

Key Characteristics

- A modular Ship Design
- One platform design capable of three variants
- Reduced design, production and procurement cost



Motivation & Objectives

- Investigate the feasibility of platform based ship designs
- Develop a ship design concept capable of undertaking one of three roles chosen at build, in order to display specific compromises

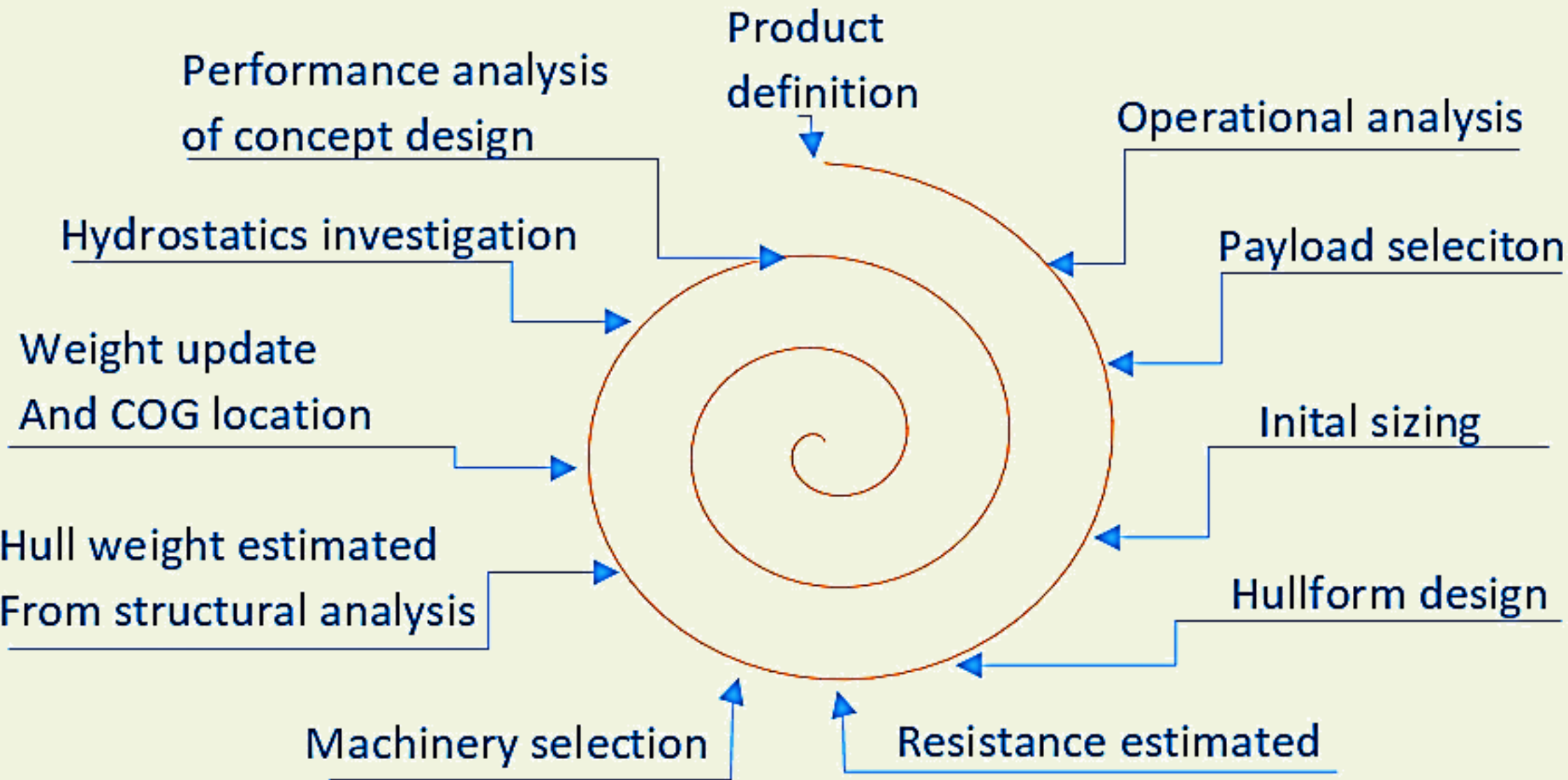
The roles being:

- A Research vessel
- A Submarine Rescue vessel
- A Coast Guard vessel

- Ensure the overall design is prepared for future applications
- Present the compromises chosen for the optimum design

