Preliminary Report

UNOLS Research Vessels

A Report on:

~ Projected Vessel Retirement Dates ~

~ Comparison of Current Vessel Capabilities with Regional Class and Ocean Class Science Mission Requirements ~

~ Service Life Extension Program Estimates ~

Prepared by:

The UNOLS Office and Fleet Improvement Committee Chair based on input provided by the UNOLS Vessel Marine Superintendents

October 2004

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Acknowledgements

We would like to extend our appreciation to the UNOLS ship operators for participating in this study. Their comprehensive input regarding vessel retirement dates and service life extension programs greatly enhanced the content of this report. The information provided by the ship operators helped us to better understand the important issues and requirements that will need to be addressed as we move forward in academic fleet planning.

Executive Summary

In 2004, The Federal Oceanographic Facilities Committee (FOFC) initiated the process of reviewing and updating their 2001 Fleet Renewal Plan. To provide input into this process, information was collected from UNOLS ship operators regarding vessel retirement dates and the feasibility of extending ship lifetimes by carrying out Service life Extension Programs (SLEPs). Additionally, the ship operators were asked to provide information about how their respective vessel(s) compare to the Regional and Ocean Class Science Mission Requirements (SMRs).

There are eleven UNOLS vessels >40 meters that have retirement dates prior to 2020 and are potential candidates for a SLEP (excluding ALPHA HELIX, which is due to be replaced by the ARRV and EWING, which is to be replaced by a modern seismic vessel). Ship operators have indicated that most of the ships (>40m) can have their lifetimes extended five and possibly ten years for an estimated cost of $1.025M-$5M per ship for a 5-year life extension. The operators of vessels <40m in most instances do not recommend extending their respective ship retirement dates.

The SLEP estimates focus on maintaining the ship in an operational condition without enhancing the scientific capabilities of the platform. The existing Intermediate Class vessels do not meet most of the Ocean Class SMRs nor do they meet several of the Regional Class SMRs. The Regional Class ships currently in operation fall short of the Regional Class SMRs in many areas. Additionally, conducting SLEPs without significant upgrade or replacement of systems may translate into future degradation of capability. Ship machinery and major shipboard science equipment of aging vessels can become obsolete. Replacement components or entire units may no longer be manufactured or available in stock.

The SLEP estimates also do not include any additional accrual of future funds to deal with what will almost certainly be an increased incidence of maintenance and breakdown problems associated with aging vessels. The SLEPs do not account for unseen failures with propulsion systems, ship equipment and machinery, and science instrumentation, some of which may be catastrophic and result in lengthy disruptions in operations.

Maintaining the current UNOLS fleet vessels beyond their designed service life will significantly impede the advance of ocean science relative to that possible with new ships that meet the SMR specifications. UNOLS considers the SLEP approach as an option that should only be considered if funds for new construction are unavailable. The right course is speedy action on the planning, budgeting, and construction of new vessels that meet the SMRs and constructing them in numbers that at minimum accord with the 2001 FOFC Fleet Renewal Plan.

Background

In 1999, the Fleet Review Committee (formed by the NSF Assistant Director for Geosciences) recommended in their “Academic Research Fleet” report that a long-range

plan for academic fleet renewal be prepared. In 2000, the Federal agencies through the Federal Oceanographic Facilities Committee (FOFC) of the National Oceanographic Partnership Program (NOPP) drafted a renewal plan. After considering comments from UNOLS and the community, the report titled, *Chartering the Future for the National Academic Research Fleet: A Long-Range Plan for Renewal*, was published in December 2001. The report indicates that the plan should be reviewed and updated by FOFC at least every five years. FOFC has recently begun the process of updating the plan.

To assist FOFC in this effort, UNOLS has collected information from ship operators regarding vessel retirement dates and service life extension plans. The 2001 FOFC report included projected ship retirement dates as provided by the UNOLS operators. These dates are included in Table I. Since it is likely that the actual arrival of the new vessels called out by the 2001 FOFC plan may be delayed by several years, UNOLS ship operators were asked to review the projected retirement dates and determine if they should be extended, and if so, to what date.

UNOLS ship operators were also asked to consider the feasibility (economics and benefit) of extending their ship lifetimes, by carrying out Service Life Extension Programs (SLEP). They were asked to provide estimates of the cost to carry out 5-year and 10-year SLEPs for their vessel and what work would be required for that extension. The SLEPs are not intended to serve as vessel upgrades, but instead to maintain the ships at their current capability.

Lastly the ship operators were asked to compare the capabilities of their respective ship(s) to the Science Mission Requirements (SMRs) of both the Regional Class and Ocean Class ships. The "desired" or maximum value of each SMR parameter was used in the comparison. This information would help us understand what research requirements could be met and not be met by extending vessel lifetimes. A table summarizing the desired SMR values for the Regional and Ocean Class was provided to each ship operator so that they could carry out the comparison.

In April 2004, a message was sent to the ship operators by the UNOLS Fleet Improvement Committee (FIC) Chair, Dave Hebert, requesting the information described above. The operators were asked to complete a Vessel Survey Form and SMR comparison table. The FIC Chair message and forms are included in Appendix A.

During the spring and summer of 2004 ship operators completed the survey forms and provided their feedback to the UNOLS Office. This report compiles the feedback received. Many of the ship operators carefully considered the project scope and associated costs for SLEPs. In developing cost estimates, they provided justification information as well as the assumptions made during the process. The input provided clearly identifies the major items that will need to be addressed. The feedback received from the operators has been included as submitted in Appendices B, C, and D.

Findings:

Table I provides a summary of the feedback received from the UNOLS ship operators. It provides revised vessel retirement dates (when applicable) as well as cost estimates for 5-year and 10-year SLEPs. Tables II, III, and IV provide a comparison of current vessel

capabilities with Ocean Class and Regional Class SMRs. A summary of the findings and operator feedback regarding vessel retirement dates, SLEP estimates, and SMR comparisons are provided below.

Global Class

The feedback provided by the Global Ship Operators is included in Appendix B. The Appendix contains vessel survey forms for MELVILLE, KNORR, THOMPSON, and ATLANTIS. A survey form was not submitted for EWING as plans for its replacement are well underway. Additionally, Scripps Institution of Oceanography (SIO) indicated that focus would be directed at REVELLE's mid-life planning, prior to planning for a potential SLEP.

Vessel Retirement Dates

Of the six current Global Class vessels, three have retirement dates prior to 2020 (*Knorr, Melville, Ewing*):

- Only MELVILLE's projected retirement date is revised, but significant work packages would be necessary to extend the ship's life.
- Plans are currently underway to replace EWING with a modern seismic vessel.
- WHOI indicates that a service life extension for KNORR would not be beneficial. If necessary, the retirement date can be extended one or two years.

The three Global ships with retirement dates beyond 2020 are focusing on mid-life refit plans. Revised retirement dates are not recommended at this time.

Service Life Extension Programs

The service life of MELVILLE could be extended 5 or 10 years, but significant work packages would be required. A 5-year SLEP cost is estimated at $3.745M and a 10-year SLEP is estimated at $5.295M. The 5-year SLEP includes work items, such as, replacement of the multibeam system ($2M); overhaul winches ($250k), and structural repairs ($200k).

SMR Comparison

Table II compares the capabilities of three of the UNOLS Global Vessels (MELVILLE, KNORR and ATLANTIS) with the Ocean Class and Regional Class SMRs. In most areas, the Global ships meet or exceed the values of the Ocean Class SMRs. However, in the categories of station keeping and track-line following, ATLANTIS meets the Regional Class SMRs. The ship requires a new dynamic positioning system to improve its capability. KNORR and ATLANTIS both exceed the Regional Class SMR for science load (50 LT), but fall short of the Ocean Class value (200 LT).

Intermediate/Ocean Class

The feedback provided by the Ocean/Intermediate Ship Operators is included in Appendix C. The Appendix contains vessel survey forms for all eight vessels, GYRE, ENDEAVOR, OCEANUS, WECOMA, SEWARD JOHNSON II, SEWARD JOHNSON, NEW HORIZON, and KILO MOANA. The vessel surveys contain extensive information regarding costs and work efforts that are important to consider when decisions are to be made regarding service life extension plans.

Vessel Retirement Dates

Of the eight current Intermediate/Ocean Class vessels, all but one (KILO MOANA) has retirement dates prior to 2020. The seven operators have all indicated that retirement dates could be extended five and ten years, but extensive service life extension programs are needed.

The retirement dates can be extended but additional operational costs should be expected. As the ships age, many of their basic systems will need repair or replacement, especially if these systems were not upgraded or replaced during mid-life refits.

Service Life Extension Programs

Service Life Extension Program estimates have been provided for each of the eight Intermediate /Ocean Class vessels. Estimates are provided for both a 5-year SLEP and a 10-year SLEP. For the ships with retirement dates prior to 2020, the estimates for a 5-year SLEP range in cost from $1.025 M to $5 M. Ten-year SLEP estimates range in price from $1.5 M to $8.5 M.

SLEP estimates for each Intermediate ship vary significantly. The difference in estimated cost is in part due to the differences in work carried out during the mid-life refit efforts. SLEP work packages will need to be tailored to meet the needs of each specific ship. A common SLEP package would not be appropriate.

Some of the major work items cited for 5-year SLEPs include:

- Replacement or renovation of deck crane
- Winch replacements
- Pilot House, “plenum” replacement
- Generator/engine replacement
- Tanks and bottom blasting and recoating
- Generator engine replacement
- Bow & stern thruster replacement
- Stern A-frame control and hydraulic system replacement

It is important to note that the SLEP costs are in addition to the average shipyard maintenance requirements which amount to approximately $1.25 M to $1.5 M every five

years.

SMR Comparison

Table III compares the capabilities of seven of the Ocean / Intermediate Vessels (all but GYRE) with the Ocean Class and Regional Class SMRs.

The existing Intermediate Class vessels do not meet most of the Oceans Class SMRs nor do they meet several of the Regional Class SMRs.

Intermediate vessel capabilities that were often indicated as less that those stated in the Ocean Class SMRs included:

- Science party size
- Endurance
- Range
- Station keeping
- Working deck size
- Laboratory areas
- Science storage
- Science load

KILO MOANA, an Ocean Class vessel, meets all of the Ocean Class values with the exception of speed and science load.

The SLEPs focus on maintaining the ship in an operational condition without enhancing the scientific capabilities of the Intermediate Class platforms.

Lack of Dynamic Positioning and hull mounted full depth multi-beam systems leave the Intermediate Class vessels without the capability to support an ever-growing number of science operations.

The Intermediate ships are on the edge of remaining within the 300 GT threshold for classification. A reliable and competent Naval Architect in close liaison with the USCG must assess this situation if any work is added to the package that alters the current gross tonnage for any ships of this class.

A review of the weight compensation needed for any service life extension job should be undertaken by competent Naval Architects prior to work beginning. Inclinings, dead weight surveys, and analysis should be conducted after completing work to verify that stability parameters are still within required criteria. Ballast plans, liquid loading, advertised payloads, and endurance capabilities may change as a part of this process. The cost for Naval Architect services needs to be included in all SLEP estimates (it is included in the OCEANUS SLEP estimate).

