



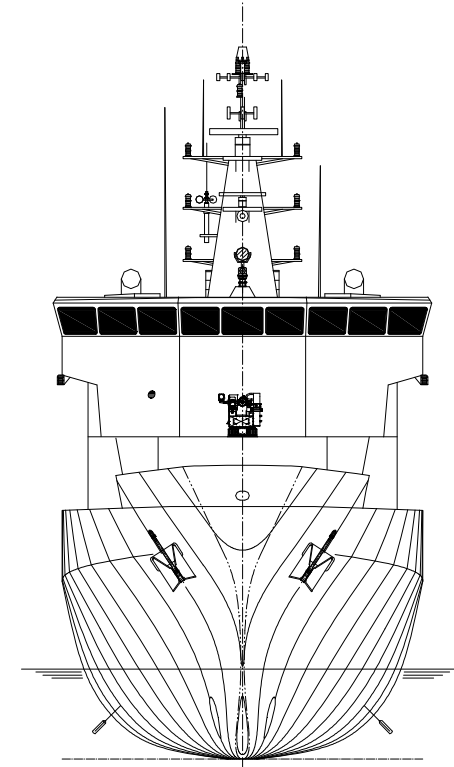
The New Zealand Offshore Patrol Vessel Design

Dan McGreer

Principal Engineer, Aker Marine

Introduction

- Project Overview
- Performance Requirements
- Principal Particulars
- General Arrangement
- Ship Performance
- Detailed Design
- Advantages of Commercial Approach to OPV Design
- Conclusion



FORWARD VIEW

Project Protector



1 Multi-Role Vessel

- 131 m x 23.1 m
- 450 lane meters

2 Offshore Patrol Vessels

- 85 m x 14 m
- Complement 80

4 Inshore Patrol Vessels

- 55 m x 9 m
- Complement 26

■ Project Overview

- NZ Maritime Forces Review (2002)
- Functional Performance Specification and RFP (2003)
- Contract with Tenix for Project Protector (July 2004)
- Aker Marine Completes Design Modifications to OPV (Mar 2005)
- Lay Keel OPV 1 (Dec 2005)
- Launch OPV 1 (Sept 2006)
- Delivery OPV 1 (Apr 2007)
- Delivery OPV 2 (Oct 2007)

NZ Project Protector Objectives

- The NZ Government's objective is to equip the RNZN with a practical fleet that is modern, sustainable and matched to New Zealand's needs.
- The Maritime Forces Review identified gaps in the RNZN's current capability to conduct military and civilian sealift and surface patrol tasks to meet Govt. multi-agency requirements.
- The New Zealand Defence Force (NZDF) has a primary goal of minimizing total cost of ownership of the patrol and support fleet.

NZ OPV

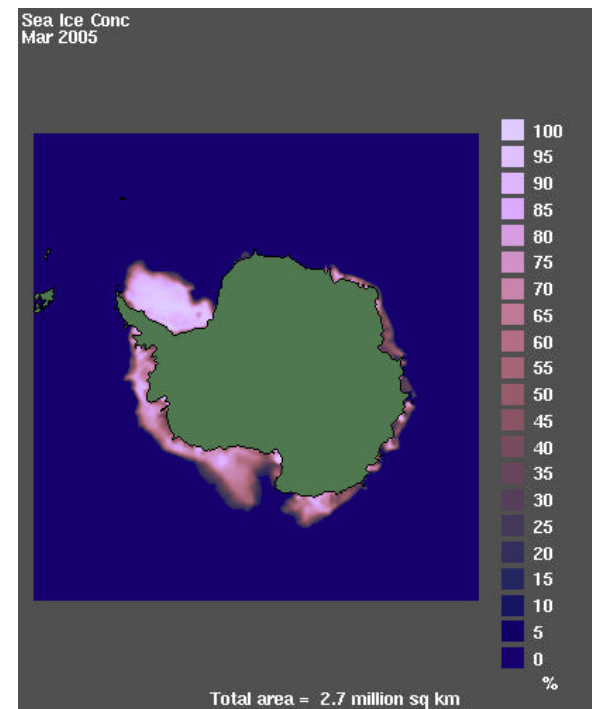
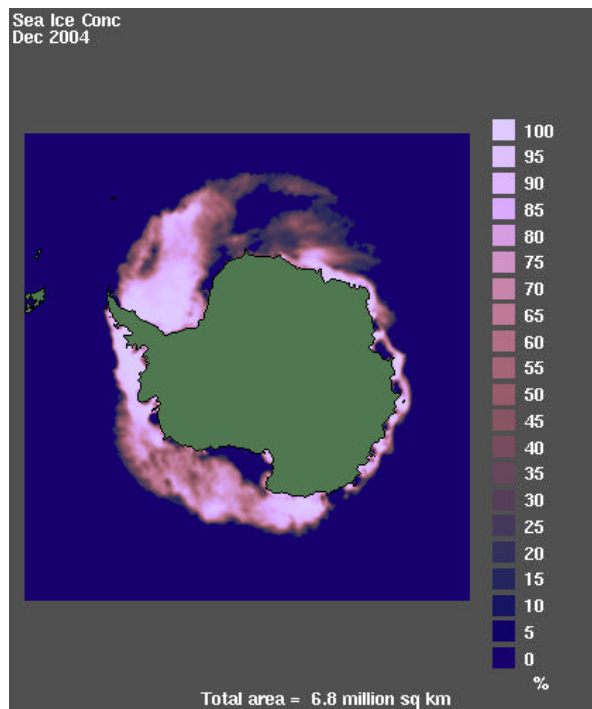


OPV Mission

- The OPV shall be capable of undertaking a number of roles including but not limited to surface patrol and at-sea training.
 - Coastal Surveillance
 - Smuggling Interdiction
 - Search and Rescue
 - Fisheries and Environmental Law Enforcement
 - Counter Terrorism
 - Support 30 Embarked Forces

Operational Area

- The OPV shall be designed for operations in the waters of the New Zealand exclusive economic zone, in the Pacific Ocean, in the deep southern latitudes of the Pacific and Indian Oceans, in the Tasman Sea and in the waters of Australia.



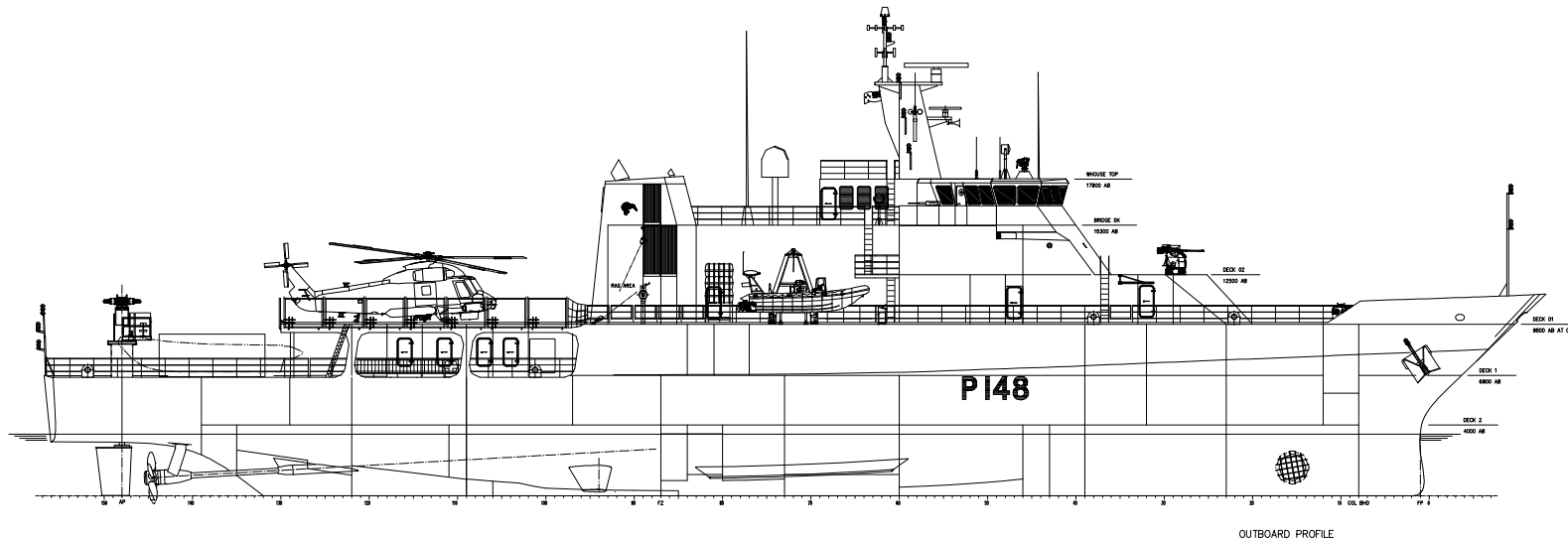
NZ OPV



Performance Requirements

- Speed 22 knots in Sea State 4
- Range 6,000 nautical miles at Endurance Speed.
- Complement 35 Navy, 10 Flight and 4 Govt. Agency Personnel
- Ice Class 1C
- Patrol in Sea State 6
- Launch and Recovery of Sea Boats in Sea State 4
- Helicopter Flight Deck Operations in Sea State 5
- SOLAS, MARPOL and Lloyds Special Service Craft

