Project Update

RVTEC 2011

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SIKULIAQ

- “sih-KOO-lee-ack”
- *Inupiaq* word for young sea ice, ice thick enough to walk on
WHAT IS R/V SIKULIAQ?

- Alaska Region Research Vessel (ARRV)
- Ice-capable general oceanographic research ship
  - IACS PC-5 Ice Classification – one of the first in US
  - 260 feet length
  - 4,053 LT displacement at design draft
  - 5,750 HP
  - 45-day endurance
  - Integrated power plant with AC propulsion motors
  - Tractor style Z-drives
- Owned by NSF, being built and operated by UAF
- UNOLS Global Class
- Homeport in Seward, Alaska
Hull Form Design for Ice Operations

- IACS/ABS PC-5 Ice Class
- Ice wedge and reamers
- 24” frames and significant shell plating
- Z-drive propulsion for maneuverability
- Double bottom
Bow form and detail of the ice wedge showing the bow thruster.
Detail of the ice reamer
Stern view with tractor Z-drive units and ice stops
Project Execution

• Four phase project
  – Phase 1 design update (completed)
  – Phase 2 Shipyard contracting (completed)
  – **Phase 3 Shipyard construction (current phase)**
  – Phase 4 Post-delivery testing

• All funding from NSF, but mix of:
  – MREFC funds
  – ARRA (stimulus) funds
SIKULIAQ CONSTRUCTION

• SIKULIAQ being built by Marinette Marine Corporation in Marinette, Wisconsin
• Construction cost: $123M
• Projected Delivery: January 2013
• Ready for Science: Late 2013
• Project funding through the American Recovery and Reinvestment Act provided by the National Science Foundation
Blast and paint building

Where our shipyard office trailer is

Shipyard engineering and management offices

Shipyard shipping/receiving and warehouse

Where the modules are put together to make the ship

Where steel is cut

Where modules are built

Side launch ways

MARINETTE MARINE CORPORATION SHIPYARD
MARINETTE, WISCONSIN
Current Construction Status
R/V SIKULIAQ Mockups

- MMC has mocked up Main Deck Labs, Bridge, Science Control Room, Upper Lab and ADA Stateroom
- Mockups include furnishings, cableways, HVAC, electrical/mechanical systems, joinery.
- Structure has been fabricated “life size”
- Reviews by Ship Captains and Science Oversight Committee
Mockups
R/V SIKULIAQ
“The Weight Issue”

• MMC’s Weight Estimate delivered Sept 2010
  - MMC estimate ~ 300LT greater than Contract Estimate
  - Weight+VCG too high – the ship “doesn’t work”

• How did this happen?
  - Inaccurate weights from vendors (30-50% of the problem)
    - Major equipment (engines, cranes, …)
  - Margins (20-30%)
    - Steel millage, design/construction, …
  - Others – errors, omissions, misc.
Generalized VCG

FAIL

PASS

Vertical Center of Gravity
Naval Architecture
From a Technician’s Perspective

"I think you should be more explicit here in step two."
R/V SIKULIAQ
The Weight Solution

• Several options evaluated combining various lengths with weight savings

• Decided on:
  - Increase length 6 feet in parallel midbody = 260 ft ship
  - Change from Steel to Aluminum structure above 02 deck
  - Eliminate elevator service above 01 deck
  - Shorten/rearrange Pilothouse
  - Other weight savings
    - light-weight joinery, steel reductions, electric deck heat, …

• The ship “works”
  - VCG is below the line, including full icing and science loads
  - Healthy VCG and weight margins at End-of-Life

• Will involve some delay in delivery – details are in development
R/V SIKULIAQ
Anticipated Schedule

Design Verification and Transfer  Wrapping Up
Start Fabrication            ? December 2010
Keel Laying                 February 2011
Z-drives Delivered to Shipyard December 2011
Launch                      April 2012
Builder’s Trials            October 2012
Acceptance Trials           November 2012
Delivery                    January 2013
Post Delivery Dockside/Training February/March 2013
Transit and Science Trials  April to June 2013
Inport Seward                July 2013
Ice Trials                   August to September 2013
Inport and Dry-dock          September 2013
NSF Inspection               October 2013
THAT'S MY PLAN. NOW I'D LIKE TO OPEN THE FLOOR TO YOUR SOUL-CRUSHING NEGATIVITY.

YOU HAVE WRITTEN HUMANITY'S FINAL CHAPTER! I'LL NEVER KNOW LOVE.

ANTICIPATING IT DIDN'T HELP.