# UNOLS Fleet Improvement Committee Meeting


**March 20-21, 2007**

**UNOLS Office – Reports**

# FIC Action/Task List (from October 2006 Meeting)

| Task Description | Action/Status |
|---|---|
| **Regional Class - Stay informed** | FIC |
| **Ocean Class Planning** – Provided input as request | FIC |
| **KILO MOANA Actions:** | |
| • Contact Brian Taylor to keep abreast of Handling System details | Dave Hebert |
| • Draft EOS or other appropriate article | D. Hebert/B. Taylor |
| **Design and Constructions Efforts -** Stay engaged in ongoing design and construction efforts (ARRV, *Langseth* Conversion, etc.) | FIC |
| | |

# FIC Action/Task List (From March 2006 Meeting)

| Task Description | Action/Status |
|---|---|
| **Global Class:** Update SMRs | Global Class SMR Cmt |
| **2005 Fleet Improvement Plan:**<br>• Complete all writing assignments. | FIC |
| **ADA Guidelines:** | |
| • Complete draft UNOLS Fleet Guidelines (Structural and Procedural) | ADAC |
| • Incorporate ADA Recommendations into SMR documents (when available) | FIC |
| **Ocean Observatories** – Stay in contact with ORION Office. | Dave Hebert |

# Fleet Improvement Plan

- Project Website:
  <http://www.unols.org/committees/fic/Fip05/FIP2005_Outline.html>

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## UNOLS Fleet Improvement Plan — 2007

# FIP – 2007 Outline: Projections

**IV. Future Fleet Utilization Projections and Future Requirements**

A. The Interagency Working Group on Facilities (IWG-F) Long Range Plan
   1. Federal Budgets??
   2. IWG-F Fleet (Academic Research)
      a. Definition and Composition
      b. Construction Timeline and Costs

If IWG-F plan changes to a status report, this section might need to be restructured – "Agency Infrastructure Plans"

B. Comparison of the Current UNOLS Fleet with the IWG-F Fleet of 2025

C. Future Facility Needs and Projections
   1. Maintain Current Fleet Capacity
   2. Additional Facility Needs
      a. Ocean Observatory Facility Needs
      b. Modes of Operation - Event Response Capability

D. Facilities Required to Meet Future Science Needs – 2025 Fleet Composition (Fig 17 Update)
   1. Fleet Required to Maintain Current Capability
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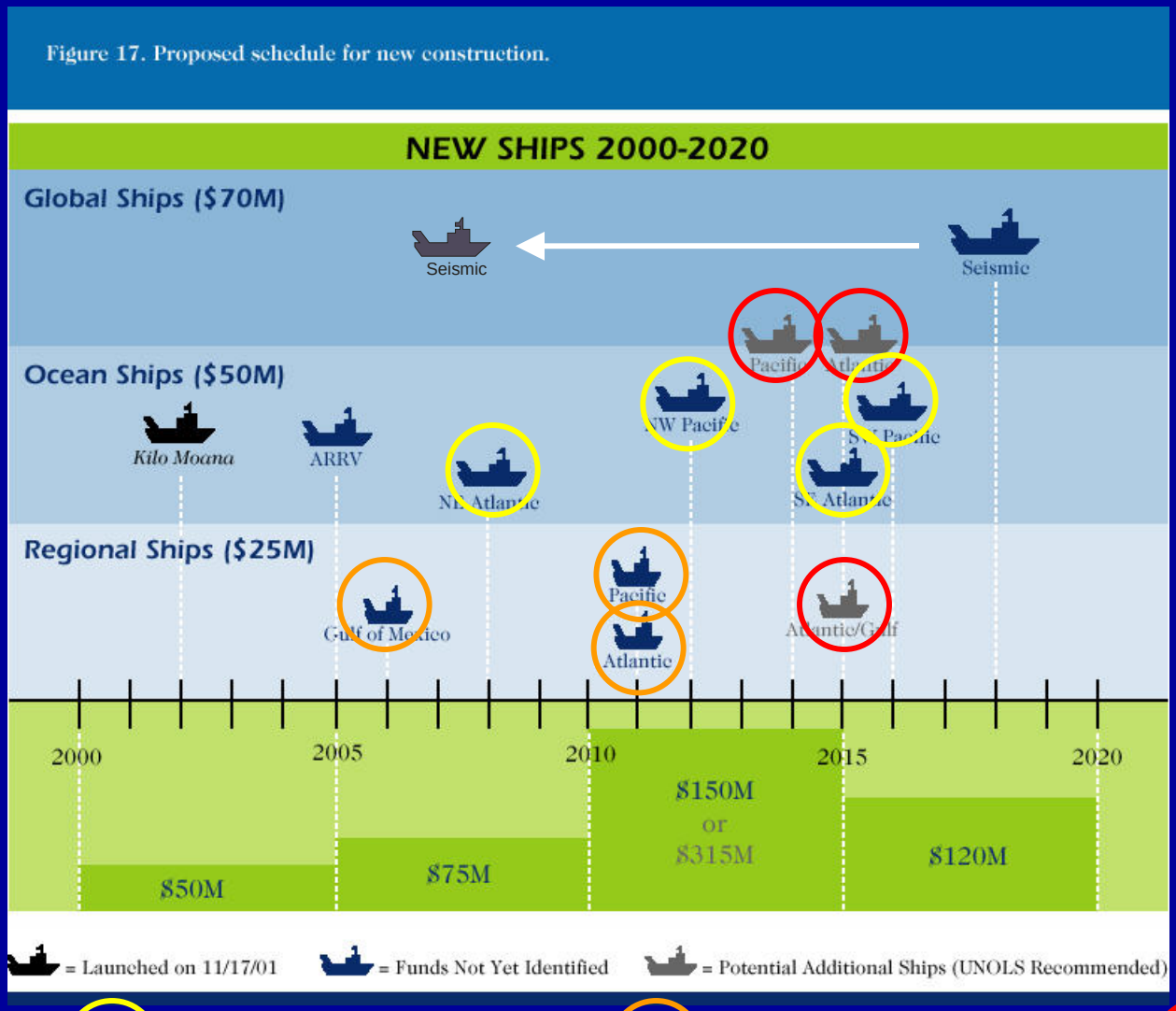
      a. Construction and Operation Costs
      b. Consequences of Not Carrying Out UNOLS Fleet Renewal

