	9/30/78	840	40-20.8N 68-08.9W	Joint Agreement Biology	L. Shumaker G. Ellis	S. Cobb	0934	1333	3-59	946m	
102	10/28/78	841	29-56.5N 76-35.5W	Joint Agreement Geology	D. Foster	A. Bradley	1040	1424	3-44	1433m	ALS recovery
"	10/31/78	842	26-25N 78-42.3W	Joint Agreement Geology	R. Hollis	C. Neumann H. Mullins	1448	1845	3-57	744m	
"	11/1/78	843	26-23.6N 78-42.3W	Joint Agreement Geology	D. Foster	R. Wilber C. Messing	0958	1558	6-00	892m	
"	11/2/78	844	26-34N 78-11.9W	Joint Agreement Geology	R. Hollis	C. Neumann H. Mullins	1011	1617	6-06	961m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time Dive	Time Surf	Time Sub.	Depth M/Ft.	Remarks
102	11/3/78	845	26-25.7N 77-52.1W	Joint Agreement Geology	D. Foster	R. Wilber C. Messing	0924	0926	02	1m	Aborted with VB problem
"	11/3/78	846	26-25.7N 77-52.1W	Joint Agreement Geology	D. Foster	R. Wilber C. Messing	1119	1808	6-49	785m	
"	11/4/78	847	26-12.6N 78-25.0W	Joint Agreement Geology	R. Hollis G. Ellis	C. Neumann	1128	1827	6-59	1277m	
"	11/5/78	848	25-54.6N 77-59W	Joint Agreement Geology	D. Foster	H. Mullins R. Wilber	0908	1637	7-29	998m	
"	11/9/78	849	24-52.9N 77-40.3W	Joint Agreement Biology	R. Hollis	F. Ingles C. Berg	1101	1917	8-16	2077m	
"	11/10/78	850	24-52.9N 77-40.3W	Joint Agreement Biology	D. Foster	J. Steele F. Grassle	1036	1601	5-25	2059m	
"	11/11/78	851	24-53.2N 77-40.0W	Joint Agreement Biology	R. Hollis	E. Kristof L. Porteous	0956	1603	6-07	2055m	
"	11/12/78	852	24-53.0N 77-40.0W	Joint Agreement Biology	D. Foster	C. Berg A. Giddings	1005	1513	5-08	2050m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time Dive	Time Surf	Time Sub.	Depth M/Ft.	Remarks
102	11/13/78	853	24-52.9N 77-40.3W	Joint Agreement Biology	R. Hollis G. Ellis	F. Grassle	0941	1656	7-15	2050m	
"	11/16/78	854	24-59.8N 77-11.9W	Joint Agreement Geology	D. Foster	N. James P. Crevello	1036	1628	5-52	800m	
"	11/17/78	855	23-58.6N 77-15.2W	Joint Agreement Geology	R. Hollis	W. Schlager R. Hooke	0921	1716	7-55	1393m	
"	11/18/78	856	24-58.9N 77-34.1W	Joint Agreement Geology	D. Foster	P. Crevello R. Hooke	1031	1758	7-27	1018m	
"	11/19/78	857	24-58.3N 77-37.8W	Joint Agreement Geology	R. Hollis G. Ellis	N. James	1050	1805	7-15	1590m	
"	11/20/78	858	24-55.4N 77-34.7W	Joint Agreement Geology	D. Foster	R. Hooke W. Schlager	0940	1743	8-03	1139m	
"	11/21/78	859	24-55.8N 77-32.9W	Joint Agreement Geology	R. Hollis	W. Schlager N. James	0918	1608	6-50	660m	
"	11/22/78	860	24-43.8N 77-44.6W	Joint Agreement Geology	D. Foster	W. Schlager P. Crevello	0940	1211	2-36	522m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	11/25/78	861	25-22.3N 77-18.6W	Joint Agreement Geology	R. Hollis	B. Hecker R. Lynde	1029	1901	8-32	2803m	GLOMAR CHALLENGER drill site 98
"	11/26/78	862	25-23.8N 76-13.9W	Joint Agreement Geology	D. Foster	D. Chayes M. Cita	0949	1654	7-05	3849m	
"	11/27/78	863	24-41.2N 75-48.9W	Joint Agreement Geology	R. Hollis	R. Lynde F. Jadoul	0949	1635	6-46	2092m	
"	11/28/78	864	24-38.3N 76-14.4W	Joint Agreement Geology	D. Foster G. Ellis	M. Cita	0942	1817	8-35	1248m	
"	11/29/78	865	24-39.1N 76-11.2W	Joint Agreement Geology	R. Hollis	E. Miller F. Jadoul	0935	1408	4-33	700m	
"	11/30/78	866	24-44.1N 75-30.3W	Joint Agreement Geology	D. Foster	W. Ryan M. Cita	1017	1815	7-58	3944m	
"	12/1/78	867	24-44.4N 75-30.4W	Joint Agreement Geology	R. Hollis	E. Miller H. Chezar	0938	1707	7-29	3399m	
"	12/2/78	868	24-43.4N 75-30.2W	Joint Agreement Geology	D. Foster	R. Lynde D. Chayes	0912	1609	6-57	3015m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	12/4/78	869	24-41.6N 76-16.9W	Joint Agreement Geology	R. Hollis G. Ellis	H. Chezar	0914	1519	6-05	1100m	