Methodology

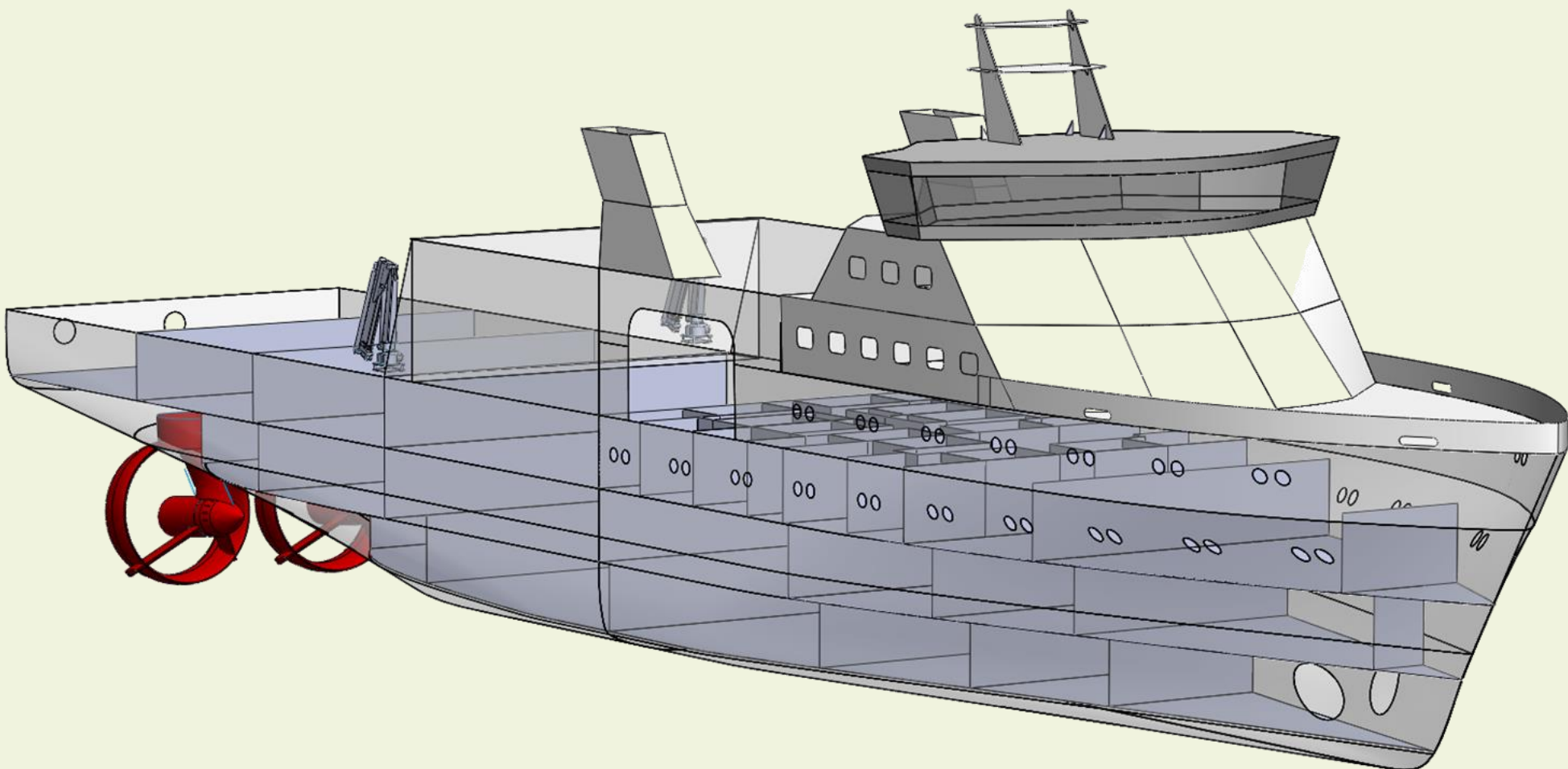
The design spiral developed for the platform based ship design



