ALASKA REGION RESEARCH VESSEL

Significant Differences and Improvements from 2004 Design

- LOA increased 6 feet
- Eliminated large fish trawl capability
- Increase noise abatement specifics
- Improved crew accommodations
- Science load handling systems improved
- Centerboard design refined
- Eliminated Aloft Conning Station
- Improved lab arrangements and details

PHYSICAL CHARACTERISTICS		
Length, Overall	LOA	242'-0"
Length, Design Waterline	LWL	219'-0"
Beam, Max across reamer	Bmax	52'-0"
Beam, Max across hull amidship	Bmidship	48'-0"
Depth, Keel to Main Deck	D	28'-0"
Draft, Design Waterline	TDWL	18'-9"
Freeboard, Design Waterline	FDWL	9'-3"
Displacement at Design Waterline	ΔDWL	3,375 LT
Propulsion Power	P	5,750 BHP
PERFORMANCE		
Endurance	45 days	
Endurance, Hotel Only	60 days	
Speed, Calm Open Water	Vcalm	14.2 kts
Speed, 4 M Sea (13.1 ft)	Vss 5	12.3 kts
Level Ice at 2 kts	Ice thickness	2'-5"

CAPACITIES	
Science Berths	26
Crew Berths	20
Science deadweight	100 LT
Science/Storage Vans, 8' x 20'	2 - 4
Science storage	8,000 ft3
Diesel Fuel, at 95%	170,000 gal
Fresh Water, at 100%	13,190 gal
Water making capacity	6,000 gal/day
Provisions	60 days
Holding capacity	24 hrs
Science Labs	2,100 ft2
Deck Working Area	3,690 ft2

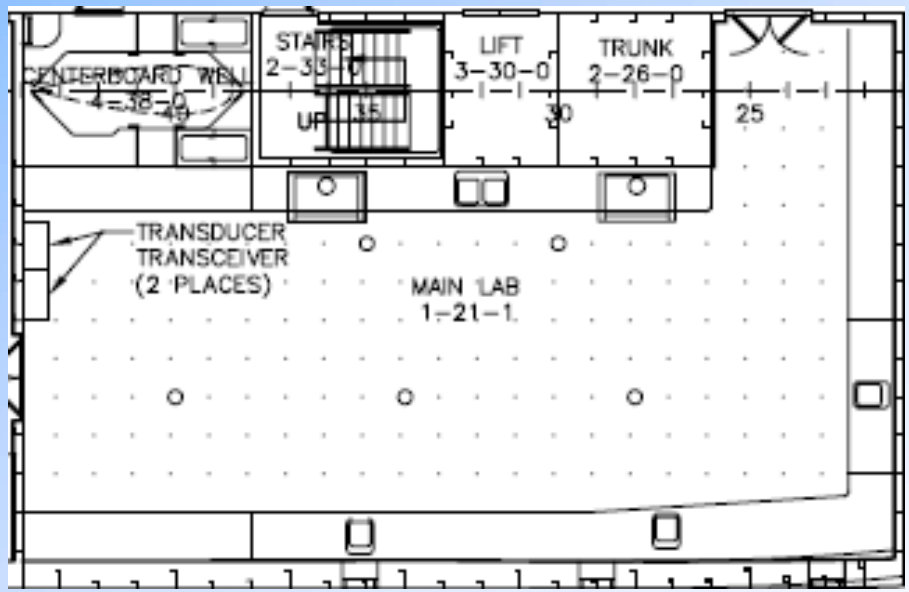
Science Capabilities of the ARRV

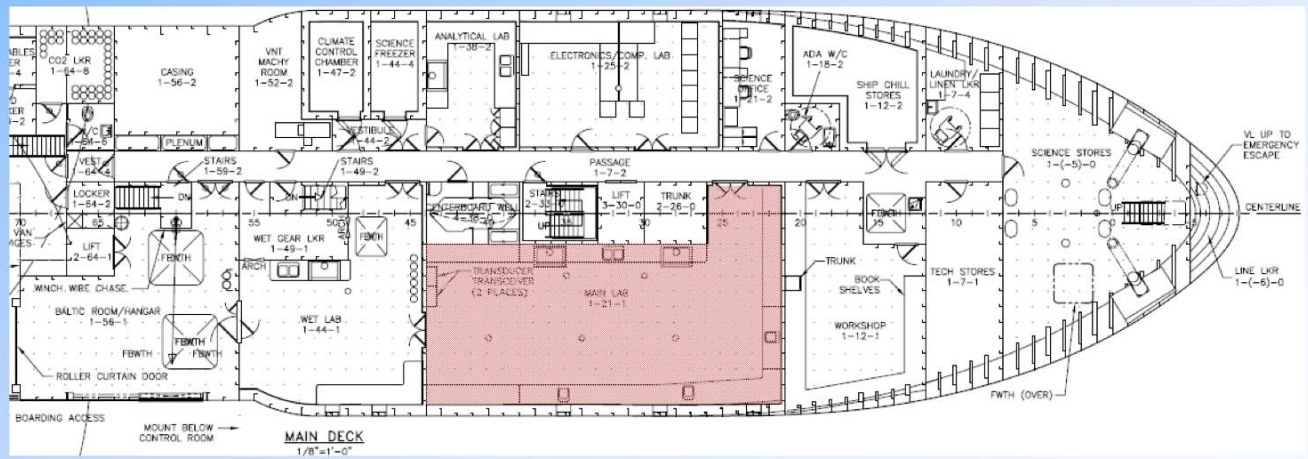
The ARRV will provide the tools needed to support ocean research on the emerging critical questions throughout the North Pacific, Bering Sea, and Arctic Ocean

- **State-of-the-art acoustic systems for bathymetry and bottom mapping**
- **“Hands-free” over-the-side profiling and water sampling system**
- **Capability for deck arrangements to be configured for long cores, mooring deployments, ROV deployments, biological tows etc.**
- **Acoustically quiet ice capable vessel**
- **Deck services for ROV and AUV deployments and support vans**
- **Accommodations for large multidisciplinary science parties**
- **Environmental chamber and freezer for controlled experiments**
- **Excellent seakeeping and station keeping capabilities**
- **Can accommodate up to four science vans**
- **State-of-the-art science data and communications systems**

