

R/V CAPE HATTERAS MIDLIFE REFIT: COST BREAKDOWN OF ITEM SUMMARY

This section will detail, as completely as possible, the costs associated with the Item Summary. As shown, the Item Summary, which includes \$154,244 in crew costs (salaries and fringe benefits), totals \$1,011,428. This does not include architectural services, which add an additional \$150,000 to the total proposal cost, and \$38,561 in Indirect Costs associated with the crew salaries. Total requested funds are \$1,199,989.

SUMMARY OF ITEMS TO BE COMPLETED

ITEM NUMBER	DESCRIPTION OF ITEM	COST
1 Modification	Relocate aft crane from main deck to 01 winch deck	12,500
2 Modification	Configure Engineer's storeroom into 2-person science cabin	25,000
3 Modification	Relocate hydro winch hydraulics to main deck	3,000
4 Renovation	Replace all interior fresh water piping and add recirculating line	35,000
5 Renovation	Replace all interior gray water and vent piping above lower deck	75,000
6 Renovation	Remove and replace all interior Torginol decking	60,000
7 Renovation	Replace existing HVAC/boiler system with new HVAC/heaters	50,000
8 Renovation	Replace all interior HVAC ductwork	55,000
9 Renovation	Remove existing boiler heating system and all associated piping	3,500
10 Renovation	Renovate all science cabins	42,000
11 Renovation	Renovate all crew cabins	49,000
12 Renovation	Renovate Main Lab – replace counters with island arrangement	40,000
13 Renovation	Remove and replace all interior bulkhead paneling	50,000
14 Renovation	Remove and replace all interior overhead paneling	50,000
15 Renovation	Renovate Mess Area – add table and rearrange configuration	30,000
16 Renovation	Replace Galley chiller/freezer units with hermetically-sealed units	30,000
17 Renovation	Renovate Wet Lab	10,000
18 Renovation	Replace existing engine/throttle controls	25,000
19 Renovation	Replace existing helm controls, autopilot, and gyro compasses	55,000
20 Renovation	Replace Pilothouse windshield wipers and clear view windows	10,000
21 Renovation	Renovate Galley	63,428
22 Renovation	Renovate Galley chiller/freezer	50,000
23 Renovation	Replace manual searchlights with remote-controlled units	3,000
24 Renovation	Replace and upgrade ship's intercom system	20,000
25 Renovation	Remove, strip, repaint, and reinstall all interior ladders	10,000
26 Renovation	Strip and repaint all interior painted bulkheads	10,000
27 Renovation	Sandblast and repaint exterior – mast to keel, as necessary	120,000
28 Renovation	Replace magnetic compass and binnacle	5,000
29 Modification	Network all cabins and labs with telecommunication outlets	20,000
	GRAND TOTAL OF ALL ITEMS, #1 - 29:	\$1,011,428

NOTE: ITEMS ARE LISTED IN ORDER OF PRIORITY AND ARE BASED ON NEED TO MAINTAIN THE VESSEL'S SCIENTIFIC CAPABILITY, BOTH DIRECTLY AND INDIRECTLY.

The total cost of the shipyard specification is based on the cost estimates provided by 4 shipyards in the Norfolk, Virginia area. Bids were as follows:

- Lyon Shipyard - \$1,372,200 (did not provide cost estimates on Items 26, 28, 29, 31)
- Collanna's Shipyard - \$1,482,121
- Associated Naval Architects - \$1,831,160
- NORSHIPCO - \$1,970,969

All items listed in the summary are based on the quotes from the Lyon bid; with the exception of items 26, 19, 28, and 23. In some cases, those estimates have been revised down based on a reduction of the work estimated to be performed. Additionally, a number of the items have been removed from the original quote; some of which will be requested in the 2003 Shipboard Scientific Support Equipment Proposal (liferafts, etc.) and some of which have been removed completely (Forepeak tank tied to #1C tank, fuel vent piping, etc.).

The shipyard specifications will include provisions stating the necessity of approval by the shipyard to allow ship's crew to work on board during the refit, provided that the ship's crew does not interfere with the shipyard work or it's schedule. All line items will be bid by the prospective yard as part of the specification, but provision will also be made to delete items by line, so that costs can be cut as necessary, and ship's crew utilized wherever possible to keep overall costs down.