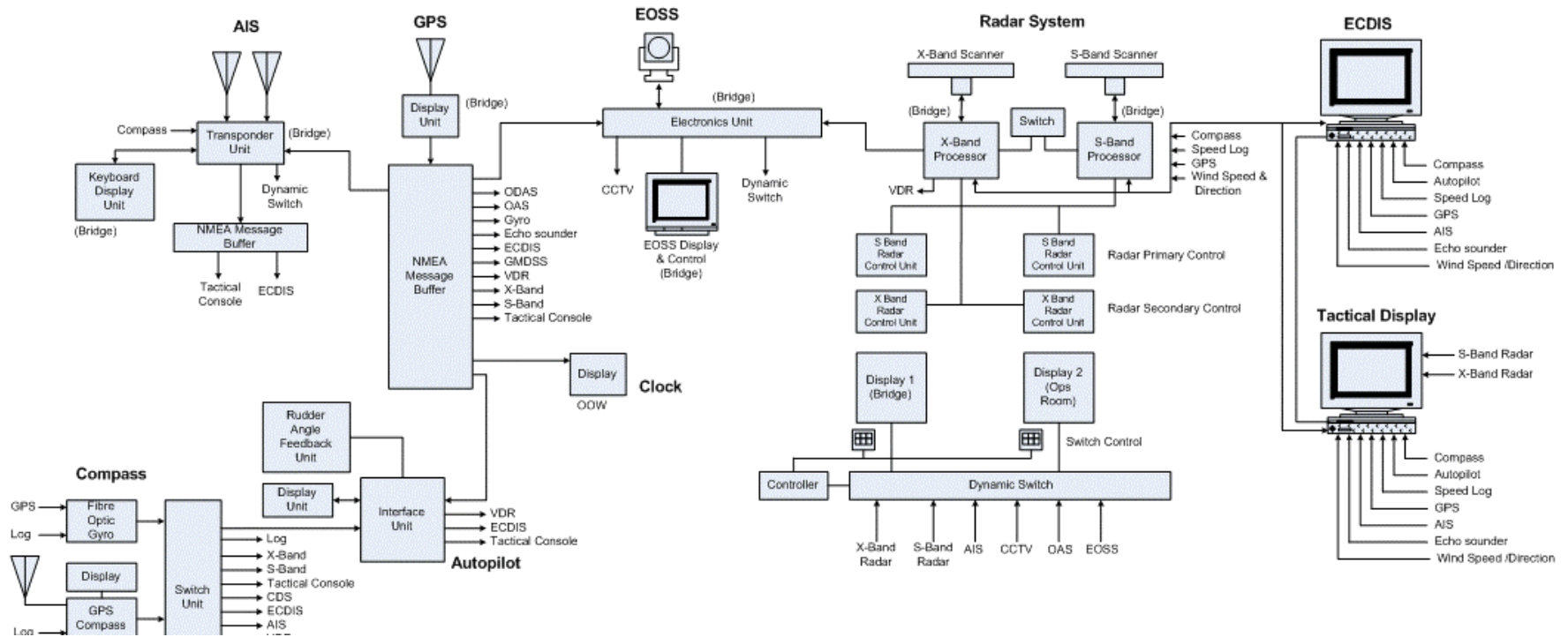
Principal Particulars



Length Overall 85 m
Length Waterline 77.6 m
Beam 14 m
Draft 3.6 m
Propulsion Power 10,800 kW
Design Speed 22 knots
Cruising Speed 12 knots

Crew Complement 45 Navy
 4 Govt. Agency
 30 Embarked Force
Range 6,000 nm
Helicopter SH-2G Super Seasprite
Cargo 16 tonnes
Armament 1 x 25 mm Stabilized Naval Gun
 2 x 50 caliber Machine Guns

Mission Systems



Electro Optical Surveillance System (EOSS)
Communications Detection System (CDS)
Radar Detection System (RDS)
Automatic Identification System (AIS)
Obstacle Avoidance Sonar

HF Tactical Communications
Secure Radio and WAN Communication
Satellite Communication
Civil V/UHF Radios

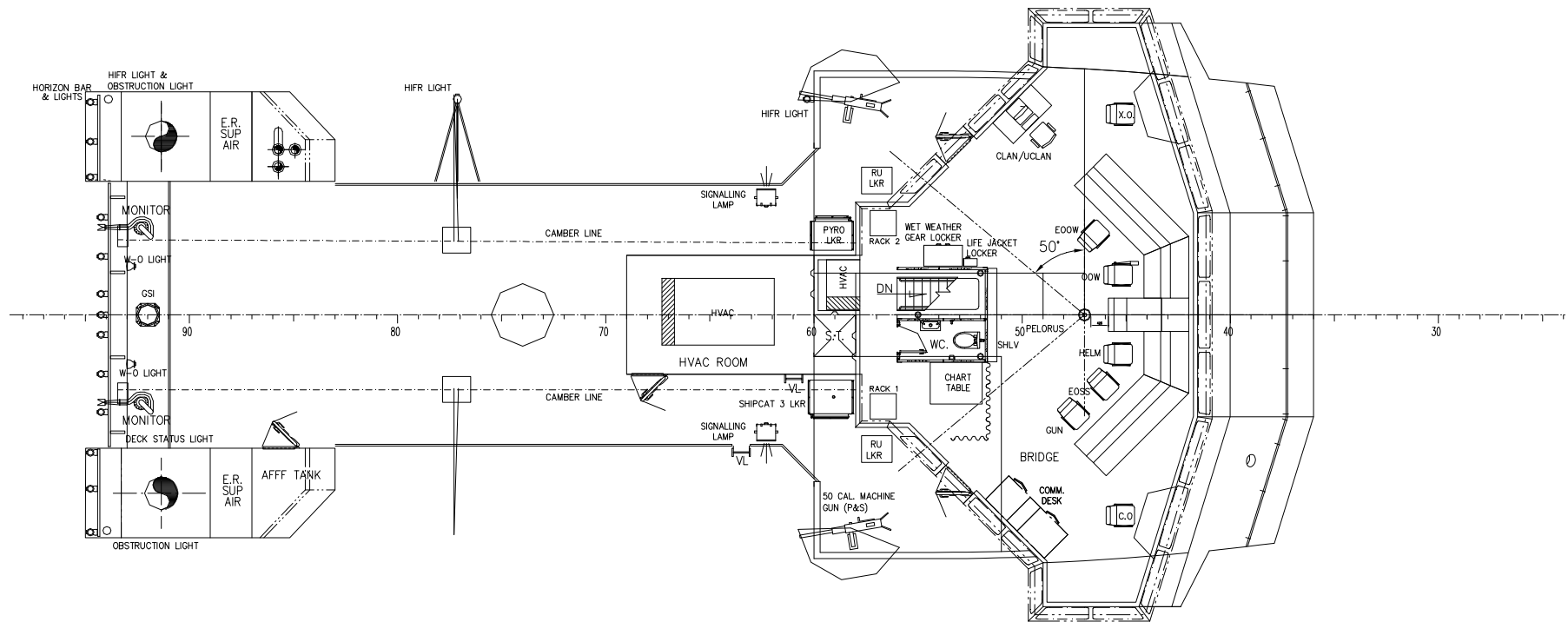
Mission Systems



NOTES:

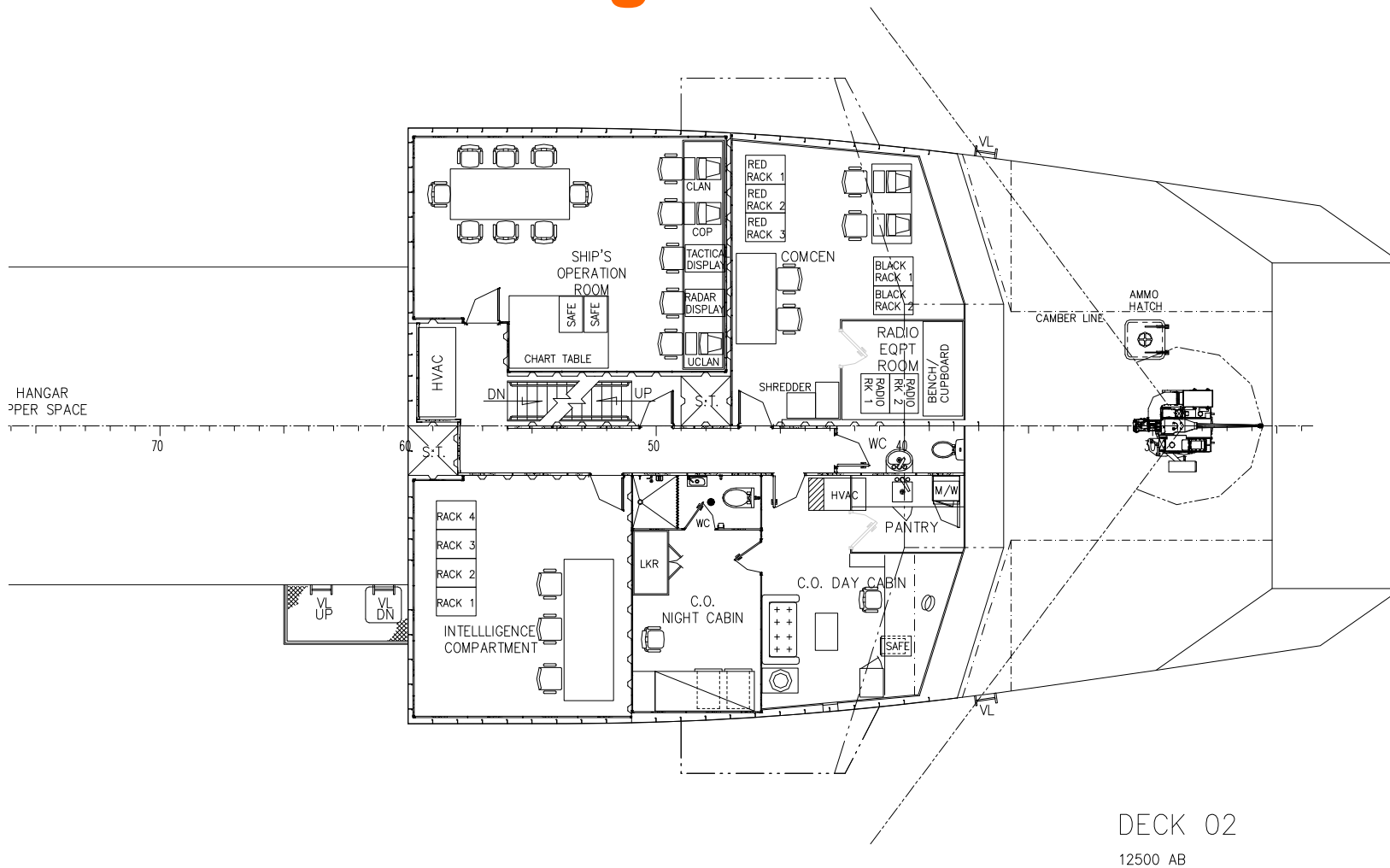
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General Arrangement