Regional Class

The feedback provided by two of the three Regional (>40m) Ship Operators is included in Appendix D. The Appendix contains vessel survey forms for CAPE HATTERAS and POINT SUR. A vessel survey is not included for ALPHA HELIX since the Alaska Region Research Vessel (ARRV) project has been included in the queue for the National Science Foundation's (NSF) Major Research Equipment (MRE) account.

Vessel Retirement Dates

The ship operators for both CAPE HATTERAS and POINT SUR do not recommend extension of the vessels' retirement date. However, they have provided SLEP estimates if the necessity, due to lack of funds, to extend the ship life becomes unavoidable.

The retirement date for ALPHA HELIX is extended to 2008. NSF's MRE plans call for the ARRV construction to be complete by 2008 provided the funds become available. If the ARRV construction is delayed, ALPHA HELIX' retirement date will need to be reconsidered.

Service Life Extension Programs

Service Life Extension Programs for CAPE HATTERAS and POINT SUR are extensive and are estimated at $2 M to $2.125 M. Both SLEPs include re-powering the vessel at a cost ranging from $1M to $1.125M. The 5-year SLEP packages vary in work items for the two ships.

A 10-year SLEP estimate is also provided for CAPE HATTERAS at a cost of $5 M. It entails a complete refit/overhaul or replacement of all machinery.

SMR Comparison

Table IV compares the capabilities of CAPE HATTERAS and POINT SUR with the Ocean Class and Regional Class SMRs. The two vessels fall short of meeting most of the Regional Class SMR values.

The SLEPs focus on maintaining the ship in an operational condition without enhancing the scientific capabilities of their platforms. CAPE HATTERAS and POINT SUR will fall short of meeting the SMRs identified by the community that are needed to carry out science programs using Regional vessels.

Vessels <40m

The feedback provided by Regional and Local (<40m) Ship Operators is included in Appendix D. The Appendix contains vessel survey forms for four of the ten ships, CAPE HENLOPEN, LONGHORN, PELICAN, and SPROUL. SLEP estimates were provided

for these ships. Additionally an SMR Comparison Table for the CAPE HENLOPEN Replacement Vessel (CHRV) is included. Ship operators also provided vessel survey forms for BARNES, CAPE HENLOPEN, BLUE HERON, and WALTON SMITH each indicating that the retirement dates should remain unchanged and no SLEP estimates were provided. The survey forms for these vessels are not included in Appendix D.

Vessel Retirement Dates

The ship operators for vessels <40m do not recommend extending the retirement dates for these vessel. Two of the ten <40m vessels are new and have retirement dates beyond 2020 (WALTON SMITH and SAVANNAH). A replacement for CAPE HENLOPEN is currently under construction and should be ready for service by 2006. SIO has indicated that if construction funds are lacking and if a SLEP is conducted prior to the projected retirement date, SPROUL's life could be extended 5 or 10 years.

Service Life Extension Programs

Estimates for 5-year Service Life Extension Programs were provided for LONGHORN, PELICAN and SPROUL. They differ significantly and range in cost from $ 625k to $5M. Ten-year SLEP estimates are also provided for LONGHORN and SPROUL with costs ranging from $1.395 M to $7 M.

SMR Comparison

Table IV compares the capabilities of SPROUL, LONGHORN, PELICAN, and WALTON SMITH with the Regional Class SMRs. These vessels fall short of meeting most of the Regional Class SMR values. Table IV also includes a comparison of the CHRV design with the Regional Class SMRs. The CHRV meets many of the Regional SMR values.

Conclusions and Recommendations:

There are eleven ships >40 m that have retirement dates prior to 2020 and are potential candidates for a SLEP (excluding ALPHA HELIX, which is due to be replaced by the ARRV and EWING, which is to be replaced by a modern seismic vessel). The findings indicate that:

1) Most of the ships (>40m) can have their lifetimes extended 5 and possibly 10 years for an estimated cost of $1.025M-$5M per ship for a 5-year life extension.

2) The SLEP estimates focus on maintaining the ship in an operational condition without enhancing the scientific capabilities of the platform. The existing Intermediate Class vessels do not meet most of the desired Ocean Class SMRs nor do they meet several of the Regional Class SMRs. The Regional Class ships currently in operation fall short of the Regional Class SMRs in many areas. We emphasize that these SMRs have been intensively studied and reviewed by the community. Thus they represent a considerable and serious consensus about ship

capabilities needed for future science. Maintaining the current UNOLS fleet vessels beyond their designed service life will significantly impede the advance of ocean science relative to that possible with new ships that meet the SMR specifications.

3) The operators of vessels <40m in most instances do not recommend extending their respective ship retirement dates.

4) In most cases, SLEPs were not prepared for ships with retirement dates past 2020. Instead, the immediate focus is on mid-life refit planning.

In reviewing the material received it is clear that there are certain caveats that must be considered if SLEPs are to be carried out:

1) The SLEP estimates are only to extend the life of the vessel(s); they are not estimates for improving their current capabilities. In many cases this may translate into future degradation of capability as per bullets #4 and 5 below.

2) The SLEP cost estimates are in addition to current average shipyard maintenance requirements and costs associated with ship operations. The SLEP estimates also do not include any additional accrual of future funds to deal with what will almost certainly be an increased incidence of maintenance and breakdown problems on SLEPed ships despite best efforts at good operations and preventive maintenance.

3) The SLEPs do not account for unseen failures with propulsion systems, ship equipment and machinery, and science instrumentation. (As an example, SLEP planning is currently underway for the USCG Polar Class ships, yet POLAR SEA's engines were just condemned and the ship will be out of service for a protracted period. Similar problems could happen in the UNOLS fleet.)

4) Ship machinery and major shipboard science equipment of aging vessels can become obsolete. Replacement components or entire units may no longer be manufactured or available in stock. This could result in the need for full replacement of failed systems. The above estimates do not include such items. Neither do they include the potentially lengthy disruptions of research plans and schedules that could result from such a failure, followed by the need to engineer the installation of a different replacement system, as opposed to a "drop-in" replacement system of the same (obsolete) type.

5) Important capabilities and system upgrades should be considered in plans for service life extensions. These include features such as dynamic positioning and hull mounted multibeam systems. Without the addition of these systems, the vessels will be incapable of supporting an ever-growing number of science operations. The above estimates do not include these enhancements. The same concerns that are noted in the preceding item about disrupted research and time lost while engineering the installation of different replacements also pertain here.

6) Many of the Intermediate Class ships are in the threshold of the 300 GT classification. Naval Architects should be consulted to undertake a review of the weight compensation needed for any service life extension program early in the

planning process.

7) Differences in original construction, as well as work carried out during mid-life refits, result in some differences in SLEP needs for the Oceanus class ships. A common SLEP plan would not be appropriate for all three ships.

In conclusion, UNOLS considers the SLEP approach as a bad option. The right course is speedy action on the planning, budgeting, and construction of new vessels that meet the SMRs and constructing them in numbers that at minimum accord with the 2001 FOFC Fleet Renewal Plan.

Table I: UNOLS Vessel Projected Retirement Dates and SLEP Estimates

UNOLS Vessel Retirement Dates and Service Life Extension Program (SLEP) Estimates							
Vessel	Year Built / Refit	Length (ft)	FOFC Retirement Date	Revised Retirement Date (1)	5-year estimated SLEP Cost ($M) (2)	10-year estimated SLEP cost ($M) (3)	Notes
Vessels > 40 m							
ALPHA HELIX	1996	133	2005	2008	--	--	
GYRE	1973	182	2006	2011	$1.335	$3.235	
ENDEAVOR	1976	184	2008	2018	$1.025	$1.5	
OCEANUS	1976	177	2009	2019	$1.175	$1.98	
WECOMA	1976	185	2010	2020	$1.5	$2	
CAPE HATTERAS	1981	135	2011	2016	$2	$5	
POINT SUR	1981	135	2011	2016	$2.125	$5	
SEWARD JOHNSON II	1982	161	2012	2017	$5	$8.5	
MELVILLE	1969 / 1991	279	2014	2019	$3.745	$5.295	
KNORR	1970 / 1989	279	2015	--	--	--	(4)
SEWARD JOHNSON	1985	204	2015	2020	$5	$7.5	
NEW HORIZON	1978	170	2016	2021	$1.150	$1.70	
EWING	1983 / 1990	239	2018	2005	--	--	(5)
EWING Replacement	1996/2006	235	xx	2025	--	--	
T.G. THOMPSON	1991	274	2021	--	--	--	(6)
R. REVELLE	1996	274	2026	--	--	--	(6)
ATLANTIS	1997	274	2027	--	--	--	(6)
KILO MOANA	2002	186	2032	--	$7.5	$12.5	
Vessels <40 m							
BARNES	1966	66	2005	--	--	--	
CAPE HENLOPEN	1976	120	2005	--	--	--	
LONGHORN	1971	105	2011	--	$4 - $5	$6 - $8	
WEATHERBIRD II	1981	115	2013	--	--	--	
PELICAN	1985	105	2013	--	$2	--	
SPROUL	1981	125	2015	2020	$0.625	$1.395	
BLUE HERON	1985	86	2015	--	--	--	
URRACA	1986	96	2016				
WALTON SMITH	2000	96	2031	--	--	--	
SAVANNAH	2001	91	2032	--	--	--	

Notes:

(1) Revised retirement dates are based on the premise that SLEPs will be funded and carried out prior to the original retirement date.

(2) SLEPs are in addition to shipyard maintenance requirements

(3) 10-year SLEP costs include all 5-year SLEP work items and associated costs.

(4) 1-2 year life extension if needed

(5) EWING to be replaced with new Seismic Vessel

(6) Initial focus will be on mid-life planning - prior to predicting SLEP needs.

TABLE II

Comparison of

Global Class Ship Capabilities

With

Regional Class and Ocean Class

Science Mission Requirements

Vessel operators were asked to compare their ship capabilities with the Ocean and Regional Class SMRs. An "X" indicates that the ship meets or exceeds the SMR value. If an "X" appears in the Ocean Class SMR column, the Regional Class SMR is also met or exceeded.

