

ALASKA REGION RESEARCH VESSEL (ARRV)

Preliminary Design Presentation
June 2002



Alaska Region Research Vessel



Project Team

Design Oversight Committee

- Broader Advisory Committee
- The Glostén Associates
 - AKAC Inc.
 - Terry Brockett
 - VTT/MARC
 - NCE



Alaska Region Research Vessel



Science Objectives

Regional Needs, Multidisciplinary Requirements

- Oceanography
- Fisheries Research (except stock assessment)
- Coastal marine studies
- Marine mammal and bird studies
- Sea ice, water and atmospheric interactions
- Ocean engineering
- Marine Biology
- Student training



Alaska Region Research Vessel



Summary SMR Requirements

- Size: LOA <220 ft., Draft ≤ 18ft., freeboard 9-10 ft.
- Endurance: 45 days; 15 days transit; 30 days on station; 60 days hotel service
- Ice Strengthening: ABS Ice Class A1; 2.5 ft. of level ice; 7 ft. ridges
- Accommodations: 24 Science Berths in 2-person rooms
- Speed: 14 kts max; 12 kts cruising; 10 kts in SS 5
- Speed Control: ± 0.5 kts in 0-7 kt range
- Quiet Ship: goal is ICES 209 compliance
- Transducer Wells: Retractable Centerboard; Aft Pressurized



Alaska Region Research Vessel



Summary SMR Requirements (Cont.)

- Seakeeping: Able to Perform Science Thru SS 5
- Stationkeeping: ± one ship length; SS 4; 35 kt; 3 kt current
- Precision Trackline: 35 kt wind; SS 4; 3 kt current; ± 160 ft. @ 11 kts; ± 330 ft. @ 3 kts (towing)
- Working Deck: 2,000 ft² min.; 50 ft. contiguous side deck
- Cranes: 20,000 Lb capacity; able to reach all areas of the deck
- Winches: Standard suite; coring; deep-tow; CTD; Hydro; portable trawl winches
- Labs (4): Main; Analytical; Wet; Elec/Computer; 2,000 ft² total
- Science Storage: 100 LT; 8,000 ft³
- Vans: Two (integrated); more if possible
- Boats: Two 20-22 ft. RIBS; 25-30 ft. Workboat



Alaska Region Research Vessel



Vessel Design Requirements Derived From The SMR

- Science Requirements
- Dimensional Constraints
- Performance Requirements
- Regulatory Requirements



Alaska Region Research Vessel



Vessel Design Requirements Derived From The SMR

Science Requirements

- Lab spaces/areas
- Science accommodations
- Science deadweight
- Permanently installed science equipment
- Radiated Noise Criteria



Alaska Region Research Vessel



Vessel Design Requirements Derived From The SMR

Dimensional Constraints

- Intermediate size ship, length of 220 ft.
- Moderate draft, about 18 ft.
- Freeboard of 9 – 10 ft.



Alaska Region Research Vessel



Vessel Design Requirements Derived From The SMR

Performance Requirements

- Open Water Requirements
- Ice Operations Requirements



Alaska Region Research Vessel



Vessel Design Requirements Derived From The SMR

Regulatory Requirements

- Structural Requirements
- Safety Requirements
- Pollution Requirements
- Habitability Requirements



Alaska Region Research Vessel



Design Drivers

- Endurance
- Performance
- Dimensional Constraints



Alaska Region Research Vessel



Basic Vessel Characteristics

- Dimensions
- Capacities
- Science Outfit
- Support Outfit
- Performance



Alaska Region Research Vessel



Basic Vessel Characteristics

Dimensions

- Length, Overall 226'-0"
- Length, Waterline 200'-0"
- Beam, Maximum 52'-0"
- Depth, Hull 28'-0"
- Draft, Design Waterline 18'-0"
- Freeboard, Main Deck 10'-0"



Alaska Region Research Vessel



Basic Vessel Characteristics

Capacities - Science

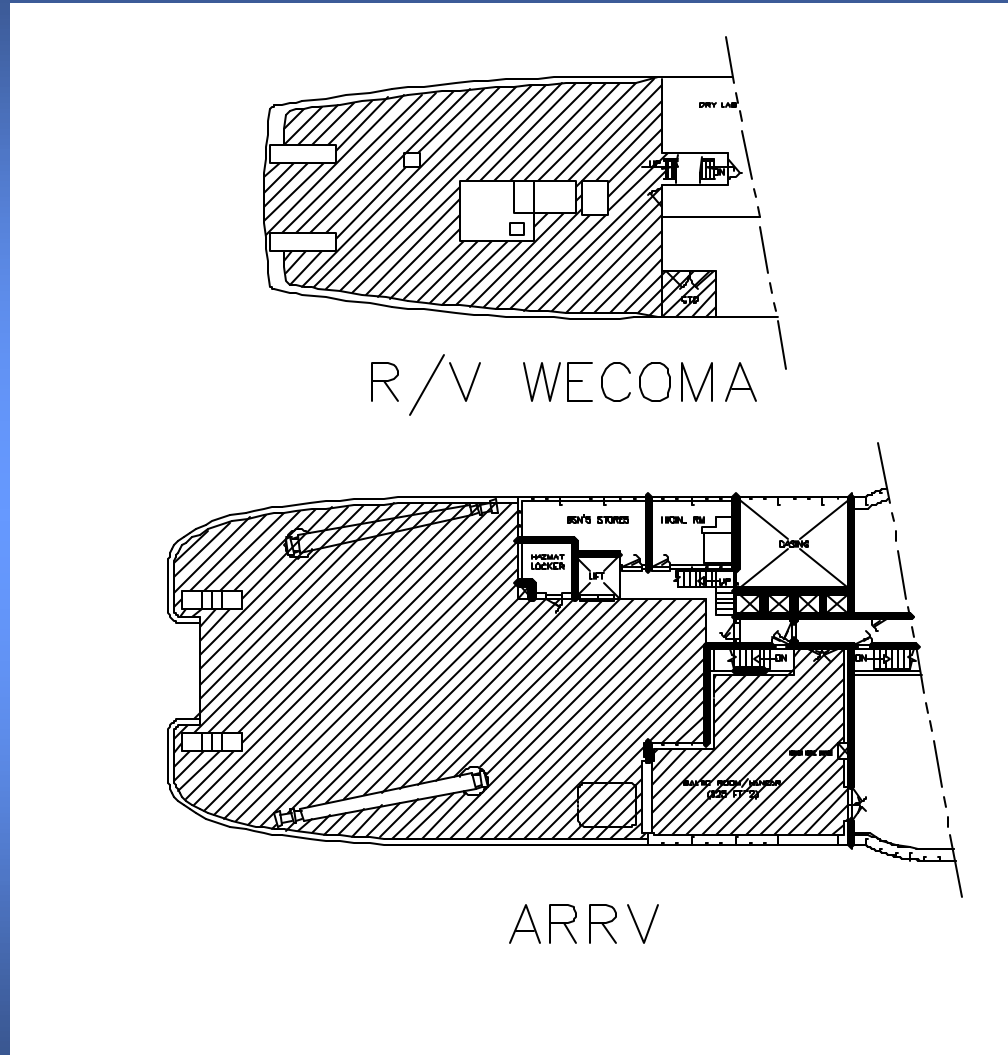
- Science Berths 24
- Science Labs 2,000 ft.²
- Deck Working Area 2,700 ft.²
- Science Storage Volume 8,000 ft.³
- Science Storage Load 100 LT



