

APPENDIX XI

UCSD95-1442

New Horizon Mid-Life Refit:

NEW HORIZON MID-LIFE REFIT PLAN

Project Goal: Improve *New Horizon's* ability to support scientific operations by taking maximum benefit of the opportunity presented by an extended mid-life refit period through orderly planning and execution of repairs and upgrades which will ensure continued reliable operations and which conform to the UNOLS "Scientific Mission Requirements for an Intermediate General-purpose Oceanographic Research Ship" as closely as possible. Elements of the refit which support this goal are:

Resolution of long-standing stability problems,

Repairs, upgrades, and modifications that improve operation, reliability and maintenance of the ship by correcting design deficiencies, replacing worn out or obsolete equipment and machinery and capitalizing on technical advances since delivery,

Improvements, modifications and installations which will result in improved ability to support scientific operations in both coastal and open ocean areas,

Habitability improvements resulting in a higher quality of life for the science party and crew

Funding: The funding for the planned refit will come from three sources. Normal overhaul projects will be funded from the Major Overhaul Stabilization Account. The University of California' San Diego proposes to share the remaining cost of the refit with the National Science Foundation. The University's percentage of the cost will be the same as the percentage of use for state projects. Historically , in the past 10 year period since 1985, this amounts to 21% of ship's scheduled operations. An estimated cost breakout will be presented later in this proposal.

Timing: *New Horizon* completed her last regular overhaul period in January 1993. Normal interval between dockings is 2-2 1/2 years. A conscious decision was made to extend this interval to ensure that the ship was available for science during 1995 because of a large number of requests for her services. Additionally, predictions from funding agencies for 1996 have consistently indicated a lighter operating schedule for-all ships. As an ABS classed vessel, she must be drydocked and inspected no later than January 1996 to remain in class . Normal maintenance and repair efforts have continued during this extended period, but the ship now needs overhaul. This timing also supports accomplishment of work items scheduled at intervals longer than the normal 2 year cycle such as gearbox overhaul and tail shaft clearance measurements which are now due.

1995's operating schedule for *New Horizon* currently ends on 21 November. We propose to immediately place the ship "out of service, and commence preparing for the shipyard phase of the refit which will commence in December. Upon completion of the shipyard availability, *New Horizon* will return to Nimitz Marine Facility for a second phase which will consist of additional contractor and MARFAC shop work. We plan to complete the refit in approximately five months.

Scope: As evidenced by her ability to successfully complete extensive, complex science schedules each year, *New Horizon* is in excellent material condition with a minimum of deferred maintenance. Engines,

pipinq systems and the ship's structure are fully sound. The long standing stability problem which result in a limit on mission duration have been continually documented. Correction of these problems is the highest priority and in the refit package. Because the work necessary to resolve stability problems is so extensive, it will define the critical path of the refit Another major item is the replacement of the underpowered, retractable bow thruster with a modern tunnel thruster

Improvements in deck systems will be included to take advantage of the full capabilities of the DYNACON traction winch which was installed in 1994 as an .initial phase of the refit.

A common occurrence in shipyard overhauls which can cause significant delays and cost over runs is the discovery of asbestos in a ship after commencement of work. To guard against this possibility, a full hazardous material survey of the ship has been accomplished with UC funds. This survey verified that *New Horizon* is asbestos free

The following four tables detail the work planned during *New Horizon's* mid-life refit. Items funded in previous Shipboard Scientific Support Equipment or Oceanographic Instrumentation Proposals are indicated. The tables cover;

- Projects to ensure continued reliable operations of *New Horizon*
- Projects to provide a modest improvement in science capability for *New Horizon*,
- Projects that will meet future science requirements or are desirable upgrades to *New Horizon*
- Items which constitute a normal overhaul and drydocking for *New Horizon*.