TABLE II: Comparison of Global Class Ship Capabilities With Regional Class and Ocean Class SMRs

SMR parameter	Non-crew personnel		Endurance		Range		Speed		Sea keeping		Station Keeping		Track-line following		Crane		Towing		Working Deck					
																			Stern aft of all deck houses		Along one side		Total stern clear area	
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	16-20	20-25	21 days, surge to 30 (15 transit and 15 station)	40 days (20 transit and 20 station)	8,000 nm	10,800 nm	12 kts, 10 kts in SS4, 7 kts in SS5	12 kts through SS4	Work in SS 4, >50% in SS 5	Maximize ability to work in SS 5 and higher	Best available Dynamic positioning	Dynamic position in 35 kt wind, SS 5 and 2 kts current	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	Load/unload up to 20000 lb to a pier	10000 lb at 6 kts, 20000 lb at 4 kts for several days	10000 lb at 6 kts, 25000 lb at 4 kt for several days	1000 sq ft; 1500 sq ft desirable	1500 sq ft	50' x 10' area	80' clear deck area	1300 sq ft	2000 sq ft
GLOBAL SHIPS																								
MELVILLE		X		X		X		X		X		X		X	X			X		X		X		X
KNORR		34		60		12,000		12 kts, 14.5 kts max		X		yes, has SDP-10 which meets this SMR		contains superb high & low speed Track Mode using SDP-10 DP system		6' / 60,000, 70'/ 8,000 ft/lbs		20,000 lbs portable A-frame		2,024		124		3,818
ATLANTIS		37		60		17280		12 kts, 15 kts max		X	X(1)		X(2)			10'/ 42000, 65'/ 3400 ft/lbs		X		3,045		124		3805

TABLE II: (continued - Comparison of Global Class Ship Capabilities With Regional Class and Ocean Class SMRs)

SMR parameter	Laboratories														Vans		Science Storage		Science load		Workboats		Real-time data acquisition system	
	Main dry lab		Wet/hydro lab		Electronics/ computer lab		Res Tech work space		High Bay		Climate controlled space		Total lab space											
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	800 sq ft	1000 sq ft	400 sq ft	400 sq ft	Separate or part of main lab	300 sq ft	Separate electronics repair shop/work space for resident technicians	Separate electronics repair shop/work space for resident technicians	High bay/ hanger space adjacent to aft main deck	High bay/ hanger space adjacent to aft main deck	100 sq ft	100 sq ft	1000 sq ft (1500 sq ft desired)	2000 sq ft	2 20'x8' deck vans, space for 1-2 smaller vans	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	400-500 cubic ft	5000 cubic ft	At least 50 LT	200 LT	16' or larger	At least one 16' or larger	Multibeam, ADCP, IMET, transducer wells	Multibeam, ADCP, IMET, transducer wells
GLOBAL SHIPS																								
MELVILLE		X	<400			X		X		X		X		X		X		X		325 LT(3)		X		X
KNORR		2,011	320			X		X		250 sq ft		240		2756		X		5,520	175 LT			X		X
ATLANTIS		1512		880		750		X		X		375		3,517		X		6,000	150 LT			X		X

Notes: (1) ATLANTIS needs a new DP System and there are issues with the Bow Thruster.
(2) ATLANTIS needs a new DP System with a good high speed and low speed track follow system.
(3) MELVILLE science payload verified by The Glosten Assoc. and stability documents.

TABLE III

Comparison of

Intermediate / Ocean Class Ship Capabilities

With

Regional Class and Ocean Class

Science Mission Requirements

Vessel operators were asked to compare their ship capabilities with the Ocean and Regional Class SMRs. An "X" indicates that the ship meets or exceeds the SMR value. If an "X" appears in the Ocean Class SMR column, the Regional Class SMR is also met or exceeded.

TABLE III: Comparison of Intermediate / Ocean Class Ship Capabilities with Regional Class and Ocean Class SMRs

SMR parameter	Non-crew personnel		Endurance		Range		Speed		Sea keeping		Station Keeping		Track-line following		Crane		Towing		Working Deck					
																			Stern aft of all deck houses		Along one side		Total stern clear area	
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	16-20	20-25	21 days, surge to 30 (15 transit and 15 station)	40 days (20 transit and 20 station)	8,000 nm	10,800 nm	12 kts, 10 kts in SS4, 7 kts in SS5	12 kts through SS4	Work in SS 4, >50% in SS 5	Maximize ability to work in SS 5 and higher	Best available Dynamic positioning	Dynamic position in 35 kt wind, SS 5 and 2 kts current	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	Load/unload up to 20000 lb to a pier	10000 lb at 6 kts, 20000 lb at 4 kts	10000 lb at 6 kts, 25000 lb at 4 kt for several days	1000 sq ft; 1500 sq ft desirable	1500 sq ft	50' x 10' area	80' clear deck area	1300 sq ft	2000 sq ft
Intermediate / Ocean Ships																								
Gyre		24		X	X		9 kts		X		No	No DP	X		4000		X			X	65		X	
ENDEAVOR	18		32		8000		X	X	X	X	no	no	X	X	X	X	X	X	~1,200		~50		~1500	
OCEANUS	19		30		7000		12 kts, 14.4 kts Max		X	X	no	no	not w/DP style track line following			sea: full extension - 6890 lbs; retracted 40000 lbs. Pier: Exceeds 40000 lbs		35000 lbs SWL A-Frame	1,122			84'	1,600	
WECOMA	18		30+		~7200			X		X		no		at what speed?		14,000		?	~1,200		~50		~1500	
SEWARD JOHNSON II		27	32		7000			X		X		no DP		X	10,000			X	1,400		35 x 20		970	
SEWARD JOHNSON		28	35		6000			X		X		X		X		X		X		1,762	60'		1,160	
NEW HORIZON	X			X	X				X				X						X		X	X	X	
KILO MOANA		X		X		X				X		X		X		X		X		X		X		X

TABLE III: (Continued - Comparison of Intermediate / Ocean Class Ship Capabilities with Regional Class and Ocean Class SMRs)

SMR parameter	Laboratories														Vans		Science Storage		Science load		Work-boats		Real-time data acq. system	
	Main dry lab		Wet/ hydro lab		Electronic/ computer lab		Res Tech work space		High Bay		Climate control space		Total lab space											
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	800 sq ft	1000 sq ft	400 sq ft	400 sq ft	Separate or part of main lab	300 sq ft	Separate electronics repair shop/work space for resident technicians	Separate electronics repair shop/work space for resident technicians	High bay/ hanger space adjacent to aft main deck	High bay/ hanger space adjacent to aft main deck	100 sq ft	100 sq ft	1000 sq ft (1500 sq ft desired)	2000 sq ft	2 20'x8' deck vans, space for 1-2 smaller vans	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	400-500 cubic ft	5000 cubic ft	At least 50 LT	200 LT	16' or larger	At least one 16' or larger	Multibeam, ADCP, IMET, transducer wells	Multibeam, ADCP, IMET, transducer wells
Intermediate / Ocean Ships																								
Gyre	480		160		336 0r 156		45		No		X		X		1 10x8 and 1 20x8				X		X		X less multi-beam	
ENDEAVOR	700		390		208		X	375	no	no	no	no	1657		very small	very small	1600		50 LT		X	X	X less multi-beam	
OCEANUS	595		240		X		X						1185			3			40 LT		X		X less multi-beam	
WECOMA	700		390		208		no	no	no	no	A/C in labs?	A/C in labs	1174			yes, on deck	none	none	60 LT			X	X less multi-beam	
SEWARD JOHNSON II	342		220		264			160		NA	96		1082			X	1000			X		22'	X less multi-beam	
SEWARD JOHNSON	468		288		288			224		NA	85					X4	1100			X		21'	X less multi-beam	
NEW HORIZON													X			X			X					
KILO MOANA		X		X		X		X		X		X		X		X		X				X		X

TABLE IV

Comparison of

Regional and Local Class Ship Capabilities

With

Regional Class and Ocean Class

Science Mission Requirements

Vessel operators were asked to compare their ship capabilities with the Ocean and Regional Class SMRs. An "X" indicates that the ship meets or exceeds the SMR value. If an "X" appears in the Ocean Class SMR column, the Regional Class SMR is also met or exceeded.

TABLE IV - Comparison of Regional and Local Class Ship Capabilities with Regional Class and Ocean Class SMRs

SMR parameter	Non-crew personnel		Endurance		Range		Speed		Sea keeping		Station Keeping		Track-line following		Crane		Towing		Working Deck					
																			Stern aft of all deck houses		Along one side		Total stern clear area	
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	16-20	20-25	21 days, surge to 30 (15 transit and 15 station)	40 days (20 transit and 20 station)	8,000 nm	10,800 nm	12 kts, 10 kts in SS4, 7 kts in SS5	12 kts through SS4	Work in SS 4, >50% in SS 5	Maximize ability to work in SS 5 and higher	Best available Dynamic positioning	Dynamic position in 35 kt wind, SS 5 and 2 kts current	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	Load/unload up to 20000 lb to a pier	10000 lb at 6 kts, 20000 lb at 4 kts for several days	10000 lb at 6 kts, 25000 lb at 4 kt for several days	1000 sq ft; 1500 sq ft desirable	1500 sq ft	50' x 10' area	80' clear deck area	1300 sq ft	2000 sq ft
Regional & Local Ships																								
CAPE HATTERAS			X						X						X		X							
POINT SUR	12		need resup.if >21		6500				X				X		6,500		X		X					
Vessels <40m																								
CAPE HENLOPEN Replacement	X		21 day max, no surge		3500		12kts, 6 kts SS4		X		X		X		X		X		~1700 w/o vans		w/o stbd van			
LONGHORN															X									
PELICAN	X		X						X						X				X		X			
SPROUL													X						X		X		X	
WALTON SMITH											X		X											

TABLE IV - Comparison of Regional and Local Class Ship Capabilities with Regional Class and Ocean Class SMRs

SMR parameter	Laboratories														Vans		Science Storage		Science load		Work-boats		Real-time data acq. system	
	Main dry lab		Wet/ hydro lab		Electronic/ computer lab		Res Tech work space		High Bay		Climate control space		Total lab space											
	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC	RC	OC
	800 sq ft	1000 sq ft	400 sq ft	400 sq ft	Separate or part of main lab	300 sq ft	Separate electronics repair shop/work space for resident technicians	Separate electronics repair shop/work space for resident technicians	High bay/ hanger space adjacent to aft main deck	High bay/ hanger space adjacent to aft main deck	100 sq ft	100 sq ft	1000 sq ft (1500 sq ft desired)	2000 sq ft	2 20'x8' deck vans, space for 1-2 smaller vans	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	400-500 cubic ft	5000 cubic ft	At least 50 LT	200 LT	16' or larger	At least one 16' or larger	Multibeam, ADCP, IMET, transducer wells	Multibeam, ADCP, IMET, transducer wells
Regional & Local Ships																								
CAPE HATTERAS					X																X		no IMET, no multi - beam	
POINT SUR	480		100		X								~660		1 20'x8', 1 10'x8'		~360 under bench		X		X		X	
Vessels <40 m																								
CAPE HENLOPEN Replacement	~380		~250		X		work- shop for general use		no		buy van as need				x		no		30 LT		17'		X	
LONGHORN			X		X - part																			
PELICAN			X		X		X										X				X		X	
SPROUL					X								X		X				X					
WALTON SMITH							X																	

APPENDIX A1. - Message from Dave Hebert, FIC Chair, to Ship Operators

Dear Ship Operator,

As you know, the federal agencies funding research in oceanography were requested by the National Science Foundation's (NSF) National Science Board in May 1999 to provide a long-range plan for fleet renewal. In 2000, the federal agencies through the Federal Oceanographic Facilities Committee (FOFC) of the National Oceanographic Partnership Program (NOPP) drafted a plan. After considering comments from UNOLS and the community, the plan was published in December 2001. This plan must be reviewed and updated by FOFC at least every five years.

