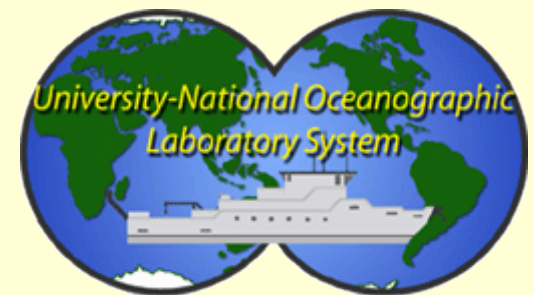


# Overview of the UNOLS SMR Process

Polar Research Vessel Workshop

Feb 28-Mar 1, 2011

Arlington. VA



# What is Ship Design ?

## **Chapter 4- Oceanographic Research Vessel Design**

“Ship Design is an exercise in conflict resolution. It is the creation of a system of systems to perform a specific mission while balancing conflicting requirements to achieve a ship capable of performing its mission in the best way possible within economic constraints.

Oceanographic ship design is one of the very complex subsets of ship design, due to the large variety of oceanographic missions: physical, biological, and chemical oceanography; marine geology and geophysics; ocean engineering; and atmospheric science. Each discipline has its own unique set of mission requirements, yet a given ship is called upon to perform work for a number of different disciplines, often on the same research cruise. In addition, the capital needed to build effective oceanographic ships is finite and scarce”

***Science at Sea- Meeting Future Oceanographic Goals with a robust academic research fleet, National Research Council- 2009, RADM Richard Pittenger & Ronald Kiss- Co-Chairs***

# UNOLS SMRs – Background, Process, Document

- Purpose of SMRs
- Background and Timeline of UNOLS SMRs
- SMR Workshop
- The SMR Document
  - Mission Statement
  - Elements
  - Mission Scenarios
- Community Survey

# PURPOSE OF SMR

- **SMR Purpose**

- Ensure ship design and construction based on scientific requirements
- Ensure important criteria are identified early in design cycle
- Set priorities for design compromises
- First step in Design Cycle Process

“The process used to construct new ships is many faceted, but a **fundamental action is the formulation of the Science Mission Requirement: the SMR. The SMR states with as much specificity as possible what attributes the ship must have to perform the science envisioned.** For example

