Ship Construction and Upgrades
Status Report to the UNOLS Council
February, 2001

R/V THOMPSON

We have just completed a significant habitability upgrade to the R/V Thomas G. Thompson. With much appreciated funding support from ONR, we have removed the originally fitted two four-person berthing vans from the 01 deck, at the after end of the superstructure. In their place, Foss Shipyard has built a new superstructure addition with four new permanent two-person staterooms (built on the pattern of the other science staterooms on the AGORs). Quality of construction and materials are excellent, and we're delighted to provide this enhanced berthing. In addition, creation of the new superstructure provided increased deck surface at the 02 level, allowing for much roomier and more logical stowage for the auxiliary work boat and the gangways and shore power cables. As part of this project, the overhead of the hydro lab (underneath the new berthing area) was modified and improved, and the portside crane pedestal was raised and re-enforced.

We thank ONR for its generous funding support, Glosten and Associates for an excellent design--making effective use of available space, and the Foss Shipyard of Seattle for a quality, on-time job.

Capt. Daniel S. Schwartz
Manager of Marine Operations
University of Washington

URI and OSU Planning Process

The University of Rhode Island in partnership with Oregon State University are in the early stages of developing plans for a conceptual design for an Oceans Class research vessel. The ship(s) will have superior acoustic characteristics, provide a stable platform and will have a well designed working deck for over-the-side handling of sophisticated scientific instruments and tools including ROVs and AUVs.

Jack Bash

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R/V KILO MOANA (AGOR 26)

We have started cutting steel for the SWATH AGOR 26 (R/V KILO MOANA,) and I updated the web site so that if follows the progress of the ship. As we build the modules I add pictures to the effected deck. The web site address is

http://imina.soest.hawaii.edu/agor26/index.htm

A keel laying ceremony was held on Feb 9th with Module # 3 of the pontoons serving as the keel.

Robert Hinton

Current tracking Schedule

MILESTONES	CurrentSchedule
Contract Award	10/27/99
Completion of Model Testing	04/18/00
Cutting of Steel Commences	1/8/01
Land first Module #3	02/03/01
Keel Laying Ceremony	02/09/01
Complete steel work lower hulls	Feb 01
Substantial Comp. Of Superstructure	May 01
Vessel Launch	Sept 01
Completion of Sea Trials	Nov 01
Preliminary Acceptance	01/26/02
Dockside Availability (30 day)	02/25/02
Mission trial (30 day)	03/27/02
Available for service	03/29/02
Final Acceptance	Jun 02

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R/V PELICAN

On September 28, the Louisiana Bond Commission voted on the list of Capital Outlay projects to be supported by the state this year. $1.5 million was approved for a mid-life refit of the RV PELICAN. The PELICAN is now 15 years old and, with the refit, we can anticipate another 12-15 years of service life.

This $1.5 million will go towards:

Repair/replace worn or deteriorated systems and components, including: bilge, ballast, fire, gray water, and sewage piping; hydraulic piping, hydraulic components; blast and recoat ballast and sewage holding tanks; new engine controls; electrical wiring

Correct design deficiencies including: hydraulic system; manifold and pump system; capacity of bilge and sewage lines; electrical capacity; HVAC deficiencies

Increase capability including: 10 ft extension; bulbous bow; chain locker and anchor handling system.

The PELICAN presently has a full schedule for 2001. An architect's report to completely describe the planned work will be prepared during this time. Work is expected to begin in late 2001 - early 2002 and will last several months.

The Pelican Refit Committee met on 30 January to begin the process of finalizing a list items to be addressed as a part of the refit.

The Louisiana Department of Facility Planning and Control has appointed a Program Engineer for the refit, Bill Obier. Mr. Obier visited the Pelican on 30 January to get acquainted with the vessel and meet with members of the Committee. A request for proposals for the design phase of the project is being prepared by Facility Planning and Control and should be out before the middle of February.

Steve Rabalais

R/V CAPE HENLOPEN REPLACEMENT VESSEL

I would like to briefly describe the progress to-date in the University's effort to design a replacement vessel for the R/V CAPE HENLOPEN.

Bay Marine, Inc., has been contracted as the principle naval architect for this phase of design, and the Science Mission Requirements (SMR's) have been with them since November. Noise Control Engineering, Inc., has been contracted as the noise consulting firm for the project.