As an aid to FOFC in their need to update the plan, we would appreciate receiving some information concerning the vessel(s) that you operate. In the original plan (Appendix A), the projected retirement dates were provided by the operators. These dates are attached for your review, <Retire_dates.pdf>. We would like to update these projected retirement dates. Should the retirement date of your vessel(s) be extended? If so, what would be the revised projected retirement date?

Since it is likely that the actual arrival of the new vessels called out by the FOFC plan may be delayed by several years, it might be necessary to extend the service life of some of our present vessels. The UNOLS Fleet Improvement Committee (FIC) would appreciate receiving estimates of the cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel and what work would be required for that extension. Likewise, what would be the SLEP cost and effort for a 10-year extension beyond the currently planned retirement date?

Finally, it is highly desirable to understand which Science Mission Requirements (SMRs) of both the Regional Class and Ocean Class ships would be met and not be met by extending the lifetime of your vessel(s). A table summarizing the SMRs for the Regional and Ocean Class is attached. If you operate a ship that can possibly be categorized as one of these vessel classes, please use the table (by checking the appropriate boxes) to indicate the requirements that your vessel would be able to meet.

All of the questions asked in this message have been incorporated into the attached Vessel Survey. The survey includes the SMR table. Please provide your responses on the survey sheet and return it by email to the UNOLS Office <office@unols.org>.

As the efforts to implement Academic Fleet renewal move forward, your input is very important. Your time and feedback is greatly appreciated.

Thank you.

Regards,
Dave Hebert
FIC Chair

Appendix A.2. – Vessel Survey Form and SMR Comparison Chart

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____

2. Class of Vessel (check one):

_____ Global
_____ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____ No

4. If so, what would be the revised projected retirement date? _____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____

5.b. What work would be required for the 5-year extension?

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____

6.b. What work would be required for the 10-year extension?

Science Mission Requirements

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)		40 days (20 transit and 20 station)	
Range	8,000 nm		10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5		Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	
Along one side	50' x 10' area		80' clear deck area	
Total stern clear area	1300 sq ft		2000 sq ft	
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	
Wet/hydro lab	400 sq ft		400 sq ft	
Electronics/ computer lab	Separate or part of main lab		300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft		100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft		5000 cubic ft	
Science load	At least 50 LT		200 LT	
Workboats	16' or larger		At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

APPENDIX B

Ship Operator Feedback

Global Class

Retirement Dates and Service Life Extension Program Estimates

Vessel Surveys included in this Appendix:

- MELVILLE
- KNORR
- THOMPSON
- ATLANTIS

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: ____ MELVILLE_____

2. Class of Vessel (check one):

___X___ Global
_____ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____ No

MELVILLE's retirement date could be delayed 5 or 10 years if required by lack of funding for a replacement IF a well planned SLEP is completed in about 2012.

4. If so, what would be the revised projected retirement date? __2019 or 2024_____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? __$3.745 million in present year dollars____

5.b. What work would be required for the 5-year extension?

This assumes that the current overhaul cycle for major equipment such as Main Engines, Generators, Z-drives, Main Motors, etc., is maintained before and after the SLEP.

1.	**Structural repairs to replace deteriorated/pitted steel**	**$ 200K**
2.	**Piping replacement/repairs**	**$ 100K**
3.	**Replace A/C units**	**$ 150K**
4.	**Galley Overhaul**	**$ 75K**
5.	**Replace Radars and Electronics**	**$ 120K**
6.	**Ventilation System Restoration**	**$ 150K**
7.	**Renew rescue boat**	**$ 50K**
8.	**Replace Reefer Plants**	**$ 20K**
9.	**Replace Sewage Treatment Plant**	**$ 80K**
10.	**Replace Fuel Oil Purifier**	**$ 100K**
11.	**Overhaul Cranes**	**$ 160K**
12.	**Overhaul Traction, CTD and Hydro winches**	**$ 250K**
13.	**Overhaul A-frames and Hydroboom**	**$ 90K**
14.	**Replace Multibeam System**	**$2,000K**

15.	**Replace Gyro Systems**	**$ 100K**

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _Total of $5.295 M in present year dollars_

6.b. What work would be required for the 10-year extension?

IN ADDITION TO WORK LISTED IN 5.b. above

1.	**Replace Main Motors**	**$1,000K**
2.	**Renovate Habitability Spaces**	**$ 350K**
3.	**Replace Emergency Generator**	**$ 200K**

NOTE: **(1) If 10 yr extension is selected, consideration should be given to replacing Traction, Hydro and CTD winches rather than overhauling.**

(2) Both plans assume Crew Staterooms have already been converted to singles. If not completed before SLEP add $350K to the option selected.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: R/V Knorr

2. Class of Vessel (check one):

__X_____ Global
_____ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes ___X_____ No

Not for any appreciable period of time. Perhaps in a pinch the life could be extended for a year or two, but no more.

4. If so, what would be the revised projected retirement date? 2015 + (1-2 yrs if needed) (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____N/A_____

Do not recommend extending life for 5 years.

5.b. What work would be required for the 5-year extension?

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____N/A_____

Do not recommend extending life for 10 years.

6.b. What work would be required for the 10-year extension?

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____Thomas G. Thompson_____

2. Class of Vessel (check one):

___X___ Global
_____ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes ____X___ No

4. If so, what would be the revised projected retirement date? _____ (Year) The next milestone for the AGOR-23 class, the Thompson first of these vessels, is a mid-life refit. FOFC has been approached to call a meeting regarding mid-life refit SMRs for these vessels and we look forward to participating in this process.

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____

5.b. What work would be required for the 5-year extension?

The scope of work and its cost will be identified in future meetings regarding mid-life-refit SMRs for the Global Class vessels.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____

6.b. What work would be required for the 10-year extension?

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: R/V Atlantis

2. Class of Vessel (check one):

___X____ Global
_____ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____ No

The newer AGORS are coming upon their mid-life renovations. Determinations regarding extending the life of these vessels should be made after the results of the mid-life renovations are assessed.

4. If so, what would be the revised projected retirement date? _____ (Year)

For now leave the retirement date at the planned date of 2027

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? N/A

5.b. What work would be required for the 5-year extension?

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? N/A

6.b. What work would be required for the 10-year extension?

APPENDIX C

Ship Operator Feedback

Intermediate / Ocean Class

Retirement Dates and Service Life Extension Program Estimates

SMR Comparison Tables

Vessel Surveys included in this Appendix:

- GYRE
- ENDEAVOR
- OCEANUS
- WECOMA
- SEWARD JOHNSON II
- SEWARD JOHNSON
- NEW HORIZON
- KILO MOANA

Annette,

Yes the estimate is for a five-year extension as far as the cost is concerned. There are two items that reference a ten-year extension, Dynamic Positioning, which includes the bow thruster, and the replacement of the main engines. These items would really only be feasible if the other listed repairs were made. Without dynamic positioning Gyre will not able to compete in today's market place much past her present retirement date, we are already performing tasks that should ideally be done using DP capabilities. Some of the ships that have been converted to DP later in life, have had marginal systems installed. This usually ends up being a marketing ploy, rather than good DP, we would not want to go down that road, as it soon becomes common knowledge that your DP is in name only. Almost all of the ships being built by industry have DP, and those that do not are quickly becoming obsolete.

Just a little note, to illustrate that we are not overestimating the cost of things - I have just received a quotation for one new shaft coupling for $14,873, this is for the cheaper one, of the two we have on each shaft. We put $50,000 in for coupling replacements, it will likely end up around $80,000, without the installation cost.
Thanks for your time Annette, Cheers, Desmond.

At 04:20 PM 7/14/04 -0500, you wrote:
Annette,
Thanks for sending the spreadsheet. Since we sent ours in, we have received a bit more info related to a ten-year extension. We have a few figures on the DP conversion and some other items.. Would you please put $ 1,900,000 in the ten-year column. Glad you explained that the ten-year figure is an addition.
Thanks, Desmond,

R/V Gyre Cost Estimate for Extended Retirement Dates

Repair and replacement of miscellaneous ballast tank bulkheads and frames	Gyre tanks were never properly coated at build, have been a headache since new	$300,000
Repair and or replacement of miscellaneous piping	Black iron piping is reaching the end of its life, extensive replacement will be required. Sanitary and ballast piping through tanks should be replaced.	$100,000
Sea chests will need to be replaced in the next few years	The sea chests are showing sign of impending problems, and should all be replaced.	$50,000
Shaft coupling replacements	SKF shaft couplings have been re-used many times, and are at the end of their life.	$50,000
Shaft repairs	At least one shaft will need to be replaced shortly, others may be repairable.	$60,000

Controllable pitch hub repairs	The mechanical components in the hubs are developing more than acceptable wear. Should be completely rebuilt.	$85,000
Generator engine overhauls	One generator engine is already overdue for a rebuild	$80,000
Main Engine overhauls	Main engines are not in bad shape but will need overhaul for extended service. These engines blocks may be on their last rebuild. CAT 398 & 379 engines are no longer manufactured. For a ten-year life extension new more efficient engines should be considered.	
		$100.00
Anchor Windlass	The anchor windlass would need a complete factory overhaul , or replacement for any long-term extension.	$125.00
Hydro and CTD winches	The DC drive system, which drives both the Hydro & CTD winches, is obsolete, replacement components are becoming unobtainable. This needs to be replaced with a new unit.	$50,000
Deck Crane	The existing deck crane is becoming marginal at best, for the increasing load requirements. This unit has been re-built several times, and is reaching the end of its life span.	$200,000
Frames	The existing frames are adequate from a size standpoint, but the stern unit will need to be replaced if a ten-year extension is considered.	$120,000
Core Winch	The core winch is doing a good job, and has plenty of power and speed. It has had numerous components replaced or re-designed over the years, and still has a lot of life left. This unit does need some upgrades, the tension system works but is temperamental and should be replaced. The hydraulics and 250 HP motor are incredibly noisy, and we receive a lot of complaints on the subject. We would consider changing to a DC drive system for a long-term solution. Some of the frame on the winch needs to be replaced, and a re-designed emergency brake added. There is no hand-operated emergency brake at this time. The gearbox has never been rebuilt.	$100,000
Dynamic positioning	Gyre does not have dynamic positioning, and we have lost numerous projects because of this deficiency. To add dynamic positioning to Gyre is not out of the question, and would almost be essential if a ten-year extension were to be considered. With the twin CP system already in place along with the twin rudders, the modifications are entirely feasible. The rudders would need to have independent operation, and the bow thruster would need to be replaced with a larger more powerful unit. The present bow thruster is only 150HP so would not be very effective for a dynamic positioning system. A stern thruster would be required for a first class installation.	No figure given for this item. Price will depend on several options. We will investigate this subject in depth at a later date.