Main Lab

- 1000 Square Feet
- Two Chemical Hoods
- Adjustable bench with sink

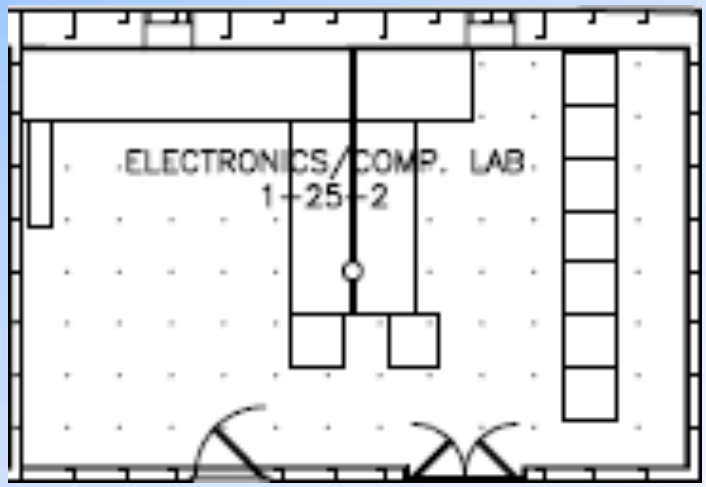


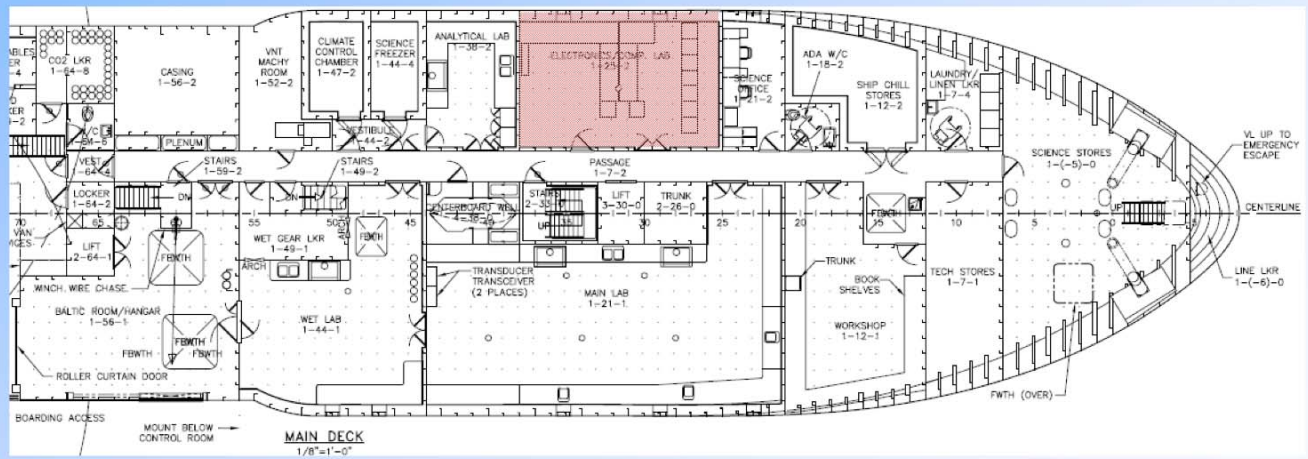


Main Deck

Computer Lab

- 410 Square Feet
- Nine Full Racks

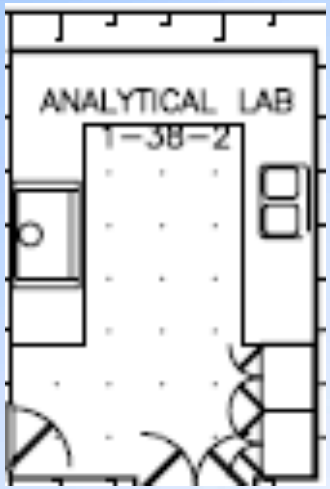


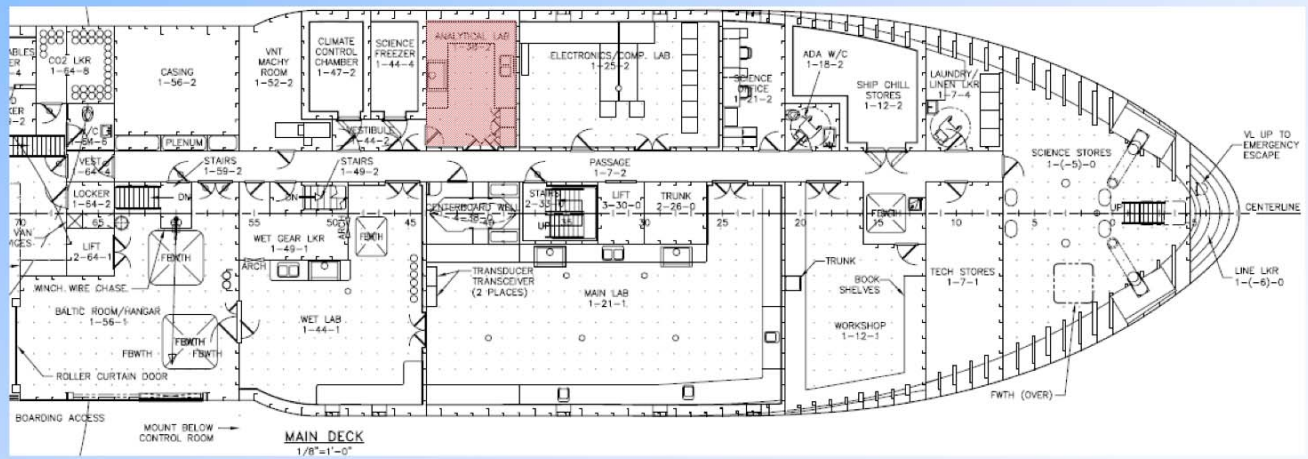


Main Deck

Analytical Lab

- 183 Square Feet
- One Chemical Fume Hood
- Temperature controlled

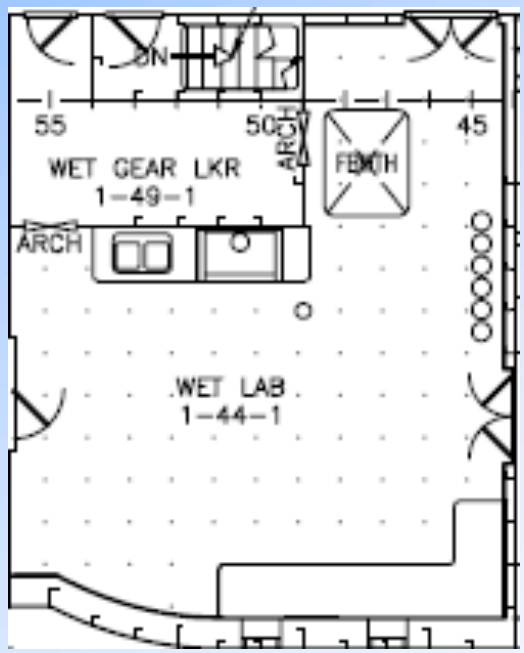


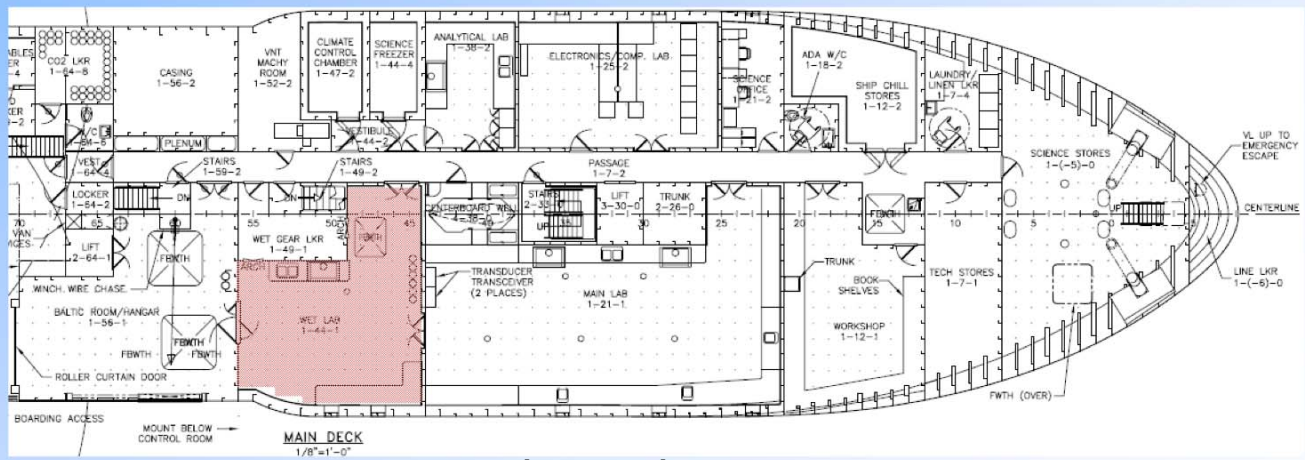


Main Deck

Wet Lab

- 510 Square Feet
- One Chemical Fume Hood

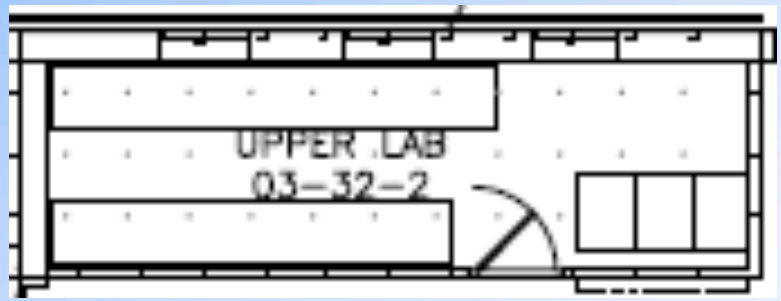