Breakdown of Personnel Costs

PERSON	POSITION	SALARIES/ WAGES	FRINGE BENEFITS	EXPLANATION OF COSTS
Quentin Lewis	Superintendent	\$13,644.14	\$2,919.85	1/3 of NSF funds for salary, 4 months of overhaul period
Mark Smith	Chief Engineer	\$18,511.38	\$3,961.44	4 months overhaul; 6 months in Ship Ops; 2 months from below
John Nelson	Bosun	\$12,518.29	\$2,503.66	4 months overhaul; 6 months in Ship Ops; 2 months from below
Dwight Arrants	Senior Tech	\$15,282.70	\$3,056.54	3 months overhaul; 6 months in Technician's, 3 months comp
Remainder of Ship's crew	9 positions	\$67,641.41	\$14,204.70	2 months full crew (9); 7 months in Ship Ops, 3 months comp
TOTALS		\$127,598	\$26,646	
GRAND TOTAL	\$154,244			

NOTES:

- A) All salaries assumed at straight time only; no overtime
- B) Superintendent salary is cost-shared by Duke University. Position is funded 75% NSF, 25% Duke. Duke will pay 25% for full year.
- C) 9 positions of crew are: Master, Chief Mate, Bosun, Mate/AB, AB, Chief Engineer, Asst. Engineer, Steward, and Cook/Messman
- D) There will be some flexibility necessary in which person/people complete which job(s). The listing of people above is mainly for reference

These salaries are built into the cost of the shipyard estimates of \$1,011,428, as the crew and staff will complete a number of items, such as Items 3, 9, 23, 24, 25, 26, 28, and 29. They will also assist with items 6, 10, 11, 12, 13, 14, 15, 16, 17, 19, and 21 by completing most of the removals in each of these items. They may assist with the remaining items as necessary.

SUMMARY BUDGET FOR NSF BUDGET PAGES

Architectural Services - \$150,000

Explanation of Architectural Services – Tidewater Naval Architects has been selected as the sole source for architectural services, based on their knowledge of the CAPE HATTERAS and its systems, their proximity to Duke Marine Laboratory, and their history with Ship Operations over the past 5 years. They performed a number of jobs for the ship since 1995, including a structural analysis and stability analysis for the new aft crane, the feasibility study for the Midlife Refit, and a stability analysis for the installation of the new forward crane. Cost breakdown for these services is as follows:

Phase I: Feasibility Study	Completed
Phase II: Engineering and Design	\$95,000
Phase III: a. On-site representation during shipyard construction	\$5,000
b. Development of manuals, as-built drawings, and Trim and Stability Documentation update, Inclining Experiment	\$50,000
SUBTOTAL FOR ARCHITECTURAL AND ENGINEERING SERVICES:	\$150,000
CONSTRUCTION COSTS AT YARD AND DOCK, AND CREW LABOR:	\$1,011,428
INDIRECT COSTS ON CREW SALARIES:	\$38,561
 GRAND TOTAL FOR PROPOSAL:	 \$1,199,989

Labor and Materials are broken down in the next table, and include materials, crew labor, shipyard labor, vendor labor, and crew travel.

SUMMARY OF ITEMS TO BE COMPLETED

ITEM NUMBER	MATERIAL COSTS	CREW LABOR	SHIPYARD LABOR	VENDOR LABOR	CREW TRAVEL	TOTAL COST
1 Modification	2,000	500	10,000			12,500
2 Modification	10,000	3,000	4,000	5,000		20,756
3 Modification	500	2,500				3,000
4 Renovation	15,000		20,000			35,000
5 Renovation	25,000		50,000			75,000
6 Renovation	10,000	20,000	25,000		5,000	60,000
7 Renovation	40,000		10,000			50,000
8 Renovation	15,000		40,000			55,000
9 Renovation	200	3,300				3,500
10 Renovation	24,000	6,444		11,556		42,000
11 Renovation	28,000	7,000		14,000		49,000
12 Renovation	30,000	2,000		8,000		40,000
13 Renovation	20,000	10,000		20,000		50,000
14 Renovation	15,000	10,000		25,000		50,000
15 Renovation	15,000	5,000	8,000		2,000	30,000
16 Renovation	20,000	2,000		8,000		30,000
17 Renovation	5,000	5,000				10,000
18 Renovation	15,000	3,000		7,000		25,000
19 Renovation	39,000	8,000		8,000		55,000
20 Renovation	6,000		4,000			10,000
21 Renovation	30,000	10,000	18,428		5,000	63,428
22 Renovation	25,000		25,000			50,000
23 Renovation	2,000	1,000				3,000
24 Renovation	7,000	13,000				20,000
25 Renovation	1,000	9,000				10,000
26 Renovation	2,500	7,500				10,000
27 Renovation	25,000	10,000	75,000		10,000	120,000
28 Renovation	4,000	1,000				5,000
29 Modification	5,000	15,000				20,000
GRAND TOTAL	436,200	154,244	290,428	108,556	22,000	\$1,011,428