Based on information received thus far, we are fairly confident that the new vessel will have the following characteristics:

- It will be an "all-electric" ship because of lower noise capability, flexibility in arrangement, and good low speed control. Power will be provided by either a diesel-electric or a fuel cell/ diesel-electric hybrid system.
- It will have omni-directional propulsors for higher maneuverability.
- It will be a mono-hull due to low freeboard, shallow draft, and asymmetric loading requirements given in the SMR's

The lines plan and general arrangement are now being developed. The target date for delivery of the DRAFT "Concept" design is **April 1, 2001**. We are in the process of scheduling the second Delaware Research Vessel Committee (DRVC) meeting for late April, where we will conduct our first science community review.

The refined "concept" design will be completed by **September 1, 2001**, which we hope will incorporate comments from the Fleet Improvement Committee as well.

Matthew J. Hawkins

Director, Marine Operations

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Purpose

The EWING is a 17 year old vessel currently projected by UNOLS to be in operation until about 2015. To maintain our viability as a research vessel and improve our operational capabilities through the end of the EWING's projected life a number of science and shipboard upgrades are needed. These include upgrade of the multibeam swath mapping syste,s, an improved 2-D multi channel seismic capability along with the addition of a modest 3-D MCS capability; improved capabilities for 3D MCS surveys, surveys with towed vehicle, ocean bottom sampling and measurements, ROV's and general operations through the addition of dynamic positioning capability.

I. Overview

A. EWING Acquisition

The R/V Maurice Ewing was built in 1983 at the MIL Shipyard in Sorel, Quebec. The Bernier was a purpose built as a state of the art marine geophysical survey vessel and was operated in this capacity by Petro Canada until being laid up in 1987.

In 1988 Columbia University was able to acquire the Bernier as a replacement for the soon to be retired R/V Robert Conrad as part of a cooperative agreement with the National Science Foundation. Following an extensive refit the R/V Maurice Ewing began operation in 1990 as a general purpose research vessel capable of supporting multidisciplinary cruises while also maintaining a highly specialized geophysical capability.

In 1995, with completion of the cooperative agreement established with the National Science Foundation for acquisition of the EWING the title was transferred to the National Science Foundation. The EWING has subsequently been operated by Lamont Doherty Earth Observatory under a charter party agreement.

A description of the EWING is contained in Appendix A and a summary is contained in Appendix B summarizes continued improvements made over the past 11 years.

B. Operational Summary:

The R/V MAURICE EWING has now been in operation for 11 years. Over those 11 years we have been funded for 121 cruise legs totaling, 3082 days of operation, and averaging 280 days per year.

Of the cruise legs-

-30 cruise legs or 11% of funded ship time has involved transits or sea trials.

-10 cruises legs or 7% of ship time has been related to Biology, Chemistry, Physical Oceanography, and/or Mooring Work

-The remaining 81 cruise legs or 82% of all shiptime had the following science requirements(with a number of legs having multiple requirements):

Cruise Legs Requiring

Hydrosweep* 28
MCS** 46
SCS 13
OBS/OBH 18
Towed Vehicle 11
Heat Flow 3
Coring 10
Dredging 4

*Hydrosweep data is collected on every cruise. The number however reflects cruises in which hydrosweep was a science requirement.
**Of the 46 cruise legs involving MCS, 5 of these were 3D MCS and 2 were High Resolution Multi Channel Seismic cruises.

The Ewing is configured to carry a total of 50 personnel including ship's crew, technician support group, and science personnel. The normal ship's crew totals 21.

The standard technical support staff totals 3 including a Science Officer, System Manager, and Electronics Technician, The total number of Lamont Technical Support personnel for a cruise will increase depending on science being conducted, for example when undertaking a multi-channel seismic cruise 4 trained air gunners are required for round the clock operations.

Reviewing the size of the science party, including the Lamont technicians, for the last 11 years our science parties have averaged a total of 18. There have been 17 cruise legs in which the EWING sailed at 90% or more of our total crew and science capacity and only 4 cruise legs in which we sailed at 98% or more of our total crew and science capacity.

C. Overview of modifications being proposed

The major modifications that are being proposed as part of this midlife refit are as follows:

-Upgrade of swath bottom mapping system to provide 118 beams over 120 degrees with full ocean capability and add a medium depth high resolution system.
-Upgraded MCS capability- multiple streamers for 3 D MCS.
-Dynamic positioning capability including bridge control unit, bowthruster and stern thruster.
-Stern and Starboard A Frame upgrades
-New engine room monitoring system
-Upgrade of analogue machinery control system to digital
-Fuel monitoring and overflow system
-Renewal of ship's accommodations; science spaces; lounge spaces; galley
-Reconfiguration of ship's mast
-Replace ship's stack.