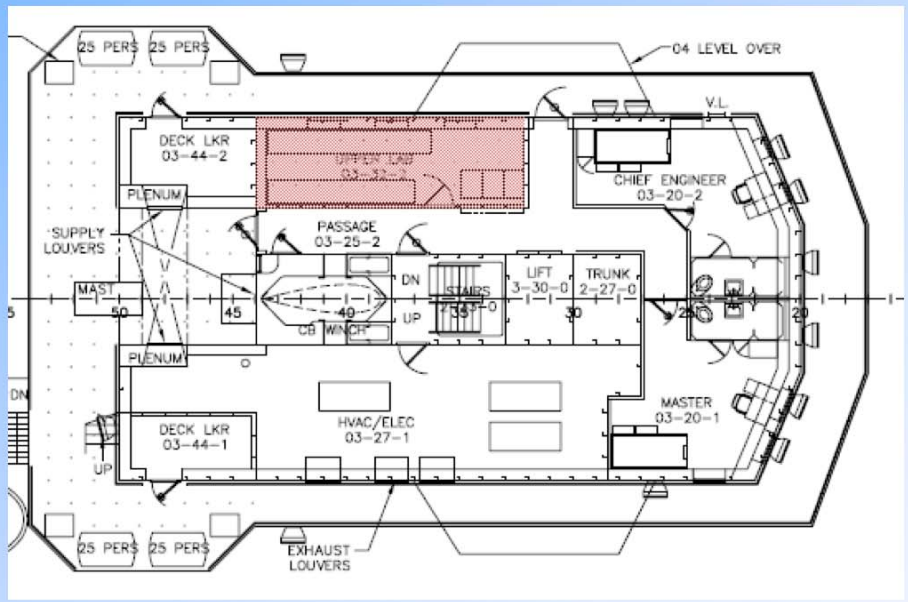


Main Deck

Upper Lab

- 160 Square Feet
- Three Full Instrument Racks

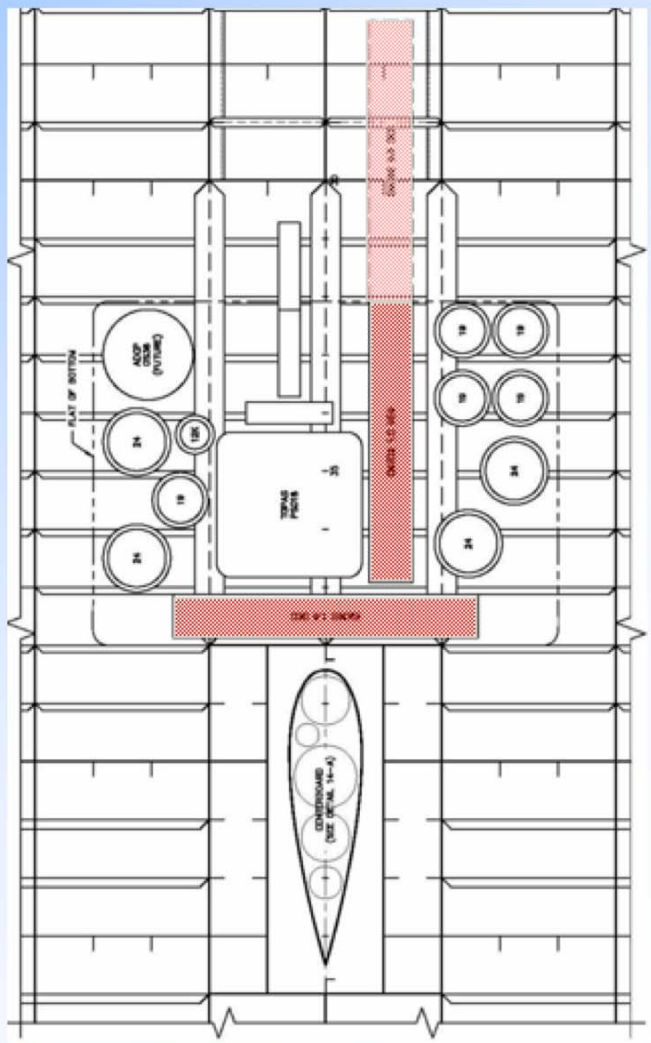




03 Deck

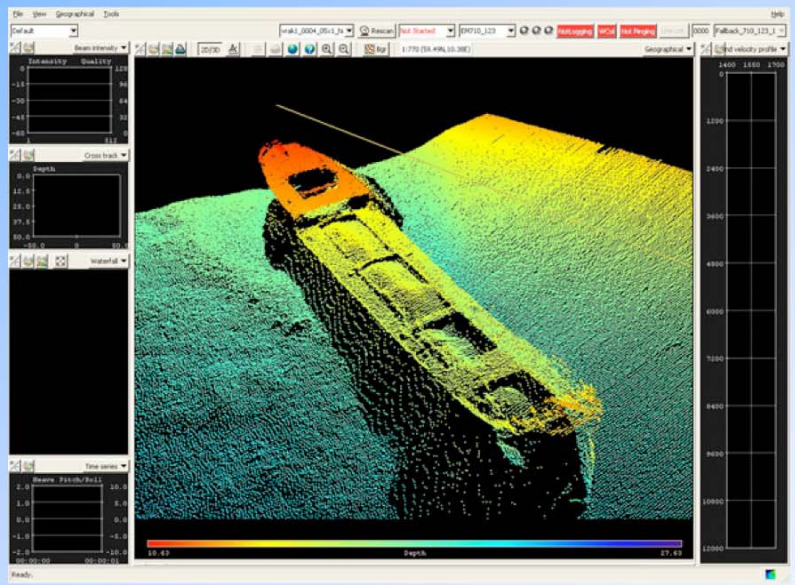
EM302 Multibeam

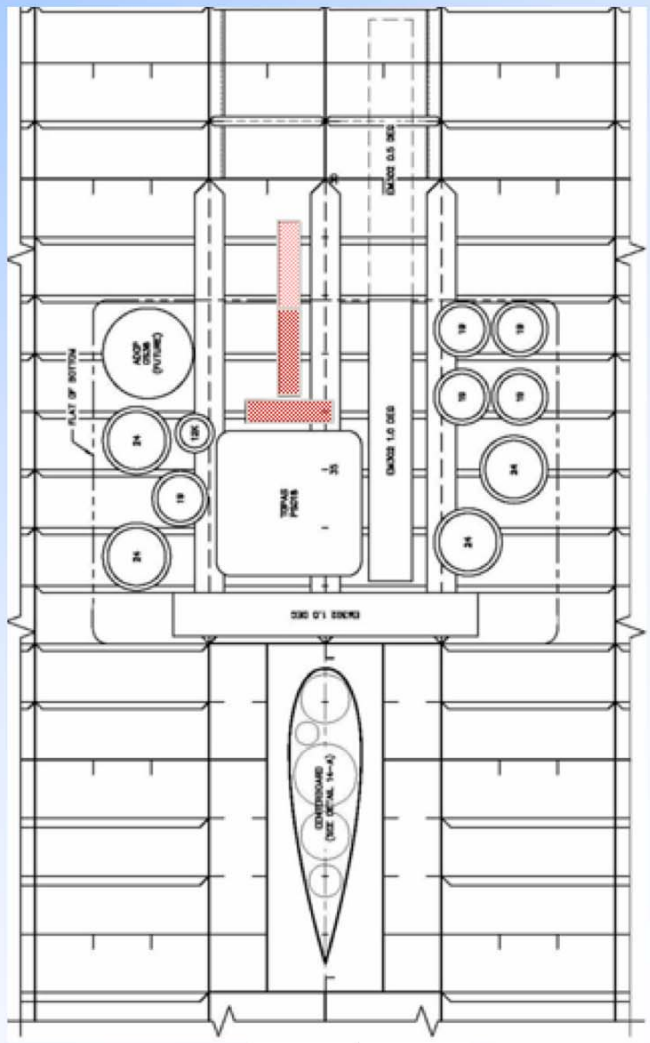
- Operating Freq: 30 kHz
- Transducer array: 1 X 1 (opt .5 X 1)
- Depth Range: 10-5000m
- Pulse Forms: CW and FM chirp
- Max soundings/ping : 864
- Depth Resolution: 1 cm



EM710S Multibeam

- Operating Freq: 70-100 kHz
- Transducer array 1 X 1 (opt .5 X 1)
- Depth Range 3-1000m
- Pulse Forms, CW
- Max soundings/ping 400
- Depth Resolution 1 cm

