

APPENDIX XIII

New Equipment Used, Tried or Evaluated ALVIN - 1995

- ABE
- Rock Drill
- NAVOCEANO Gravimeter
- Pan/Tilt Mechanism
- HBOI 10mw micro lasers
- DSP&L Thallium Iodide light for HMI ballast
- TriTech sonar
- Imagenex sonar
- New Moog motor controllers
- Cameras
 - DSP&L small 1-chip color
 - DSP&L small ICCD
 - WHOI HiDef B/W
 - WHOI Macro
 - Benthos/Kodak ESC

Battery Power

- Bottom time comparisons
- ALVIN bottom time
- Bottom time variables
- Improvement efforts

A [figure](#) that shows the Cruise Averages of Bottom Time is available from the UNOLS Office.

Comparison of On-Bottom Times for Different Deep Diving Submersibles

ALVIN	(1500 dive average 1985-1995) (dives >1500 m, >2 hr)	4 hr 47 min
NAUTILE	(200 dive average 1994)	4 hr 8 min
CYANA	(200 dive average 1994)	5 hr
SHINKAI-2000	(at 2000m 1994)	4 hr
SHINKAI-6500	(at 6000m 1994)	4 hr
	(at 6500m 1994)	3 hr 30 min
	(at 3000m 1994)	5 hr

Comparison of Battery Characteristics & Cost Factors for Deep-Diving Submersibles

SPEC	ALVIN	NAUTILE	SHINKAI 6500
Type	Pb acid	Pb acid	AgZn
Capacity	37.4 kwh (80%)	38.4 kwh (80%)	86.4 kwh (80%?)
Cost/set	\$7,800	\$42,000	\$2,630,000
Dives/set	200	200	75
\$/dive	\$39	\$210	\$35,000
\$/kwh	\$208	\$1,141	\$30,440
Maint. Int.	60 dives	50 dives	30 dives

Variables Affecting Alvin Power and Bottom-Time

Long-Term Variables

1. Power Characteristics of Battery Type
2. Charging Equipment and Procedures
3. Changing Configuration and Number of Power Consumptive Operational Equipment and Science Equipment

Short-Term Variables

1. Science Mission Objectives
2. Lead-Observer Experience and Organization of Science Tasks
3. Piloting Style (e.g. throttle usage, trim control, mission planning, manipulator skill, fatigue,
4. Dive Depth
5. Type of Terrain
6. Lights (observation and video photography)
7. Sampling/Hydraulics Demand
8. Battery Condition
9. Service - Maintenance Procedures

Improvement Efforts

- Continue Monitoring Battery Market
- Continue to Optimize Charge Cycle
- Continue to Optimize Battery Maintenance
- Continue Pilot Efficiency Training
- Continue Electronic Monitoring Development

Increased payload possibilities

- New motor controllers
- Reduce battery weight
- Variable ballast monitoring

Imaging Proposal Status

Complete:

- Macintosh computer monitor, laser printer
- Long baseline nav upgrade investigation
- EXACT system evaluation on ALVIN
- Additional shipboard recorders, monitors, editing station
- New HMI, quartz iodide lights
- Scaling lasers
- Spare relay can electronics

Pending:

- Additional 1-chip color camera
- 3-chip color camera
- Pan/tilt mechanism - selected, order Dec 95

Motor Controllers

- Housings complete
- Testing new endcaps and connectors