D. Discussion of phased refit

It is our intent to carry out this refit in distinct phases over the next three years. There are two primary benefits to a phased refit . First, funds for the refit can be spread over different budget cycles. Second, the out of service time for the R/V Maurice Ewing refit will be accomplished in shorter blocks of time, rather than one long block period thus insuring that science programs can continue to be accommodated without significant delays.

The chart in Appendix C summarizes the phased refit and items we propose addressing. Items have been selected for assignment to each of the phases based on-

-Funding requirements
-Requirements for drydocking the vessel to accomplish the assigned task. Items requiring that the ship must be drydocked will be scheduled to occur during a Coast Guard and ABS required drydocking.
-Items for each phase have been selected to insure they are discreet items or are part of an incremental step necessary for the accomlishment of a work item of greater scope.

We originally viewed this the refit as being accomplished in two phases. In the interim we have already been able address pieces of the overall refit plan. These items we have identified as Phase 0 on our charts. We were able to fund these items from the Major Overhaul and Stabilization Account. They included replacing the lube oil and diesel oil purifiers, a new reverse osmosis unit, accommodation blowers and ducting, engine room blowers and ducting, central cooling system pumps, and lab/engine control room air conditioning; incinerator; and tying the evaporative water makers directly into seachest.

The next phase, currently underway, is Phase 0.5. Two items are being addressed. The first being the acquisition and installation of SPECTRA, a software system for improved MCS data quality which funded through the Instrumentation Proposal. The second is the upgrade from a Hydrosweep DS to a DS-2 with 118 beams over a 120 degree swath
and add sidescan image data.

We have just undergone a drydocking; those items selected for Phase 1 can be accomplished during a dockside availability which is tenatively targeted for the second quarter of 2002.

Phase 2 is targeted for the second quarter of 2003 when the EWING is due for drydocking.

II. Appendices

A. Description:

DESCRIPTION OF VESSEL AND STANDARD EQUIPMENT
R/V MAURICE EWING(EX: BERNIER)

BUILT: 1983 Modified:1990
LENGTH: (LOA) 70.20 m (230')
BEAM: (EXTREME) 14.10 m (46' 3")
DRAFT: (MAX.) 5.3 m (14' 5")
GROSS TONNAGE: 1978
DISPLACEMENT: 2666
CREW: 21
SCIENTIFIC PERSONNEL: 29
SHIP POWER: 4 diesel generator sets (1000 kW) furnish power for ship service and propulsion
PROPULSION MOTOR: four 800 hp. motors
BOW THRUSTER: 506 hp
PROPELLER(S) Single Screw 5 blade with Kort nozzle
SEWAGE SYSTEM: (gal/day)
MSD: OMNIPURE Model 12M
HOLDING TANK: 4200 gals

SPEED, (knots)
CRUISING: 9-11
FULL: 13.5
MINIMUM: 0.5
ENDURANCE: 60 days, fuel
RANGE: 17,000 N.M.

FUEL CAPACITY: (gals) 184,946
LABORATORIES: (sq. ft.)
DRY: 550
ANALYTICAL: 280
INSTRUMENT: 1400
CTD/SAMPLING: 380
VEHICLE STAGING: 320
DARK ROOM: 60
OFFICE: 90

INCINERATOR: Atlas Denmark ASWI-402-A
DOCUMENT/STATE/I.D. #NY6034FL

The R/V Maurice Ewing is an undocumented, Coast Guard inspected oceanographic research vessel classed by ABS.

Ice Class: ABS has assigned a general ice classification of C0.

Communications: Furuno GMDSS Equipment for areas A1, A2, A3, & A4; Alden Marinefax with Navtex; JRC JUE 45A Inmarsat Standard A (voice, fax, telex, data); Thrane Inmarsat Standard C; Seanet- ABB NERA Inmarsat B high speed data; Sailor and Raytheon VHF transceivers; and 7 handheld VHF transceivers.

Navigation: Two Sperry Mk 23 gyro compasses, two Magnavox 4200 GPS Receivers, Trimble 200D differential GPS, Trimble Tasman B - GPS, Ashtech 3DF - GPS, Furuno CI-30 Doppler Speed Log, Furuno 10 cm radar, Furuno 3 cm radar with collision avoidance, and a Furuno depth recorder.

Winches: (1) Multipurpose (LDGO-Lebus design) core/trawl/deep tow winch with 9000 m of 9/16" 6 x 19 wire (2) Hydrographic winch (LDGO-Lebus design) with 9000 m of .250" 3 x 19 wire. (3) CTD winch(LDGO-Lebus design) with 9000 m of .320" electro-mechan-ical cable. (4) Dynacon traction winch with 9000m of .680" electromechanical cable (5) Two air tugger winches for coring/general operations support. (5) Two hydraulic magnetometer winches. (7) Removable single channel seismic streamer reel. (8) Multi-Channel Seismic Streamer Reel capable of handling a 6000 m streamer and cans. (9) One magnetometer reel.