E. Other (non-UNOLS Ship) Facility Projections

# The FOFC Ship Renewal Plan - 2001

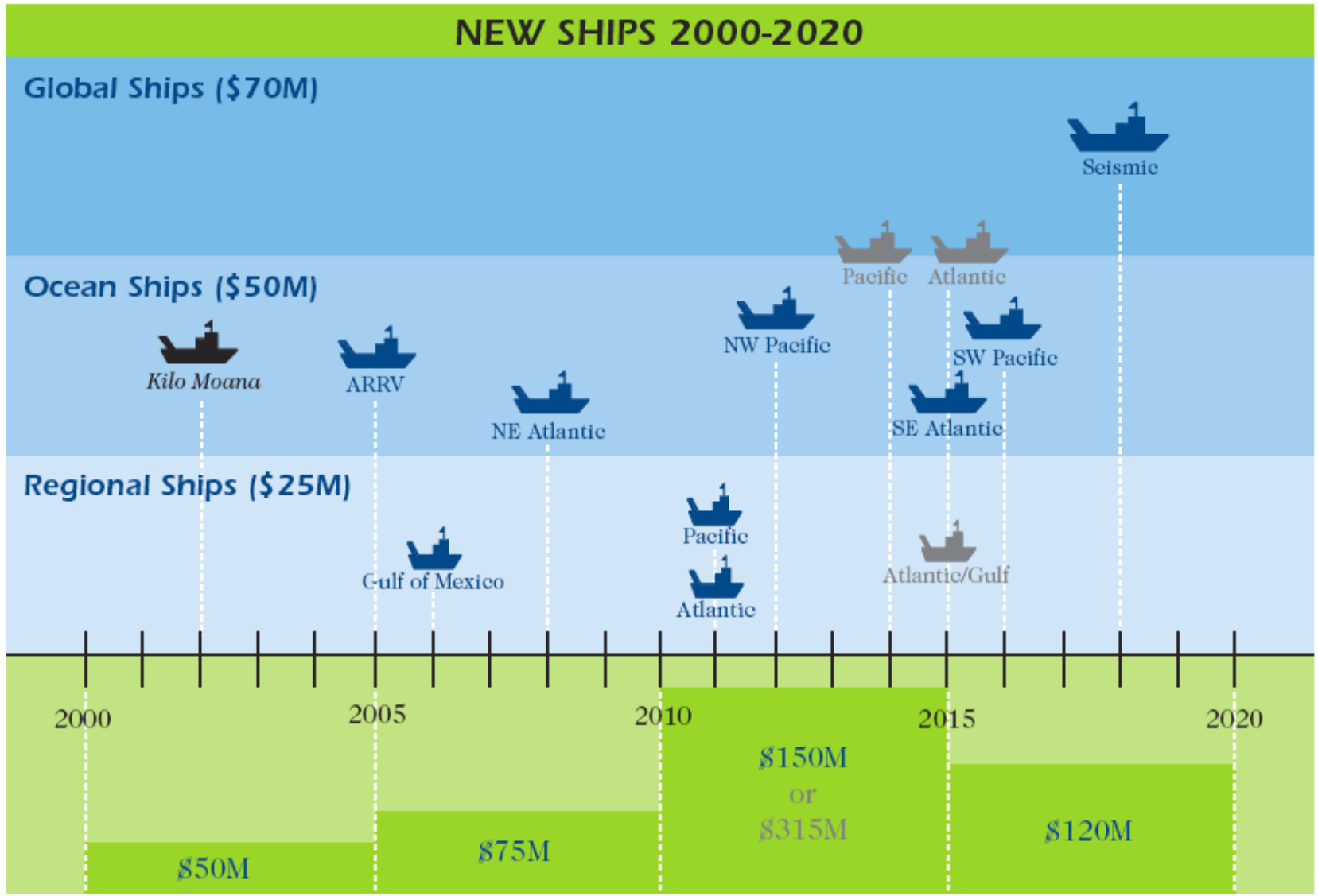
## University-National Oceanographic Laboratory System




- Major, long funding ramp, with or without Enhancements. Ocean Class needs a funding plan.
- Interagency cooperation Vital.
- UNOLS/FIC has refined SMRs with community Inputs.

= Ocean Class  = Regional Class  = Orphan Class

Figure 17. Proposed schedule for new construction.



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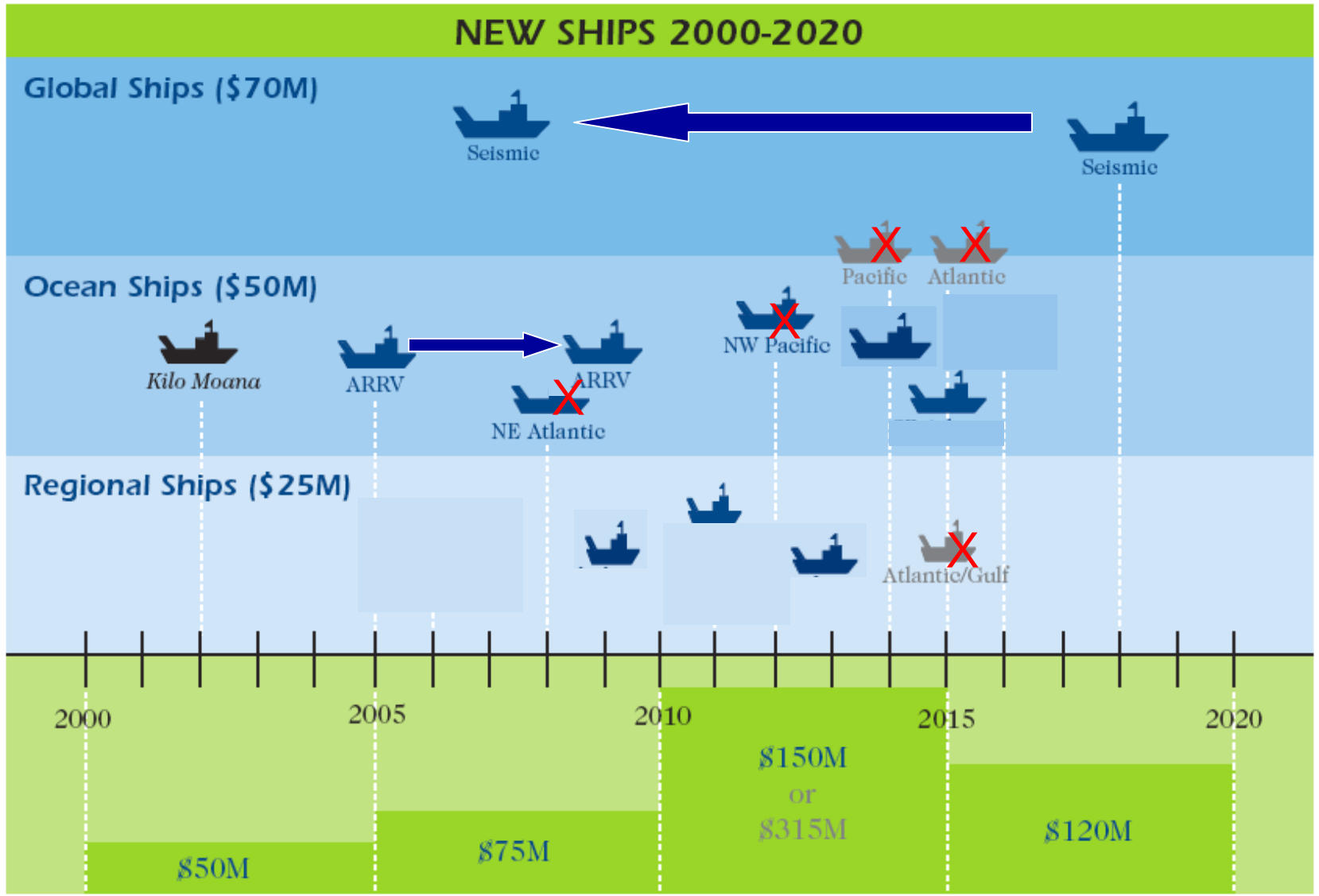