"	12/13/78	870	17-43.4N 65-55.7W	St. Croix Range Pinger recovery	D. Foster	J. Williams J. Johnston	1040	1551	5-11	865m	Recovered two pingers
"	12/15/78	871	18-53.8N 66-00.3W	Joint Agreement Biology	R. Hollis	F. Grassle R. Turner	0934	1611	6-37	3930m	
"	12/16/78	872	17-57.6N 64-48.6W	Joint Agreement Biology	D. Foster	F. Grassle R. Turner	1257	1815	5-18	3970m	
"	12/17/78	873	17-58.1N 64-49.3W	Joint Agreement Biology	R. Hollis	C. Berg L. Morse-Porteous	0946	1757	8-11	4018m	
"	12/18/78	874	17-57.4N 64-48.3W	Joint Agreement Biology	D. Foster	C. Berg R. Turner	0908	1622	7-14	3995m	
"	12/19/78	875	17-57.5N 64-48.5W	Joint Agreement Biology	R. Hollis G. Ellis	L. Morse-Porteous	1015	1723	7-08	4000m	
"	12/20/78	876	17-57.6N 64-48.5W	Joint Agreement Biology	D. Foster	F. Grassle R. Turner	0959	1713	7-14	3998m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	1/18/79	877	00-35.6N 86-06.31W	Joint Agreement Biology	R. Hollis	F. Grassle H. Sanders	1238	1739	5-01	2725m	
"	1/19/79	878	00-47.92N 86-13.5W	Joint Agreement Biology	D. Foster	J. Childress D. Karl	1103	1657	5-54	2478m	
"	1/20/79	879	00-48.18N 86-04.1W	Joint Agreement Biology	G. Ellis	R. Ballard H. Jannasch	1014	1855	8-41	2495m	
"	1/21/79	880	00-47.6N 86-06.4W	Joint Agreement Biology	R. Hollis	R. Hessler S. Williams	1011	1829	8-18	2493m	
"	1/22/79	881	00-47.33N 86-03.45W	Joint Agreement Biology	D. Foster	F. Grassle A. Giddings	1109	1341	2-32	1675m	oil warning light came on dive aborted
"	1/23/79	882	00-48.3N 86-06W	Joint Agreement Biology	G. Ellis	R. Turner K. Smith	1108	1932	8-24	2491m	
"	1/24/79	883	00-47.0N 86-08W	Joint Agreement Biology	R. Hollis	R. Hessler H. Sanders	0955	1936	9-41	2493m	
"	1/25/79	884	00-48.1N 86-07W	Joint Agreement Biology	D. Foster	F. Grassle A. Giddings	0946	1802	8-16	2482m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	1/26/79	885	00-48.9N 86-08.1W	Joint Agreement Biology	G. Ellis	K. Smith R. Hessler	1018	1922	9-04	2489m	
"	2/11/79	886	00-48.3N 86-08.8W	Joint Agreement Biology	D. Foster	F. Grassle A. Giddings	1036	1309	2-33	2100m	Abort due to hyd. leak
"	2/12/79	887	00-48.5N 86-09.1W	Joint Agreement Biology	D. Foster	F. Grassle A. Giddings	1050	1955	9-05	2488m	
"	2/13/79	888	00-47.1N 86-08.5W	NGS Photography	R. Hollis	R. Ballard A. Giddings	1200	2003	8-03	2483m	
"	2/14/79	889	00-48.7N 86-12.7W	Joint Agreement Geology	G. Ellis	J. van Andel R. Holcomb	0950	1921	8-31	2458m	
"	2/15/79	890	00-48.9N 86-13.3W	Joint Agreement Geology	D. Foster	E. Kristof K. Crane	0906	1633	7-27	2447m	
"	2/16/79	891	00-48.3N 86-13.4W	Joint Agreement Biology	R. Hollis	R. Hessler K. Crane	1057	1751	6-54	2488m	
"	2/17/79	892	00-48.3N 86-13.8W	NGS Photography	R. Hollis	R. Ballard A. Giddings	1058	1850	7-52	2454m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	2/18/79	893	00-46.8N 86-01.9W	Joint Agreement Geology	G. Ellis	R. Ballard R. Holcomb	0938	2008	10-30	2578m	
"	2/19/79	894	00-48.2N 86-14.9W	NGS Photography	D. Foster	E. Kristof A. Giddings	0937	2007	10-30	2457m	
"	2/20/79	895	00-47.9N 86-09.3W	Joint Agreement Biology	G. Ellis	F. Grassle R. Holcomb	1005	2014	10-09	2482m	
"	2/21/79	896	00-48.2N 86-13.6W	NGS Photography	J. Donnelly D. Foster	A. Giddings	0926	1727	8-01	2460m	Donnelly Certification Dive
"	3/7/79	897	00-47.9N 86-08.8W	Joint Agreement Geochemistry	R. Hollis	J. Edmond C. Measures	1447	1930	4-43	2486m	
"	3/8/79	898	00-47.8N 86-09.2W	Joint Agreement Geochemistry	G. Ellis	J. Edmond L. Gordon	1212	1941	7-29	2490m	
"	3/9/79	899	00-48.3N 86-13.9W	Joint Agreement Geochemistry	D. Foster	C. Measures J. Corliss	0853	1912	10-19	2452m	
"	3/10/79	900	00-48.0N 86-13.6W	Joint Agreement Geochemistry	R. Hollis	J. Edmond R. McDuff	0918	1730	8-12	2458m	