Winch control station	The forward winch control station is marginal, and does not have enough room to install the new control station that we have on hand. The new station will combine all the controls and wire monitoring for both CTD and Hydro in one unit. Winch control cab needs to be enlarged.	$5,000
MSD	The MSD unit will need to be replaced if an extended life is contemplated. The present unit requires a lot of attention, and frequent replacement of parts. Good service is difficult and expensive to obtain, due to long travel times for service reps. Shipment of spares has not been a problem.	$65,000
Communications/ Electronics	The communications on Gyre have been undergoing a major upgrade. A new KVH system has been installed, with some networking between the bridge and labs. Most of the bridge electronics are in good order, but one of the radars may need to be replaced in the near future. The 12hz transducer array has had one transducer removed due to damage, and the remaining unit is showing signs of trouble.	$70,000

TOTAL Estimate

$1,335,225

Science Mission Requirements

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	24
Endurance	21 days, surge to 30 (15 transit and 15 station)	X	40 days (20 transit and 20 station)	
Range	8,000 nm	X	10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5	9 kts	12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning	No DP	Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	X	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	4,000	Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	X	10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	
Along one side	50' x 10' area	65	80' clear deck area	
Total stern clear area	1300 sq ft	X	2000 sq ft	
Laboratories				
Main dry lab	800 sq ft	480 sqft	1000 sq ft	
Wet/hydro lab	400 sq ft	160	400 sq ft	
Electronics/ computer lab	Separate or part of main lab	336 156	300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians	45	Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck	No	High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft	X	100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	1, 8x10 1, 8x20	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft		5000 cubic ft	
Science load	At least 50 LT	X	200 LT	
Workboats	16' or larger	X	At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells	No Multi X	Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: ENDEAVOR

2. Class of Vessel (check one):

_____ Global
___✓___ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? ____✓___ Yes _____ No

ENDEAVOR is in good material condition. The retirement date can be extended from 2008 with additional operational costs as the ship ages since many of the ship's basic systems were not upgraded or replaced during the mid-life in 1993. However, this does not address the ever-growing need to meet the science requirements expressed in the Ocean Class SMRs. Without dynamic positioning and without the ability to hull mount a full depth multi-beam system the ship is incapable of supporting an ever-growing number of science operations. Her limited berthing also impacts her ability to accommodate future science needs.

4. If so, what would be the revised projected retirement date? _2018___ (Year)
This is predicated on the five year and ten year plans expanded on below

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? $1025K in addition to the current average shipyard maintenance requirements of $1.2M every five years

5.b. What work would be required for the 5-year extension?

Replace CPP control system.	$75-150K
Replace main crane.	$ 250K
Ship's Service Generator upgrade	$ 150K
Replace 3.5 kHz array	$ 25K
Piping replacements	$ 50K
Replace Trawl winch	$ 400K

ENDEAVOR's trawl winch is over twenty years old and has none of the features found on the Dynacon winches found on most vessels. While we use this winch very little now we expect that the ability to handle .680" fiber optic cable will be a necessity in the future.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? ____~$1.5 M. in addition to the average shipyard maintenance requirements of $1.5 M every five years_____

6.b. What work would be required for the 10-year extension?

Items in addition to those above would be:	
Main Engine Overhaul	$ 200K
Bow thruster replacement/upgrade	$ 250K
MSD Replacement	$ 80K

Science Mission Requirements - ENDEAVOR

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20	X	20-25	18 Max.
Endurance	21 days, surge to 30 (15 transit and 15 station)	X	40 days (20 transit and 20 station)	32 days
Range	8,000 nm	X	10,800 nm	8,000
Speed	12 kts, 10 kts in SS4, 7 kts in SS5	X	12 kts through SS4	X
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning	No	Dynamic position in 35 kt wind, SS 5 and 2 kts current	No
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	X	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	X
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	X	Load/unload up to 20000 lb to a pier	X
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	X	10000 lb at 6 kts, 25000 lb at 4 kt for several days	X
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable	X	1500 sq ft	~1,200
Along one side	50' x 10' area	X	80' clear deck area	~50
Total stern clear area	1300 sq ft	X	2000 sq ft	~1,500
Laboratories				
Main dry lab	800 sq ft	700	1000 sq ft	700
Wet/hydro lab	400 sq ft	390	400 sq ft	390
Electronics/ computer lab	Separate or part of main lab	X	300 sq ft	208
Res Tech work space	Separate electronics repair shop/work space for resident technicians	X	Separate electronics repair shop/work space for resident technicians	375

High Bay	High bay/hanger space adjacent to aft main deck	NO	High bay/hanger space adjacent to aft main deck	No
Climate controlled space	100 sq ft	NO	100 sq ft	NO
Total lab space	1000 sq ft (1500 sq ft desirable)	X	2000 sq ft	1,657
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	Very small	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	Very small
Science Storage	400-500 cubic ft	X	5000 cubic ft	1600
Science load	At least 50 LT	X	200 LT	50
Workboats	16' or larger	X	At least one 16' or larger	X
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	X less multibeam

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name **R/V Oceanus**

2. Class of Vessel (check one):

_____ Global
__√__ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? ___√_____ Yes _____ No

OCEANUS is in excellent material and materiel condition. The retirement date can be extended past 2009. Extending the service life will require additional funding as the ship ages since many of the ship's basic systems were not upgraded or replaced during the mid-life in 1993-1994.

It is important to note that this survey focuses on maintaining the ship in an operational condition without enhancing the scientific capabilities of the Intermediate Class platforms. This presents concern within the scientific community. Every scientific oversight committee at WHOI has expressed concern over the thought of extending the life of the Intermediate Class vessels without enhancing the scientific capabilities. The existing Intermediate Class vessels do not meet most of the Oceans Class SMRs nor do they meet several of the Regional Class SMRs. Lack of Dynamic Positioning and hull mounted full depth multi-beam systems leave the Intermediate Class vessels without the capability to support an ever-growing number of science operations. So, while not a part of this exercise, upgrading the scientific mission capabilities will need to be addressed with respective science users before extending the service life for the Intermediate Class.

Additionally, all ships of this class are on the razor sharp edge of remaining within the 300 GT threshold for classification. This situation must be assessed by a reliable and competent Naval Architect in close liaison with the USCG if any work is added to the package that alters the current gross tonnage for any ships of this class. Also, it has recently been determined that Oceanus requires additional permanent ballast to stay within the allowable GM curve for all operating conditions. Explanation of how this was determined is too involved to address here, but suffice it to say the weight and loading status has been especially important on vessels of this class since the mid-life renovations were completed. The resulting impact to representing payloads, liquid loading, and endurance to maintain proper stability parameters has, on occasion, been confusing to the customers. A review of the weight compensation needed for any service life extension job should be undertaken by competent Naval Architects prior to work beginning. Inclinings, dead weight surveys, and analysis should be conducted after completing work to verify that stability parameters are still within required criteria. Ballast plans, liquid loading, advertised payloads, and endurance capabilities may change as a part of this process.

4. If so, what would be the revised projected retirement date? See below (Year)

The present projected retirement date is 2009. Per the nature of this request WHOI believes that the service life of Oceanus could be extended through both the 5-year period to 2014 and through the 10-year period to 2019. We do believe however that the ten-year period constitutes the upper limit upon which service life of all the Intermediate Class vessels should be considered.

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? Approximately $1.175M *

* This is in addition to the current average shipyard maintenance requirements which amount to approximately $1.25M every 5 years.

Note: Cost estimates have been discussed among all operators of Intermediate Class vessels. As noted in responses from the other Intermediate operators, costs inputs should not be viewed as anything but very rough orders of magnitude. Various jobs, upgrades, and replacements listed have not been scoped with sufficient detail to rely on the estimated provided in any of our surveys. To obtain budget quality estimates, a time frame for when the upgrades would take place needs to be established. Then the jobs can be scoped with various vendors, manufacturers, Nav Archs, etc., and more reliable cost estimates established. A line item is included for Nav Arch support in the 5-year extension plan that is meant to cover work needed to execute a 5 or 10 year extension effort.

5.b. What work would be required for the 5-year extension?

Major renovation of CPP Control System	$150K
Major renovation (includes part replacements) of existing Allied Crane	$150K
Replacement of CAT 353 Ship's Service Generator diesel engine	$200K
A-Frame renovations	$100K
Piping replacements	$ 75K
Winch – Hydro Boom renovations	$200K
Navigational/Communication/UPS System replacements	$150K
Design & Nav Arch Services (Planning, Tech docs, & Stability analysis)	$150K

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? Approximately $1.980M *

* This is in addition to the current average shipyard maintenance requirements which amount to approximately $1.25M every 5 years.

Note: Cost estimates have been discussed among all operators of Intermediate Class vessels. As noted in responses from the other Intermediate operators, costs inputs should not be viewed as anything but very rough orders of magnitude. Various jobs, upgrades, and replacements listed have not been scoped with sufficient detail to rely on the estimated provided in any of our surveys. To obtain budget quality estimates a time frame for when the upgrades would take place needs to be established. Then the jobs can be scoped with various vendors, manufacturers, Nav Archs, etc., and more reliable cost estimates established.

6.b. What work would be required for the 10-year extension?

Items in addition to the items listed for the 5 year extension:	
Main Engine upgrades	$200K
Bow Thruster replacement/upgrade	$250K
MSD Replacement	$ 80K
Replacement of 3.5 and 12 kHz transducers	$ 50K
Deck/Tank Top repairs various points throughout ship	$ 75K
Habitability/HVAC renovations *	$150K

* Arguably habitability renovations could be viewed as upgrades vice a service life extension item. Whatever this item is determined to be, if various forms of HVAC/furniture/head/bunk/general stateroom renovations are not executed within the next 10 years, it's hard to envision anyone agreeing to sail aboard any of the Intermediate vessels.

Science Mission Requirements - OCEANUS

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20	19	20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)	30 days	40 days (20 transit and 20 station)	
Range	8,000 nm	7,000 nm	10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5	12 kts. 14.4 kts Max	12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning	NO	Dynamic position in 35 kt wind, SS 5 and 2 kts current	NO
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	Not w/DP style track line following.	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	Sea: Full Extension – 6,890 lbs; Retracted – 40,000 lbs. Pier: Exceeds 40,000 lbs.	Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	35,000 lbs SWL A-Frame	10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable	1,122 sq ft	1500 sq ft	
Along one side	50' x 10' area	84 ft.	80' clear deck area	
Total stern clear area	1300 sq ft	1,600 sq ft	2000 sq ft	
Laboratories				

Main dry lab	800 sq ft	595 sq ft	1000 sq ft	
Wet/hydro lab	400 sq ft	240 sq ft	400 sq ft	
Electronics/ computer lab	Separate or part of main lab	X	300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians	X	Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft		100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)	1,185 sq ft	2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	3	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft		5000 cubic ft	
Science load	At least 50 LT	40 LT	200 LT	
Workboats	16' or larger	X	At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells	ADCP, IMET, 'ducer Wells, No Multibeam	Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: ____WECOMA_____

2. Class of Vessel (check one):

_____ Global
___✓___ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? ____✓___ Yes _____ No

Wecoma has seen 200 plus days at sea for the past several years. With the present apparent lack of funding for a replacement vessel it appears that extending the operational life of the vessel is necessary to meet the ship time needs of the oceanographic community. The vessel's structure and major systems have been maintained is good shape over the years. A concern is that the ship doesn't meet most of the "Oceans" class SMR's nor does it meet several of the "Regional" class SMR's.