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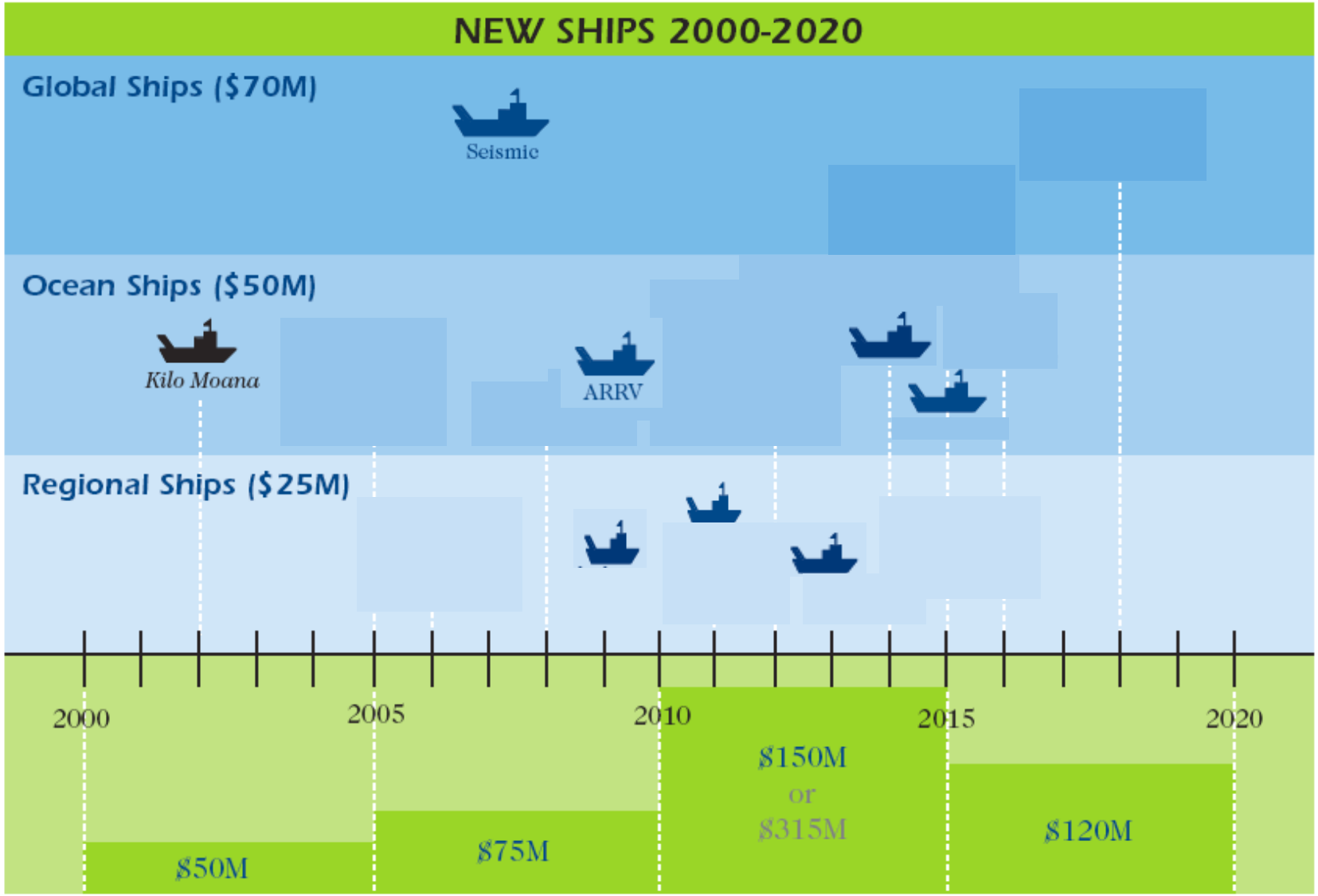