LULU Cr. No.	Date	Dive No.	Location	Sponsor/ Purpose	PIC/CP	Obs.	Time			Depth M/Ft.	Remarks
							Dive	Surf	Sub.		
102	3/11/79	901	00-47.7N 86-01.4W	Joint Agreement Geochemistry	G. Ellis	C. Measures L. Gordon	0845	1858	10-13	2518m	
"	3/12/79	902	00-47.5N 86-09.4W	Joint Agreement Geochemistry	D. Foster	J. Edmond S. Huested	0917	1724	8-07	2481m	
"	3/13/79	903	00-48.5N 86-13.9W	Joint Agreement Geochemistry	R. Hollis	J. Edmond B. Grant	1035	1735	7-00	2458m	
"	3/14/79	904	00-47.6N 86-08.5W	Joint Agreement Geochemistry	G. Ellis	C. Measures J. Corliss	0852	1914	10-22	2485m	
"	3/15/79	905	00-47.8N 86-12.4W	Joint Agreement Geochemistry	D. Foster	J. Edmond J. Corliss	0848	1645	7-57	2453m	

HIGHLIGHTS 1979

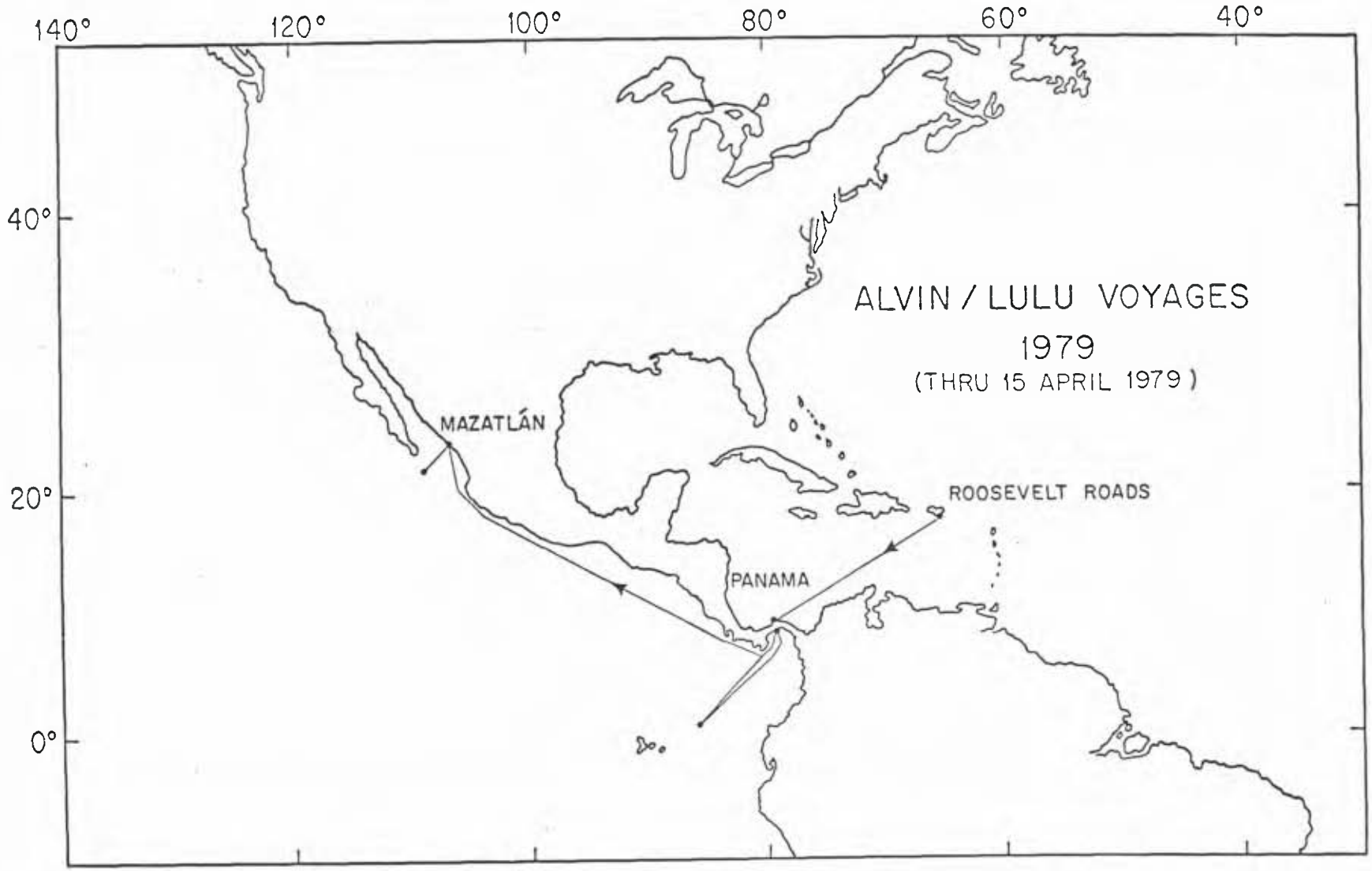
Galapagos Rift Expeditions
CCD Color Video
Hydraulic Arm
East Pacific Rise