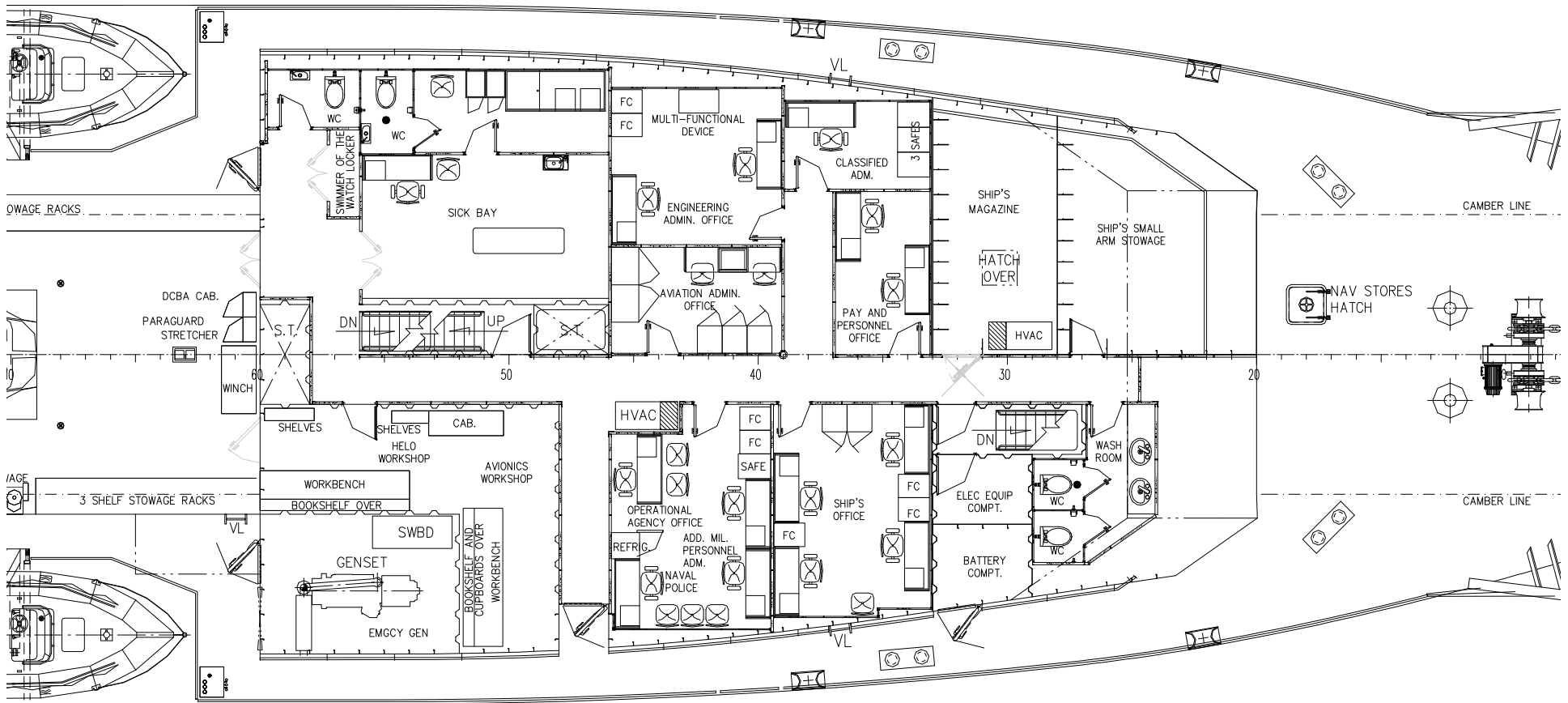
BRIDGE DECK
15300 AB

General Arrangement



DECK 02
12500 AB

General Arrangement

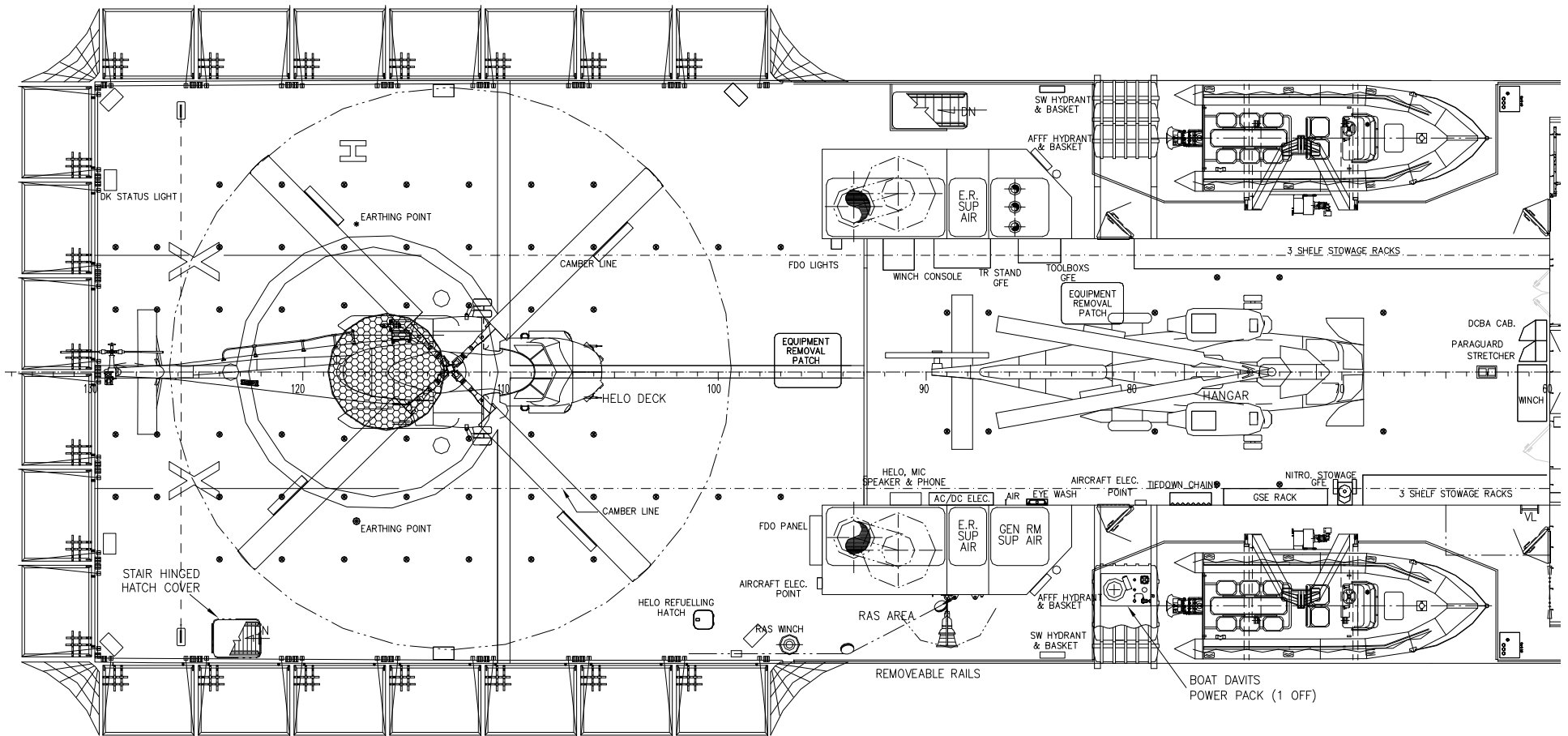


DECK 01

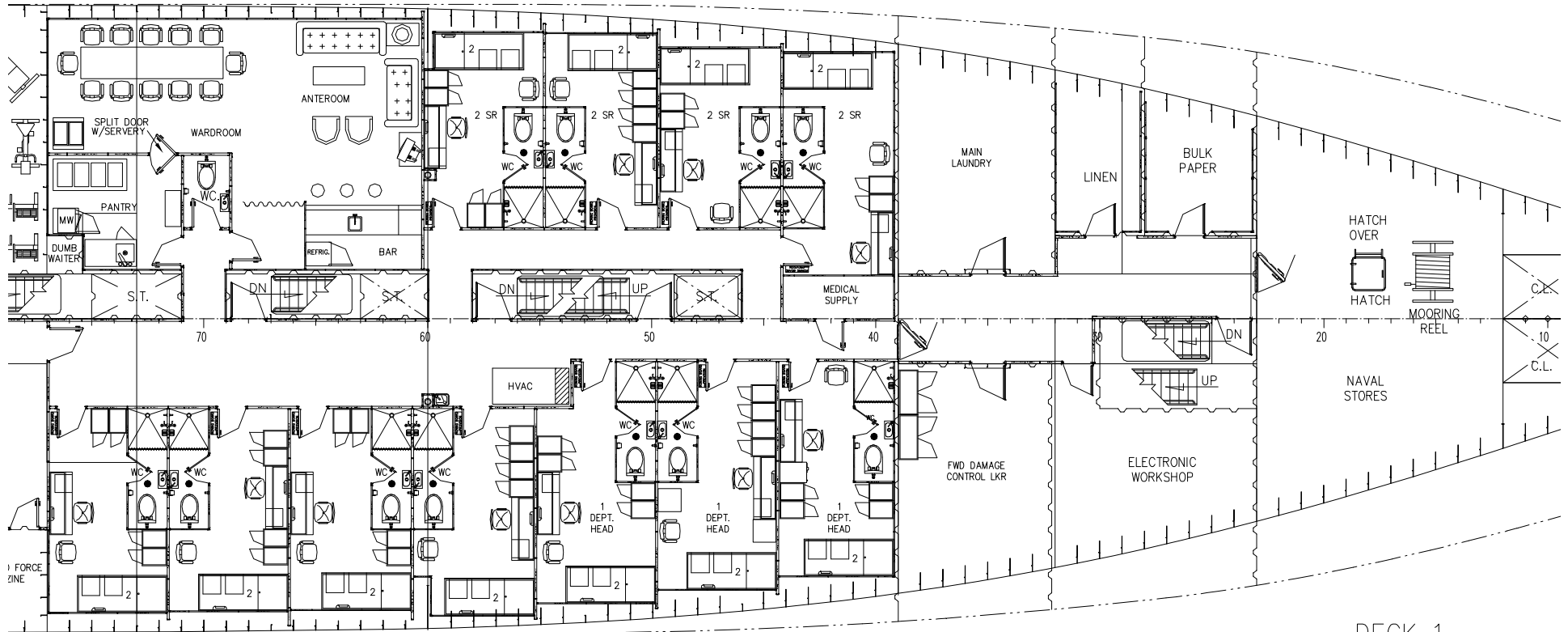
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Preferred for innovation

