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VARD™

a Fincantieri company

Vard Marine

Research Vessel Design Approach - IRSO

Lee Grace

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VARD™

a Fincantieri company

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Vard Marine at a glance

Product lines

17

Design offices

5

HQ in Vancouver, Canada

Employees

150

Unique designs

250+

Vessels delivered and under contract

160+

VARD and Fincantieri corporate support

Vard Marine is the expert in tailored offshore ship design solutions

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THE VARD MARINE VISION

The ship designer of choice for sustainable tailored solutions.

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OUR PRODUCT RANGE

Offshore Patrol Vessels

Naval Auxiliary Vessels

Offshore Supply Vessels

Icebreaking Vessels

Reseach Vessels

Passenger & Vehicle Ferries

Energy Infrastructure

Compact Semi-Submersibles

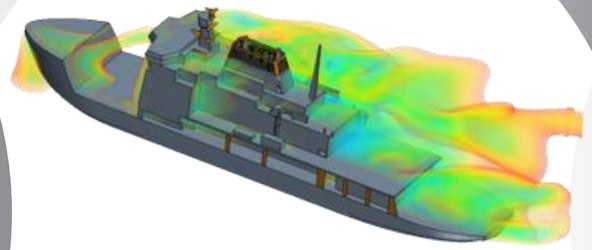
Offshore Support Vessels

Offshore Renewable Vessels

OUR SERVICES

Conceptual Development

Basic naval architecture
Feasibility studies
Cost estimates
Vessel specification
Trade-off studies
HAZID/HAZOP analysis
Condition analysis



Engineering Analysis

Naval architecture
Structural designs
Machinery arrangements
Electrical system design
Equipment selection
Outfit drawings
Environmental applications

Shipyard Support

Functional design package
Construction specifications
Production and detail design
Build support
On-site supervision
Trials supervision
Equipment procurement

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VESSELS CONSTRUCTED

Vard Marine - Research and Hydrographic

(Photo Credit: Canadian Coast Guard)

CCGS John Tully

(Photo Credit: US Coast Guard)

USCG Icebreaker Healy

(Photo Credit: Navy Lookout)

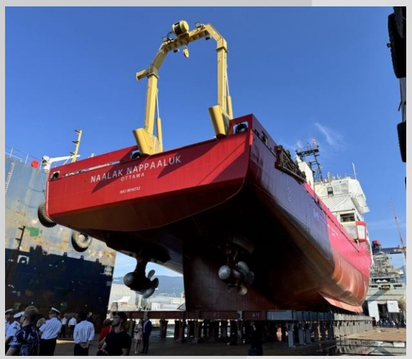
HMS Echo

(Photo Credit: Seaspan Corporation)

CCG Offshore Fisheries Science Vessel

(Photo Credit: ASMAR)

Chilean Navy Antarctica Icebreaker



CCG Offshore Oceanographic Science Vessel*

* Under Construction

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VESSELS

Contemporary Group Projects

(Photo Credit: Institute of Marine Research)

RV Kronprins Haakon – Fincantieri Group

(Photo Credit: REV Ocean)

REV Ocean – Vard Group

(Photo Credit: VARD)

Ocean Infinity – Vard Group

Science & Research Community Impact

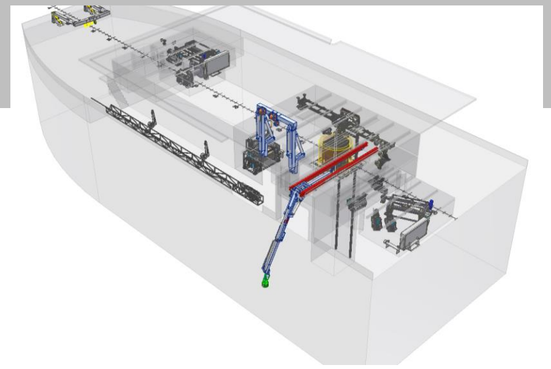
Early-stage design influence and critical design inputs