1979 SUMMARY

Three expeditions to the Galapagos Rift Zone resulted in significant accomplishments. The new hydraulic manipulator was used to maneuver either the color video or still stereo cameras. Many samples of crabs, mussels, and tube worms were collected for laboratory study. In situ instruments and experiments were placed and recovered in the thermal springs.

Adjustments to the schedule were required to accommodate longer transit times to and from Panama instead of Manta, Ecuador. This port change was neccessitated by an inability to arrive at satisfactory terms of diplomatic clearance with Ecuador.

At this time, the first expedition to the East Pacific Rise is underway. Many large active vent areas have been located by the ANGUS system. Successful dives have been made with the VSA gravimeter and with the sound source for OBS studies. We expect some biological samples will be recovered for shore study.


140°
120°
100°
80°
60°
40°
40°
20°
0°
ALVIN / LULU VOYAGES
1979
(THRU 15 APRIL 1979)
MAZATLÁN
ROOSEVELT ROADS
PANAMA

1979

ALVIN LULU SUMMARY
(to 11 April 1979)

Days Away From Home Port	100
Port Days	19
Days at Sea	81
ALVIN Use Days	58

	DIVES
Biology	13
Geology	3
Geochemistry	9
Other (NGS)	4
TOTAL	29

1979
PROJECTION
USE DAYS (Provisional)

	NSF	ONR	NOAA	OTHER	
To 11 April 79	20	33	0	5	NGS
Future	85	1	19	10	USGS
				12	USGS/EPA
	105	34	19	27	

