R/V SIKULIAQ

Project Update

RVTEC 2011

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RESEARCH VESSEL SIKULIAQ

SIKULIAQ

- “sih-KOO-lee-ack”
- *Inupiaq* word for young sea ice, ice thick enough to walk on

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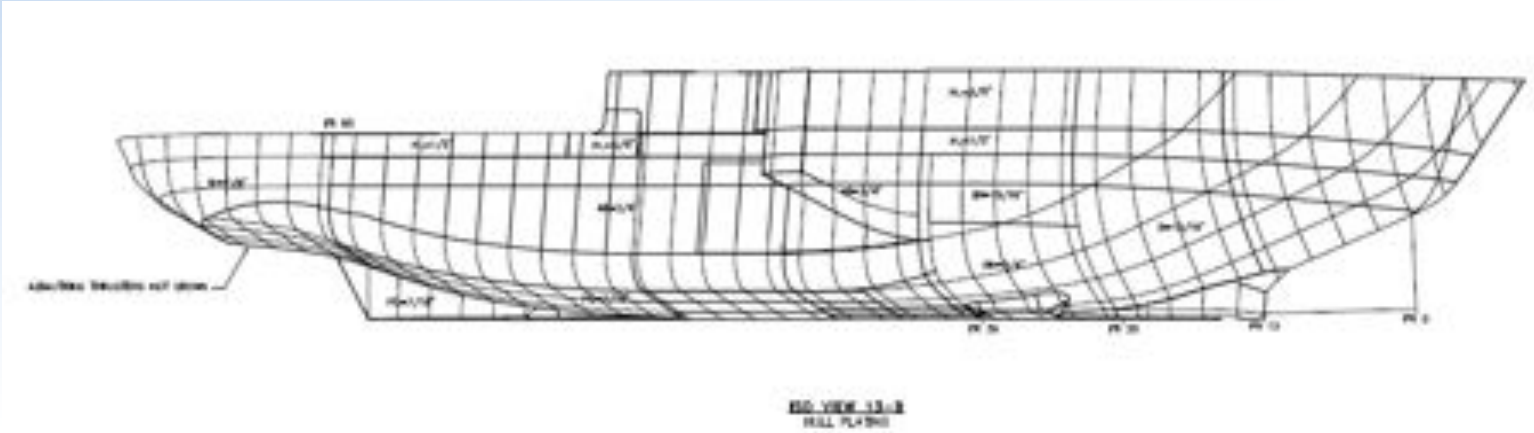
WHAT IS R/V SIKULIAQ?

- 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



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Bow form and detail of the ice wedge showing the bow thruster.

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Detail of the ice reamer

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Stern view with tractor Z-drive units and ice stops

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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

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Current Construction Status

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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

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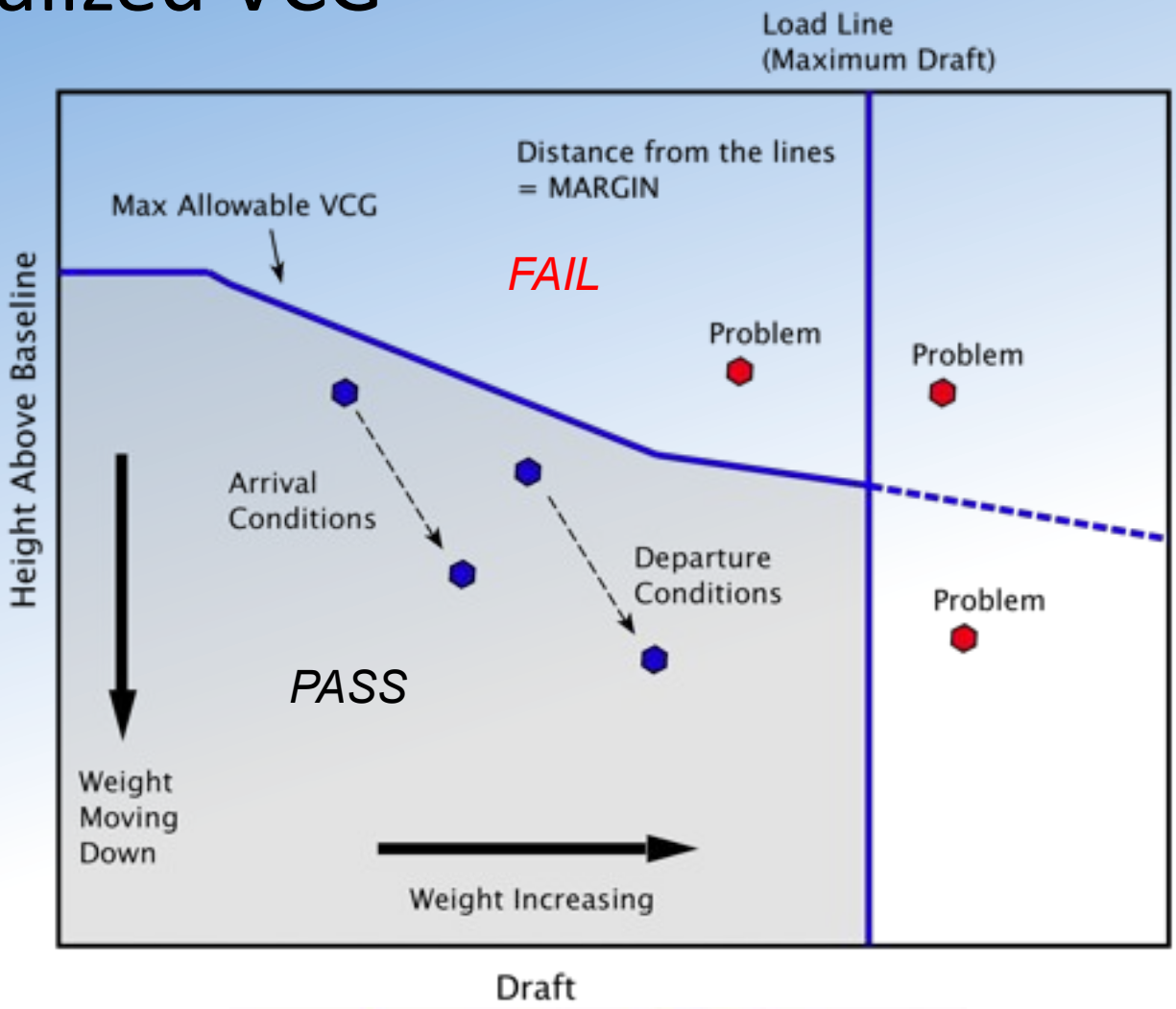
R/V SIKULIAQ
"The Weight Issue"