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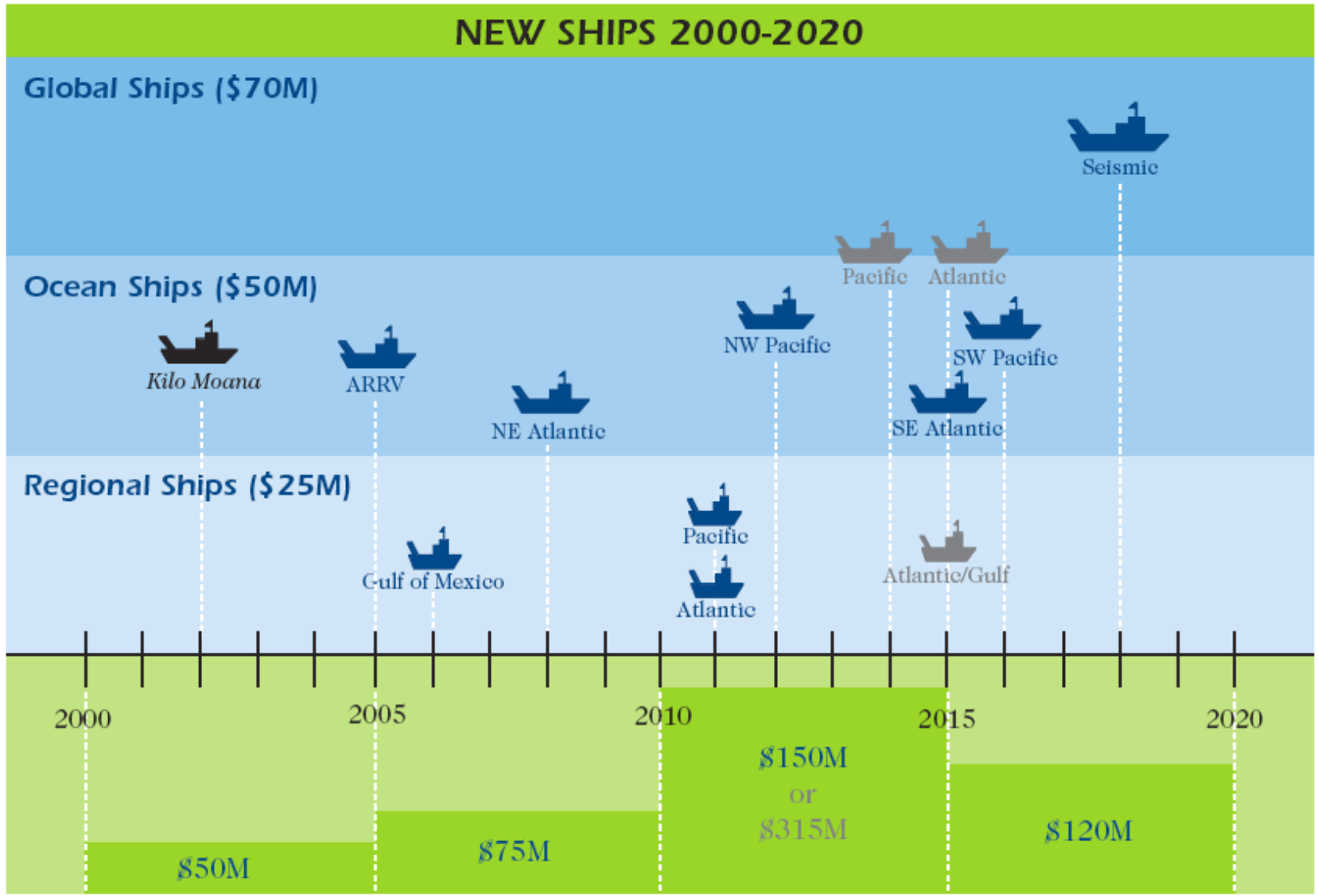
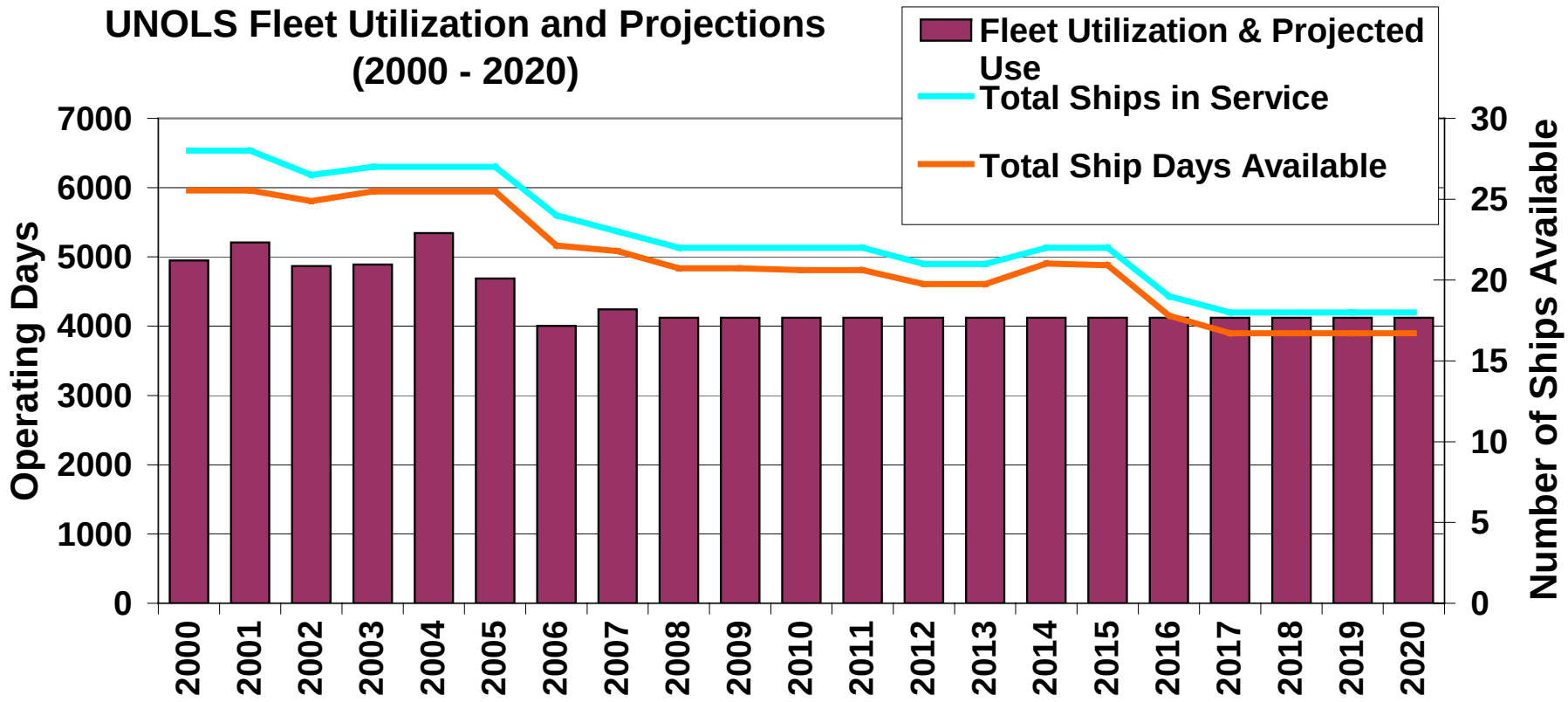



NEW SHIPS 2000-2020
Global Ships ($70M)
Seismic
Ocean Ships ($50M)
Kilo Moana
ARRV
Regional Ships ($25M)
2000
2005
2010
2015
2020