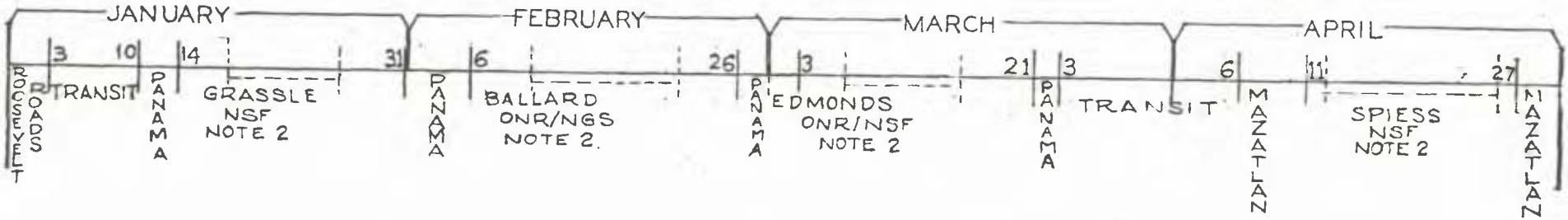
Sub Total
(NSF, ONR, NOAA) 158

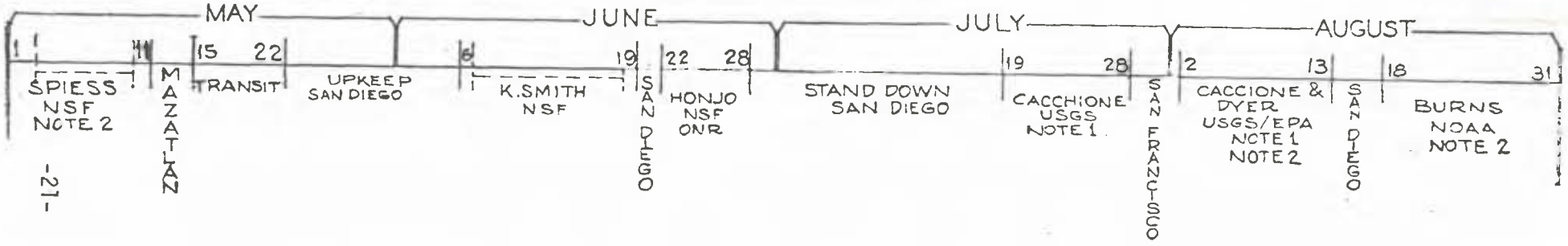
Grand Total
(above plus OTHER) 185

14 APR 79

~~1 DEC 1978~~
~~5 JAN 1979~~
~~24 JAN 1979~~
~~21 MAR 1979~~

— ALVIN-LULU OPERATIONS – 1979 —





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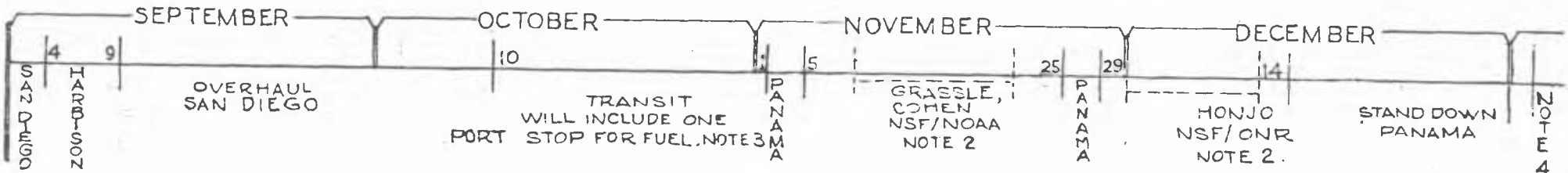


NOTES:

1. FUNDED INDEPENDENT OF JOINT AGREEMENT. 2. ESCORT REQUIRED. 3. PORT AS YET UNDETERMINED.
4. AN 18 DAY LEG FOR NOAA, DR. MALAHOFF, WILL BE SCHEDULED IN PANAMA BASIN DURING JANUARY 1980.
5. SPACE BETWEEN DOTTED LINES IS TIME ON STATION.

App. III, cont'd.

ALVIN Cruise Duration Definitions

	Port Days
1 day - one day cruises are not recommended	-
8-10 days - normal cruise	3
11-14 days - extended cruises	4
15-18 days - very long cruises	5
19-26 days - exceptional cruises	6

NOTE: Cruises will normally be limited to 8-10 days on station

Requirements for Exceptional Cruises:

a) A suitable escort is required.

b) The escort shall tow LULU during the transits.

c) During the transits the escort shall provide berthing for nine (9) of the 27 man LULU complement.

d) The escort shall be prepared to send fuel and water to LULU.

e) The cruise shall be planned for no more than 12 days on station.

f) The funders and scientists shall be warned that a major breakdown requiring a return to port early in the diving program is a possibility.

g) The science funding shall bear the costs of installing the special LULU support outfitting of the escort. (Installation only of towing bitts and resupply equipment).

h) The escort may be required to carry certain ALVIN/LULU supplies including ALVIN steel.

i) Shipping of the towing equipment, if required, shall be considered a science expense.

24 April 1979

INTERIM PROCEDURES FOR CURATION AND DISPOSITION OF SAMPLES COLLECTED FROM ALVIN

The UNOLS ALVIN Review Committee

23 April 1979

There are several unique and fundamental characteristics of scientific deep submersible operations which dictate special concern over the management of diving programs.

These include:

1. The limited duration and high cost of time actually spent on the bottom.
2. The unique nature of actual in situ observations and measurements, and the invaluable capability of documenting in great detail the environment from which samples are collected.
3. The limited ability of the personnel in the submersible, and in fact, those taking part in any given expedition, to fully comprehend the significance of and fully utilize the observations made and the samples collected. A diverse set of processes -- including

biological, geological, chemical -- create the environment into which the submarine dives, and thus the data and samples collected by ALVIN are potentially useful to a diverse set of scientists.

These considerations lead the ALVIN Review Committee to establish the following regulations concerning the collection, curation and disposition of samples:

1. Sample Collection

   The chief scientist has ultimate responsibility for the sampling program. All sample collection shall be done under the direction of the scientists in the sphere. In practice the actual sample collection is carried out by the pilot, whose skill is ultimately responsible for the success of sampling operations, and who has responsibility to determine that the sampling operations do not compromise the safety of the submarine.

2. Sample Curation

   All samples returned to the surface by ALVIN, without exception, and regardless of whether collected intentionally, incidentally or accidently, shall be curated on board the ship. This curation assures access to information about the samples to

the scientific community, and that important samples not relevant to the immediate goals of the expedition are not lost. Such curation shall include the following:

a. Labeling of the sample with a unique number, which shall include the ALVIN dive number.

b. Preservation of biological samples according to standard procedures available from the ALVIN Group.

c. Recording the following:

    1. Sample number (including dive number)
    2. Geographic position of sampling site with the best precision available
    3. Time of sampling
    4. Depth of sampling site
    5. Brief sample description
    6. Disposition of sample, that is, the name and address of the individual who assumes responsibility for the sample when it leaves LULU or the escort vessel on arrival in port.

A copy of these curation records will be promptly supplied to the operating institution (WHOI) as part of the cruise report, and copies will be provided to interested scientists on request.