1. Class notations and regulatory regimes
2. Length, beam and draft restrictions
3. SAR and other organizational requirements
4. Mission profiles – Benthic, Arrays, Coring, Geophysics
5. Bubble sweepdown
6. URN
7. Crew and science complements
8. Wet and dry labs
9. Workflow
10. LARS and over the side equipment, ramps and access
11. Cranes and A frames
12. CTD spaces
13. Coring
14. ROVs/AUV
15. Gondolas and drop keels
16. Helo facilities
17. Sensor interaction/interference
18. Dynamic positioning and station-keeping
19. Seakeeping and anti-roll systems
20. Modularity and mission containers
21. Compressed air and on deck power/water
22. Areas of operation and endurance
23. Ports of operation
24. Ice class
25. Propulsion fuel availability
26. Propulsor preferences – shafts, pods, Voith
27. IMO emissions requirements – Urea, scrubbers
28. Existing equipment compatibility
29. Preferred vendors and makers

Impacts on design

Generic Requests from Operators that had severe impacts on design:

- 300m² of workshop space
- A moonpool
- A CTD LARS
- XYZ sensor suite
- Launch vehicles over the side

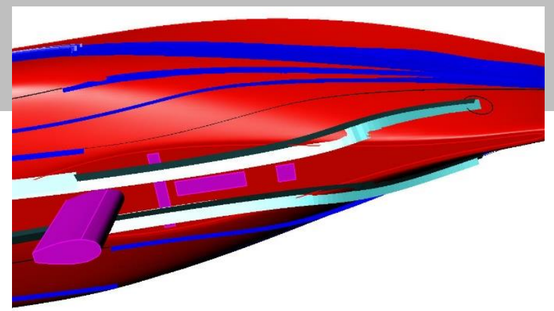


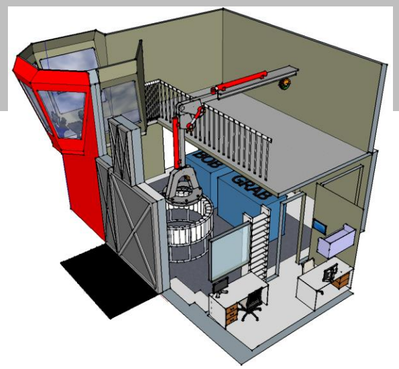
Impacts on design

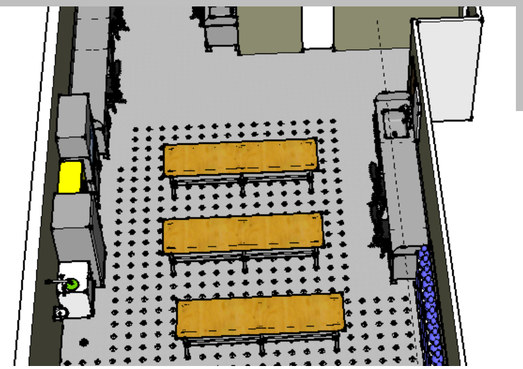
Overlooked concept decisions that were crucial for mission effectiveness

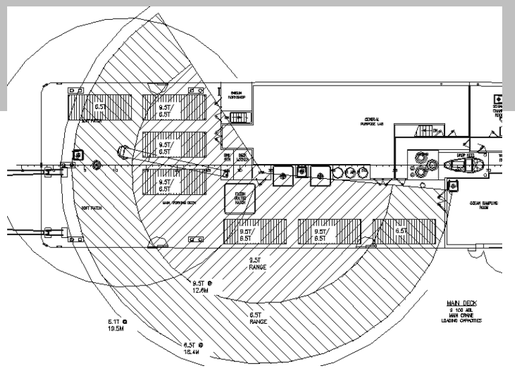
- Drop keel position and sizing
- Bubble sweep down
- Coring requirements
- Compressed air access
- Winch cable lengths

- Lab workflow
- Server room sizes
- Lifesaving requirements
- Crane reach
- Winterization









Source: Arktos

Operator Expertise

Improving the design

- Coring requirements
- Modularity improvements
- Workshop workflow
- Future mission and capability
- Autonomous technology and support
- Changing Arctic and Antarctic environments
- Underwater noise