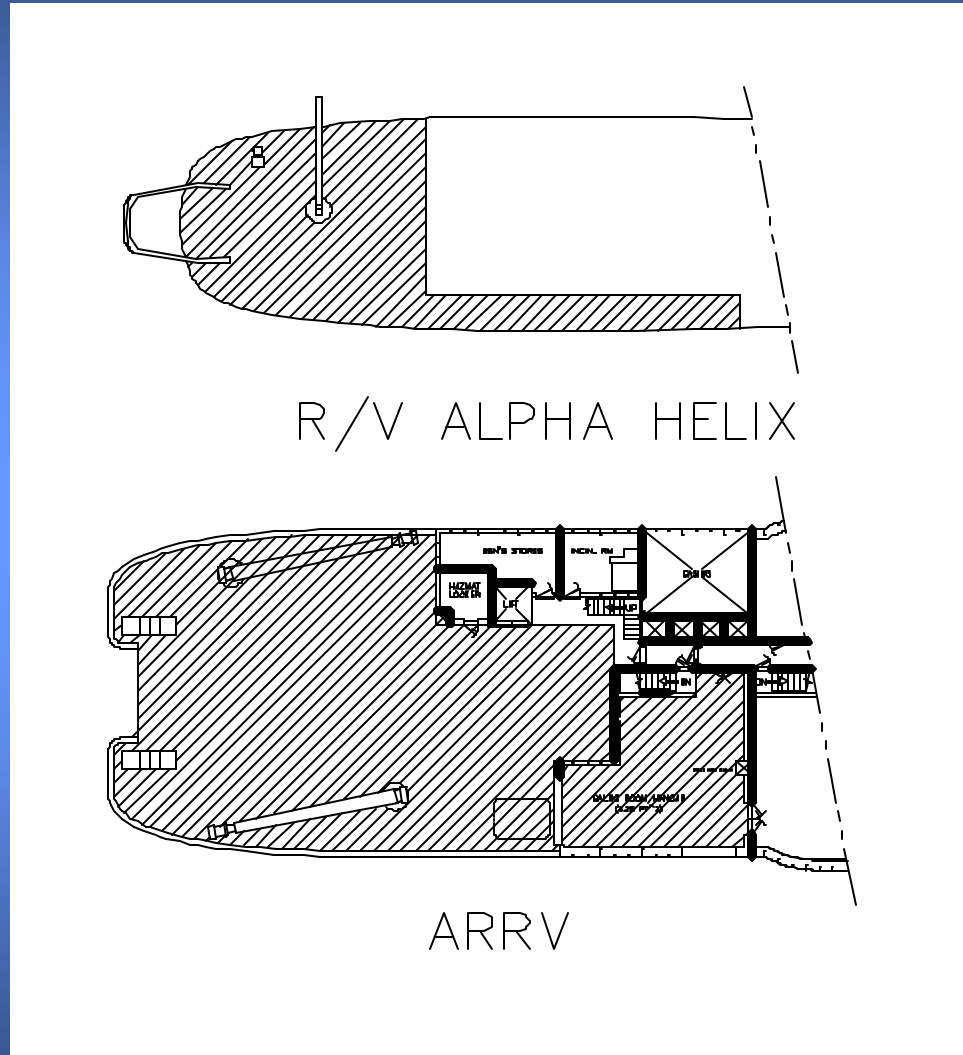
Alaska Region Research Vessel



Aft Working Deck Comparison



Aft Working Deck Comparison



Basic Vessel Characteristics

Capacities - Consumables

- Fuel 148,000 gal
- Potable Water 6,000 gal
- SW Ballast 200,000 gal
- Provisions 60 days
- Holding Capacity 24 hours