3. Sample Disposition

The funded principle investigators of a project are ultimately responsible for disposition of all samples. The disposition of all samples must be in accord with the requirements of the funding agencies.

a. Geological samples

Within one year after the end of the cruise, all geological samples shall be stored in a recognized marine geological sample repository funded for such purposes by NSF (for example WHOI, L-DGO, SIO, Oregon State, University of Washington, Hawaii, USC or others as may be established). The distribution of such samples to scientists not participating in the expedition shall be governed by the written policy of the repository, or, in the absence of such a policy, shall be guided by the policy of the WHOI Core Lab (as outlined in WHOI Institution Memorandum #3-75).

b. Biological samples

These samples shall be stored under the direction of the principal investigators or those to whom they delegate this responsibility, and the

distribution of these samples to scientists not participating in the expedition shall be under their direction.

When analyses of biological specimens are complete or within three years, the specimens will be offered to a recognized repository, such as the National Museum of Natural History, Smithsonian Institution.

c. Water samples

These samples shall be stored under the direction of the principal investigators or those to whom they delegate the responsibility, and the distribution of these samples to scientists not participating in the expedition shall be under their direction.

4. Distribution of Incidental or Accidental Samples

These are samples collected by ALVIN which do not fall within the scope of research for which the principal investigators are funded. The chief scientist is responsible for their disposition. Biological samples will be offered directly to the N.M.N.H. Geological samples will be sent directly to the core repository at Woods Hole Oceanographic Institution.

INVESTIGATOR	ASSOCIATES	AREA	PURPOSE	SPONSOR	DATE	ALTERNATE	ESCORT*	DIVES (requested)	COMMITTEE ACTION
1980									
1. BENNETT, R. NOAA/AOML	Lambert, D. Stanley, D. Nelson, T. Merrill, G.	N.E. of Wilmington Canyon	In Situ Geotechnical Studies	NOAA-2	June-July '80	May-June '80	Unknown	10	#
2. BRYAN, W.B. W.H.O.I.	Dick, H. Mottl, M. Delaney, J. Thompson, G.	Kane F.Z.	Crustal Studies	NSF-1	July	May-Aug.	KNORR	12	#
3. BUTLER, J. Harvard		Bermuda	Pet. in Seds.	NSF-1	Open	(No proposal received, information by tel. 3/79)			no action
4. COOPER, R.A. NOAA/NEFC	Valentine, P. Schlee, J.	Oc. Canyon	Biol & Geol Invest.	NOAA-2	Aug. 10-21	Sept.1-11		8	#
5. DILLON, W.P. U.S.G.S. Woods Hole	Paull, C.K. Valentine, P. Shinn, E. Ball, M.	Blake Escarpment	Reef Studies	DOE-1	May '80	June '80	EASTWARD	10	#
6. EMBLEY, R.W. NOAA/NOS	Malahoff, A. Ryan, W.	N.W. Africa	Sediment Slide Scar	NOAA-3	Aug. '80	Sept. '80		5	%
7. FOX, P. SUNY, Albany and BONATTI, E. L-DGO	DeLong, J. Dewey, W. Crane, K. Karson, J. Needham, D.	Oceanographer TF	Transform Fault Studies	ONR-2	Summer '80	Summer '81	Yes	12	#
8. GEORGE, R.Y. UNC		East of N.C. Oc. Sta.	Deep Sea Biology			(He is in Antarctic thru April '79, interest expressed 3/78)			no action
9. GRASSLE, J.F. W.H.O.I.	Turner, R.	St. Croix & DOS #2 & TOTO	Deep Sea Ecology	NSF-3 (OCE-78-19820)	Not Dec. Jul.-Aug. Not Dec.		No	5 4 2	#

Sponsor Code:

1. Proposal will be submitted
2. Proposal submitted
3. Funded

* This column indicates escort indicated or preferred by P.I.

#Tentatively allocated time

%Not recommended to be scheduled

INVESTIGATOR	ASSOCIATES	AREA	PURPOSE	SPONSOR	DATE	ALTERNATE	ESCORT*	DIVES (requested)	COMMITTEE ACTION
1980 (Continued)									
10. FRANCIS, C. Malone-Gill Prod.	Ballard, R. Gill, M. Plumb, J. Greenhill, B. Kemp, P.	Bahamas	Public Education	Private-3	Nov.'80			2	turned down
11. HECKER, B. L-DGO	Ryan, W.	N.W. Africa	Benthic Recolonization	NSF-3	June '80	Sept. '80	Yes	3	%
11a. HECKER, B.		DSDP Site 98		NSF-3	Fall '80			5	#
12. HONJO, S. SPENCER, D. W.H.O.I.	Grassle, J.F. Farrington, J. Takahashi, T. et al	Panama Basin	LEBBLE I	DOE-2 NSF-2	Early'80		Yes	20	postponed
13. HEIRTZLER, J.R. W.H.O.I.	Aubrey, D. O'Connell, S. Grassle, J.F.	N.E. Seamounts (Michael)	Geol.& Biol.	NSF-1	May-Jun '80		KNORR	8	%
14. JANNASCH, H.W. W.H.O.I.	Wirsen, C. Molyneaux, S.	V.I. Sta. 1 and DOS #2	Microbial Transformations	NSF-1 (OCE-77-19766)	Winter, spring, fall Summer '80			2 2	#
15. MALAHOFF, A. NOAA/NOS	Fornari, D. Embley, R. Perry, R.	Shelf off Carolinas	Submarine Landslides	NOAA-3	Spr-Summer '80		Yes (NOS)	10	%
16. NEUMANN, A.C. UNC	Scoffin, T.P. Hine, S.C. Lans, J.	N.E. Strait of Florida	Carbonate Margins	NSF-1 (OCE-77-24639)	Spring '80	Fall '80		8	%
17. RONA, P.A. NOAA/AOML	Ballard, R. Crane, K. Edmond, J. Thompson, G. et al	Mid-Atlantic Ridge	Hydrothermal Processes	NOAA-3	June '80	July '80	Yes (NOS)	12	%
18. RYAN, W.B.F. L-DGO	Jadoul, F. Miller, E. Wissmann, G. Nelson, D.	Mazagan Escarp. & Cape Bojador Canyons	Passive Margin Stratigraphy	NSF-1	Spring-Summer '80	Fall '80	VEMA/ BANNOCK	12	%