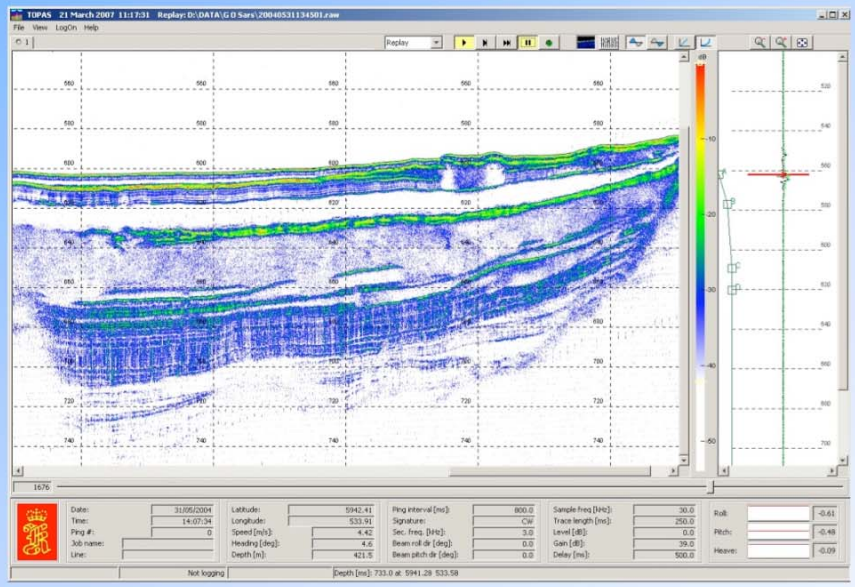


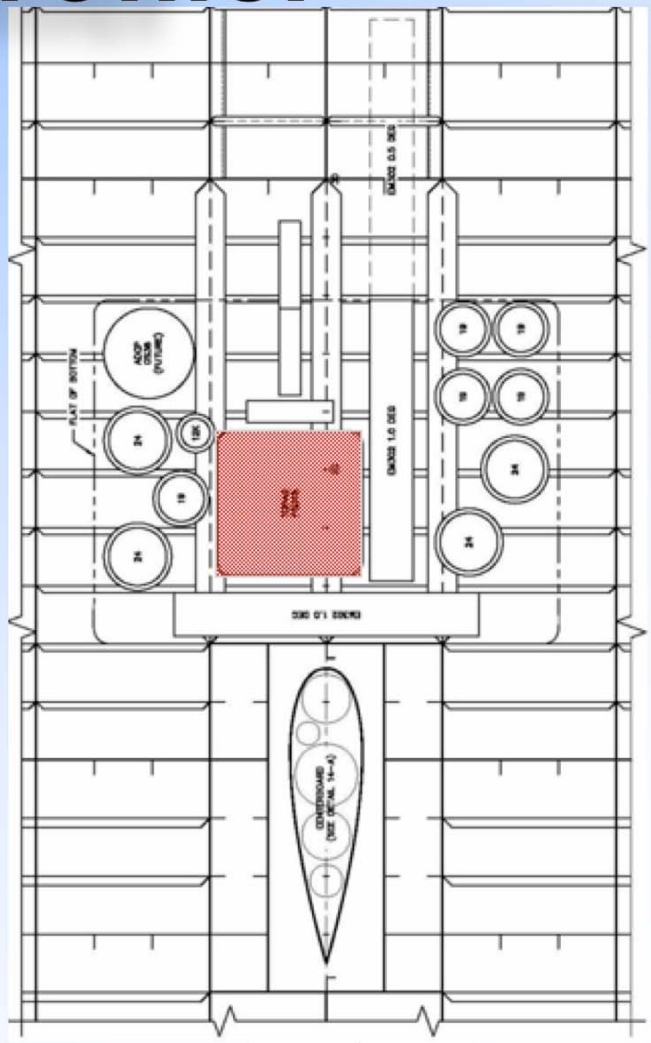


PS18 Sub-bottom profiler

- Frequency Range: 0.5-6,15-20,30-42kHz
- Signatures : CW, Chirp, Ricker
- Depth Range: 30 – 10000m
- Max Penetration: ~150m