Alaska Region Research Vessel



Basic Vessel Characteristics

Science Outfit

- Winches
- Frames
- Cranes
- Transducers
- Control Spaces
- Masts

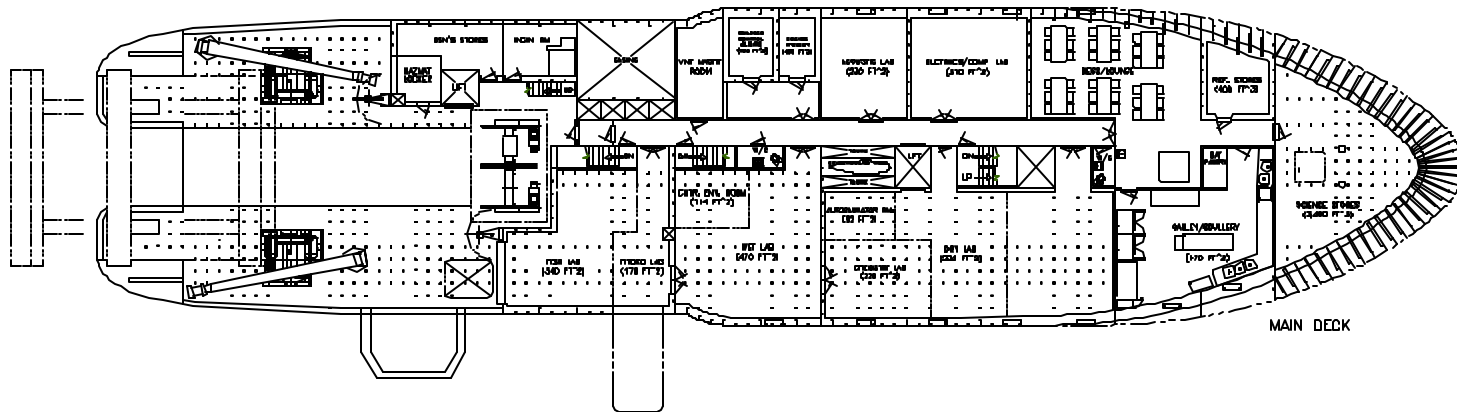
Basic Vessel Characteristics

Science Outfit

Winches

- ✓ Hydro Winch
- ✓ CTD Winch
- ✓ Traction Winch
- ✓ Alternate Fisheries Winches

Fisheries Arrangement



Basic Vessel Characteristics

Science Outfit

Frames

- ✓ Stern A- Frame
- ✓ Side A- Frame
- ✓ Baltic Room Gantry Frame



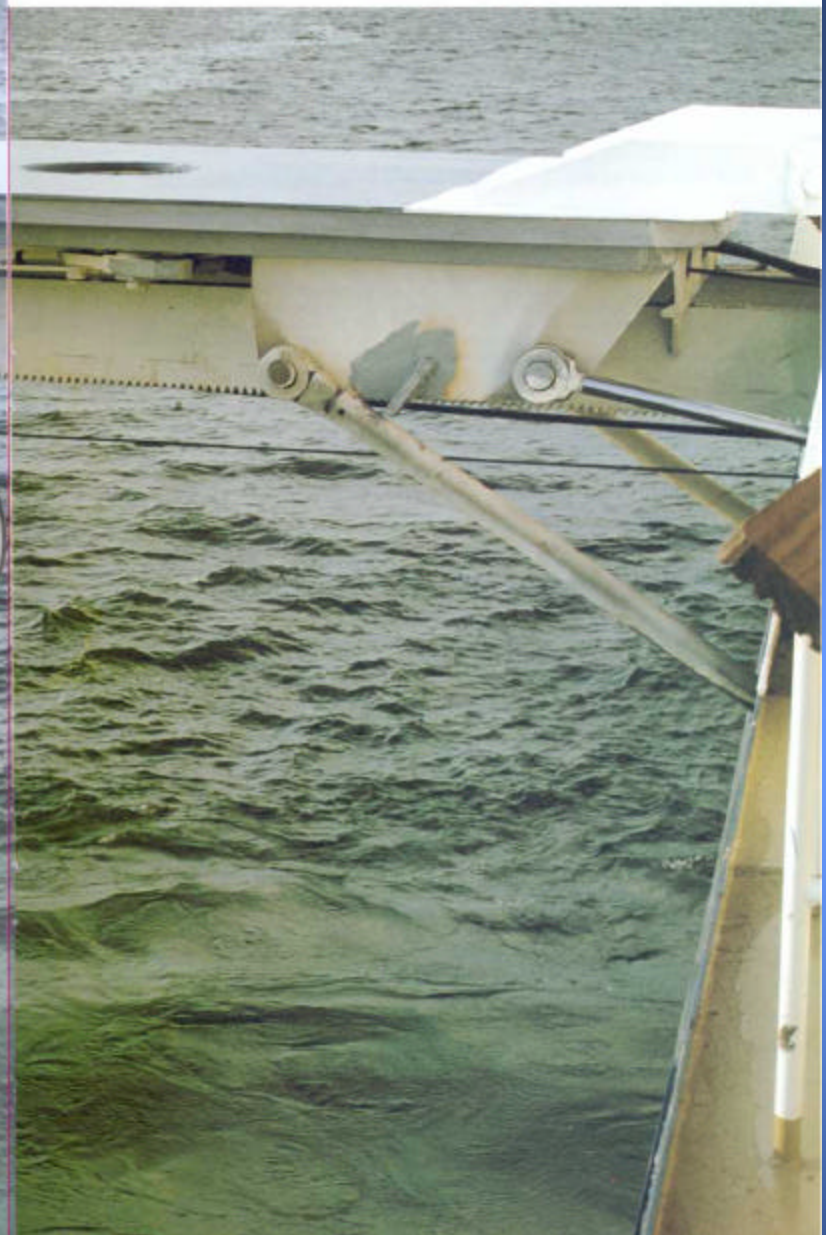
Alaska Region Research Vessel





Alaska Region Research Vessel





Alaska Region Research Vessel



Basic Vessel Characteristics

Science Outfit

Cranes

- ✓ Working Deck Cranes
- ✓ Foredeck Crane
- ✓ Portable Cranes

Basic Vessel Characteristics

Science Outfit

Transducers

- Centerboard, forward
- Transducer well, aft



Alaska Region Research Vessel



Basic Vessel Characteristics

Science Outfit

Control Spaces

- ✓ Aft Control Room
- ✓ Flying Bridge Observation Area
- ✓ Enclosed Bridge Wings
- ✓ Masthead Observation Area