General Arrangement

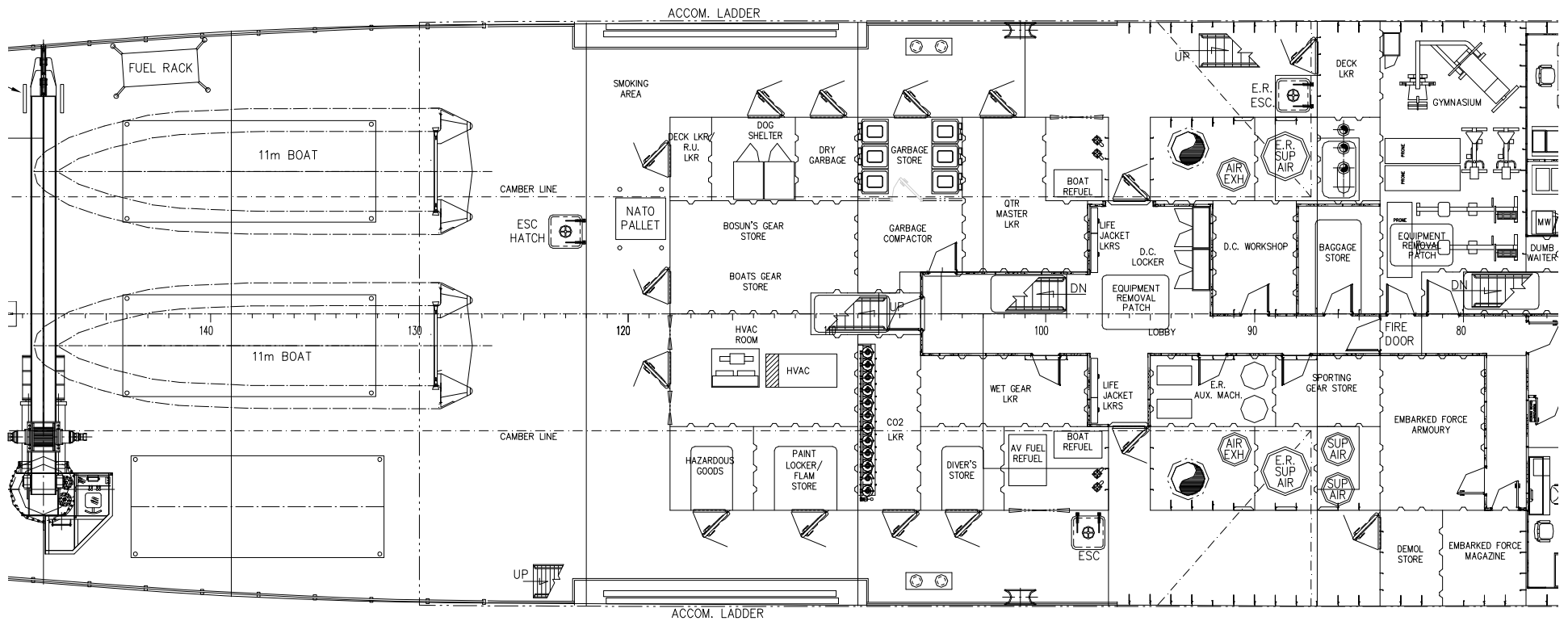


General Arrangement

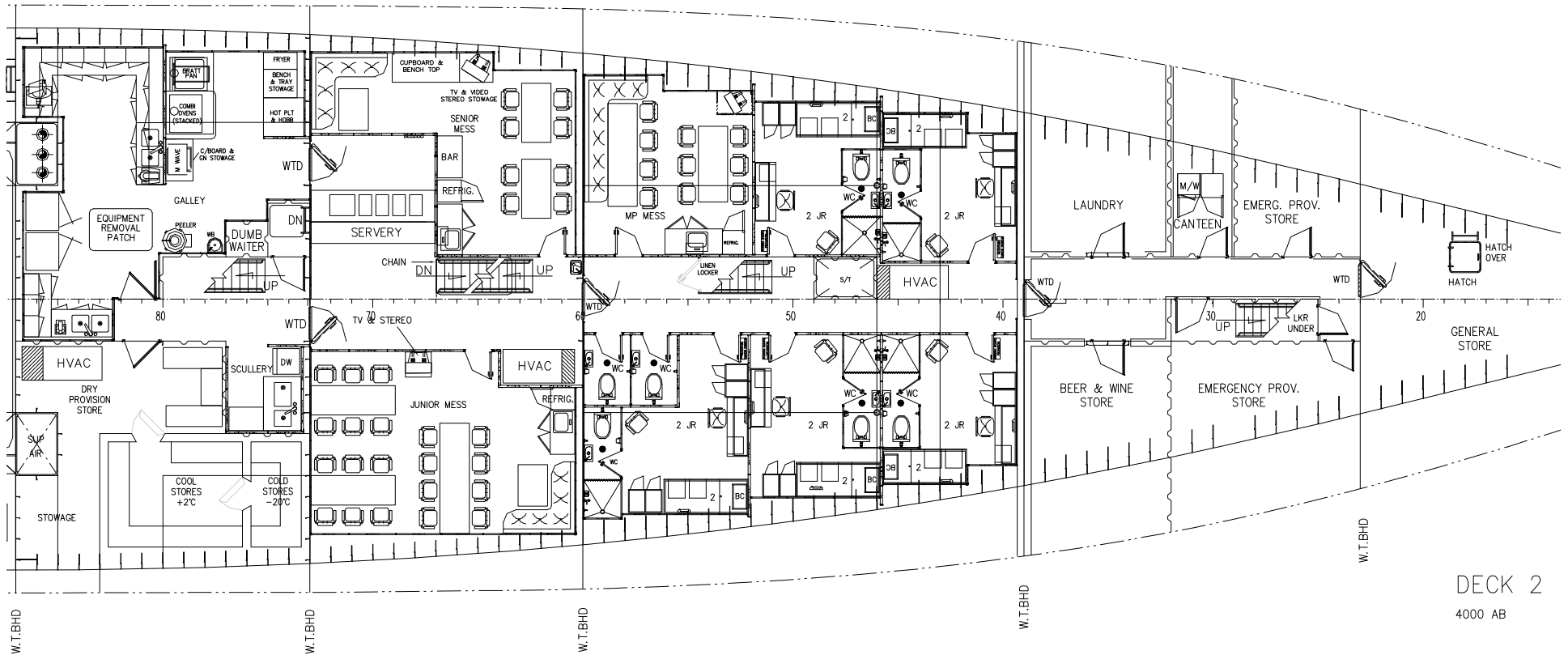


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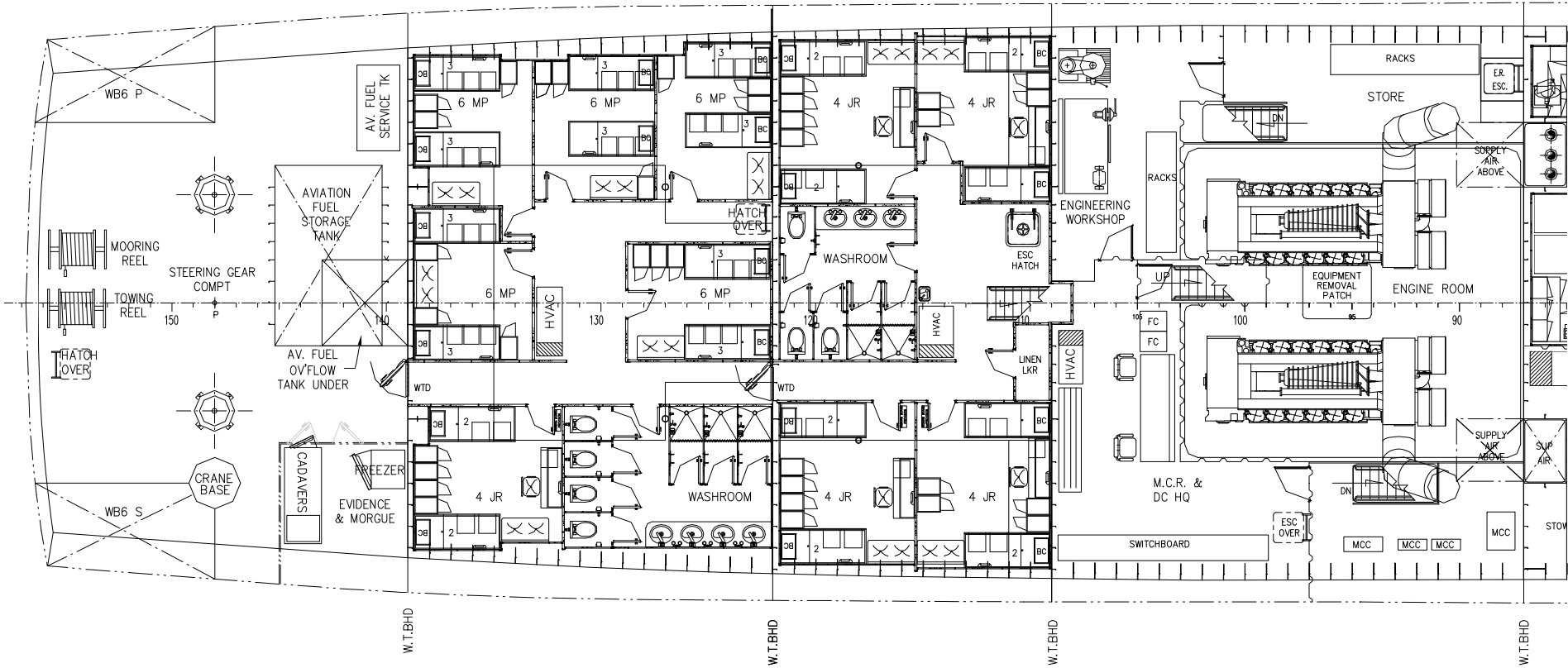
General Arrangement



General Arrangement



General Arrangement



Ship Performance

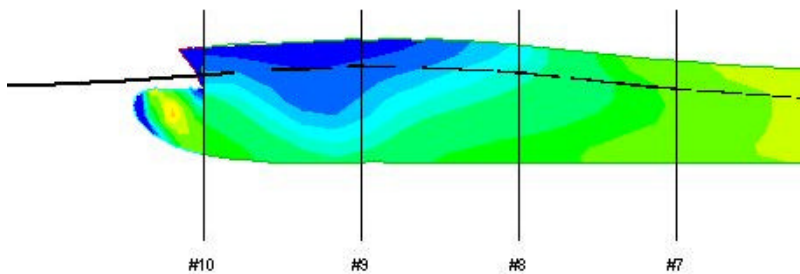