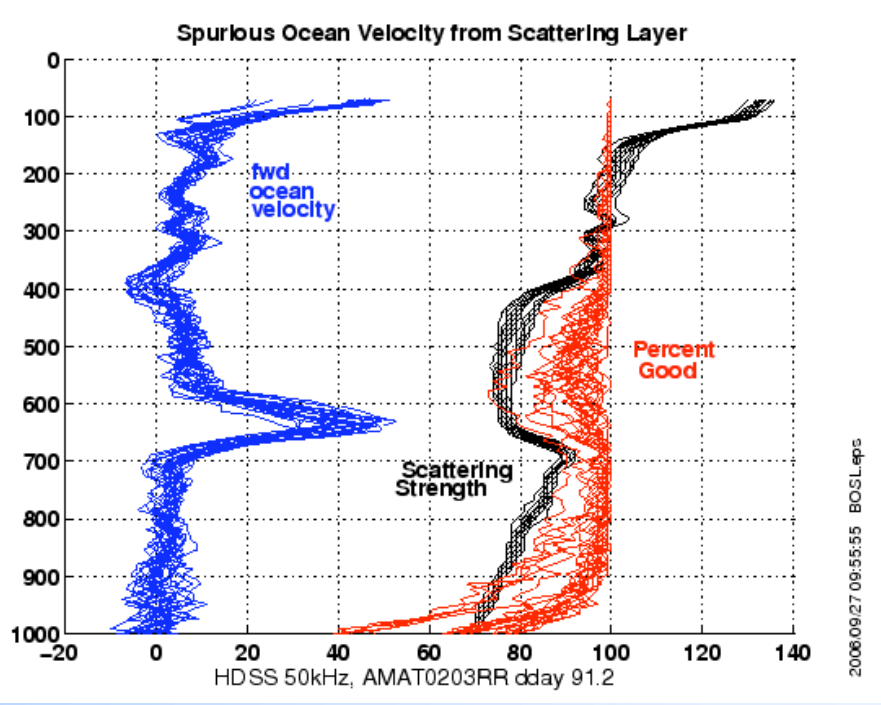
- Audible noise inside hull: none

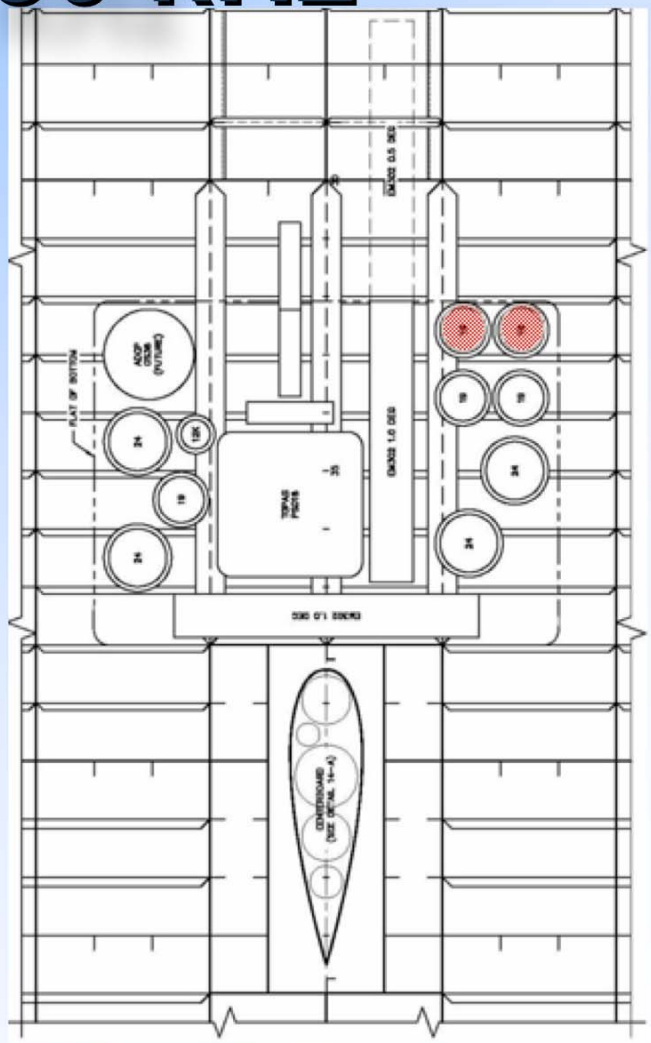




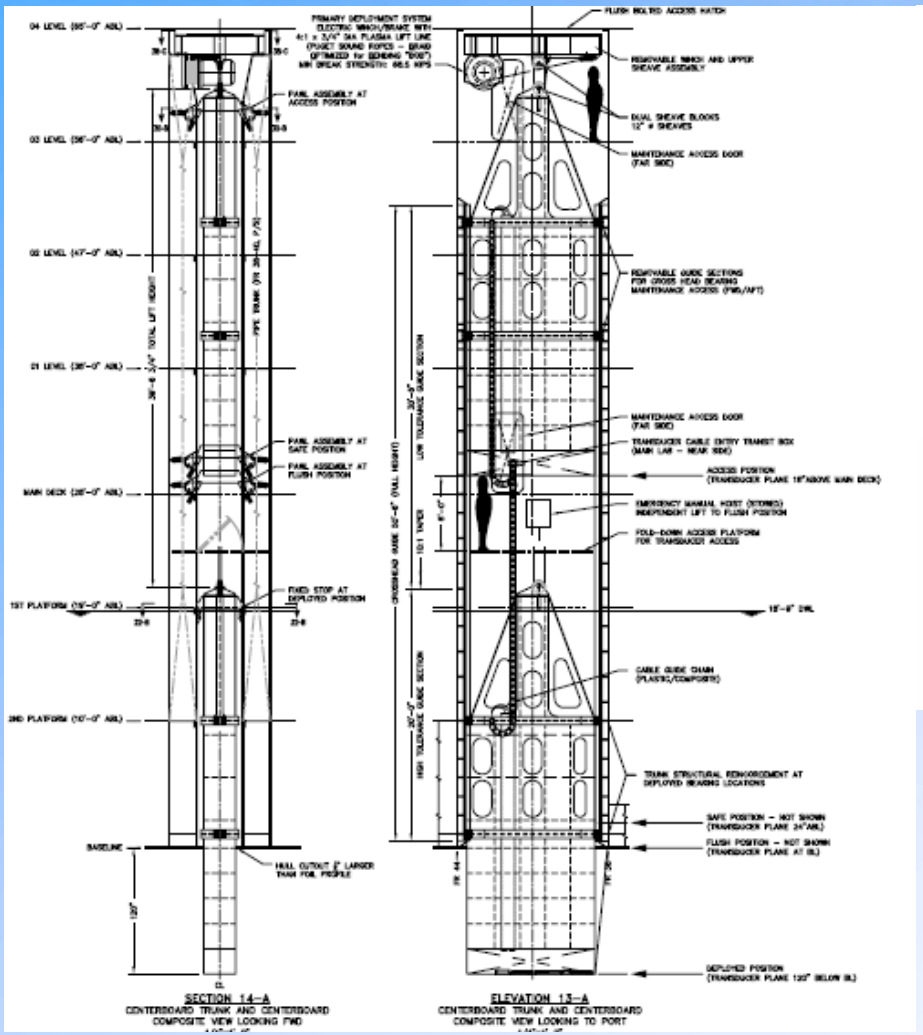
ADCP 75 kHz and 150 kHz

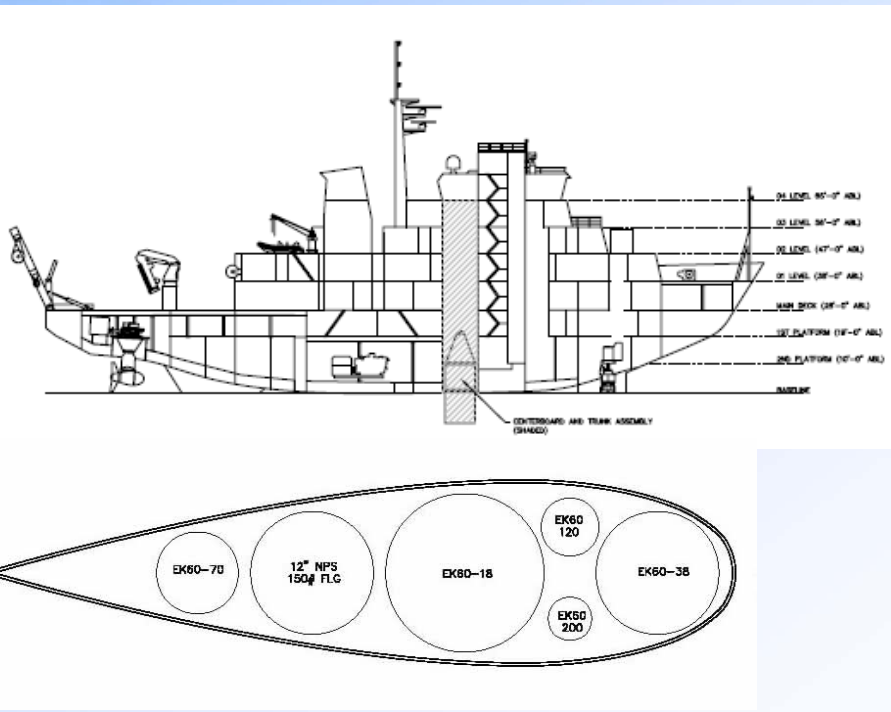
Phased Array Current Profilers





Acoustic Centerboard





EK-60 Scientific Sounder System

Science Seawater System

- Provides uncontaminated seawater
- Two sea chests; one forward and one starboard side aft
- Each seachest instrumented with thermosalinograph, fluorometer, flow sensor
- PVC piping, food grade pumps

Over-the-Side Winch Systems

- Hydro and CTD winches
  - Direct Drive
  - 3/8” Wire rope led aft to A-frame or starboard crane
  - 0.322” EM cable led starboard to CTD handling boom
  - Drums interchangeable, one spare empty drum

- Deep-Sea Winch
  - Two storage drums served by single traction device
  - 9/16” Wire rope
  - 0.680” Coax cable
  - Led to A-frame or starboard crane

Ice Performance Measurements

Ice breaking (per PC-5 classification)

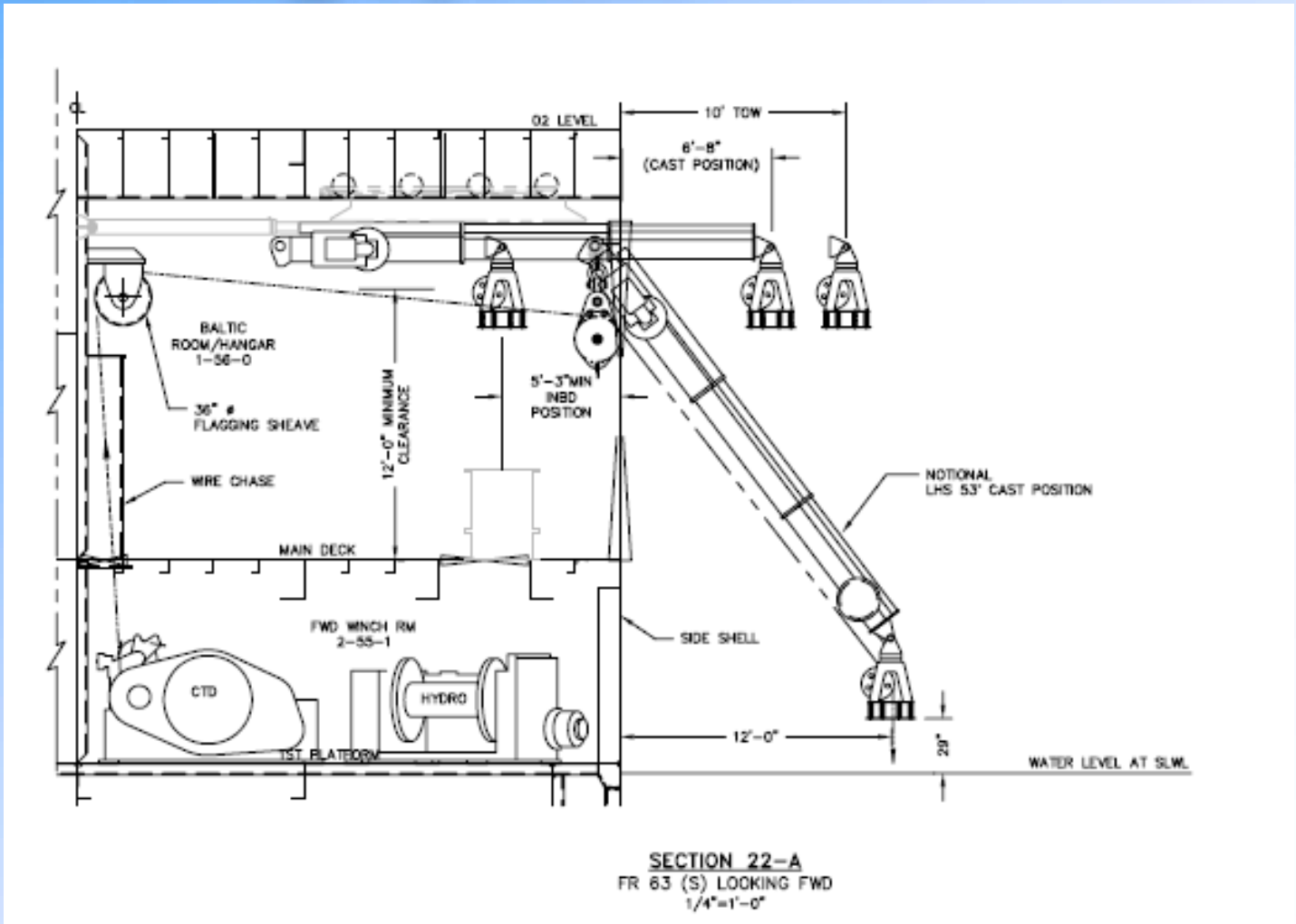
Medium First Year Ice with Multiyear Inclusion
(WMO definition, 0.70-1.20 m)