Basic Vessel Characteristics

Support Outfit

- Boats
- Helo Facility
- Heated Decks
- Baltic Room/ Hangar



Alaska Region Research Vessel



Basic Vessel Characteristics

Performance

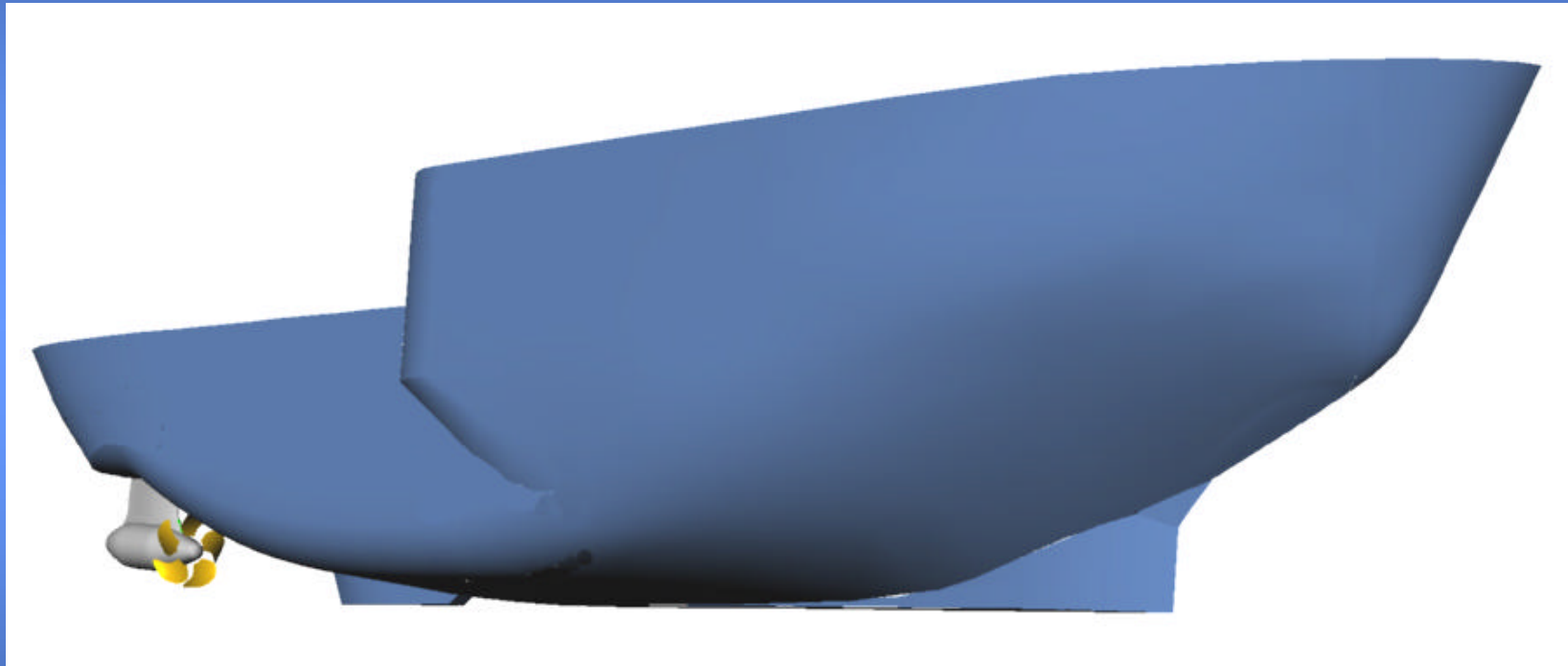
- Speed, Max. 14 kts
- Speed, Cruising 12 kts
- Level Ice 2.5 ft
- Endurance 45 days
- Installed Power 5,750 hp



Alaska Region Research Vessel



Preliminary Hull Geometry

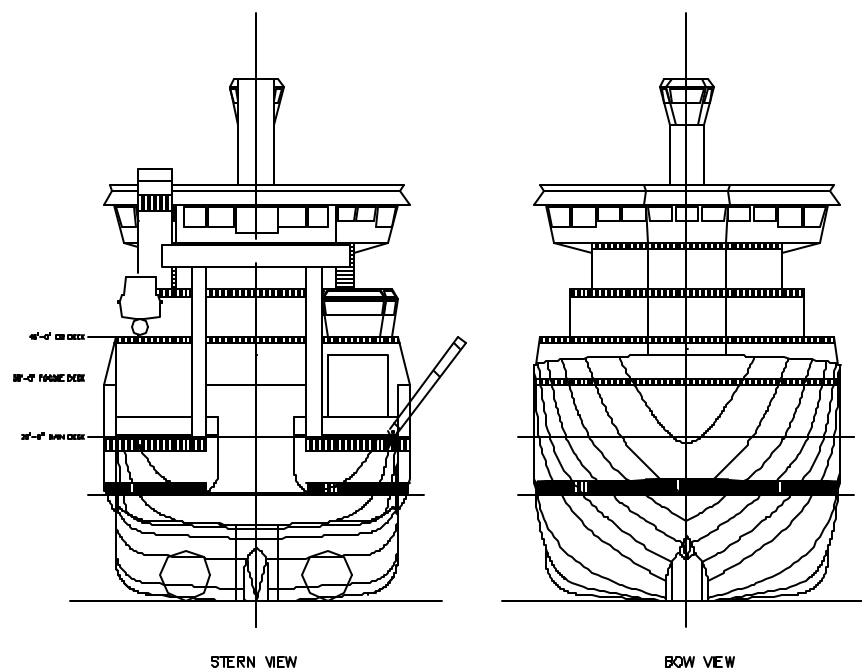


Azipod Advantages:

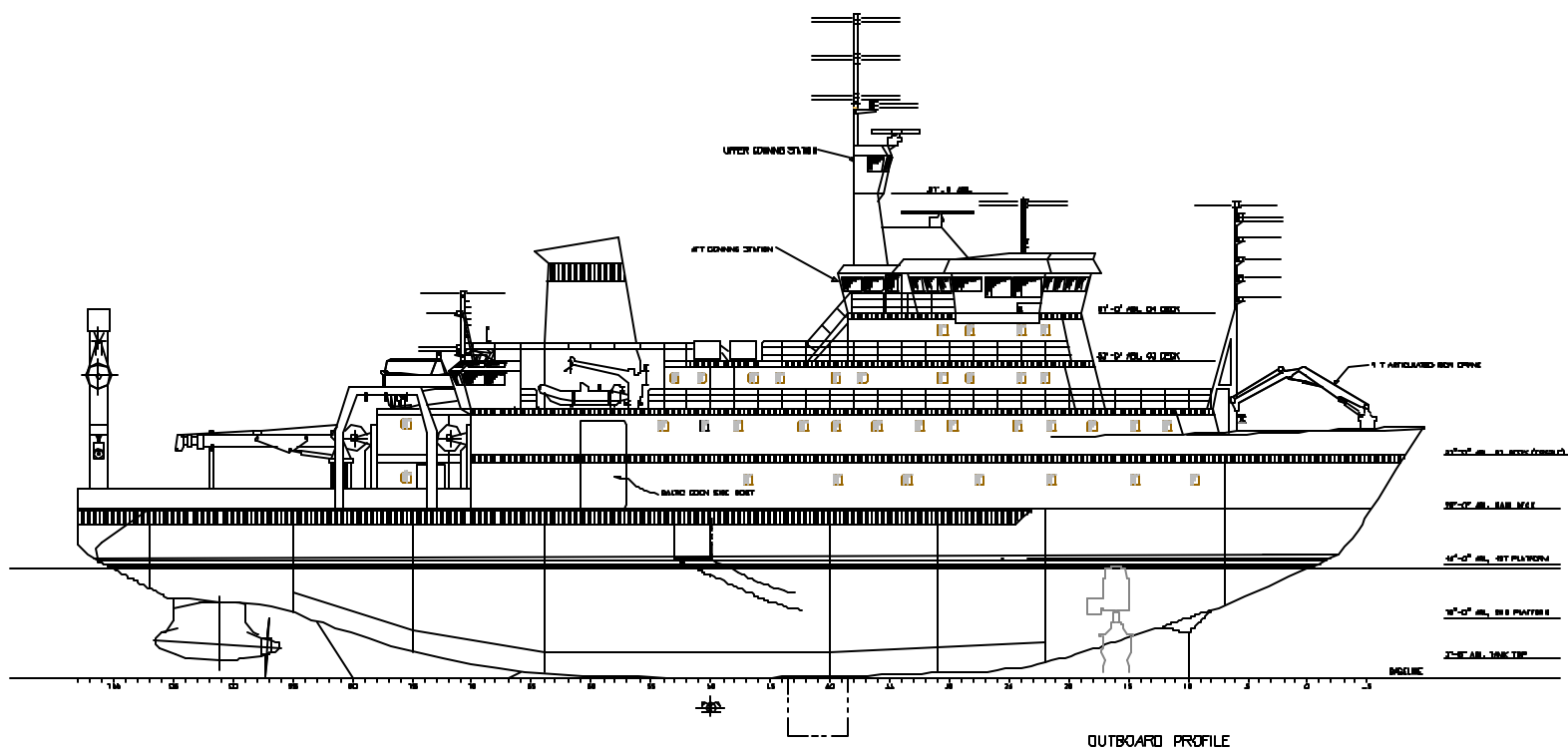


- Superior Manueverability
- Ice Clearing Ability
- Improved Ice Ridge Extraction
- Reduced Noise & Vibration
- Mechanical Simplicity
- Construction Simplicity