Scientific Support: (1) Hiab articulated crane, SWL 1.5 T @44 ft. (2) Alaska crane with tele-scoping boom MWL 2T @ 50 ft. (3) Starboard side A-Frame with clear width 15', outreach 10', vertical clearance 25', MWL 33,000 lbs. (4) Stern A-Frame with clear width 12', outreach 10', vertical clearance 22', MWL 33,000lbs. (5) Two 45' towing booms with tow/retrieval winches for up to 8 sound sources on each boom.

Permanent and removable scientific equipment: (1) Krupp Atlas Hydrosweep multi-beam bathymetric mapping system. (2) RDI Acoustic Doppler Current Profiler. (3) Echo sounders: a 12 khz bathymetry transducer, a 10-12 khz command transducer, a twelve transducer Massa TR 137 3.5khz sonar array, and 16 bottle TR109 3-5 khz hull mounted chirp array. (4) Two Geometrics 886 magnetometers. (5) A Bell BGM3. (6) Seismic Air Compressors: 3 LMF compressors capable of 1000 scfm @ 2000 psi@ 2500 psi. (7) Sound Sources: 20 Bolt 1500 Long-Life Air Guns and 2 GI guns. (8) Multi-channel Seismic System with 24-bit Digital Streamer with up to 480 channels and 6km length

Data Logging: Instrument logs are acquired through SCSI Serial Port Terminal Servers connected to a Solaris file server running a custom data acquisition system. The UNIX platform allows us to asynchronously log multiple data streams to disk as well as broadcast the data real time to the network which is available to any computer with a TCP/IP connection.

Additional capabilities: Piston core, gravity core, and rock dredge. Three mounting points on deck for 20' containers. S.S. Unistrut on 2' centers in deck and bulkhead of scientific spaces. Weather decks have 1" deck tie downs on 2' centers. 60 KVA of clean single phase power distributed through scientific work areas provided by regulated isolation transformers. Also available is 10KVA of 220V 50Hz provided by an MG set.

B. Summary of Upgrades

During the initial refit of the EWING in 1990 major objective was to combine an improved 2-D MCS

capability with a state of the art Swath mapping capability. Since that time EWING we have continuously worked to improve the EWING through a series of equipment modifications and upgrades which have included

-Installation of an ADCP (1990).
-Installation of a new Inmarsat A and Inmarsat C (1991).
-Masscomp real-time-UNIX computers replaced with SUN and SGI workstations (1990-1992).
-Replaced reel to reel tape drives with high speed cartridge drives for seismic recording (1992).
-Watertight door to CTD lab installed to open weather wind ship could operate in (1993).
-Removed old boiler and replaced with smaller auxiliary boiler (1993).
-New central cooling system with plate heat exchangers installed improving ship reliability and efficiency (1993).
-Installation of Dynacon traction winch with 10km of .680 coax cable (1993).
-Installation of new S band radar (1993).
-Installation of new evaporative water makers (1994).
-Installation of improved meteorological instrumentation with automatic logging capabilities (1994).
-Increase in MCS streamer going from 3 km to 4 km (1994).
-Installation of new steering stand (1995).
-New bridge echo sounders installed (1995).
-New SOLAS approved rescue boat davit and rescue boat resulting in Coast Guard issuing SOLAS Safety Equipment Certificate (1995).
-Uncontaminated seawater system installed (1996).
-Replaced 10Base2 Ethernet with 10 BaseT switched network for an order of magnitude improvement in network speed (1996).
-Replaced HMF articulated crane with Hiab articulated crane(1997).
-Installed a GPS P-Code receiver (1997).
-Increased MCS streamer reel capacity and acquired and installed a new 6 km 480 channel streamer and acquisition system (1998).
-Replaced X band radar with new Furuno X band radar (1999).
-Installation of new sub bottom profiling transducer array (1999).
-Completed upgrade of air guns to a model with improved reliability (1999).
-Replaced the networked SUN and SGI workstations with Sun Enterprise 3000 mainframes with X-terminals replacing the work stations (1999).
-Installation of SeaNet/Inmarsat B (1999).
-Replaced lube oil and fuel oil purifiers.(2000)
-Replaced reverse osmosis unit.(2000)
-Replaced laboratory/engine control room air conditioning unit.(2001)
- Galley upgrade with new garbage disposal, sinks, and dishwasher/ sanitizer.(2001)
-Replaced ship's incinerator. (2001)