4. If so, what would be the revised projected retirement date? _See below___ (Year)

The presently projected retirement date is 2011. From a material condition aspect there doesn't appear to be any reason the vessel's operational life couldn't be extended 5 years (2016) or 10 years (2021) beyond the presently projected date.

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? ___~$1.5 M.__ __

5.b. What work would be required for the 5-year extension?

Pilot House, "plenum" replacement (done during mid-life on ENDEAVOR & OCEANUS)	$ 500K
Replace autopilot (done during mid-life on ENDEAVOR & OCEANUS)	$ 25K
Replace CPP control system.	$75-150K
Replace Markey DESH-6 "trawl" winch	$ 250K
Replace main crane.	$ 250K
Ship's Service Generator upgrade	$ 150K
Replace laboratory decking (similar to ENDEAVOR's)	$ 50K
Replace some sanitary system piping	$ 50K
Replace MSD	$ 50K

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? ____~$2 M._____

6.b. What work would be required for the 10-year extension?

Items in addition to those above would be:	
Main Engine Upgrade	$ 200K
Bow thruster replacement/upgrade	$ 250K
3.5 and 12 kHz transducer replacement	$ 50K

Science Mission Requirements -WECOMA

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	18 Max.
Endurance	21 days, surge to 30 (15 transit and 15 station)		40 days (20 transit and 20 station)	30+ days
Range	8,000 nm		10,800 nm	~7,200
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	X
Sea keeping	Work in SS 4, >50% in SS 5		Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	No
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	at what speed?
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	14,000
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	?
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	~1,200
Along one side	50' x 10' area		80' clear deck area	~50
Total stern clear area	1300 sq ft		2000 sq ft	~1,500
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	700
Wet/hydro lab	400 sq ft		400 sq ft	390
Electronics/ computer lab	Separate or part of main lab		300 sq ft	208
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	No

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	No
Climate controlled space	100 sq ft		100 sq ft	Labs have A/C?
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	1,174
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	Y, on deck
Science Storage	400-500 cubic ft		5000 cubic ft	None
Science load	At least 50 LT		200 LT	60
Workboats	16' or larger		At least one 16' or larger	Y
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	No multibeam

Thank you for your input.

A few “bullets” to go with WECOMA’s SLEP Questionnaire

- The scope of the ’94 “mid-life” on R/V WECOMA was limited because of higher than anticipated shipyard costs and limited funding and did not include the upgrades to the superstructure decks that were accomplished on the other two OCEANUS class vessels. If the vessel is to continue operation until 2016 (a 5 year extension) or 2021 (10 year) some mid-life work including expanding the size of the pilot house to accommodate mandated equipment, eliminating the “plenum” below the pilot house which has been subject to corrosion and deterioration over the years, and upgrading the autopilot need to be done. This may be complicated by the current restrictions on modifications to “under 300 GT vessels” which were not in place at the time of the ’94 mid-life and stability considerations but a cost guess of $0.5M has been included in our response.
- The “cost estimates” provided should be viewed with skepticism. Some work, the pilot house modification and plenum elimination for example, will require the services of a naval architect before a good estimate can be developed. Other costs, the ship’s service generator replacement for example, are based on estimates from potential suppliers and contractors and are more accurate.
- Some items, the main engine conversion to a blower and bow thruster replacement have not been sufficiently investigated to determine if they are necessary or economically justified. Unknown factors, such as future pollution regulations for shipboard diesel engines, continued factory support of aging equipment, etc. and major considerations.
- As noted in the questionnaire, the OCEANUS class vessels do not meet some of the SMR’s for “Regional Class” vessels and don’t meet many for the “Oceans Class.” Only a few “upgrade” items (e.g., a larger A-frame) have been mentioned in our 5 or 10 year SLEP. It may be that modifications or upgrades to meet science needs in the next 5 to 10 years are more significant than keeping the hull and machinery in good condition.

R/V WECOMA Service Life Extension (SLE) and Upgrade (U) Items

Updated 25 Jun '04 by FJ

The OCEANUS and ENDEAVOR columns are for comparison to WECOMA only and do not speak for either WHOI or URI. These institutions will provide their own responses for their vessels.

Item	Type	WECOMA Discussion	WECOMA Cost Guess	OCEANUS Status	ENDEAVOR Status
				(see note above)	(see note above)
Enlarge, upgrade pilot house	SLE	The present pilothouse and console are not large enough to accommodate all of the equipment now necessary (e.g., GMDSS, ARPA radars, etc.), the visibility is limited by the stacks forward (safety issue for navigation as well as limiting usefulness as marine mammal observing vessel) and access to equipment in the console (ECS computer, CPP controls, etc.) is extremely limited.	$250K -- associated with additional work to eliminate pleneum.	Pilothouse, stacks and mast upgraded as part of mid-life.	Pilothouse, stacks and mast upgraded as part of mid-life.
Do something about the "plenum."	SLE	This area will completely rust away in 10 to 15 years.	$250K - combine with pilothouse modification above.	Eliminated during the midlife.	Eliminated during the midlife.
Replace autopilot, etc.	SLE	The existing autopilot, steering tiller, repeater amplifier and distribution system, etc. is the ship's original equipment. It is difficult to maintain (the last time the tiller failed we had to have a part made in a local machine shop because Sperry didn't support it) and the distribution amplifier is causing problems with other equipment including the new ARPA radar. We have a Sperry AGP 6000 system that was purchased for the mid-life but never installed. Sperry states that this equipment will be supported for the next 10 - 15 years.	$25K	Autopilot was replaced during mid-life. Robertson Controls were used.	Upgraded in mid-life?

Item	Type	WECOMA Discussion	WECOMA Cost Guess	OCEANUS Status	ENDEAVOR Status
Replace CPP control system	SLE	Present system is pneumatic. System is difficult to maintain and adjust for optimum performance. NOAA has gone with Mathers (sp?) on FAIRWEATHER and PLC based systems on RAINIER and MILLER FREEMAN. Options appear to be a PLC based system (AWT Mfg.) for about $150K or a "modern" pneumatic system from Mathers at about $75K. OSU would like to stick with pneumatic.	$75K	Have original equipment, would like to upgrade.	Have original equipment, would like to upgrade.
Install central fire detection system	U	This has been a recommendation of the NSF inspection. Highly desirable given the extensive use of wood, lack of fire boundaries, etc.	$50K	Has central system installed in mid-life.	Has central system.
Replace the main crane.	SLE/U	The present crane is inadequate to exchange the deep sea winch storage reels, need something with a capacity of at least 27,000 pounds at 28'. Crane is somewhat of a maintenance problem though overhauled during last yard period	$250K	Crane was replaced in mid-life -- will probably need refurbishment.	Allied Crane capable of 20 K at 30'.
Install larger main A-frame	U	The present A-frame is of marginal weight capacity for 9/16" wire (side loading limitations), possibly not tall or wide enough for future science projects, needs a top platform to make changing blocks easier.	$100K	A-frame upgraded during mid-life, not removable. Has side loading limitations.	Has side loading limitations.

Item	Type	WECOMA Discussion	WECOMA Cost Guess	OCEANUS Status	ENDEAVOR Status
Main Engine Upgrades	SLE/U	Convert from turbo to Roots blower? The turbo is rarely used and "runs on the clutch" most of the time. This conversion was done on the NOAA Ship MILLER FREEMAN and works well. MSI (EMD engine representative in Pacific Northwest) recommendation is to do conversion including emission upgrade. Cost is estimated around $175K but could be done at the time of a normal overhaul ($134K on WECOMA this past winter) for an estimated additional cost of about $50K	$200K	Main engine same as WECOMA's -- little interest in changing	Main engine same as WECOMA's -- has some turbocharger filter blocking problem.
Generator upgrade	SLE	Replace electrical ends or entire engine/generators. Cat no longer supports electrical end. Newer engines are more fuel efficient, meet current emission standards, cost less to overhaul, etc.	$125 - 150K	Replaced electrical end with Kato generators, still have Cat 353 prime movers. Interested in upgrading due to Cat problems.	ENDEAVOR just had one electrical end rewound, has original generators and prime movers as does WECOMA. Interested in upgrading due to Cat problems.
Upgrade bow thruster	SLE	How long can we continue to support?	$250K?	Not much concern.	Same as WECOMA's but runs off AC generators rather than shaft driven DC. "Underpowered."
Consolidate HPU's	SLE/U	Currently have separate HPU's for A-frames, Morgan crane. Would save space and increase flexibility if they could be combined.	?		Winches are all hydraulic. Will look into.

Item	Type	WECOMA Discussion	WECOMA Cost Guess	OCEANUS Status	ENDEAVOR Status
Winch Replacement	SLE	WECOMA's Trawl winch is an old (mid-60's) Markey DESH-6. The motor is long beyond being supported and is rated "Intermittent." Some reliability problems have been experienced with the solid state controls on the Markey DESH-5 Hydro Winch as well -- this system may need replacement or major modification.	$250K	Unknown	Unknown
CTD Handling System	U				
Habitability improvements	U	Quarters areas should be upgraded.		"Something should be done."	
Laboratory electrical power upgrade/UPS?	U	WECOMA has 60 kVA of filtered "clean power" for labs but no UPS.		Has about 15 kVA of UPS power in labs	Has about 15 kVA of UPS power in labs.
Lab water purifier system	U	Dedicated still for laboratory clean water like THOMPSON has	Probably too small to be considered an SLE item.		Has direct line from ship's evap to Milli-Q
Transducer replacement	SLE	Present 12 kHz and 3.5 kHz array are old and in need of replacement/upgrade		Unknown	Probably need to replace 3.5 kHz array
Scientific storage	U	WECOMA currently has no space, other than a small, portable van, for science storage		Unknown	Preserved "lower laboratory" as storage, also converted No. 10 ballast tanks to storage in mid-life.
Replace lab decking	SLE	Deck covering in lab spaces is old and deteriorating		Would like to recoat decks.	ENDEAVOR has new (mid-life?) deck coating which should be placed on WECOMA as well
Van dock at aft end of dry-lab	U	May be a tonnage issue per NVIC 11-93		Unknown	Can't do because of winch location.