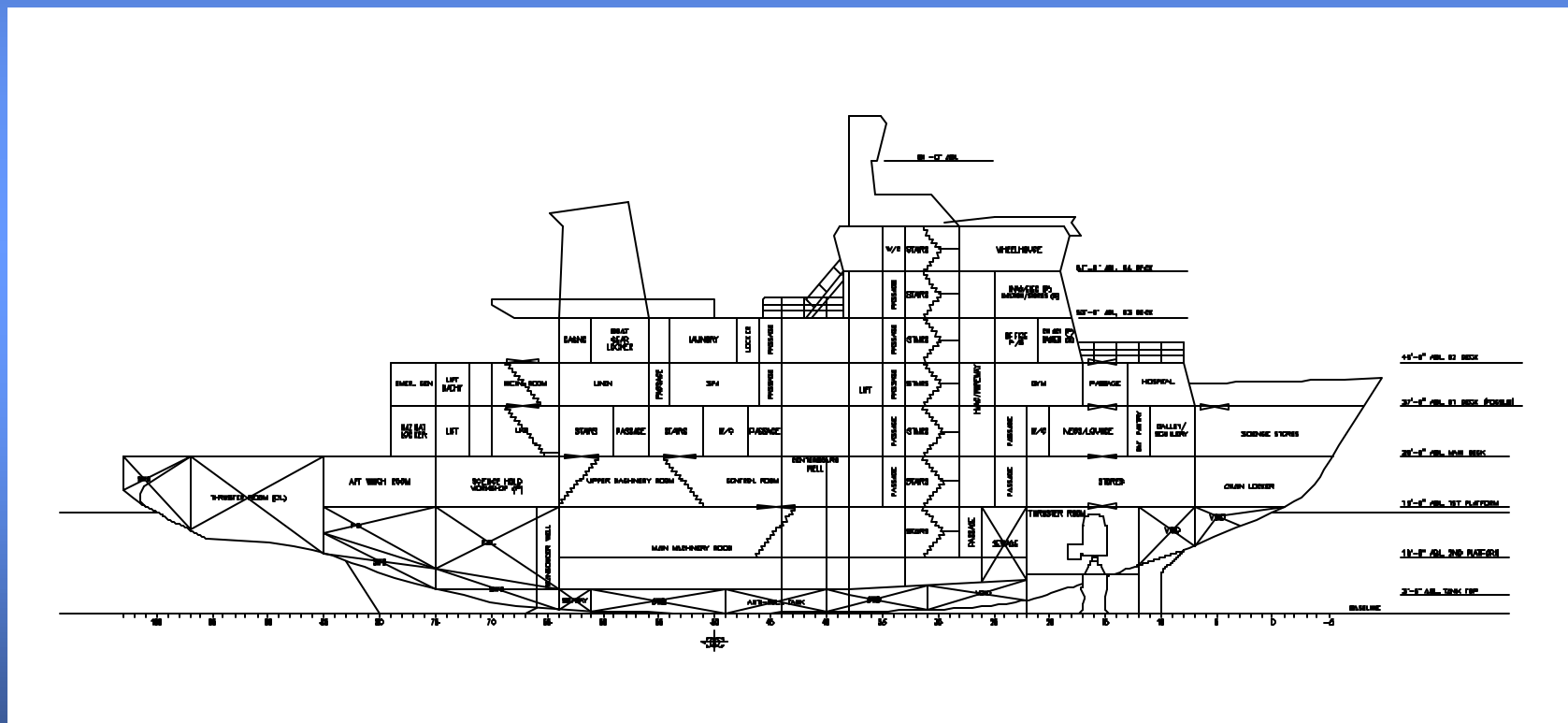
End Views



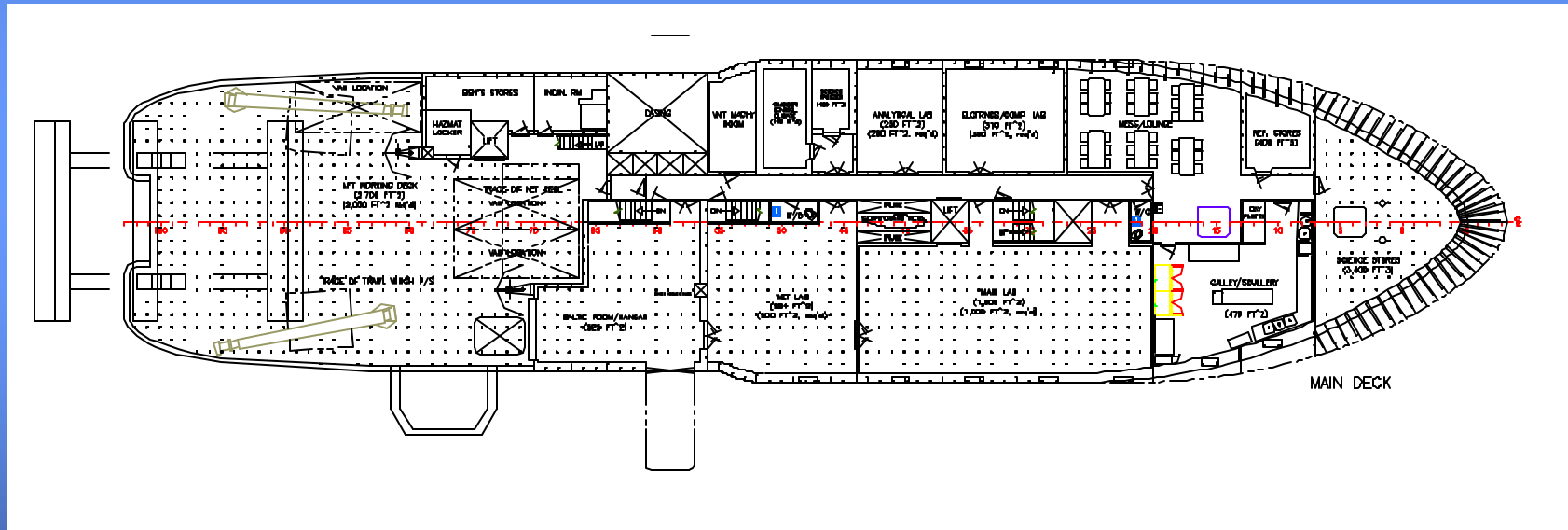
Outboard Profile



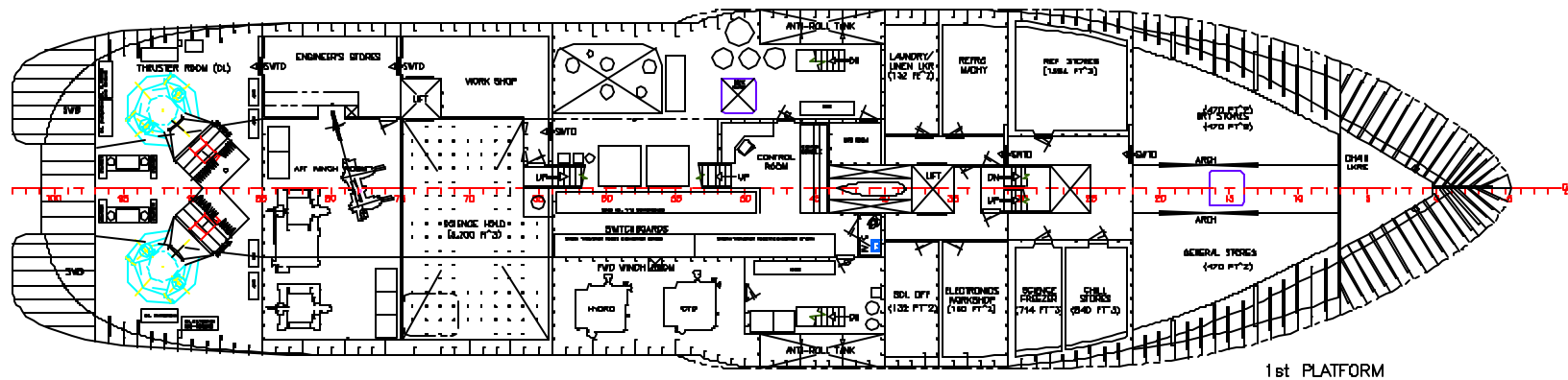
Inboard Profile



Main Deck Arrangement



1st Platform Deck