With funding provided as part of the University of California cost share, the Glosten Associates conducted a Feasibility Study of major mid-life refit work items. After review of this study and selection of the applicable items, UC funding was provided for development of detailed work-Item Specifications, General Specifications, Work Item Drawings and a Purchase Specification for Tunnel Thruster, which have been used to develop cost estimates for major elements of the refit. Justification of all work items in the tables is provided in Appendix A. Annex I to Appendix A contains the detailed Work Item Specifications, Work Item Drawings, General Specifications and the Purchase Specification for Tunnel Thruster developed b-y the Glosten Associates for the major structural refit items. Annex II is the Glosten Associates letter describing estimated costs-for various options to resolve the ship's current admeasurement problems. Vendors, quotes and other amplifying information related to overall refit costs are included in Annex III.

NEW HORIZON MID-LIFE REFIT PROJECTS TO ENSURE CONTINUED RELIABLE OPERATIONS

ITEM	DESCRIPTION	MLR	PROVIDED SSSE/01'93 OR EARLIER	PROVIDED SSSE/01 '94
<i>Stability Improvements</i>	Hull Tankage Modifications -			
	Fuel and Ballast Tanks			
	Potable Water			
	Piping Systems	\$452,200		
	Replace Concrete Ballast	\$157,000		
<i>Correct</i>	Deckhouse Modifications	\$82,300		

<i>Admeasurement</i>	Correct Historic Admeasurement Problems	\$30,000		
<i>Piping Systems Modifications</i>	Replace Saltwater Suction Systems			
	Isolate Bilge and Ballast System			
		\$48,000		
<i>Replace Machinery and Equipment</i>	Bow Thruster	\$354,800		
	No. 2 Ship's Service Generator	\$30,000		
	Autopilot	\$33,409		
	Winch Readouts			\$17,819
	Deck Equipment			
	Hydraulic System	\$30,446		
	Main Reefer Units	\$16,000		
	Science Reefer Units	\$7,600		
	Fathometer	\$11,508		
	VHF Transceivers	\$1,047		
	PDR	\$26,500		\$26,600
	Lab Ventilated Workstations			\$10,041
	Portable Fire Pump			\$9,550
	Mission Announcing (Intercom) System	\$30,702		
<i>Install New Machinery and Equipment</i>	Marine Sanitation Device	\$60,000		
	UPS Clean Power			\$8,963
	HAZMAT Locker			\$3,423
	NAVTEX			\$1,302
<i>Machinery Overhauls</i>	Nautilus Crane			\$36,785
	Anchor Windlass	\$9,240		
	Forward Hydraulic W/T Door	\$8,560		
	No. 1 & 2 A/C Units	\$3,000		
<i>Pitch Controls</i>	Replace Improperly Routed Piping and Oversize Actuators	\$49,000		

NEW HORIZON MID-LIFE REFIT PROJECTS TO PROVIDE SCIENCE CAPABILITY UPGRADE

ITEM	DESCRIPTION	MLR	PROVIDED SSSE/01'93 OR EARLIER	PROVIDED SSSE/01'94
	Install Scientific Information System			\$12,500
	Install Science Closed Circuit TV	\$11,750		
	Replace Lab Benches			\$4,678

<i>Lab Upgrades</i>	Modify Overheads & Scientific Cableways	\$8,000		
	Install Dock Tiedowns	\$4,200		
	Scientific Cableway to Upper Lab	\$3,255		
<i>Scientific Storage</i>	Construct Storage Van	\$5,500		
	Complete 01 Level Tiedown Pattern			\$5,204
	Install Tiedowns In Science Freezer	\$800		
<i>Deck Systems</i>	Traction Winch		\$278,424	
	Deck Air System	\$4,860		
	Install Deck Lighting			\$4,987
	Stern Ramp Extension Removal	\$5,000		
<i>Science Accommodations Communications</i>	Install Convertible Stateroom	\$12,300		
	Install GMDSS	\$44,229		