BREAKDOWN OF COSTS BY COLUMN

TOTAL MATERIAL COSTS: \$436,200
 TOTAL CREW LABOR COSTS: \$154,244
 TOTAL SHIPYARD LABOR COSTS: \$290,428
 TOTAL VENDOR LABOR COSTS: \$108,556
 TOTAL CREW TRAVEL COSTS: \$22,000
 GRAND TOTAL OF ITEMS #1 - #29: \$1,011,428

R/V CAPE HATTERAS MIDLIFE REFIT: PHASES OF COMPLETION AND WORK TIMELINE

The refit of the R/V CAPE HATTERAS will take place in 3 phases, over An 8 month period, October 1st – May 31st.

PHASE 1 - Design

The first phase will include engineering, design, and shipyard bid specification by the Naval Architect. Simultaneously, it will include work dockside by the crew in removing equipment and starting the removal of material under pertinent line items as indicated in the Cost Breakdown of Item Summary section. During this period, the crew will also perform maintenance on a number of items affected by the refit, while these items are off the vessel. These items are included under the Maintenance and Repair section of the 2002 Ship Operations Budget, and include:

Removal, disassembly, cleaning, blasting, painting, reassembly, and reinstallation of both deck cranes.

Removal, disassembly, cleaning, blasting, painting, reassembly, and reinstallation of the ship's research winches.

Sanding, chipping, and painting of ship's mast and top of pilothouse, including the removal, rebundling, and reinstallation of all antennas and mast wiring.

PHASE 2 – Shipyard Period

Phase 2 will include a continuation by the crew of pertinent removals in order for the shipyard to complete it's part of the refit, including:

Crane relocation

Piping replacement

Steel deck repair in preparation for decking replacement

HVAC system and ductwork replacement

Mess area renovation

Pilothouse windshield wiper replacement

Galley and galley chiller/freezer renovations

Addition of keelcooler for new HVAC system

Exterior blasting and painting

Additionally, the ship's Marine Technicians will install a new ADCP transducer, funded under the 2001 Instrumentation Grant, as well as

replace one of the 12khz transducers, funded under the 1998 Shipboard Scientific Support Equipment Grant.

PHASE 3 – Dockside Period

Phase 3 will include the majority of vendor work involved in completing this project, including:

Renovation of crew and science cabins, including new science cabin
Renovations of both laboratories
Replacement of bridge control equipment
Replacement of all interior bulkhead and overhead material
Completion of all documentation for ABS, including completion of an Inclining Experiment.

NOTE:

One important note to consider is that several of the items now listed as shipyard projects may become vendor projects, depending on the bids received, or possibly vice versa. It is planned to bid as many jobs as possible to local vendors, once the specification has been completed. Consequently, this sequence of events and the following timeline may be altered significantly to take advantage of the best bid on each item.

TIMELINE: Phase 1

(NOTES: 1 - SHIP COMPLETES IT'S CRUISE SCHEDULE OCTOBER 26TH; 2 – TIMELINE ASSUMES APPROVAL AND FUNDING OF PROPOSAL BEGINNING SEPTEMBER 1ST.)

August 1st – September 1st:

Superintendent, staff, and crew complete identification of major components involved in each line item of refit. All potential local vendors contacted with preliminary specifications from this proposal. Superintendent to contact architect with preliminary information in anticipation of start of work.