# Ship Service Timeline

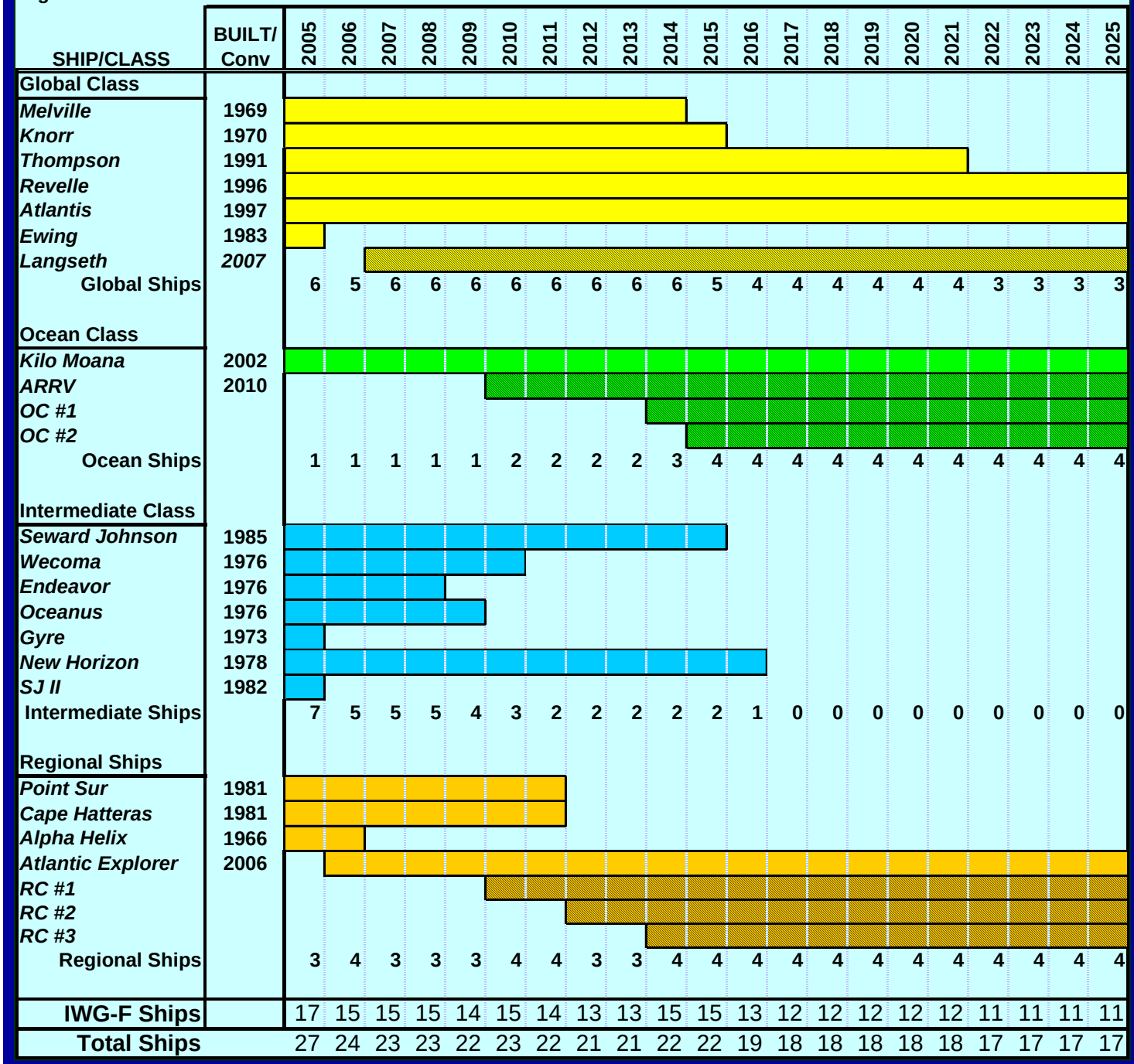
| Fleet Renewal Timeline | | |
|---|---|---|
| | | |
| **Ships** | **IWG-F** | **UNOLS** |
| | | |
| NSF: | | |
| Langseth | 2007 | 2007 |
| ARRV | 2009 | 2010 |
| RC #1 | 2009 | 2010 |
| RC #2 | 2011 | 2012 |
| RC #3 | 2013 | 2014 |
| | | |
| Navy: | | |
| OC #1 | 2014 | 2014 |
| OC #2 | 2015 | 2015 |

# UNOLS Fleet Projections




**Total ships in service is based on all planned ships being built: ARRV, 3 Regional, ARRV, 2 Ocean, and all current Locals are replaced.**

Figure 2: UNOLS Vessel Service Life Timeline



| SHIP/CLASS | BUILT/ Conv | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Global Class** | | | | | | | | | | | | | | | | | | | | | | |
| *Melville* | 1969 | | | | | | | | | | | | | | | | | | | | | |
| *Knorr* | 1970 | | | | | | | | | | | | | | | | | | | | | |
| *Thompson* | 1991 | | | | | | | | | | | | | | | | | | | | | |
| *Revelle* | 1996 | | | | | | | | | | | | | | | | | | | | | |
| *Atlantis* | 1997 | | | | | | | | | | | | | | | | | | | | | |
| *Ewing* | 1983 | | | | | | | | | | | | | | | | | | | | | |
| *Langseth* | *2007* | | | | | | | | | | | | | | | | | | | | | |
| Global Ships | | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 |
| **Ocean Class** | | | | | | | | | | | | | | | | | | | | | | |
| *Kilo Moana* | 2002 | | | | | | | | | | | | | | | | | | | | | |
| *ARRV* | 2010 | | | | | | | | | | | | | | | | | | | | | |
| *OC #1* | | | | | | | | | | | | | | | | | | | | | | |
| *OC #2* | | | | | | | | | | | | | | | | | | | | | | |
| Ocean Ships | | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **Intermediate Class** | | | | | | | | | | | | | | | | | | | | | | |
| *Seward Johnson* | 1985 | | | | | | | | | | | | | | | | | | | | | |
| *Wecoma* | 1976 | | | | | | | | | | | | | | | | | | | | | |
| *Endeavor* | 1976 | | | | | | | | | | | | | | | | | | | | | |
| *Oceanus* | 1976 | | | | | | | | | | | | | | | | | | | | | |
| *Gyre* | 1973 | | | | | | | | | | | | | | | | | | | | | |
| *New Horizon* | 1978 | | | | | | | | | | | | | | | | | | | | | |
| *SJ II* | 1982 | | | | | | | | | | | | | | | | | | | | | |
| Intermediate Ships | | 7 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Regional Ships** | | | | | | | | | | | | | | | | | | | | | | |
| *Point Sur* | 1981 | | | | | | | | | | | | | | | | | | | | | |
| *Cape Hatteras* | 1981 | | | | | | | | | | | | | | | | | | | | | |
| *Alpha Helix* | 1966 | | | | | | | | | | | | | | | | | | | | | |
| *Atlantic Explorer* | 2006 | | | | | | | | | | | | | | | | | | | | | |
| *RC #1* | | | | | | | | | | | | | | | | | | | | | | |
| *RC #2* | | | | | | | | | | | | | | | | | | | | | | |
| *RC #3* | | | | | | | | | | | | | | | | | | | | | | |
| Regional Ships | | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **IWG-F Ships** | | 17 | 15 | 15 | 15 | 14 | 15 | 14 | 13 | 13 | 15 | 15 | 13 | 12 | 12 | 12 | 12 | 12 | 11 | 11 | 11 | 11 |
| **Total Ships** | | 27 | 24 | 23 | 23 | 22 | 23 | 22 | 21 | 21 | 22 | 22 | 19 | 18 | 18 | 18 | 18 | 18 | 17 | 17 | 17 | 17 |