Item	Type	WECOMA Discussion	WECOMA Cost Guess	OCEANUS Status	ENDEAVOR Status
Dynamic Positioning Capability	U	Future projects, such as the proposed ocean observing system on the Juan de Fuca ridge and PNW continental shelf are anticipated to require a substantial amount of ROV support. Dynamic positioning capability is generally considered necessary for such work. Would potentially require addition of stern thruster.	Probably not economic.		According to Bill, this was considered during mid-life's and was neither economically nor technically feasible on these vessels.
Replace sanitary system piping	SLE	Some supply and drain lines, particularly to the Master's & Mate's rooms on the upper deck and deteriorated and in need of replacement. This could be tied to the plenum and pilot house items above	$50K	Probably taken care of in the mid-life.	Probably taken care of in the mid-life.
Replace gyros with ring lasers.	U			Would like to replace as being done on other WHOI vessels.	
Communications upgrades	U			High-Seas Net or other options.	
Roll stabilization	U		Probably not economic.	Desirable	Considered in mid-life, not feasible?
Replace MSD	SLE	Present ORCA unit is reaching end of service life, has limited capacity.	$50K	Unknown	Unknown

WECOMA

Updated 16 Jun '04 by FJ

Item	Type	5 year SLEP	10 year SLEP	Upgrade
Enlarge, upgrade pilothouse. Eliminate "plenum"	SLE	$500,000	$500,000	
Replace autopilot, etc.	SLE	$25,000	$25,000	
Replace CPP control system	SLE	$75,000	$75,000	
Install central fire detection system	U			$50,000
Replace the main crane.	SLE/U	$250,000	$250,000	
Install larger main A-frame	U			$100,000
Main Engine Upgrades	SLE/U		$200,000	
Generator upgrade	SLE	$150,000	$150,000	
Upgrade bow thruster	SLE		$250,000	
Consolidate HPU's	SLE/U			$100,000
Winch Replacement	SLE	$250,000	$250,000	
Winch Control Upgrade	SLE	$100,000	$100,000	
CTD Handling System	U			
Habitability improvements	U			
Laboratory electrical power upgrade/UPS?	U			
Lab water purifier system	U			
Transducer replacement	SLE		$50,000	
Scientific storage	U			
Replace lab decking	SLE	$50,000	$50,000	
Van dock at aft end of dry-lab	U			
Dynamic Positioning Capability	U			
Replace sanitary system piping	SLE	$50,000	$50,000	
Replace gyros with ring lasers.	U			
Communications upgrades	U			
Roll stabilization	U			
Replace MSD	SLE	$50,000	$50,000	
Totals:		$1,500,000	$2,000,000	$250,000

Vessel Survey

Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____SEWARD JOHNSON II_____

2. Class of Vessel (check one):

_____ Global
___x___ Ocean/Intermediate
_____ Regional
_____ Local

3. ~~Should~~ Can the retirement date of this vessel be extended? ____x____ Yes _____ No

4. If so, what would be the revised projected retirement date? 2017 (5 year extension); 2023 (10 year extension)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____$5 million_____

5.b. What work would be required for the 5-year extension? Main engine replacement (2), gearbox replacement (2), bow thruster engine replacement, generator/engine replacement (3), stern a-frame control system replacement, all tanks and bottom blasting and recoating. NOTE: A midlife yard period is planned for 2004, which will include blasting all tanks and bottom recoating.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? $8.5 million (5 and 10 year extension cost)

6.b. What work would be required for the 10-year extension? Main engine & gear box overhaul, generator/engine overhaul, bow thruster overhaul. NOTE: Work required for a 10-year extension is predicated on completing the work for a 5-year extension at the beginning of the 5 years.

Science Mission Requirements - R/V SEWARD JOHNSON II

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	27
Endurance	21 days, surge to 30 (15 transit and 15 station)		40 days (20 transit and 20 station)	32
Range	8,000 nm		10,800 nm	7000
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	X
Sea keeping	Work in SS 4, >50% in SS 5		Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	No DP
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	X
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	10,000
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	X
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	1400
Along one side	50' x 10' area		80' clear deck area	35x20
Total stern clear area	1300 sq ft		2000 sq ft	970
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	342
Wet/hydro lab	400 sq ft		400 sq ft	220
Electronics/ computer lab	Separate or part of main lab		300 sq ft	264
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	160

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	NA
Climate controlled space	100 sq ft		100 sq ft	96
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	1082
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	X
Science Storage	400-500 cubic ft		5000 cubic ft	1000
Science load	At least 50 LT		200 LT	X
Workboats	16' or larger		At least one 16' or larger	22’
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	No multi beam

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____SEWARD JOHNSON_____

2. Class of Vessel (check one):

_____ Global
___x___ Ocean/Intermediate
_____ Regional
_____ Local

3. ~~Should~~ Can the retirement date of this vessel be extended? ____x____ Yes _____ No

4. If so, what would be the revised projected retirement date? 2020 (5 year extension); 2025 (10 year extension)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? $5 million

5.b. What work would be required for the 5-year extension? Main engine replacement (2), generator engine replacement (3), bow & stern thruster replacement, stern A-frame control and hydraulic system replacement, all tanks and bottom blasting and recoating. NOTE: The RVSJ has completed a midlife yard period in April 2004 and the work required to extend 5 years is based on the present condition of the vessel, which is excellent.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? $7.5 million (5 and 10 year extension cost)

6.b. What work would be required for the 10-year extension? Possible main engine overhaul (2), possible generator engine overhaul (3), possible bow and stern thruster overhaul. NOTE: Work required for 10-year extension is predicated on completing the work for the 5-year extension and the beginning of the 5 years.

Science Mission Requirements - R/V SEWARD JOHNSON

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	28
Endurance	21 days, surge to 30 (15 transit and 15 station)		40 days (20 transit and 20 station)	35 days
Range	8,000 nm		10,800 nm	6000nm
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	X
Sea keeping	Work in SS 4, >50% in SS 5		Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	X
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	X
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	X
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	X
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	1762'
Along one side	50' x 10' area		80' clear deck area	60'
Total stern clear area	1300 sq ft		2000 sq ft	1160'
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	468'
Wet/hydro lab	400 sq ft		400 sq ft	288'
Electronics/ computer lab	Separate or part of main lab		300 sq ft	288'
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	224'

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	NA
Climate controlled space	100 sq ft		100 sq ft	85’
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	X4
Science Storage	400-500 cubic ft		5000 cubic ft	1100 cu ft
Science load	At least 50 LT		200 LT	X
Workboats	16' or larger		At least one 16' or larger	21’
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	All except multi beam

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____NEW HORIZON_____

2. Class of Vessel (check one):

_____ Global
___X___ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____ No

NEW HORIZON's retirement date can be extended for 5 or 10 years if required by lack of funding for a replacement IF a well planned SLEP is completed in about 2012

4. If so, what would be the revised projected retirement date? __2021 or 2026___ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? ___$1.150M in present year dollars___

5.b. What work would be required for the 5-year extension?

This assumes that the current overhaul cycle for major equipment such as Main Engines, Generators, Z-drives, Main Motors, etc., is maintained before and after the SLEP.

1.	**Structural repairs to replace deteriorated/pitted steel**	**$125K**
2.	**Piping replacement/repairs**	**$ 75K**
3.	**Replace A/C units**	**$110K**
4.	**Galley Overhaul**	**$ 40K**
5.	**Replace Radars and Electronics**	**$120K**
6.	**Ventilation System Restoration**	**$100K**
7.	**Replace Zodiak Workboat**	**$ 25K**
8.	**Replace Reefer Plants**	**$ 20K**
9.	**Replace Sewage Treatment Plant**	**$ 50K**
10.	**Replace Fuel Oil Purifier**	**$100K**
11.	**Overhaul Cranes**	**$100K**
12.	**Overhaul Traction, CTD and Hydro winches**	**$175K**
13.	**Overhaul A/J-frames**	**$ 50K**
14.	**Overhaul Bow Thruster**	**$ 60K**

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? ____$1.70 M_in present year dollars_____

6.b. What work would be required for the 10-year extension?

IN ADDITION TO WORK LISTED IN 5.b. above

1.	**Replace Ship Service Generator sets and Switchboards**	**$300K**
2.	**Renovate Habitability Spaces**	**$150K**
3.	**Overhaul Gearboxes**	**$100K**

NOTE: **(1) If 10 yr extension is selected, consideration should be given to replacing Hydro and CTD winches rather than overhauling.**

Science Mission Requirements – NEW HORIZON

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20	X	20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)	X	40 days (20 transit and 20 station)	X
Range	8,000 nm	X	10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	X	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable	X	1500 sq ft	
Along one side	50' x 10' area	X	80' clear deck area	X
Total stern clear area	1300 sq ft	X	2000 sq ft	
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	
Wet/hydro lab	400 sq ft		400 sq ft	
Electronics/ computer lab	Separate or part of main lab		300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft		100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)	X	2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	X	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	X
Science Storage	400-500 cubic ft		5000 cubic ft	
Science load	At least 50 LT	X	200 LT	
Workboats	16' or larger		At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: ____R/V Kilo Moana_____

2. Class of Vessel (check one):

_____ Global
_____X_ Ocean/Intermediate
_____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____X__ No

4. If so, what would be the revised projected retirement date? ___N/A_____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____$7.5 Mil__(2004 Dollars)_____

5.b. What work would be required for the 5-year extension?

Metal Replacement
Piping and Tank Renovation
Replace Winches
Replace Cranes
Rewind generators and Motors
Upgrade SIMRAD and other science systems

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____$12.5 Mil__(2004 Dollars)_____

6.b. What work would be required for the 10-year extension?

Work Listed in 5.b. plus:

Additional metal replacement
Additional Piping and Tank Renovation
Upgrade Propulsion Management System
Replace M/E's
Upgrade HVAC System

Science Mission Requirements – KILO MOANA

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	X
Endurance	21 days, surge to 30 (15 transit and 15 station)		40 days (20 transit and 20 station)	X
Range	8,000 nm		10,800 nm	X
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5		Maximize ability to work in SS 5 and higher	X
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	X
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	X
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable		Load/unload up to 20000 lb to a pier	X
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days		10000 lb at 6 kts, 25000 lb at 4 kt for several days	X
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	X
Along one side	50' x 10' area		80' clear deck area	X
Total stern clear area	1300 sq ft		2000 sq ft	X
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	X
Wet/hydro lab	400 sq ft		400 sq ft	X
Electronics/ computer lab	Separate or part of main lab		300 sq ft	X
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	X

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	X
Climate controlled space	100 sq ft		100 sq ft	X
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	X
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	X
Science Storage	400-500 cubic ft		5000 cubic ft	X
Science load	At least 50 LT		200 LT	
Workboats	16' or larger		At least one 16' or larger	X
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells		Multibeam, ADCP, IMET, transducer wells	X

Thank you for your input.

APPENDIX D

Ship Operator Feedback

Regional & Local Class

Retirement Dates and Service Life Extension Program Estimates

(Only surveys that include SLEP work and cost estimates are included in Appendix.)

Vessel Surveys included in this Appendix:

- CAPE HATTERAS (including SMR Comparison Table
- POINT SUR (including SMR Comparison Table)
- CAPE HENLOPEN (including SMR Comparison Table for CHRV)
- LONGHORN
- PELICAN
- SPROUL

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: __CAPE_HATTERAS

2. Class of Vessel (check one):

_____ Global
_____ Ocean/Intermediate
___x____Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____x_ No

4. If so, what would be the revised projected retirement date? _____2016_____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? ___2.0 million_____

5.b. What work would be required for the 5-year extension?