September 1st – September 30th:

Superintendent and Tidewater Naval Architects (TNA) begin work on engineering, design, and shipyard specification. Final layouts of all spaces to be determined no later than September 6th.

October 1st – October 31st:

Crew to remove cranes and winches. Crew and Technicians will complete maintenance and repair to mast and top of pilothouse, from 2002 Ship Operations grant.

Crew complete refurbishment of both cranes, from 2002 Ship Operations Grant.

Crew and Technicians begin removals in items 2, 3, 6, 9, 10, 11, 12, 13, 14, 15, 17, and 21. Technicians remove all ship's science gear.

Prospective shipyards to be contacted and inspected as necessary by Superintendent.

NOTE: AFTER THIS SCHEDULE WAS ORIGINALLY DEVELOPED, THE SHIP PICKED UP 5 DAYS OF WORK, OCTOBER 21ST – 26TH. WE HAVE WORKED AROUND THIS IN THE REMOVALS.

November 1st – November 15th:

TNA to complete engineering and design work, bid specification to be distributed to shipyards by November 15th. Bid specifications also to be distributed to local vendors at same time. Vessel available for inspection by all bidders; deadline for bids to be received no later than December 15th. Shipyard period planned for January 2nd – February 28th. Dockside period planned for March 1st – May 15th.

Crew to complete removals from items above, and cranes to be completed and reinstalled.

Crew to begin refurbishment of winches, funded under maintenance and repair section of 2002 Ship Operations grant.

All necessary plans submitted to ABS for approval by TNA.

November 15th – December 15th:

Crew to complete refurbishment of Main Trawl winch, CTD winch, and Hydrographic winch. Main Trawl winch and CTD winch to be reinstalled on ship. Hydrographic winch to be stored ashore until final determination of status made by NSF.

Any discrepancies in plans submitted to ABS to be corrected by TNA by December 15th.

December 15th – December 30th:

Shipyard and vendor bids to be opened, shipyard and vendors selected and notified. Any plan discrepancies and division of line items between shipyard and local vendors to be determined and information provided to selected bidders; any line item renegotiation completed as needed.

Ship transits to selected yard December 27th – December 30th.

TIMELINE: Phase 2

SHIPYARD PERIOD: January 2nd – February 28th

Shipyard, with assistance from ship's crew, to complete items 1, 2*, 4, 5, 6, 7, 8, 15, 20, 21, 22, and 27. * - item to be completed by vendor in Phase 3.

Crew to complete items 3, 9, 23*, 25, 26, and 28. * - with Technician's assistance.

Technicians to complete all wire removals, clean-up of cableways, identification of wire runs and wiring as necessary, installation of new ADCP transducer, and any work as necessary on underwater hull.

Crew and Technicians to begin items 24 and 29

Vessel to transit from yard February 26th – 28th

TIMELINE: Phase 3

DOCKSIDE PERIOD: March 1st – May 22nd

Vendors, with assistance from crew, to complete items 2, 10, 11, 12, 13, 14, 16, 18, 19. Items 18 and 19 to be completed first.

Crew and Techs to complete items 24 and 29.

May 1st – May 22nd:

Technicians to reload remaining ship's science gear, with assistance from crew. Technicians to begin reinstallation. Note: All gear must be on board, if possible, for upcoming Inclining Experiment. If not, it must be identified as to weight and location, and information passed to TNA.

All ship's gear, including winches and cranes, to be tested satisfactorily. Any corrections to be made as necessary.

May 23rd – May 29th:

TNA to perform Inclining Experiment, to satisfaction of ABS. Technicians to complete reinstallation of science gear and test same.

Vessel to be ready, in all aspects, to return to service as of May 31st, 2003.

FINAL NOTES:

Because of the nature of this single proposal, all items that can be identified have been identified to this point; however, there may be other items that become apparent as work progresses. The two suspect areas already identified are: the deck plating under the Torginol/concrete decking on the lower deck; and the sewer pipe trunkline running under the lower deck, which may need replacement along with the gray water and fresh water piping already planned for. Should this occur, then the line items lower in priority will be sacrificed as necessary to insure budget maintenance. These line items would be requested in subsequent Instrumentation, Technician, or Shipboard Scientific Support Proposals.