# UNOLS Vessel Retire-ment Dates

# UNOLS Vessel Retirement Dates

**Figure 2: UNOLS Vessel Service Life Timeline**

| SHIP/CLASS | BUILT/ Conv | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Regional/Coastal Ships** | | | | | | | | | | | | | | | | | | | | | | |
| ***Robert Gordon Sproul*** | **1981** | | | | | | | | | | | | | | | | | | | | | |
| ***Pelican*** | **1985** | | | | | | | | | | | | | | | | | | | | | |
| ***Longhorn*** | **1971** | | | | | | | | | | | | | | | | | | | | | |
| ***Walton Smith*** | **2000** | | | | | | | | | | | | | | | | | | | | | |
| ***Weatherbird II*** | **1989** | | | | | | | | | | | | | | | | | | | | | |
| ***Cape Henlopen*** | **1976** | | | | | | | | | | | | | | | | | | | | | |
| ***Hugh R. Sharp*** | **2005** | | | | | | | | | | | | | | | | | | | | | |
| **Regional/Coastal Ships** | | **6** | **5** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **3** | **3** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** |
| **Local Ships** | | | | | | | | | | | | | | | | | | | | | | |
| ***Urraca*** | **1986** | | | | | | | | | | | | | | | | | | | | | |
| ***Savannah*** | **2001** | | | | | | | | | | | | | | | | | | | | | |
| ***Blue Heron*** | **1985** | | | | | | | | | | | | | | | | | | | | | |
| ***Clifford Barnes*** | **1966** | | | | | | | | | | | | | | | | | | | | | |
| **Local Ships** | | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** |
| **Total non IWG-F** | | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| **Total Ships** | | 27 | 24 | 23 | 23 | 22 | 23 | 22 | 21 | 21 | 22 | 22 | 19 | 18 | 18 | 18 | 18 | 18 | 17 | 17 | 17 | 17 |

# A Comparison of Today's Fleet with the Fleet 2025

## University-National Oceanographic Laboratory System

| Class | Number of Ships in 2005 | Total # Science Berths in 2005 | Days Available | Avg Days Used (2003 - 2006) | | Number of Ships in 2025 | Total # Science Berths in 2025 | Available Days |
|---|---|---|---|---|---|---|---|---|
| Global | 6 | 199 | 1800 | 1483 | | 3 | 94 | 900 |
| Ocean | 1 | 30 | 275 | 249 | | 4 | 120 | 1100 |
| Intermed. | 7 | 147 | 1750 | 1431 | | 0 | 0 | 0 |
| Regional | 3 | 39 | 600 | 420 | | 4 | 70 | 800 |
| Fleet Total | 17 | 415 | 4425 | 3583 | | 11 | 284 | 2800 |

Note: ARRV and 2 Ocean Class ships will have 30 bunks each

New Regional class ships each have 16 bunks

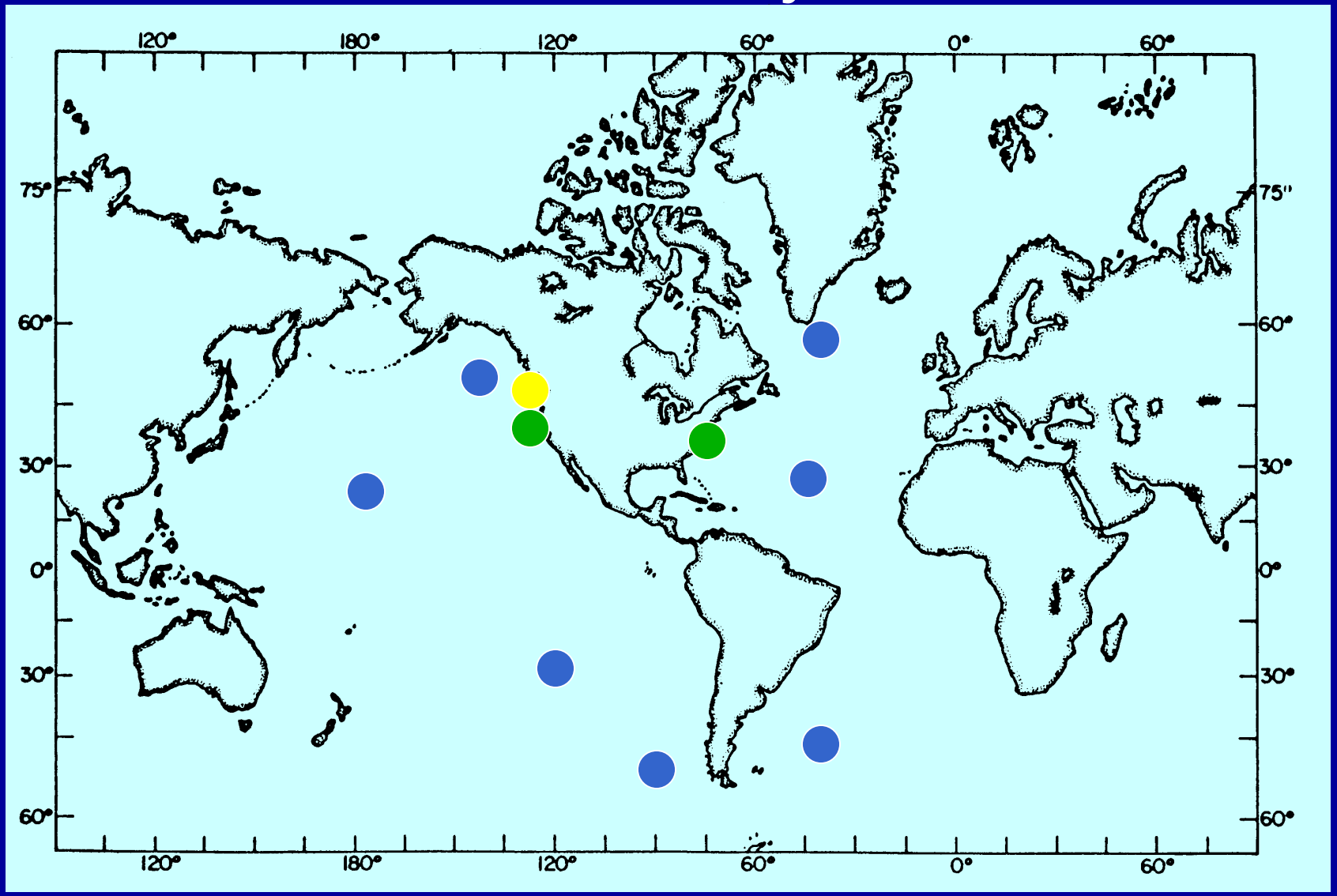
# Global Scale Observatory Ship use and ROV use Requirements