Repower	$1,125,000
Replace electronics	$ 150,000
Rework Deck Gear	$ 150,000
Replace Engine Controls	$ 40,000
Replace Sewage Trunk	$ 150,000
Replace Wiring	$ 200,000
Replace Workboat	$ 50,000

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _5 million___

6.b. What work would be required for the 10-year extension?

Complete refit/overhaul or replacement of all machinery.

Science Mission Requirements – CAPE HATTERAS

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20		20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)	X	40 days (20 transit and 20 station)	
Range	8,000 nm		10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current		Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	X	Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	X	10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable		1500 sq ft	
Along one side	50' x 10' area		80' clear deck area	
Total stern clear area	1300 sq ft		2000 sq ft	
Laboratories				
Main dry lab	800 sq ft		1000 sq ft	
Wet/hydro lab	400 sq ft		400 sq ft	
Electronics/ computer lab	Separate or part of main lab	X	300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft		100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans		2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft		5000 cubic ft	
Science load	At least 50 LT		200 LT	
Workboats	16' or larger	X	At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells	X*	Multibeam, ADCP, IMET, transducer wells	

*Partial - no multibeam or IMET.

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: __R/V Point Sur_____

2. Class of Vessel (check one):

_____ Global
_____ Ocean/Intermediate
___X____ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes ___X_____ No

4. If so, what would be the revised projected retirement date? ___2016____ (Year)
An extension to the retirement of the R/V Point Sur is not recommended. However, I've put together a rough list with estimated costs if there became an unavoidable necessity to extend the live of the vessel for an additional five years. I stress that these are indeed rough estimates at this time as I am working with an engine supplier and a propulsion supplier to determine more accurate estimates for these items.

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? ___$2,125,000_____

5.b. What work would be required for the 5-year extension?

Item	Approximate Cost
Re-power the vessel, including main engines, gearboxes, propeller system, auxiliary engines and generators	$1,000,000
Replace engine/propeller control system	$25,000
Replace sewage piping	$75,000
Replace ship's wiring	$75,000
Replace entire refrigeration system	$125,000
Replace HVAC system	$100,000
Replace various hull/deck plates	$200,000
Replace interior decking material	$100,000
Replace Trawl winch	$350,000
Replace rudders	$75,000
Total	$2,125,000

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____

6.b. What work would be required for the 10-year extension?

Science Mission Requirements – POINT SUR

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20	12	20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)	Need resup. if >21	40 days (20 transit and 20 station)	
Range	8,000 nm	6,500	10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5		12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning		Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	X	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	6,500	Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	X	10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable	X	1500 sq ft	
Along one side	50' x 10' area		80' clear deck area	
Total stern clear area	1300 sq ft		2000 sq ft	
Laboratories				
Main dry lab	800 sq ft	480	1000 sq ft	
Wet/hydro lab	400 sq ft	100	400 sq ft	
Electronics/ computer lab	Separate or part of main lab	X	300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians		Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck		High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft		100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)	~660	2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	1 20'x8', 1 10'x8'	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft	~360 under bench	5000 cubic ft	
Science load	At least 50 LT	X	200 LT	
Workboats	16' or larger	X	At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells	X	Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: CAPE HENLOPEN

2. Class of Vessel (check one):

_____ Global
_____ Ocean/Intermediate
_____ Regional
___X____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____X___ No

4. If so, what would be the revised projected retirement date? _____n/a_____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____n/a_____

5.b. What work would be required for the 5-year extension? n/a

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? _____n/a_____

6.b. What work would be required for the 10-year extension? n/a

Science Mission Requirements – CAPE HENLOPEN REPLACEMENT VESSEL

UNOLS would appreciate an assessment on how your vessel meets the Regional or Ocean Class SMRs. To indicate that the vessel meets the SMR parameter, place an "X" in the adjacent box. Operators of Local Class vessels can skip this section.

Annette – the information checked below is for the CAPE HENLOPEN Replacement Vessel – not the current CAPE HENLOPEN. Matt

SMR parameter	Regional Class (RC)	Meets RC SMR	Ocean Class (OC)	Meets OC SMR
Non-crew personnel	16-20	X	20-25	
Endurance	21 days, surge to 30 (15 transit and 15 station)	21 day max (no surge)	40 days (20 transit and 20 station)	
Range	8,000 nm	3500 nm	10,800 nm	
Speed	12 kts, 10 kts in SS4, 7 kts in SS5	12 knot cruise, 6 knots SS 4 "comfortably"	12 kts through SS4	
Sea keeping	Work in SS 4, >50% in SS 5	X	Maximize ability to work in SS 5 and higher	
Station Keeping	Best available Dynamic positioning	X	Dynamic position in 35 kt wind, SS 5 and 2 kts current	
Track-line following	Stay within 5 m of line with 25 kts wind, up to SS4, and 2 kts current	X	Heading deviation of less than 45 degrees with 30 kts wind, up to SS5, and 2kts current	
Crane	Load/unload up to 8000 lb to a pier; 16000 lb is desirable	X	Load/unload up to 20000 lb to a pier	
Towing	10000 lb at 6 kts, 20000 lb at 4 kts for several days	X	10000 lb at 6 kts, 25000 lb at 4 kt for several days	
Working Deck				
Stern aft of all deck houses	1000 sq ft; 1500 sq ft desirable	~1700 w/o vans	1500 sq ft	
Along one side	50' x 10' area	w/o stbd van	80' clear deck area	
Total stern clear area	1300 sq ft		2000 sq ft	
Laboratories				

Main dry lab	800 sq ft	~380	1000 sq ft	
Wet/hydro lab	400 sq ft	~250	400 sq ft	
Electronics/ computer lab	Separate or part of main lab	X	300 sq ft	
Res Tech work space	Separate electronics repair shop/work space for resident technicians	Workshop for general use separate from labs	Separate electronics repair shop/work space for resident technicians	

High Bay	High bay/hanger space adjacent to aft main deck	No	High bay/hanger space adjacent to aft main deck	
Climate controlled space	100 sq ft	By van As needed	100 sq ft	
Total lab space	1000 sq ft (1500 sq ft desirable)		2000 sq ft	
Vans	2 20'x8' deck vans, space for 1-2 smaller vans	X	2 20'x8' deck vans, space for 1-2 smaller vans (500 sq ft)	
Science Storage	400-500 cubic ft	No	5000 cubic ft	
Science load	At least 50 LT	30 LT	200 LT	
Workboats	16' or larger	17-foot	At least one 16' or larger	
Real-time data acquisition system	Multibeam, ADCP, IMET, transducer wells	X	Multibeam, ADCP, IMET, transducer wells	

Thank you for your input.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: R/V LONGHORN

2. Class of Vessel (check one):

_____ Global
_____ Ocean/Intermediate
_____ Regional
___X___ Local

3. Should the retirement date of this vessel be extended? _____ Yes ____X___ No, without extension.

4. If so, what would be the revised projected retirement date? _____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? $4-5 million

5.b. What work would be required for the 5-year extension?
(1) Replace both main engines and both generator engines with fuel-efficient, low-polluting models (Detroit Diesel Series 60 identified as likely candidates).
(2) Upgrade generator engines with zero-droop constant frequency governors.
(3) Upgrade electrical system to 440VAC vs. existing 220 VAC.
(4) Replace ship's electrical distribution system.
(5) Replace both ship's air conditioning systems with standard, off-the-shelf models.
(6) Replace 75% of underwater hull plating and stringers as required.
(7) Upgrade galley equipment to larger capacity marinized systems.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? $6-8 million

6.b. What work would be required for the 10-year extension?
In addition to those items listed in Paragraph 5.B:
(1) Add 15-20 foot hull section amidships. Relocate main towing winch below main deck. (These lower the center of gravity and increase working deck area to enable the vessel to carry two vans.)
(2) Add four-person crew cabin on the 01 level, increasing crew capacity to 7 and scientific party capacity to 15.
(3) Enclose and air condition the after maneuvering and crane operator station.
(4) Upgrade autopilot to interface with GPS and with radar for collision avoidance.

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: ___Pelican_____

2. Class of Vessel (check one):
_____ Global
_____ Ocean/Intermediate
_____X_ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____X__ No

4. If so, what would be the revised projected retirement date? _____ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? _____$2M 2004 $_____

5.b. What work would be required for the 5-year extension?

Re-engine, Replace steel, etc.

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? __N/A_____

6.b. What work would be required for the 10-year extension?

Vessel Survey
Vessel Projected Retirement Date and SLEP Estimates

Please complete a separate survey for each vessel that your institution operates.

1. Ship Name: _____ROBERT GORDON SPROUL_____

2. Class of Vessel (check one):

_____ Global
___ ___ Ocean/Intermediate
____X_ Regional
_____ Local

3. Should the retirement date of this vessel be extended? _____ Yes _____ No

R.G. SPROUL'S retirement date can be extended for 5 or 10 years if required by lack of funding IF a well planned SLEP is completed in about 2012

4. If so, what would be the revised projected retirement date? __2020 or 2025___ (Year)

It is important that a reasonable assessment of the following questions be provided:

5.a. In your best assessment, what is the estimated cost to carry out a five-year Service Life Extension Program (SLEP) for your vessel? ___$625 K in present year dollars___

5.b. What work would be required for the 5-year extension?

This assumes that the current overhaul cycle for major equipment such as Main Engines, Generators, Z-drives, Main Motors, etc., is maintained before and after the SLEP.

1.	**Structural repairs to replace deteriorated/pitted steel**	**$ 50K**
2.	**Piping replacement/repairs**	**$ 50K**
3.	**Replace A/C units**	**$ 30K**
4.	**Galley Overhaul**	**$ 40K**
5.	**Replace Radars and Electronics**	**$ 80K**
6.	**Ventilation System Restoration**	**$ 20K**
7.	**Replace Zodiak Workboat**	**$ 15K**
8.	**Replace Reefer Plants**	**$ 20K**
9.	**Replace Sewage Treatment Plant**	**$ 20K**
10.	**Replace Fuel Oil Purifier**	**$ 30K**
11.	**Overhaul Cranes**	**$ 50K**
12.	**Overhaul CTD and Trawl winches**	**$ 80K**
13.	**Overhaul A-frames**	**$ 50K**
14.	**Overhaul Bow Thruster**	**$ 50K**

15.	**Upgrade Habitability**	**$ 40K**

6.a. In your best assessment, what is the estimated cost to carry out a 10-year Service Life Extension Program (SLEP) for your vessel? ____$1.395 M_in present year dollars_____

6.b. What work would be required for the 10-year extension?

IN ADDITION TO WORK LISTED IN 5.b. above

1.	**Replace Main Engines**	**$300K**
2.	**Replace Ship Service Generator sets and Switchboards**	**$220K**
3.	**Renovate Habitability Spaces**	**$150K**
4.	**Overhaul Gearboxes**	**$100K**