Results

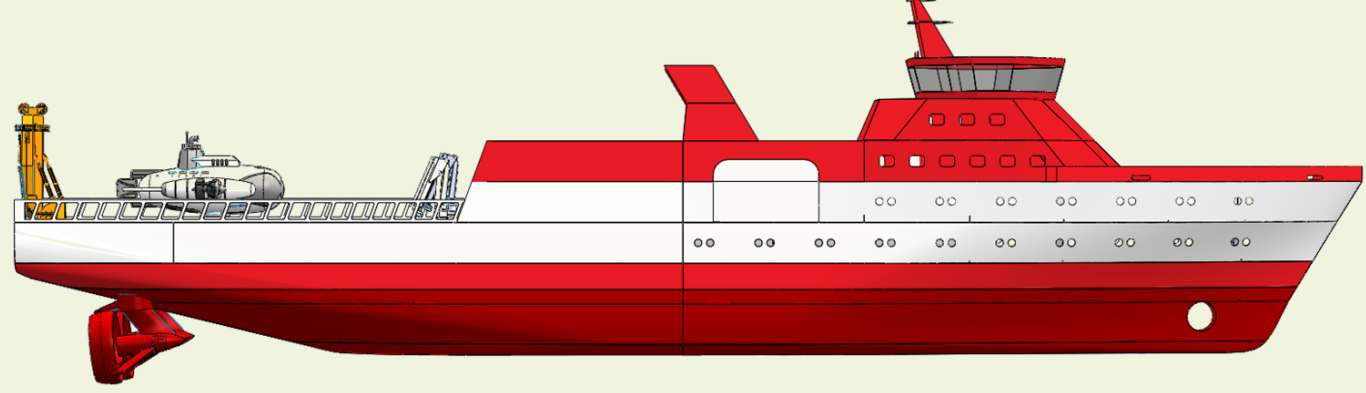
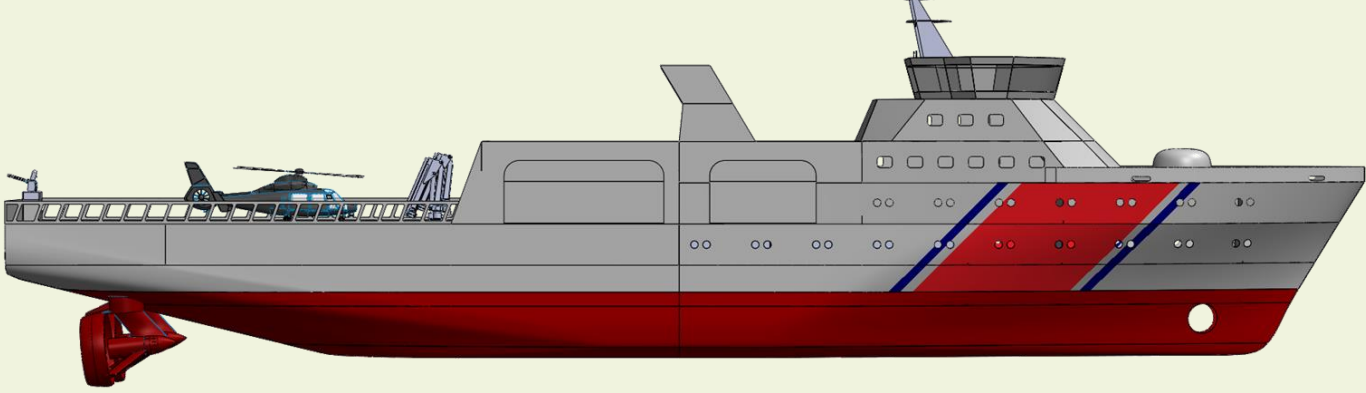
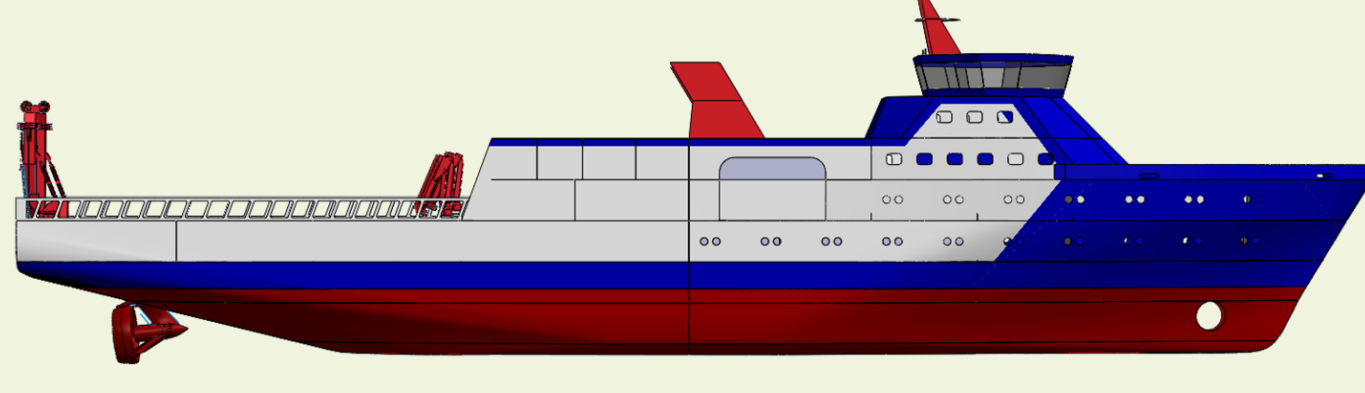
Platform Ship Capabilities