| | Loc'tn | Ship Class | Install days | ROV | Maint .Days | ROV |
|---|---|---|---|---|---|---|
| Station Papa, N Pacific | 50N, 145W | Global | 16 | no | 19 | no |
| Irminger Sea, N Atl | 60N, 39W | Global | 20 | no | 23 | no |
| Mid-Atl Ridge spar buoy | 23N, 44W | Global | 24 | yes | 27 | yes |
| SW Chile | 55S, 90W | Global | 20 | no | 23 | no |
| Argentine Basin, S Atl | 42S, 42W | Intmed | 15 | no | 18 | no |
| S Pacific Gyre | 28S, 120W | Intmed | 23 | no | 26 | no |
| Hawaii acoustic source | 23N, 158W | Global | 3 | yes | 4 | yes |
| **Total Global Ship days** | | | **83** | | **96** | |
| **Total Intermediate Ship days** | | | **38** | | **44** | |
| **Total Global Observatory Ship Days** | | | **121** | | **140** | |

# Regional and Coastal Observatory Ship Requirements

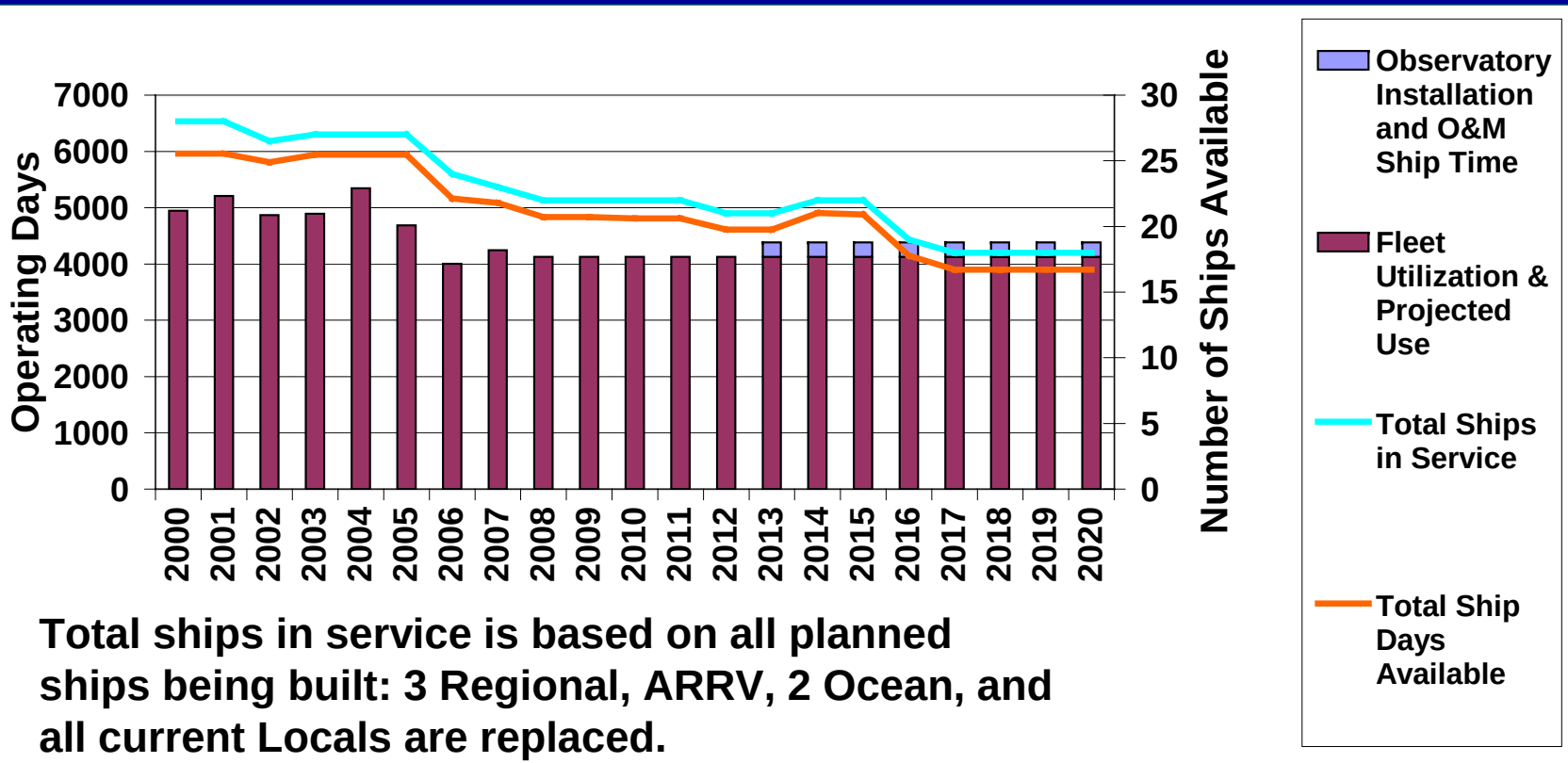
| | Install days | ROV | O&M. Days | ROV |
|---|---|---|---|---|
| Regional Cable Observatory **(Global Vessels)** [based on science indicated in the RFA, up to ~160 ship days annually may be required to service RCO] | 4.5 | Yes (4) | 32 | Yes (6) |
| Pacific NW Endurance Array **(Regional and Coastal Vessels)** | 29 | Yes (11) | 53 | Yes (13) |
| Pioneer Array – Mid-Atl Bight **(Coastal Vessels)** | 26 | Yes (12) | 34 | Yes (12) |
| **Total Regional and Coastal Observatory Ship days** | **59.5** | **27** | **119** | 31 |
| **Total Global Observatory Ship Days** (from previous slide) | **121** | | **140** | |
| **TOTAL Observatory Ship Days** | **180.5** | | **259** | |

# Ocean Observatory Locations




Global RCO Coastal

# UNOLS Fleet Projections with Observatory Facility Needs




**Total ships in service is based on all planned ships being built: 3 Regional, ARRV, 2 Ocean, and all current Locals are replaced.**

# UNOLS Vessel Retirement Dates and Service Life Extension Program Estimates

# 2007 SLEP Updates

February 2007 – Operators for Endeavor, Oceanus, Wecoma, Point Sur, and Cape Hatteras were polled:

1. How long can you continue operating your vessel with your present maintenance plan before you would need a service life extension program (SLEP)?
2. In 2004, all of the operators were polled regarding SLEP requirements and associated costs. Does the cost and work items identified in the 2004 survey still represent the SLEP requirements for the ship that you operate?