Sponsor Code:

1. Proposal will be submitted
2. Proposal submitted
3. Funded

Tentatively allocated time

% Not recommended to be scheduled

* This column indicates escort indicated or preferred by P.I.

INVESTIGATOR	ASSOCIATES	AREA	PURPOSE	SPONSOR	DATE	ALTERNATE	ESCORT*	DIVES (requested)	COMMITTEE ACTION
1980 (Continued)									
19. SCHLEE, J. U.S.G.S. Woods Hole	Valentine, P. Aaron, J. + One	E. George's Bank	Sub. Canyon Geology	U.S.G.S-2	Jul.-Aug. '80	Aug.-Sept. '80		9	%
20. SCHLAGER, W. U. of Miami	Hooke, R. James, N. Shinn, E.	N.E. Prov. Channel & San Salvador L.I.	Bahama Carbonate Platforms	NSF-1	Apr.-Oct. '80	Jan.-Mar. '80	CALANUS	13	%
21. TURNER, R. Harvard	Grassle, J.F. Jannasch, H. Wirsen, C. Berg, C.	DOS 1 & 2 TOTO St. Croix LEBBLE I (Panama Basin)	Role of Wood in Marine Biology	ONR-3	Follow Grassle			4 2 5 2	#
22. WILLIAMS, S.L. Knolls Atomic Power Lab.	One Technician	DOS #2	Deep Ocean Corrosion	DOE-3	Open		No	3	Possible, but not scheduled
1981									
23. BONATTI, E. L-DGO	Fox, P. Bryan, W.	Vema F.Z. & Romanche F.Z.	Crustal Studies in Eq. Atl. F.Z.		'81				No commitment
24. HEY, R. HIG		Galapagos	Propagating Rift Studies	NSF-1 or ONR-1	Open '81	Open '82	Yes		No commitment
25. HONJO, S. SPENCER, D. W.H.O.I.	Grassle, J.F. Farrington, J. Takahashi, T. et al	Panama Basin	LEBBLE II	DOE-2 NSF-2	Early '81 (1 yr. after '80 dives)		Yes	20	No commitment
26. SMITH, K. SIO	Childress, J. Harbison, G. Hessler, R. Yayanos, A. et al	San Diego Trough & Patton Escarpment	Biology of Benthic Boundary Layer	NSF-3 (OCE-78-08640)	April '81	March '81		20	No commitment

Sponsor Code:

1. Proposal will be submitted
2. Proposal submitted
3. Funded

#Tentatively allocated time

%Not recommended to be scheduled

*This column indicates escort indicated or preferred by P.I.

INVESTIGATOR	ASSOCIATES	AREA	PURPOSE	SPONSOR	DATE	ALTERNATE	ESCORT*	DIVES (requested)	COMMITTEE ACTION
1979									
CHILDRESS, J. UCSB	Robison, B. Cox, J. Smith, K. Alldredge, A.	San Clemente Basin	Near-bottom Animals	NSF-3	'79 Except Sept.	1981		~10	#
EDMOND, J. M.I.T.	Corliss, J. Lupton, J.	EPR 21°N	Hot Spring	NSF-2	Oct. 79			5	#
FOX, J. SUNY, Albany	Crane, K. Macdonald, K. et al	Tamayo Transform	Structure, Petrology	NSF-2	Fall '79		N. HORIZON	12	#
GRASSLE, J.F. WHOI	et al	Panama Basin	Deep Sea Ecology	NSF-3	Open			8-10	%
LOWRIE, A. Naval Oc. Office	Roquebert, J. Cockerham, R.	Panama F.Z.	Tectonic Study	Naval Oc. Office	1979	1981	Panamanian tug?	8	%
MALAHOFF, A.A. NOAA/NOS	Fornari, D. et al	Panama Basin	Micromorphology	NOAA-1				25	#
TAKAHASHI, T. L-DGO		Open	Test Spreader	ONR-3	Early 80			2	#
1980									
ZIEMAN, J./OGDEN, J. W. Indies Lab/F-D Univ.		Off St. Croix	Seagrass Decay	NSF-1	Winter 80	Any		4, plus 2 6-12 mo. later	%
BALLARD, R. WHOI	Turner, R. Grassle, F. Gill, M.	TOTO	Photo/television experiments	ONR-1	Nov. 80	Oct-Dec 80	No	6	#
1981									
ANDERSON, R.N. L-DGO	Edmond, J. Craig, H. Ballard, R. Lonsdale, P. Corliss, J. Hussong, D.	Mariana Trough	Geothermal Fluids	NSF-2 (CORES)	1981	1982		12	No commitment
HESSLER, R. SIO	Unnamed	Off California	Benthic Communities	NSF-1	Summer 81	Fall 81		10	No commitment