Turning radius (m)	*Ahead*	*Astern*
0.45m - 0.5m ice	300m (4.5*LWL)	220m
0.8m ice	350m (5.3*LWL)	220m

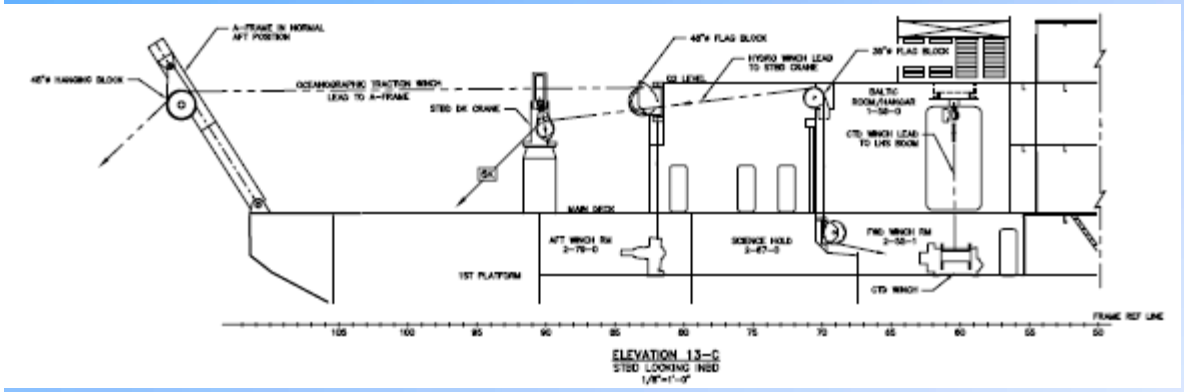
Concluding Remarks

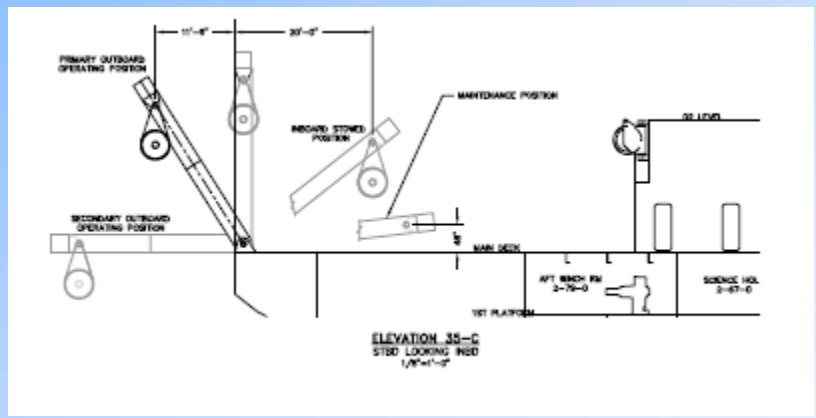
- **Successful Final Design Review Oct 2008**
- **National Science Board Review May 2009**
- **Shipyard Contract Selection Summer 2009**
- **Shipyard Contract Award Winter 2010**
- **Ship Delivery 2013**
- **Post-delivery Science & Ice Testing**
- **Ready For Science 2014**