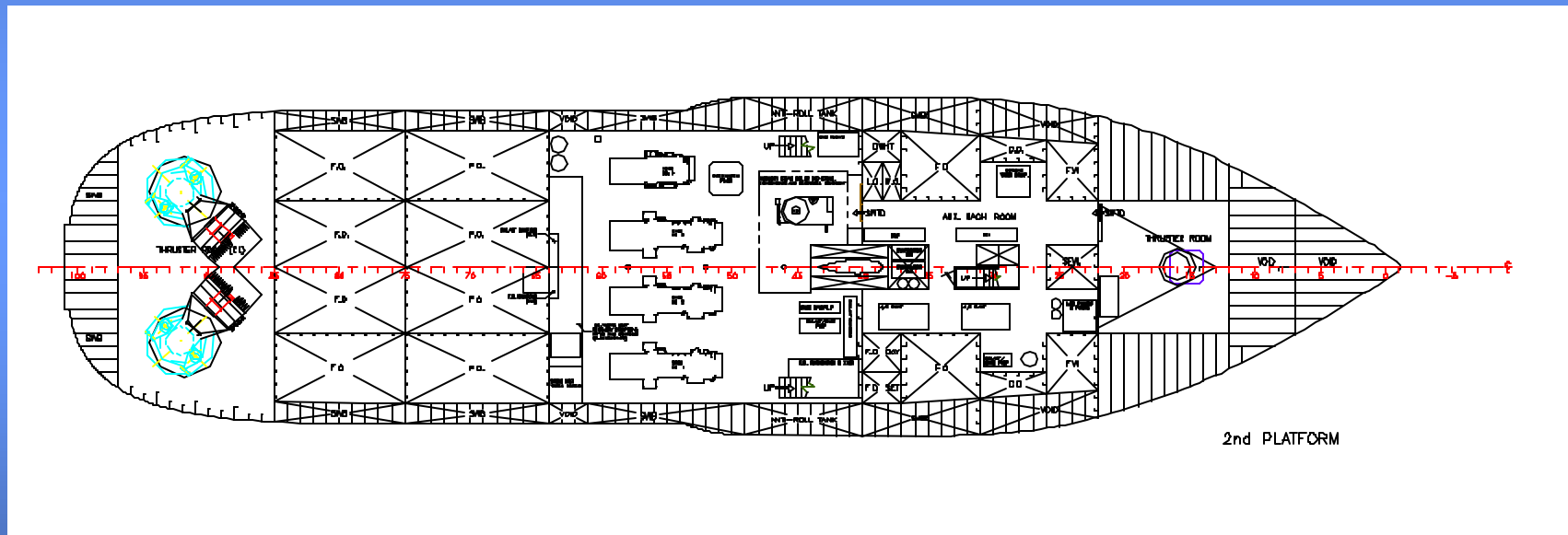
1st PLATFORM



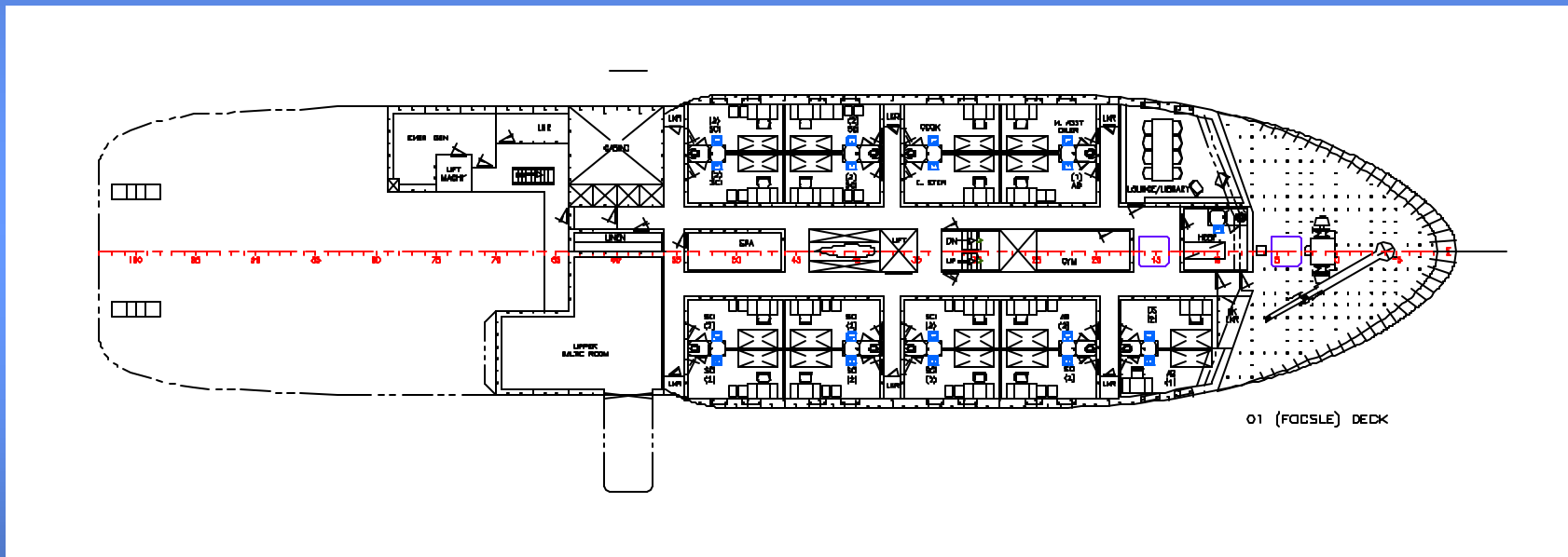
Alaska Region Research Vessel



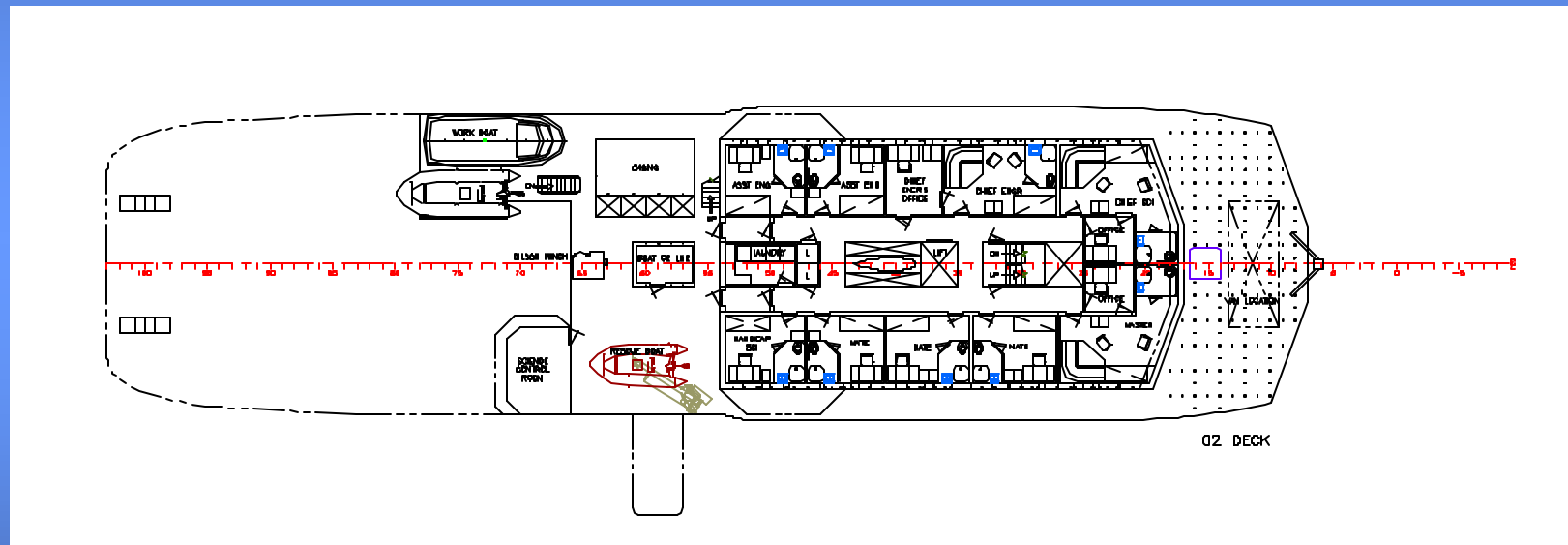
2nd Platform Deck