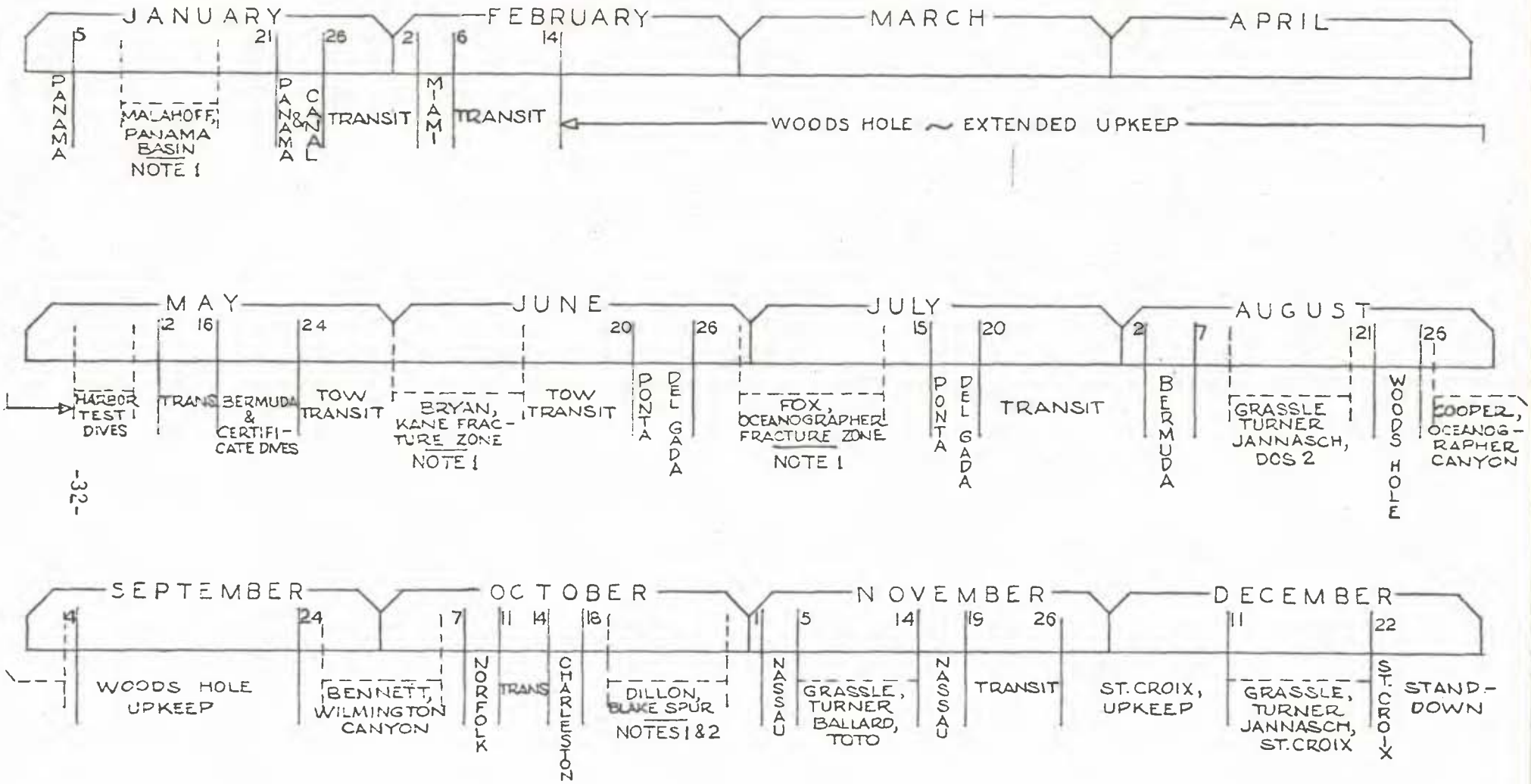
Sponsor Code:

1. Proposal will be submitted
2. Proposal submitted
3. Funded

Tentatively allocated time

% Not recommended to be scheduled

* This column indicates escort indicated or preferred by P.I.



NOTES=

1. ESCORT REQUIRED.
2. FUNDED INDEPENDENT OF JOINT AGREEMENT.
3. SPACE BETWEEN DASHED LINES IS TIME ON STATION.

TENTATIVE RECOMMENDED 1980 SCHEDULE - ALVIN/LULU

26 May 1979