- Design developed based on successful previous designs.



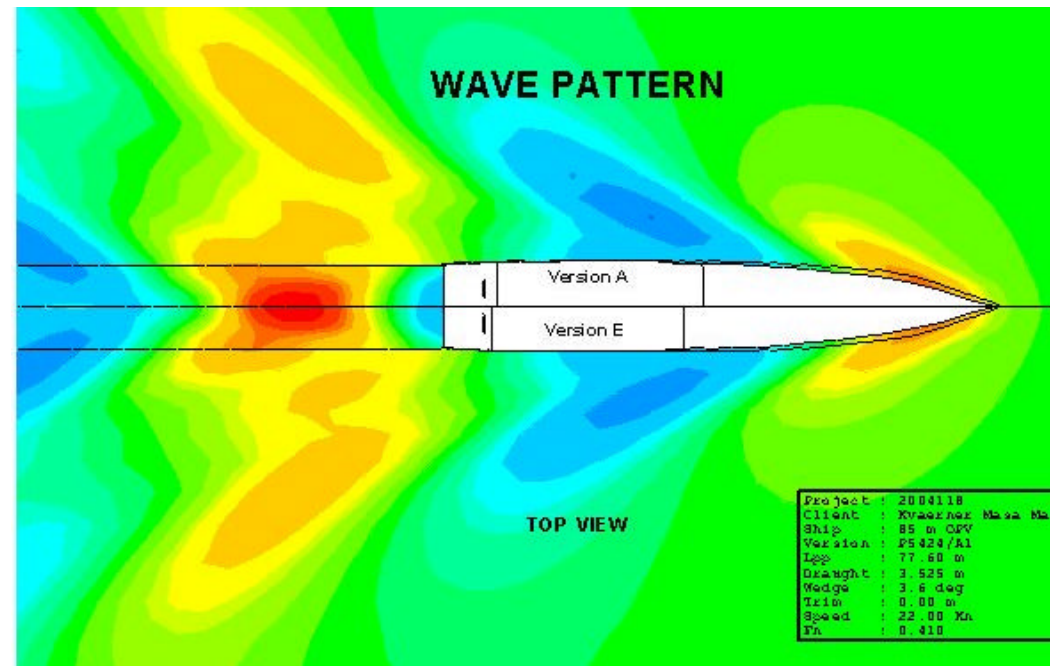
Ship Performance

- Hull Form Optimization using CFD
- Considered alternative stern design, variations in stern wedge angle and bulbous bow.

AXIAL VELOCITY DISTRIBUTION



WAVE PATTERN



Ship Performance

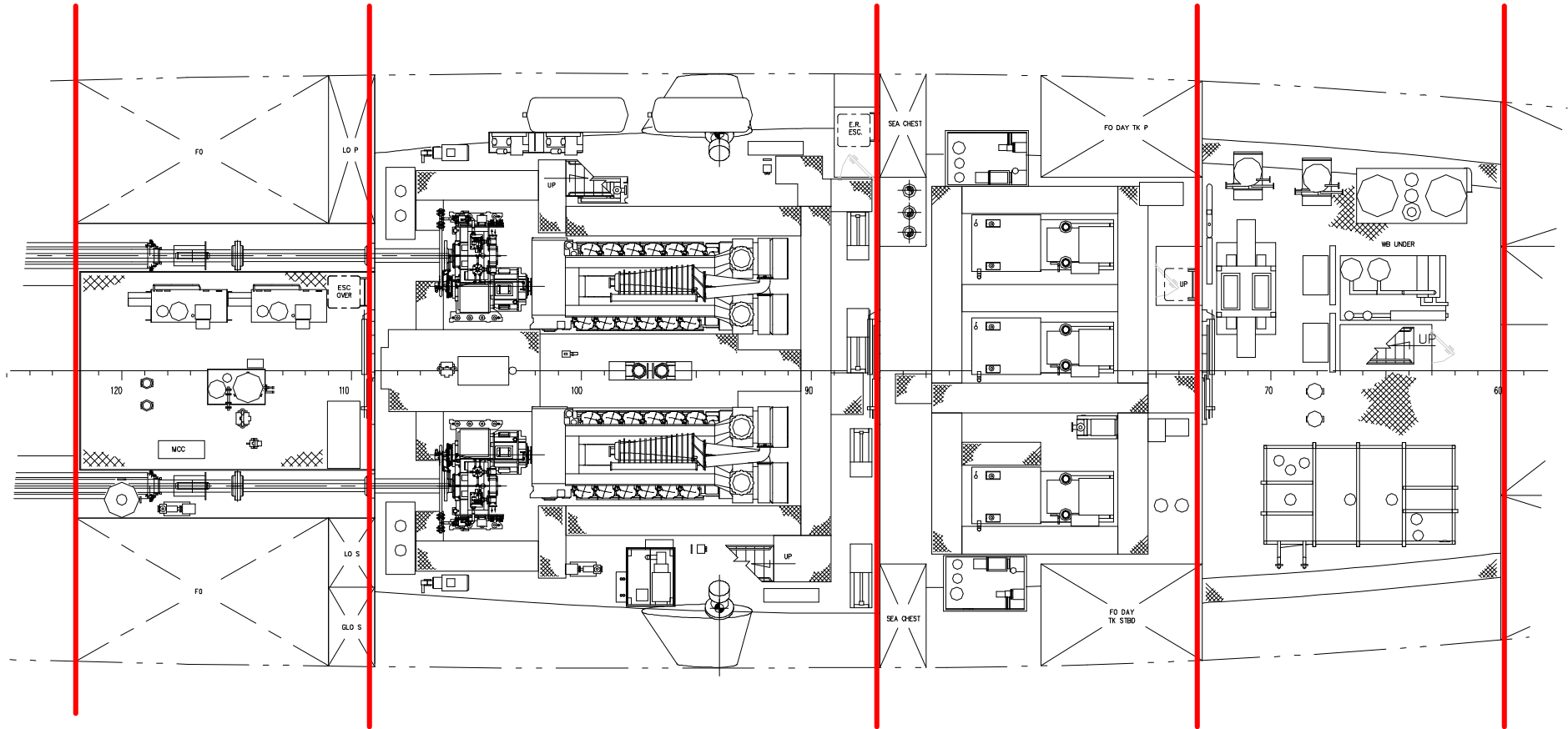
- Model Tests at FORCE Technologies (DMI)