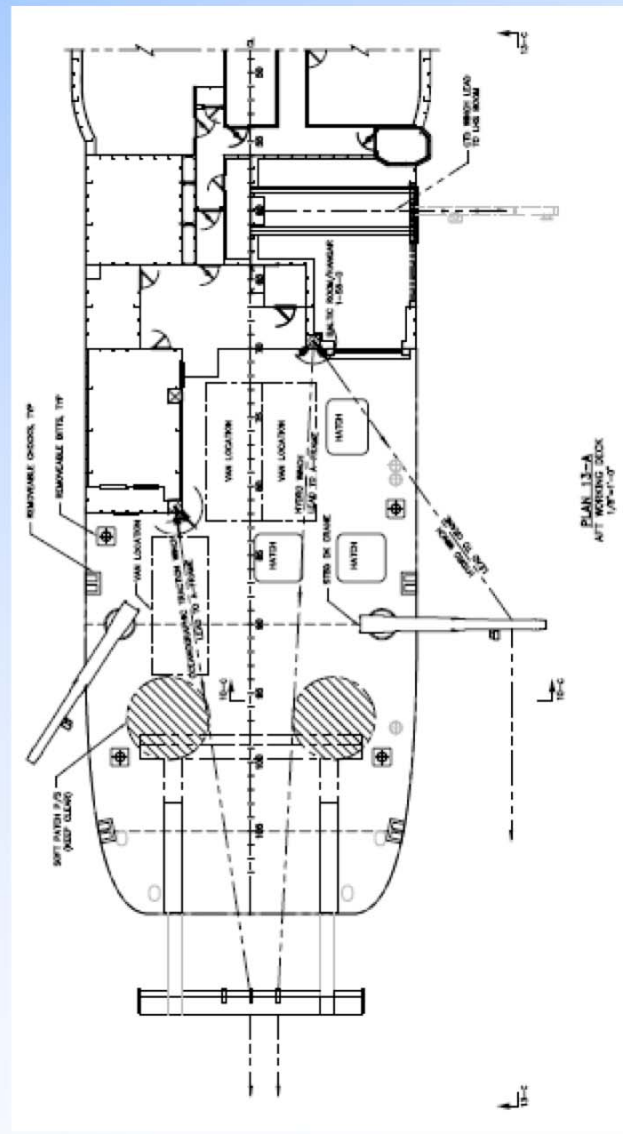
CTD Handling System



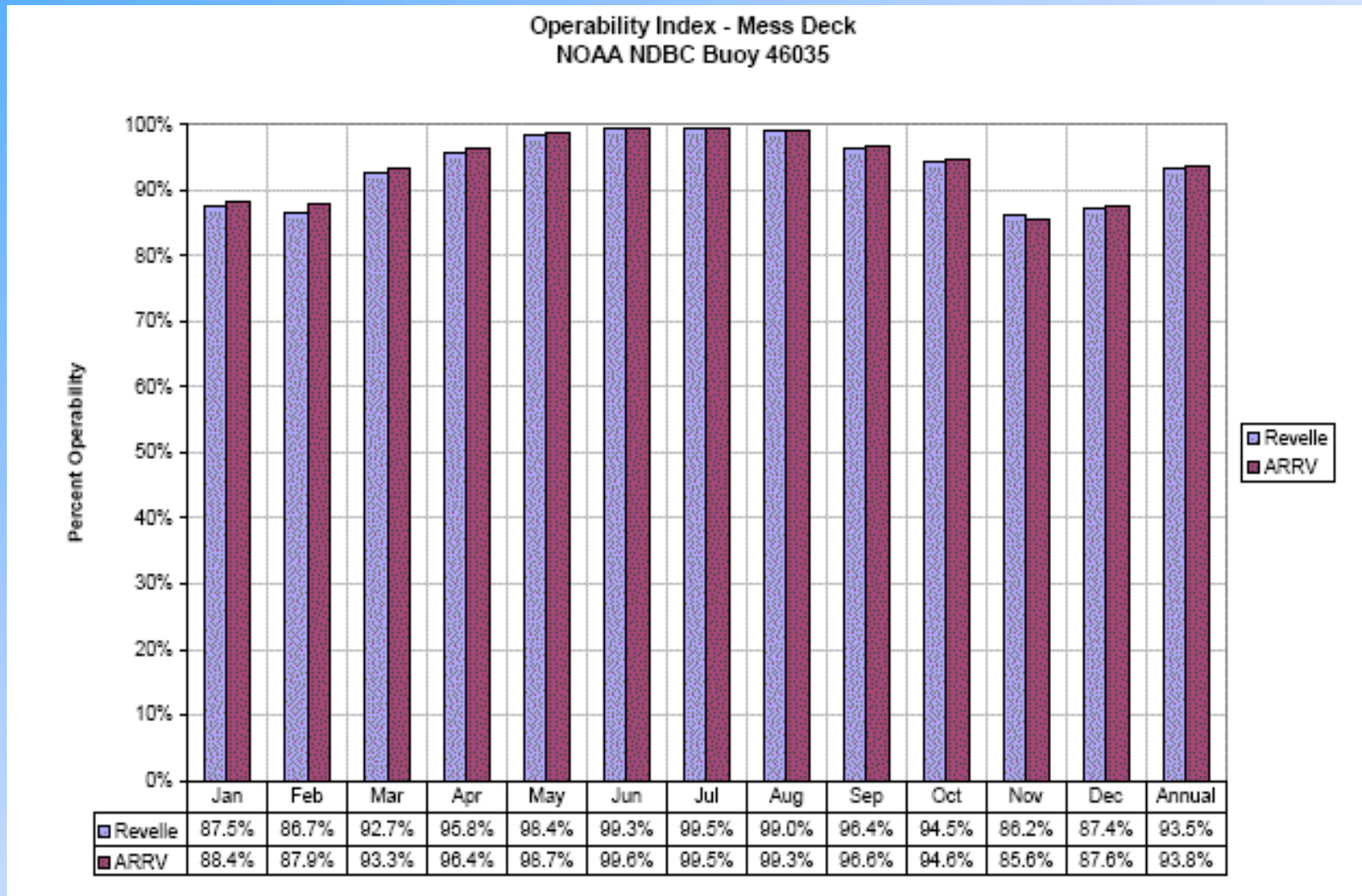
Working Wire







Annual and monthly operability (short-crested seas)
Mess Deck, in South Bering Sea, ARRV and Revelle

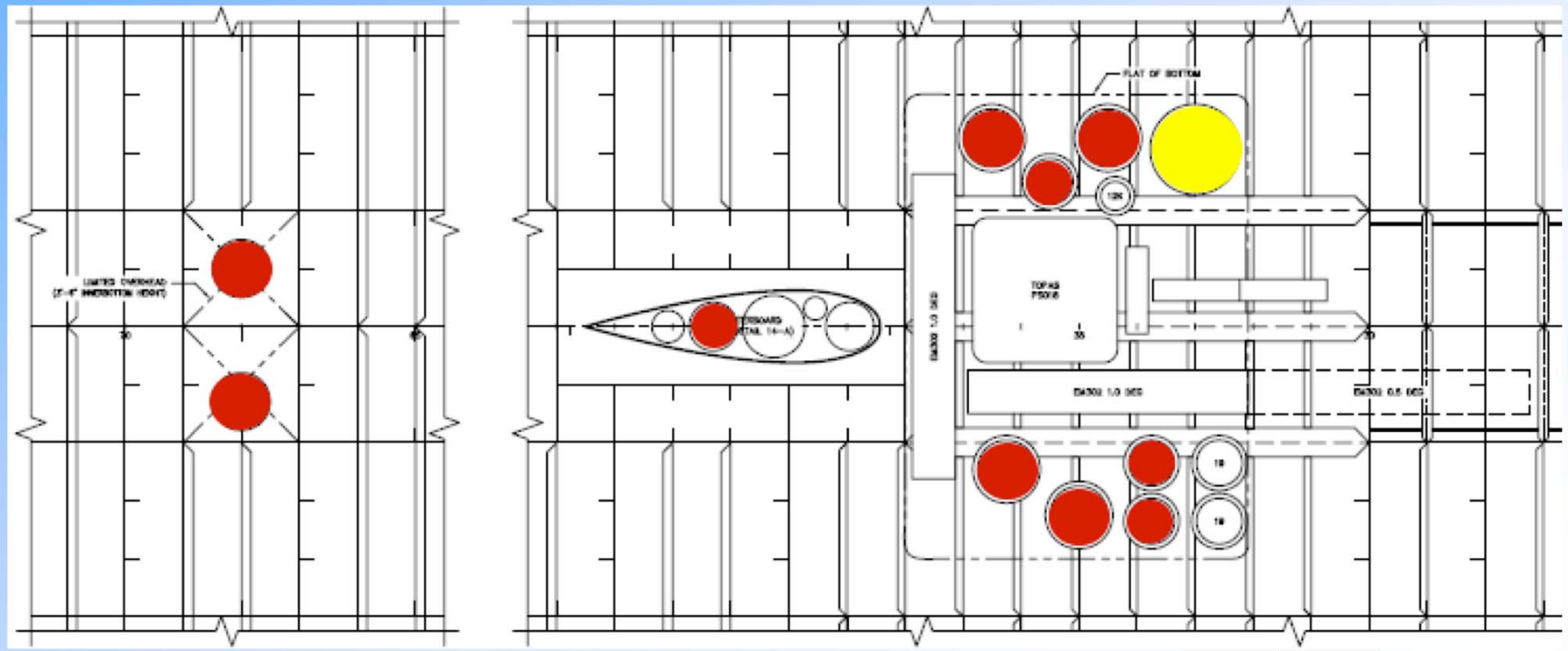


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Revelle	87.5%	86.7%	92.7%	95.8%	98.4%	99.3%	99.5%	99.0%	96.4%	94.5%	86.2%	87.4%	93.5%
ARRV	88.4%	87.9%	93.3%	96.4%	98.7%	99.6%	99.5%	99.3%	96.6%	94.6%	85.6%	87.6%	93.8%