NEW HORIZON MID-LIFE. REFIT PROJECTS TO MEET FUTURE SCIENCE NEEDS / DESIRABLE SHIP UPGRADES

ITEM	DESCRIPTION	MLR	PROVIDED SSSE/01'93 OR EARLIER	PROVIDED SSSE/01'94
<i>Habitability</i>	Upgrade Two Person Science Rooms	\$20,000		
	Replace & Relocate SR Chillers	\$16,560		
	Replace PVC Chiller Piping with Cu	\$10,400		
	Improve SR Furnishings	\$10,000		
	Upgrade SR Entertainment Systems	\$6,090		
	Replace SR & Lounge Carpeting	\$10,000		
	Replace Deteriorated Paneling	\$20,000		
<i>Galley</i>	Clean end Overhaul Exhaust System	\$12,000		
<i>HVAC</i>	Modify A Deck, Port Side Vent System	\$6,000		
	Provide Hot Water to Main Ship's Supply Heat Exchanger	\$8,040		
<i>Water System</i>	Install Hot Water Recirculation System	\$5,700		
<i>Windows</i>	Remove and Restore 02 Level Windows	\$5,700		

NEW HORIZON OVERHAUL ITEMS

DESCRIPTION

COST

General Shipyard Services	\$16,500
Drydock	\$20,000
Sandblast and paint hull and sides	\$40,000
Sandblast and paint ballast tanks	\$70,000
Inspect/service sea valves	\$6,000
Pull, Inspect and repair tail shafts	\$21,000
Pull rudders, replace bearings	\$16,000
Replace zincs as required	\$2,700
Conduct audio gauging of hull	\$3,500
ABS Survey	\$10,000
Service tank vents and check valves	\$3,500
Service bilge, tank, and void foot valves	\$2,500
Gas free bilges for hot work	\$6,000
Empty and gas free fuel tanks	\$15,000
Clean main switchboard	\$2,000
Overhaul main engine	\$120,000
Overhaul main engine gearboxes/propellers	\$115,000
Clean and hydro ships' svc air flasks	\$7,000
Repair stringers in sewage holding tank	\$20,000
Overhaul engine room supply fans	\$2,800
Calibrate switchboard meters	\$3,000
Replace hydraulic hoses and fittings	\$10,000
Repair control panels in aft control station	\$12,000
Provide guards	\$5,200
Total	\$529,700

SUMMARY BUDGET

A. Mid-Life Refit Projects

Stability Improvement	\$609,200
Correct Admeasurement	\$112,300
Piping System Modifications	\$48,000
Replace Machinery and Equipment	\$605,922
Install New Machinery and Equipment	\$73,688
Machinery Overhauls	\$57,585
Pitch Controls	\$49,000
Lab Upgrades	\$44,383
Scientific Storage	\$11,504
Deck Systems	\$293,271
Science Accommodations	\$12,300
GMDSS	\$44,229

Habitability	\$93,050
Galley	\$12,000
HVAC	\$14,040
Water System	\$5,700
Windows	\$5,700
Total Mid-Life Refit Projects	\$2,091,872

B. Tests and Trials Dock/Sea Trials (3 Days)

Dock/Sea Trails	\$30,000
Total Tests and Trials	\$30,000

C. Project Management

Engineering, Design, Technical Services (Note 1)	\$170,000
Owner's Representative	\$16,000
Contract Review Consultant	\$5,000
Total Project Management	\$191,000

D. Out of Homeport Costs (Note 2)

Owner's Representative	\$7,080
Ship's Crew	\$5,963
Marine Facilities Staff	\$15,080
Transit	\$80,000
Total Out of Homeport Costs	\$108,095
Total Mid-Life Refit	\$2,420,967
Funding From Previous SSSE/01 Grants	\$420,176
New Funding Required	\$2,000,791
University of California 21% Share (See Note 1)	\$420,166
TOTAL REQUESTED FROM NSF	\$1,580,625

Note 1: This amount Includes \$139,000 expended through 4/95 for the feasibility study and detailed specifications and drawings by The Glosten Associates funded as part of UC's 21 % cost share of the refit.

Note 2: Required only if refit conducted outside San Diego. This cost will be used as a factor in evaluation of bids. If shipyard is in San Diego, this item will be deleted and the total request to NSF will be reduced accordingly.