■ Propulsion System

- Twin Screw CPP (Wartsila LIPS)
- Propulsion Engines MAN B&W 12V RK280
- 5400 kW @ 1000 RPM per shaft
- Single Shaft Operation for Patrol Speeds

Machinery Arrangement



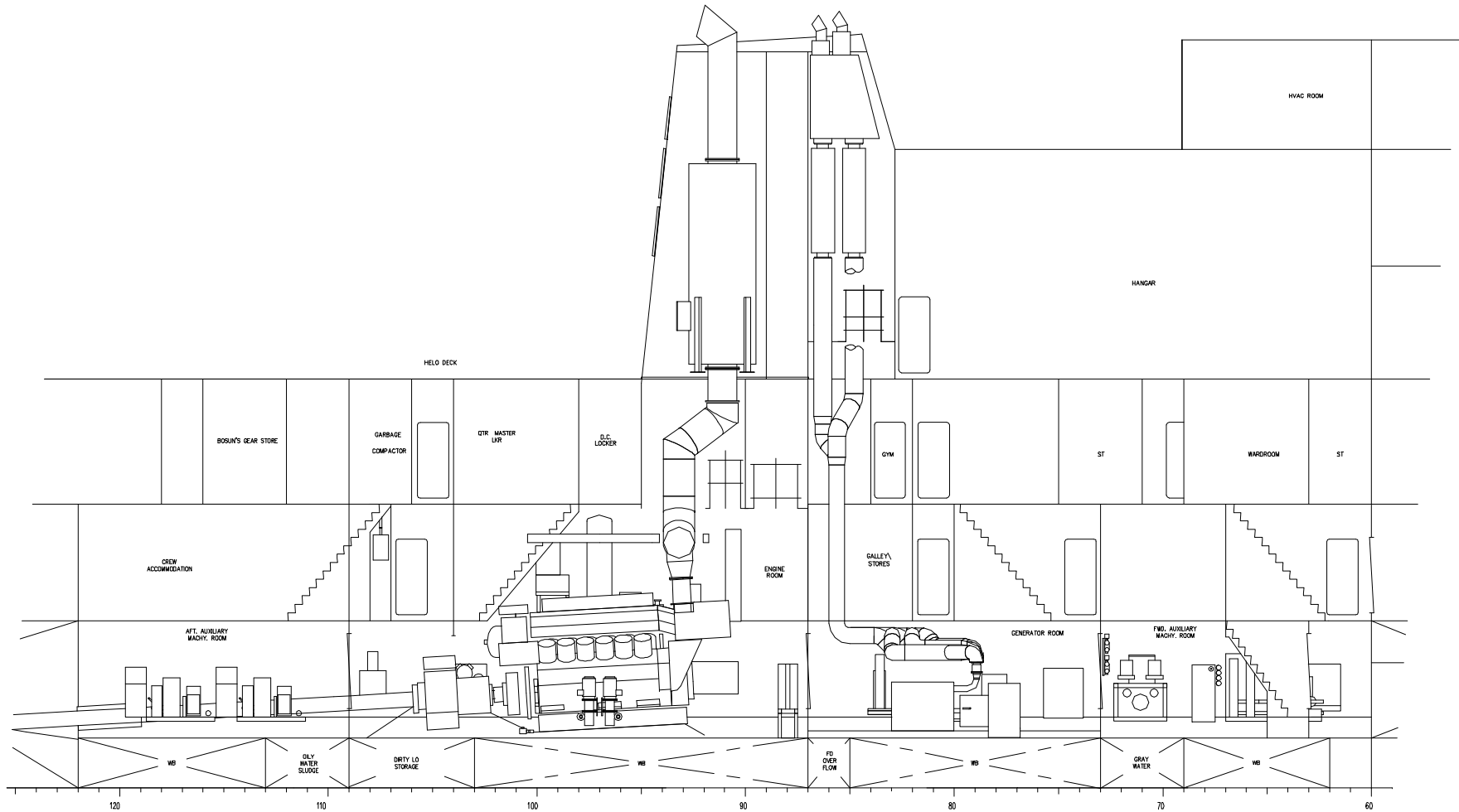
Aft Auxiliary Machinery Space

Propulsion Machinery Space

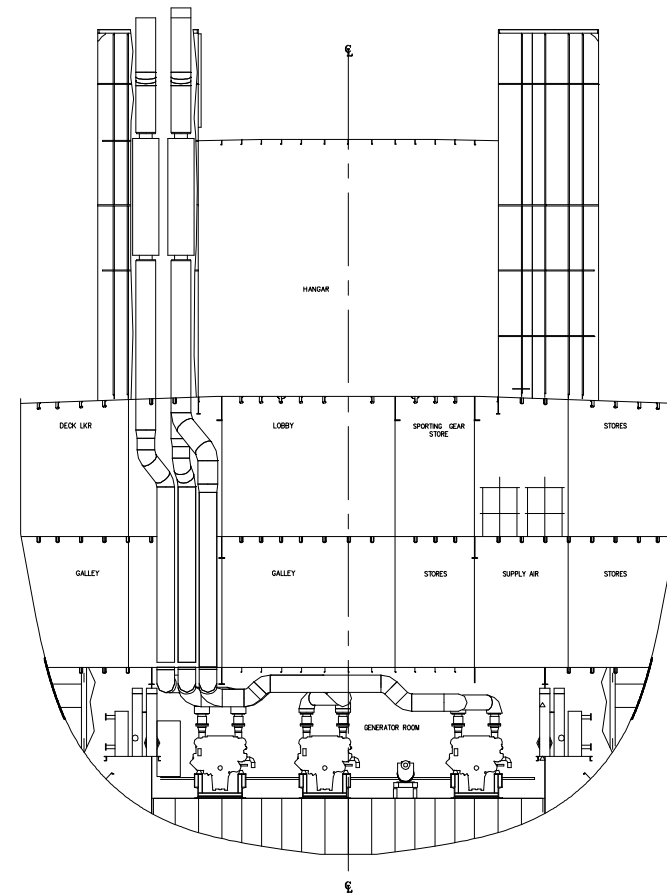
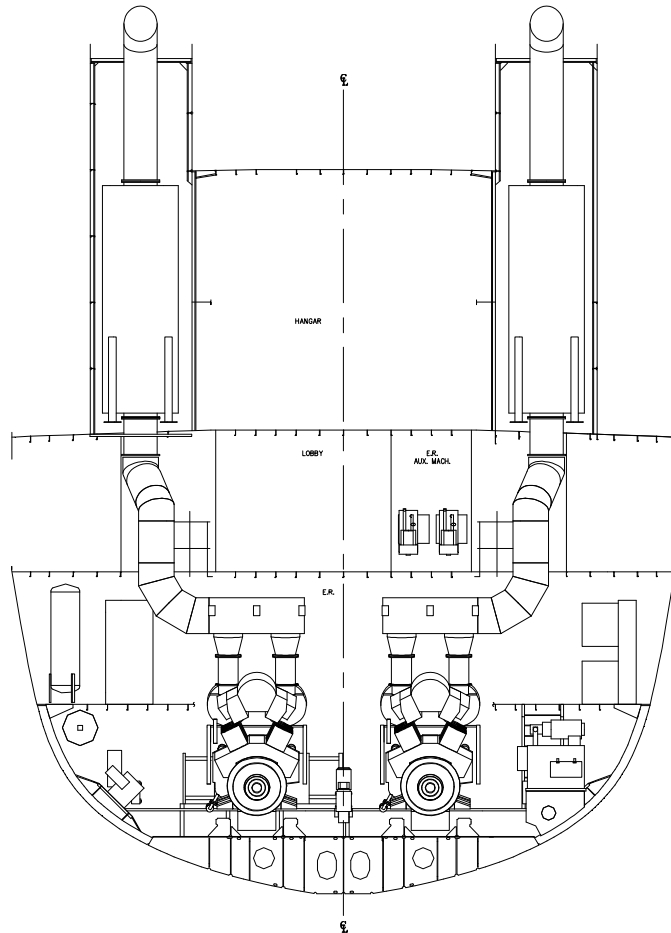
Generator Machinery Space