Spare Acoustic Wells

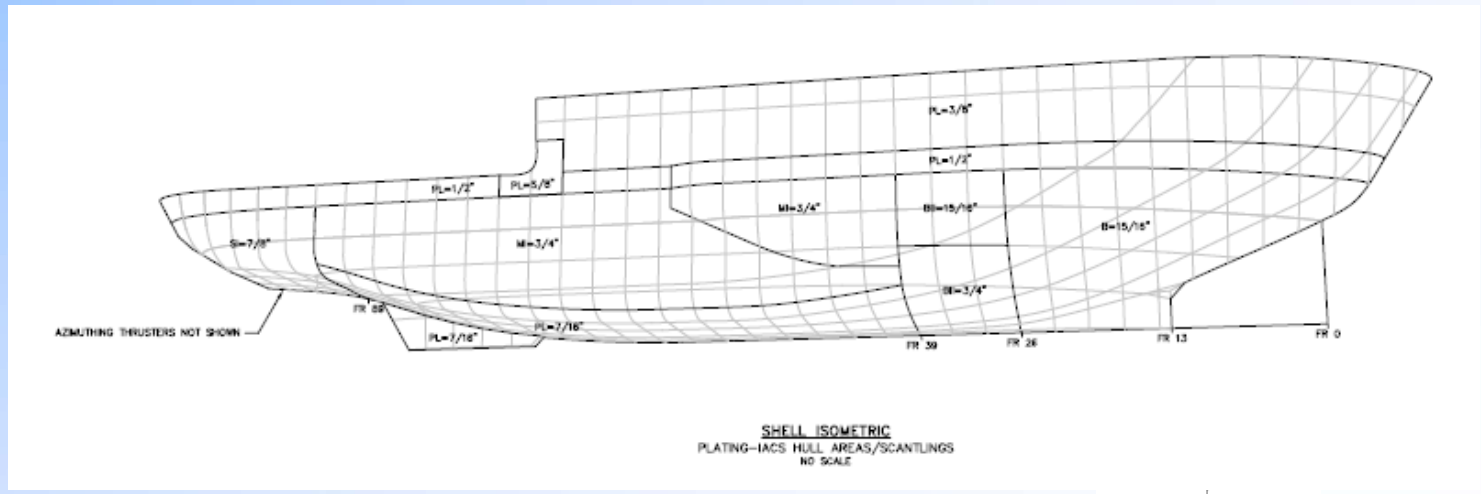
Ten general purpose transducer wel

One (future or science furnished) 38 kHz Ocean Surveyor A

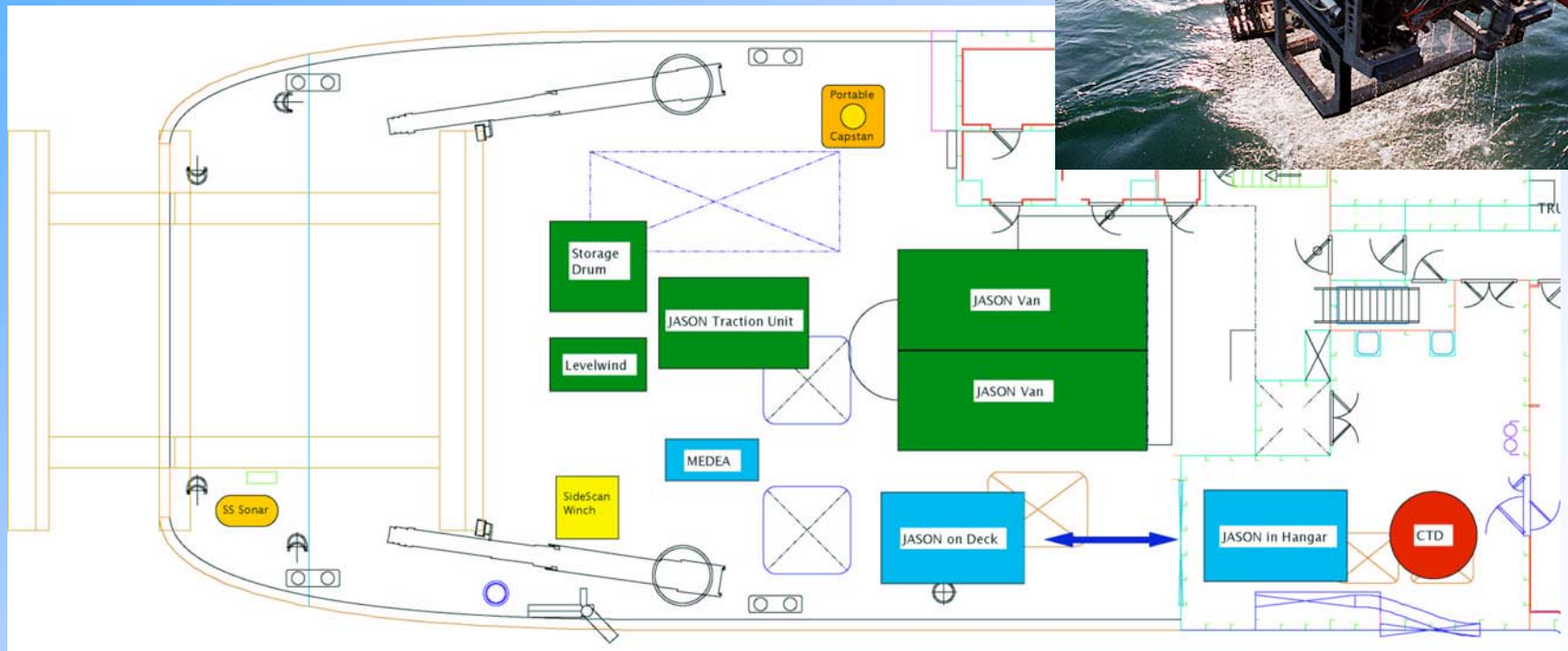


Hull Form Design for Ice Operations

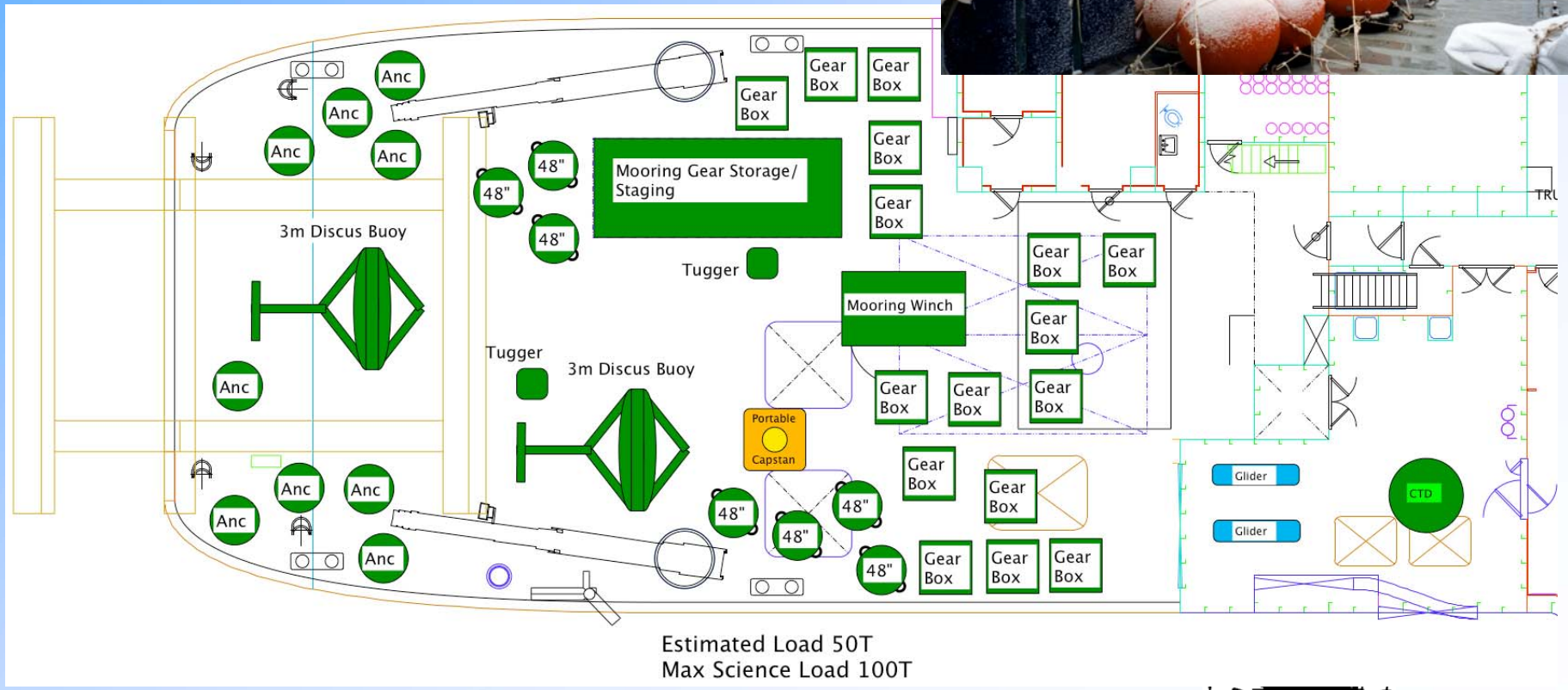
- Reamers, improves turning radius and reduces friction
- Ice wedge, splits and guides ice and improves stability
- Ice breaking bow form, with improvements for open water performance
- 24” frames and significant shell plating



JASON Deck Layout



Physical Oceanography/Mooring Deck Layout



NORCOR Piston Core Arrangement