- Reminder: SLEPs are not intended to upgrade the condition or outfitting of the vessel. The purpose of the SLEP is to extend service life.

# 2007 SLEP Updates

| UNOLS Vessel Retirement Dates and SLEP Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vessel | Current Retirement Date | 2004 Revised Retirement Date | 2004 5-year estimated SLEP Cost ($M) | 2004 10-year estimated SLEP cost ($M) (*) | 2007 Year SLEP is Needed | 2007 Service Life with SLEPs | 2007 5-year estimated SLEP Cost ($M) | 2007 10-year estimated SLEP cost ($M) (*) |
| ENDEAVOR | 2008 | 2018 | $1.025 | $1.5 | **2011** | **2019** | **$0.75** | **$1.35** |
| OCEANUS | 2009 | 2019 | $1.175 | $1.98 | **2011** | **2021** | **$2.075** | **$3.05** |
| WECOMA | 2010 | 2020 | $1.5 | $2 | **2010** | **2020** | **$3.695** | **$3.970** |
| CAPE HATTERAS | 2011 | 2016 | $2 | $5 | **2015** | **2025** | **$0.835** | **$5** |
| POINT SUR | 2011 | 2016 | $2.125 | $5 | **2011** | **2016** | **$0.785** | **$1.785** |
| ATLANTIC EXPLORER | 2026 | | | | | | | |
| MELVILLE | 2014 | 2019 | $3.745 | $5.295 | | | | |
| KNORR | 2015 | -- | -- | -- | | | | |
| SEWARD JOHNSON | 2015 | 2020 | $5 | $7.5 | | | | |
| NEW HORIZON | 2016 | 2021 | $1.150 | $1.70 | | | | |
| MARCUS LANGSETH | 2025 | 2025 | -- | -- | | | | |
| T.G. THOMPSON | 2021 | -- | -- | -- | | | | |
| R. REVELLE | 2026 | -- | -- | -- | | | | |
| ATLANTIS | 2027 | -- | -- | -- | | | | |
| KILO MOANA | 2032 | -- | $7.5 | $12.5 | | | | |
| Note: | * 10-Year SLEP cost includes the cost of the 5-year SLEP estimate. | | | | | | | |

# Intermediate SLEP - Issues

- SLEP extends service life without enhancing science capability
- Intermediate Class ships do not meet Ocean Class SMRs and several Regional Class SMRs
- Intermediate ships lack DP
- Intermediate ships lack hull-mounted full depth multibeam
- Intermediate Ships are within razor edge of remaining within 300 GT threshold for classification
- Despite time and cost put into a SLEP, issues associated with age/use may still lead to increased maintenance cost.
- As machinery ages, risk of failure increases and cost of replacing equipment also increases.

# Intermediate SLEP - Recommendations

- Enhancements to the scientific capability should also be considered.
- Consultation with Naval Architects and USCG assessments are required before consideration of SLEP

# Global Class SMRs

- **Community Survey -** In Progress:

<http://www.unols.org/committees/fic/global/_GCSMR_Survey_Form.asp>

- **Community Input:**

<http://www.unols.org/committees/fic/global/gcsmrinput.html>

- **Project Website:**
  <http://www.unols.org/committees/fic/global/global_smr.html>

**2006 - *THOMPSON***

**2011 – *REVELLE***

**2012 – *ATLANTIS***

# *Kilo Moana* Handling System

- System manufacturer - Caley Ocean Systems (Glasgow)
- Delivery/Installation Status - Dave Hebert to report
- *Jason 2* test on KM: 17-21 November, 2006.

# Volunteers and Opportunities

- A draft web page has been developed. FIC input is needed.
  - <http://www.unols.org/info/volunteers.html>

# FIC Membership

- **David Hebert, URI (Chair) – [at-large, 9/09] PO**
- **Newell Garfield, SFSU – [Non-op, 9/09] PO**
- **Jim Cochran, LDEO – [At-large, 10/07] MG&G**
- **Terry Whitledge, U Alaska – [Operator, 7/07] BIO/Chem**
- **Clare E. Reimers, OSU – [Operator, 1/09] Chem**
- **Bauer, Jim, VIMS – [Non-Operator, 9/09] Chem/Bio**
- **Maureen Conte, BBSR – [Operator, 9/09] BioGeoChm**
- **Al Hine, USF – [Non-Operator, 9/09] Geology**
- **Marc Willis, RVTEC Rep (ex-officio)**
- **Al Suchy, RVOC Rep (ex-officio)**

**Jim Cochran (10/04 – 10/07) Eligible for Second Term**
**Terry Whitledge (7/00 – 7/07) Second Term Ending**

# Past Nominees

- UNOLS Operator Representative:
  - Kenneth Coale (MLML) - BioGeoChem
- Non-Operator Representative from any Institution:
  - Raphael Kudela (UC, Santa Cruz) – Biol O
  - Jim Moffett (move to U. of S. Cal in 2007) – Chem O

# Backup Slides

# 2004 SLEP Estimates

In 2004 the UNOLS Vessel Operators were polled:

- Should vessel retirement dates be extended? And if so:
    - Service Life Extension Program (SLEP) cost estimate for 5-year extension
    - SLEP cost estimate for 10-year extension
- How do the capabilities of their current ships compare to the Ocean Class and Regional Class SMRs?

# 2004 SLEP Findings

<http://www.unols.org/committees/fic/FIP05/retire_date_report_Oct04.PDF >

- Nine UNOLS ships >40 m have retirement dates prior to 2020 and are potential candidates for a SLEP:
- 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.
- Extension of retirement dates for most vessels <40m is not recommended.
- The immediate focus for ships with retirement dates past 2020 is on mid-life refit planning.

# 2004 SLEP Findings

- 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
  - Regional Class ships fall short of the Regional Class SMRs in many areas.
- 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.