Fwd Auxiliary Machinery Space

Machinery Arrangement

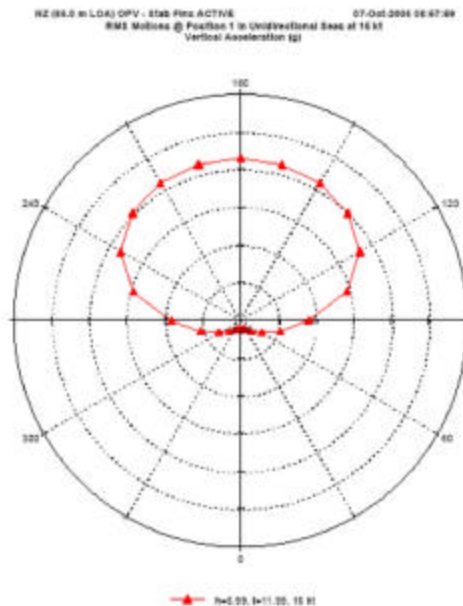


Machinery Arrangement



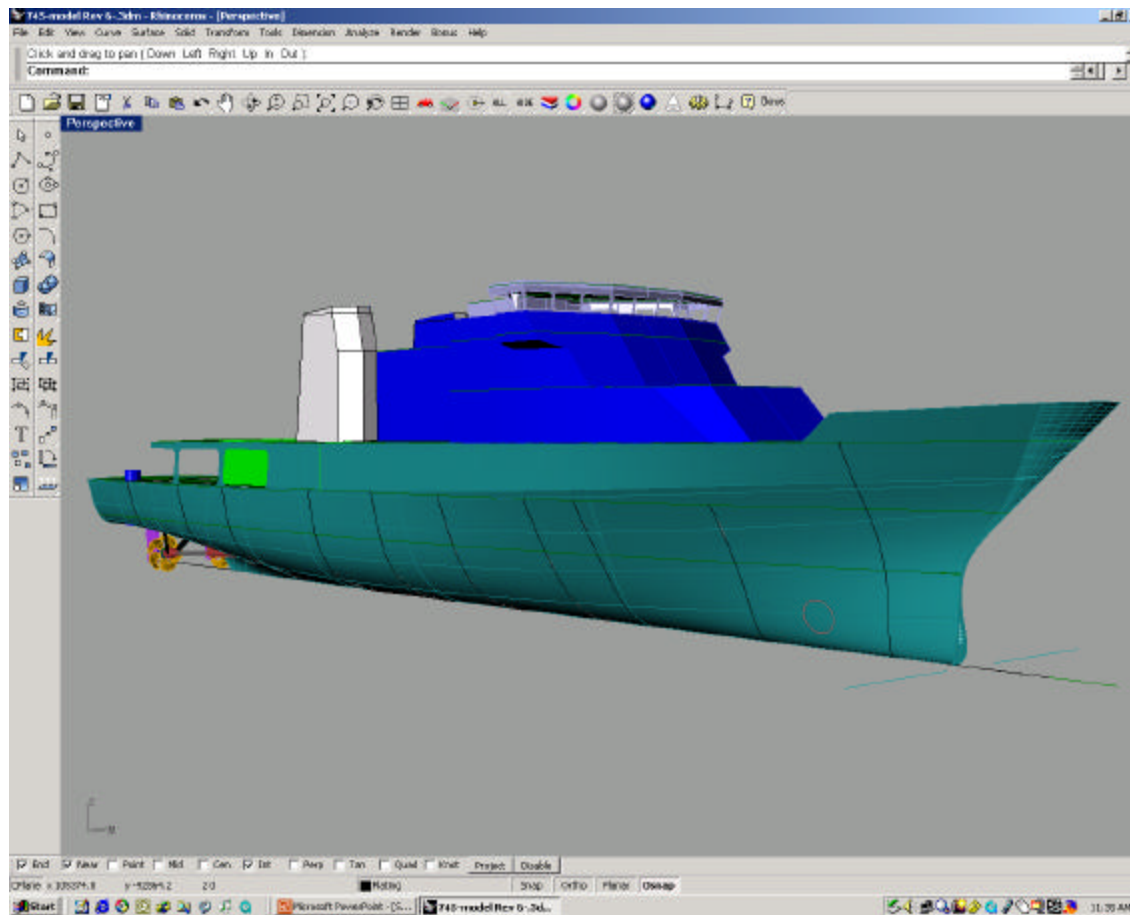
Seakeeping Performance

- Seakeeping performance critical for operational effectiveness.
- Performance verified by analysis and model tests.