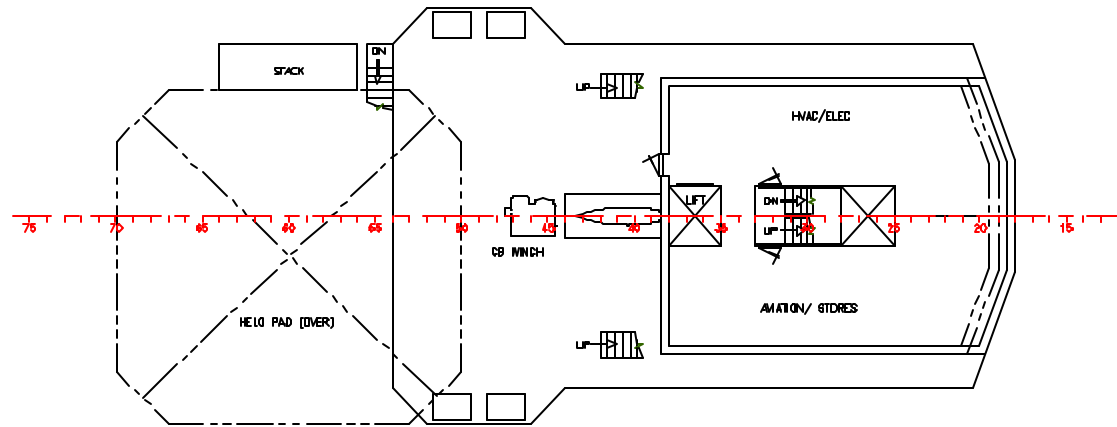
01 Deck (Fo'c'sle)



02 Deck

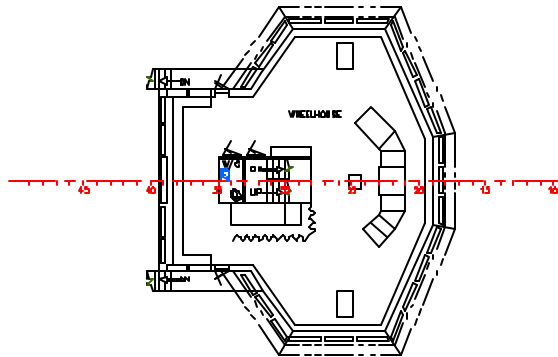


03 Deck

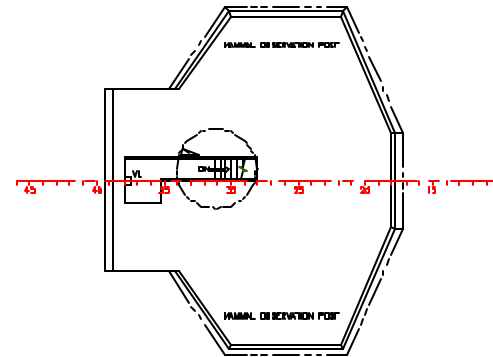


03 DECK

Upper Decks (04, 05)



04 DECK



05 DECK (FLYING BRIDGE)