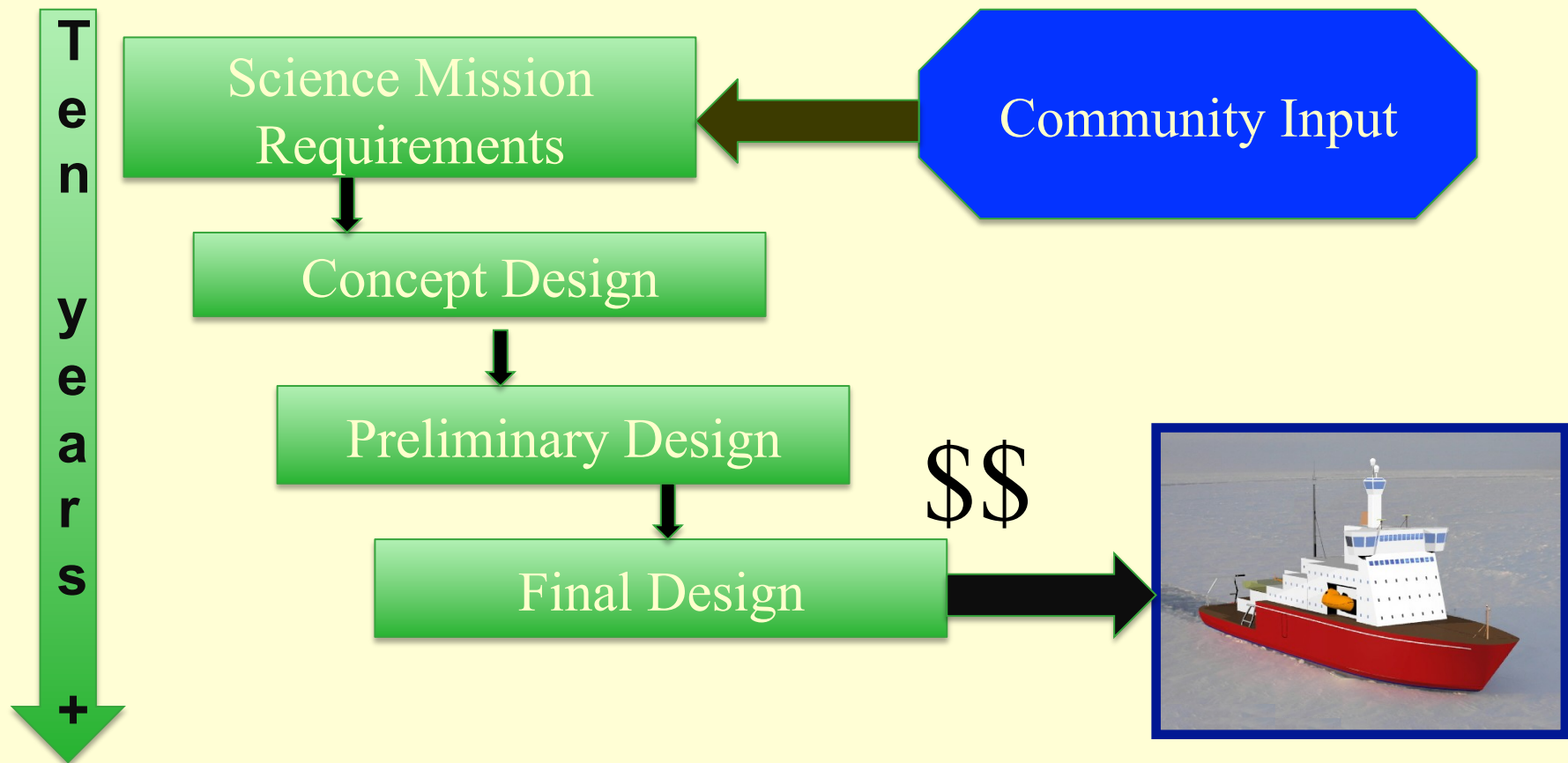
‘What is the maximum sea state that a CTD cast can be taken in?’

or

‘Is a core storage freezer needed and how big should it be?’

# PURPOSE OF SMR

‘The SMR provides a science capability framework for the steps between community input, vessel concept design, and final construction. It is not meant to serve as a final list of specifications, but as a list of science needs that may face prioritization during the funding and construction phase for the Ocean Class vessels.’



# UNOLS SMR Process

## Timeline/Milestones

- Late 1980's – SMRs for all UNOLS Ship Classes published
- 2001 – Agencies announce two new ship classes: Regional Class Research Vessel (RCRV) and Ocean Class Research Vessel (OCRV)
- May 2002 – SMR Workshop Announcement for OCRV and RCRV
  - Registration form and on-line **Questionnaire** (~6 week response period)
- Summer 2002 - Workshops: RCRV (July 15-16), OCRV (Aug 15/16)
- Late Fall 2002 – SMRs posted for community comment
- March 2003 – OCRV and RCRV SMRs published
- July 2004 – RCRV SMR Prioritization
- Oct 2009 – OCRV: Community Survey on SMR Values and Priorities (see **Questionnaire**)

## **Agenda**

# **UNOLS Regional Class Research Vessel Science Mission Requirement Workshop August 15 & 16 - Salt Lake City, Utah**

## **Major Discussion Topics:**

- Discuss the Workshop purpose, scope, and expected results of the meeting
- Review elements of SMR report
- Review mission statement & general requirements
- Review Community SMR Input
- Operational feasibility of desired features (Naval Architectural Input)
- Mission Scenarios – develop representative scenarios
- Work on individual SMR parameters
- Draft SMR – review and edit
- Assess Regional differences and requirements