- 32 days endurance
- Lloyds Fire Fighting Vessel Class 1
- Capable of towing a 20568 TEU container ship in up to sea state 5
- Conduct SAR missions with survivor capacity of 200 personnel
- NEO / Disaster Relief supplies



Platform Ship Characteristic

Displacement	3577 [tonnes]
LOA	89.5 [m]
Top speed	20 [knots]
Eco speed	13 [knots]
Range	9200 [nm]
Endurance	32 [days]
Availability	350 [days]
2 Compartment flooding	

Submarine Rescue Variant	Coast Guard Variant	Research Variant									
											
Identified similarities between the variants <table><tr><td> - Large open space requirement: Hyberbaric Treatment Chambers - Large open deck for NSRS system - Launch and Recovery at stern for NSRS system - Large main deck area for Tier 2 Hospital </td><td> - Large open space requirement: Hangar and Boat bays - Large open deck for flight deck and L&R for AUVs </td><td> - Large open space requirement: Equipment bay and Wet Laboratories - Large open deck for research equipment deployment - Launch and recovery at stern for UAVs - Large main deck area for Research facilities </td></tr><tr><td colspan="3"> Important compromises undertaken during the design process <table><tr><td> - Operational Theatre not incorporated due to excessive volume requirement - Layout of hospital is greatly constrained by other variants </td><td> - Top speed target lowered, to not excessively drive the hull form generation. - Helicopter-maintenance crew is also AUV maintenance crew - Smaller go-fast boats selected due to length impact </td><td> - Range decreased to not excessively drive the storage capacity - Only Dynamic Positioning level 2 selected, as it is not required for other variants </td></tr></table></td></tr></table>			- Large open space requirement: Hyberbaric Treatment Chambers - Large open deck for NSRS system - Launch and Recovery at stern for NSRS system - Large main deck area for Tier 2 Hospital	- Large open space requirement: Hangar and Boat bays - Large open deck for flight deck and L&R for AUVs	- Large open space requirement: Equipment bay and Wet Laboratories - Large open deck for research equipment deployment - Launch and recovery at stern for UAVs - Large main deck area for Research facilities	Important compromises undertaken during the design process <table><tr><td> - Operational Theatre not incorporated due to excessive volume requirement - Layout of hospital is greatly constrained by other variants </td><td> - Top speed target lowered, to not excessively drive the hull form generation. - Helicopter-maintenance crew is also AUV maintenance crew - Smaller go-fast boats selected due to length impact </td><td> - Range decreased to not excessively drive the storage capacity - Only Dynamic Positioning level 2 selected, as it is not required for other variants </td></tr></table>			- Operational Theatre not incorporated due to excessive volume requirement - Layout of hospital is greatly constrained by other variants	- Top speed target lowered, to not excessively drive the hull form generation. - Helicopter-maintenance crew is also AUV maintenance crew - Smaller go-fast boats selected due to length impact	- Range decreased to not excessively drive the storage capacity - Only Dynamic Positioning level 2 selected, as it is not required for other variants
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Discussion

- The hullform is designed for an average cruise speed, therefore not ideal for the Coast Guard Variants sprint speed.
- The machinery is selected for an average operational profile, therefore not optimised.
- The necessary payload compromises produces less efficient ship solutions.

Conclusion

A platform based ship design is advantageous in all economical aspects of ship building, however it entails inevitable compromises during the design process. The selected variants for the platform must have similarities in order to produce a well-working design. The similarities has been identified by conducting a thorough operational analysis and cost-capability trade-off, from which the primary compromises has been undertaken. The final design shows a possible solution to a platform based ship of the three variants. A market comparisons shows that each of the variant are highly competitive to similar ships.

Research Outlook

- Apply the concept to other variant-combinations in order to investigate the extended application.