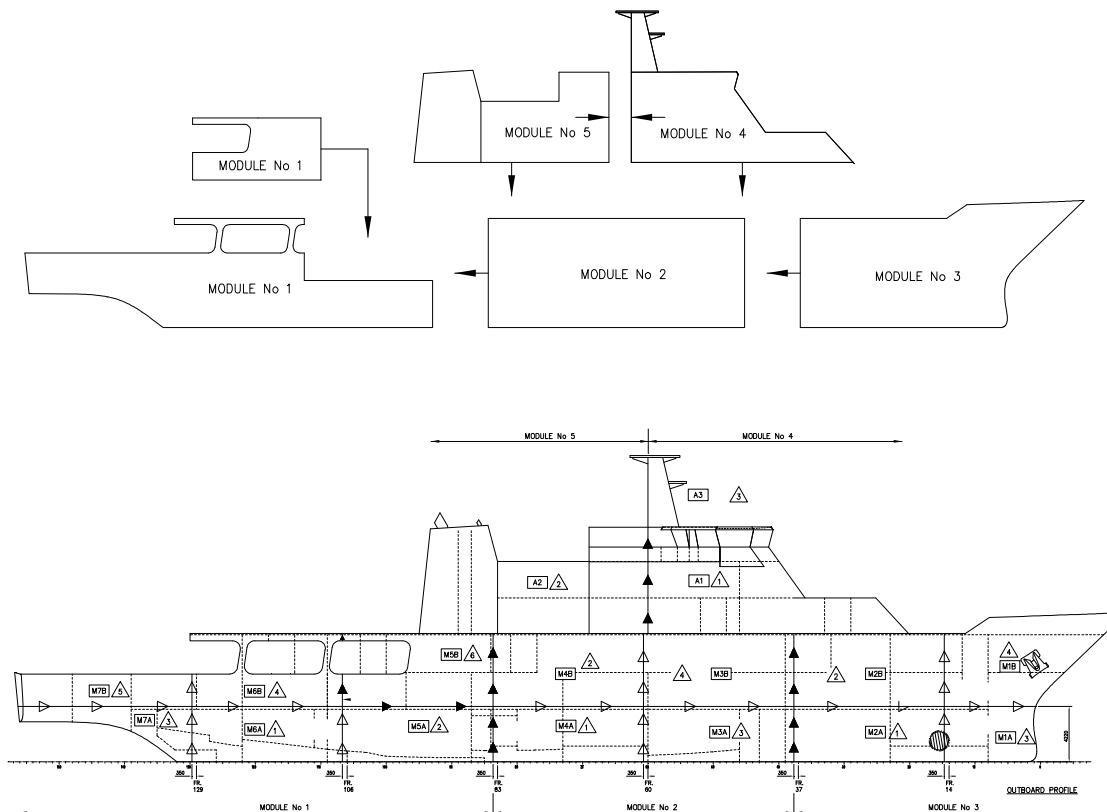
Detailed Design

- 3 D Model Developed in Fastship and Rhino



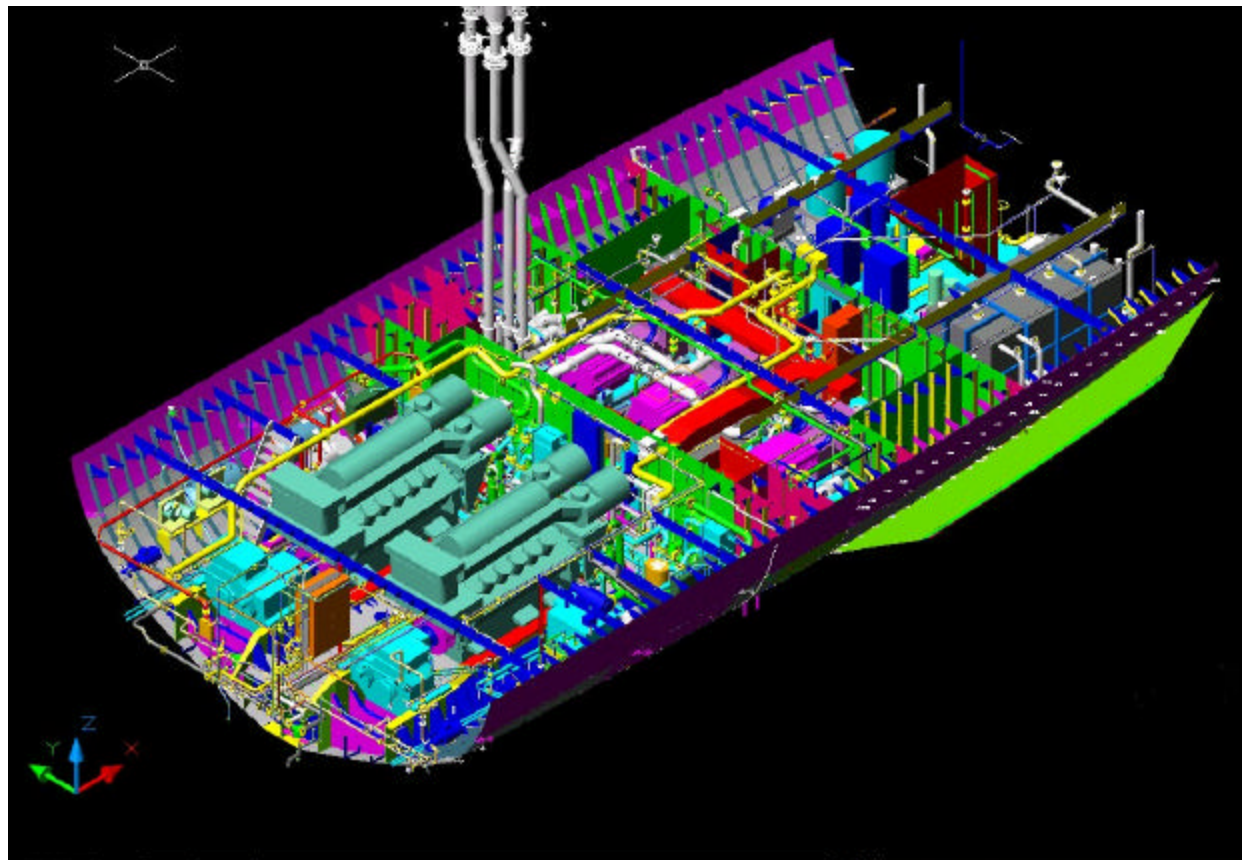
Detailed Design

- Build Strategy for Modular Construction

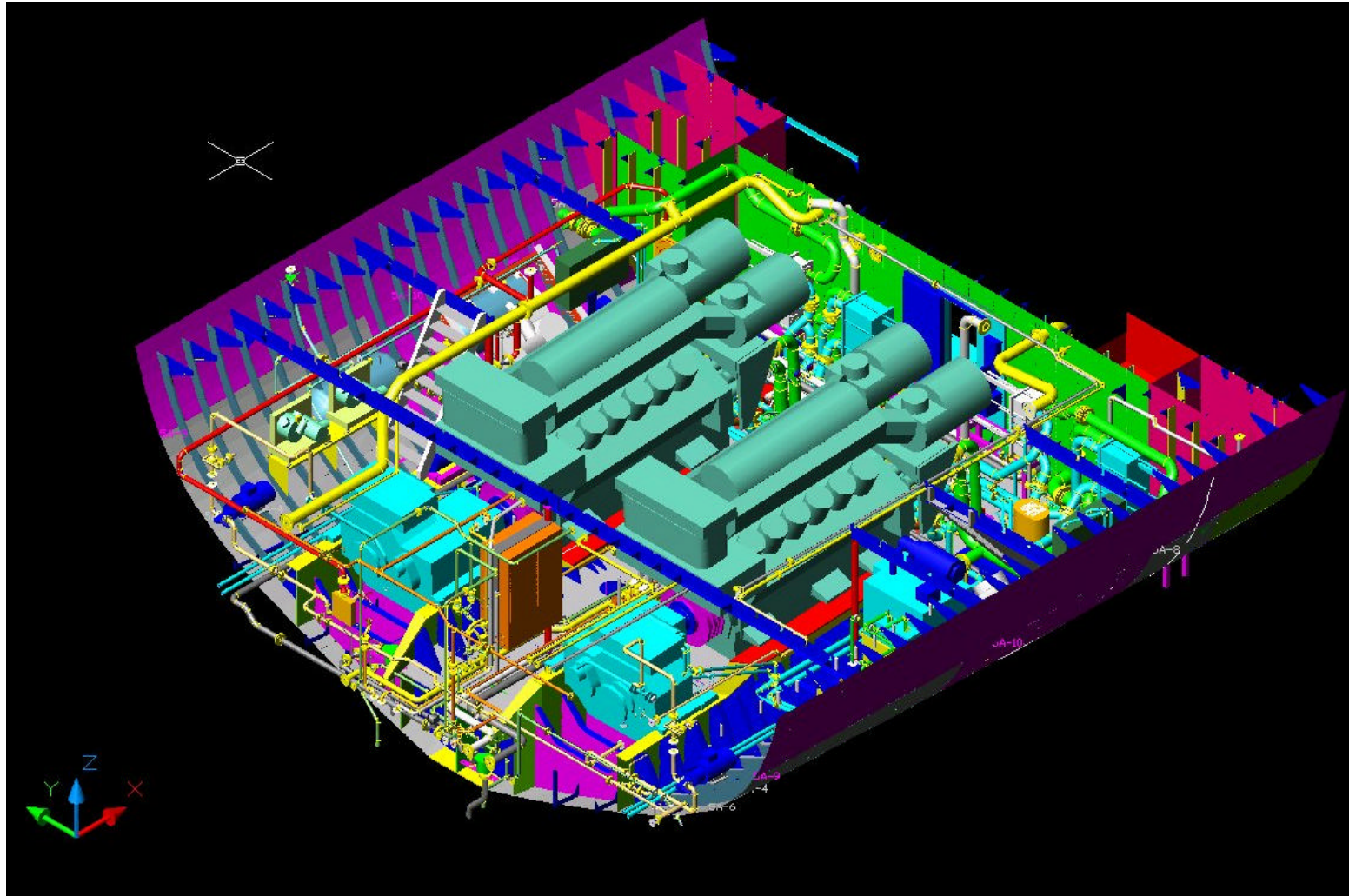


Detailed Design

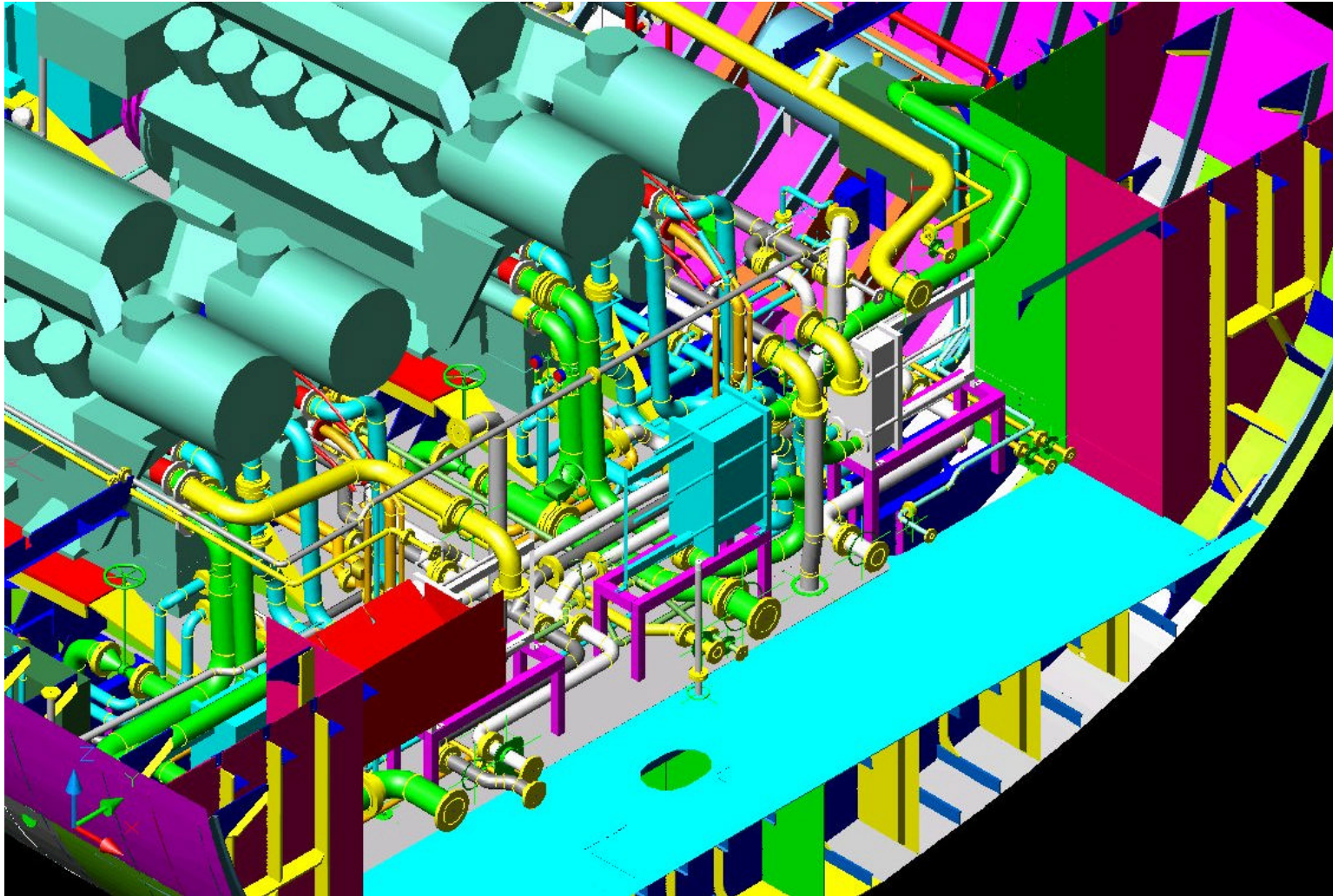
- Structure, Equipment and Piping 3D Model for Machinery Spaces developed in Ship Constructor



Detailed Design



Detailed Design



Vessel Under Construction at Tenix



Advantages of Commercial Approach

- Much Lower Construction Cost than for typical Naval Vessels
- Use of commercial marine spec equipment (COTS) results in lower through life costs
- Cost Effectiveness for Multi-Agency Patrol Missions
- Affordable for Smaller Countries
- End of Cold War necessitates reevaluation of Naval Vessel Requirements
- Naval Duties now involve more Coast Patrols to counter terrorists and for law enforcement.
- Lower cost vessels allow more vessels to be put in service.

Conclusion

- The NZ OPV is a cost effective, highly capable Offshore Patrol Vessel design for coastal patrol duties.

