

# APPENDIX VII

## U.S. Deep Submergence Community Request for ALVIN Upgrades

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Priority Rank: 1 = highest

Rank	System	Proposed Action	Cost Estimate	Comments
1	VB/ Hydraulics	Purchase new VB pump.	2@ \$10K	Replace one-of-a-kind pump. Failure of existing pump could result in lost dives.
1	Power	Upgrade battery system to increase bottom time.	?	Alvin engineers are continuing to research battery options. A new vendor of lead-acid batteries with advertised greater capacity has been identified and several cells are being tested at WHOI. Alvin Group is preparing a detailed assessment of power management and potential modifications for DESSC.
1	Power	Continue training sessions on power management during dives. Provide scientists with a shipboard orientation session on power consumption by various Alvin systems and suggestions on how to optimize bottom time.	NC.	Initiate and continue efforts to maximize science time.
1	Navigation	Replace existing gyro	2@ \$30K ea.	Purchase ring-laser gyro. This would replace the existing gyro, saving space and power. Cost includes interface development.
1.5	Payload	Increase the general payload.		Alvin Group is working toward this with modifications in Motor Controller Cans (miniaturization of electronics to eliminate one or more cans) and improvements of VB system monitoring. Additional syntactic foam can be added.
1.5	Systems Integration	Make sure Alvin upgrades are integrated as a whole		Insure power/data management will support new systems that will result in an integrated, user-friendly platform

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Rank	System	Proposed Action	Cost Estimate	Comments
2	Imaging	Add overlay displays of time, depth, alt, hdg, dive number, date, etc. to all camera feeds.		Part of complete datalogger/video display upgrade issue.
2		Place camera(s) on pan and tilt mechanisms with controls (including zoom, focus, iris) conveniently placed for operation by scientists.	paid for	A prototype pan and tilt has been funded for Alvin and is currently under development/evaluation. Consider adding position sensors and scaling device.
2		Replace b&w video monitors in-hull with color monitors for observer viewing.		This is related to navigation upgrades and improvements to video switching capabilities. Cable upgrade required? Possible use of LCD displays.
2	Navigation	Use an in-hull nav program that uses travel times from all available transponders to calculate a position.		Navigation upgrade with WINFROG will accommodate this.
2		Replace in-hull navigation receiver with an off-the-shelf item.	4@\$5,000 ea.	More reliable, improved capabilities.
2		Provide in-hull graphic display with bathymetry (and side-scan) and target overlays with tracking that differentiates current, recent, and old fixes.		Phase 2 of Navigation Upgrade. Potentially part of WINFROG capability.
2		Provide as standard a re-crunch of the transponder net and navigation data based on in-hull travel times.		WINFROG will accommodate this.
2		Implement standard inductively-coupled modem transceiver unit on Alvin with published design so anyone can build equipment that can communicate to laptops inside without needing through-hull connections.		Still in development/conceptual evaluation stage. This approach is being taken in development of a remote temperature sensor for Ti water samplers.
2	Sonar	Replace CTFM.	2@125K ea	Straza digital unit is the only suitable replacement with equivalent capability. Important to have distance capability

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2	Sampling	Purchase a pump to increase usefulness of Alvin CTD and develop a good mounting position on the sub for routine CTD profiling.		Science needs to define "good" mounting positions for quality data by all users. Upgrades include position sensors, pump and data management protocols, moveable sensors
3	Imaging	Add a digital ccd camera to the array of external imaging devices routinely carried on Alvin, with hardware and software for post-processing on board the ship.		Fornari is experimenting with this technology. Perhaps appropriate when resolved.
3		Obtain two pencil cameras (DSPL or equivalent) for view-finding or other monitoring requirements and long cables for mounting in various locations on Alvin.		
3		Ensure internal/external wiring/switching capabilities are adequate for imaging requirements.		Part of complete rework of existing datalogger/display problem.
3	Sampling	Provide push cores with core catchers.	\$200 ea	
3		Improve Paroscientific depth gauge up to spec. This should be just a programming issue. Sample at 4 Hz.		Requires upgrade of datalogging system to sample at 4 Hz.
3		Develop a remote temperature sensor for Ti water samplers.		In progress. To be tested in April 1996.
3		Develop slup-gun for general use		Multiple chamber system (SEALINK)
3		Develop a micro-water sampler (ml volumes rather than liter volumes).	-\$4K ea	