- 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

Vertical
Center
of
Gravity



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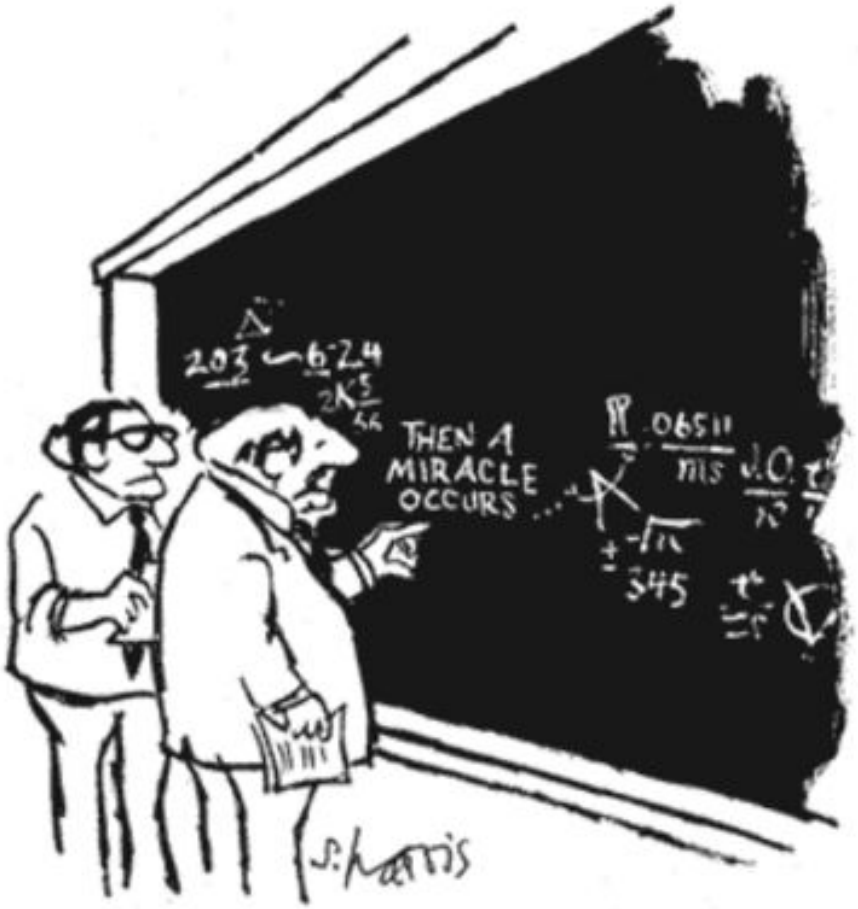
Naval Architecture From a Technician's Perspective



"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."

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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

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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

http://mather.sfos.uaf.edu/arrv/


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