Source: SEAMOR

Industry Expertise

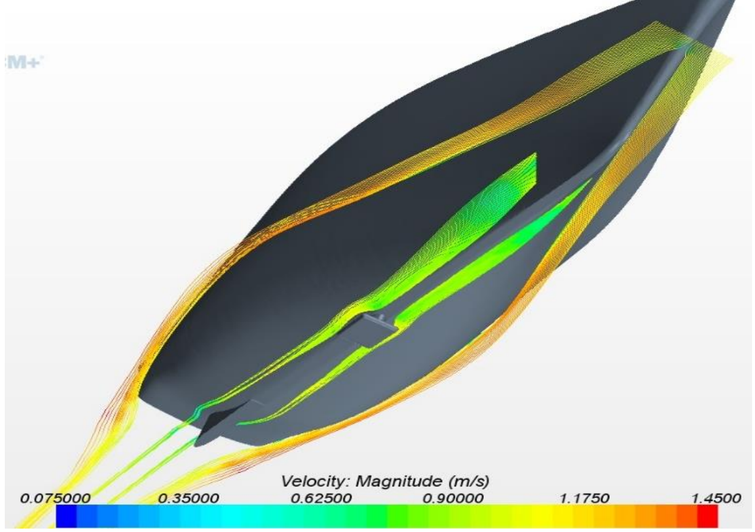
Improving the design

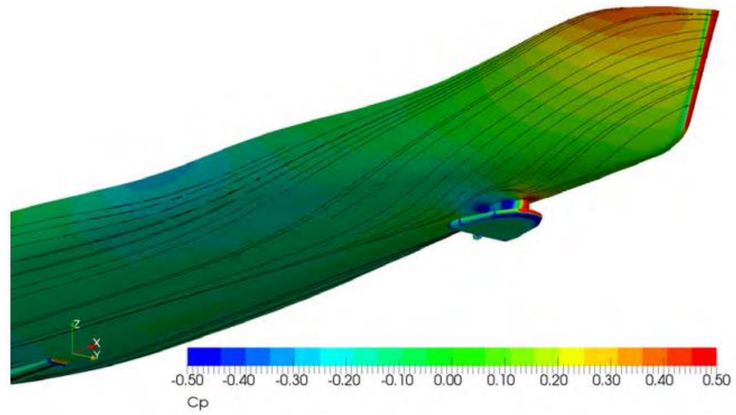
- Autonomous vehicle advancements
- Sensors and acoustic advancements
- Handling systems
- Emissions reduction
- Digital twin and AI integration
- Data transfer and communications

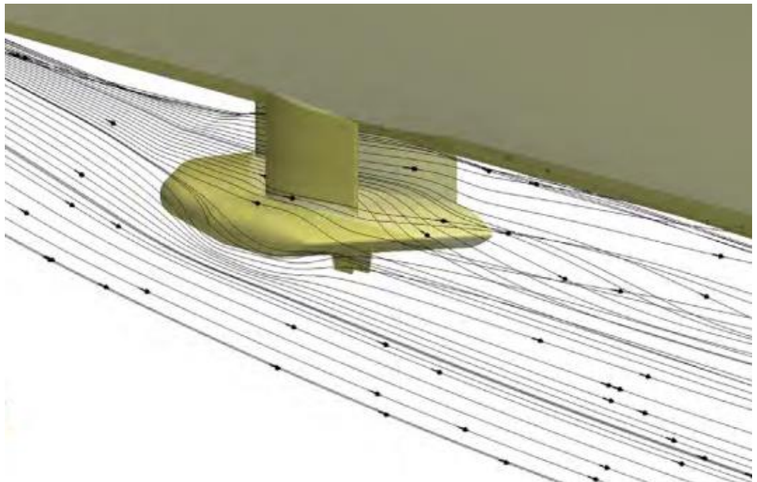
Vard Marine Expertise

Improving the design

- Requirements clarification
- Hybrid propulsion and alternative fuels
- Modularity integration
- Noise & vibration / URN
- Motions and seakeeping
- Dynamic positioning
- Bubble sweep down
- Drop keel and gondola optimization
- Workflow and ergonomics
- Ice class determination
- LARS optimization
- Reduced crewing and autonomy







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We are here to support asset development to advance all aspects of research ship operations