# Science Mission Requirements - Parameters

- **Mission statement and Overall Characteristics**
- **SMR Details**
- **Accommodations and Habitability**
  - Accommodations – crew & non-crew
  - Habitability
- **Operational Characteristics**
  - Endurance & Range
  - Speed
  - Sea Keeping
  - Station Keeping
  - Track line following
  - Ship Control
  - Ice Strengthening
- **Over-the-side and weight handling**
  - Over the Side Handling
  - Winches & Wires
  - Cranes
  - Towing
- **Science working spaces**
  - Working Deck Area
  - Laboratories
  - Vans
  - Storage
  - Science Load
  - Work boats
  - Masts
  - On deck incubations
  - Marine mammal/bird observations
- **Science and shipboard systems**
  - Navigation
  - Data network and onboard computing
  - Real time data acquisition system
  - Communications - internal
  - Communications – external
  - U/W data collection & sampling
  - Acoustic Systems
  - Project science system installation and power
  - Discharges
- **Construction, operation & maintenance**
  - Maintainability & Operability
  - Life Cycle Costs
  - Regulatory Issue
- **Americans with Disabilities Act**



# SMR Document Appendices

- **Appendix I – Mission Scenarios**
- **Appendix II – SMR Process and Participants**
- **Appendix III – Sea State Definitions**
- **Appendix IV – Ship Motion Criteria**
- **Appendix V – ADA Guidelines for Vessels**
- **Appendix VI – Document Change History**

# Mission Statement & Overall Characteristics

- Why
- Area of operations
- Type of work
- Important Features
- High Priorities
- Design considerations
- Size, Cost and other constraints

# Mission Scenarios

- G & G
  - Coring
  - Geophysical
  - Dredging
- Multi - Disciplinary
- Fisheries research
- ROV/AUV ops
- Moorings
- Physical Ocean.
- Mooring cruises
- OBS/Drifter deployment
- Biological process
- Chemical Ocean./ Trace metals
- Student cruises
- Others?

# Mission Scenario Elements

- Area of operations
- Time of year
- Type of work
- Distance to operating area
- Speed for transit and for surveys/towing
- Days for transit, on station, towing/survey
- Number of non-crew personnel (Science party)
- Major/Special Equipment or Facilities needed

# Mission Scenario - Blank

Area of Ops:				
Time of Year:				
Type of work:				
Distance from nearest port: (nm)		Transit speed:		
		Tow/survey Speed:		
Days needed	On Station	Towing/Survey	Transit	Total
# Sci:				
Major/Special Equipment:				

# Mission Scenario - Sample

Area of Ops:	Coastal Shelf - off Point Arena, California				
Time of Year:	Spring or early summer, upwelling season				
Type of work:	Current Meter moorings, ADCP survey, CTD transect, Productivity experiments				
Distance from nearest port: (nm)	100 nm	Transit speed:		10 - 12 knts	
		Tow/survey Speed:		10 (adcp)	
Days needed	On Station	Towing/Survey	Transit	Total	
# Sci:	14	7	N/a	7	14
Major/Special Equipment:	Crane and anchor sled for mooring work, ADCP, CTD, Incubators				

## 2009 - Community Feedback Requested

- Fleet Improvement Committee drafted target objectives and minimum threshold values for each Ocean Class requirement, along with a relative priority level.
- They requested community opinion on whether or not they agree with these values and priorities.
- The table was created to make the SMRs a more effective resource in ship design development, target objectives, minimum requirements, and relative priorities have been established to help guide design decisions.

## 2009 - Community Feedback Requested (continued)

- The OCRV table provides criteria for key design elements of Ocean Class research vessels.
- The criteria included in the table are items that are quantifiable and could have a range of acceptable levels or scope:
  - Minimum Threshold Values = minimum acceptable value for this Class of vessel.
  - Target Objectives = greater capabilities that are desired if they can be achieved within the budget and without compromising the threshold values.
- The priority levels:
  - Critical
  - Very Important
  - Important
- **[http://www.unols.org/forms/\\_OCSMR\\_FeedbackForm.asp](http://www.unols.org/forms/_OCSMR_FeedbackForm.asp)**



# *Next Steps*

SMR Lessons Learned

Stay tuned...

# UNOLS Survey on Ship Use

- Over the past few years the number of science proposals submitted to federal agencies that include UNOLS ship time requests has dropped significantly.
- A survey has been created to collect data that will help us to better understand the nature of the ship time demand decline.

[http://www.surveymonkey.com/s/unols\\_vessel\\_usage\\_survey](http://www.surveymonkey.com/s/unols_vessel_usage_survey)>

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Research cruise training opportunity for early-career investigators has just been announced

< [http://www.unols.org/info/cruise\\_training.html](http://www.unols.org/info/cruise_training.html)>

*Thank you!*