

NAVAL AUXILIARIES & SECURITY VESSELS

CUSTOM DESIGNS TO ENHANCE YOUR NAVAL CAPABILITY

A league of their own

In today's complex security environment, navies and coast guards around the world are being called upon to respond to an wide range of missions. Many traditional naval vessels designed for combat orientated operations are poorly suited to disaster relief and other transport or support duties. At the same time combat readiness is reduced by lengthy littoral patrols or rescue missions.

Acquisition of naval vessels is a long and costly process and Governments are turning increasingly to commercial vessels standards where combat survival is not required, enabling them to greatly expand their capabilities without tying up their front-line assets. Vessels including emergency response, icebreakers, special forces operations, submarine tenders, logistics support often have complex missions requirements and must operate far from home often in the most harsh environments. These ships are in a league of their own.

KNUD E. HANSEN is highly adept at designing special purpose vessels for demanding conditions and customers. Our agile team and design process allow us to quickly arrive at the optimum solution and our expertise and experience will ensure your new naval asset will be a success.



Based on our legacy and expertise for design of all kinds of vessels, we have in the past 20 years, developed tailormade design for Navy and Coast Guard vessels such as:

RoRo / Sealift Vessels Submarine Tender Vessels Patrol & Inspection Vessels

SAR & Emergency Response Vessels Icebreakers & Polar Security



▲ Nuyina for the Australian Arctic Division. Photo: © Pete Harmsen AAD

Military sealift compatible commercial RoRo Vessel V



Fishery inspection vessel **v**



Specialized Designs for demanding requirements

KNUD E. HANSEN has proven experience in developing complex and customised vessels, including sealift vessels (Ro-Ro), submarine tender vessels, hospital ships and other types of ships needed for national security, emergency, logistics and other support operations. From Concept Design to Tender support, Class drawings and construction approval, we can help you all the way through the design, build and commissioning of your new naval capability.

RoRo / Sealift Vessels

Together with worldwide commercial operators we have also been designing commercial vessels being contracted by Allied Forces standby infrastructure and logistics (ARK projects).



▲ Bahri, a military contracted RoRo / Sealift vessel

KNUD E. HANSEN together with Bollinger Shipyards L.L.C. supported US Navy in the CHAMP Industry studies for replacement of sealift vessels and Submarine Tender Vessels.

KNUD E. HANSEN carried out various trade-off design studies and developed concept and tender level designs for submarine tender and sealift vessels. The resulting designs are modern vessels with similar rolls to the existing Watson Class LMSR and the USS Emory S. Land Class (AS 39).

Submarine Tender Vessels

The submarine tender vessel is designed to support the needs of conventional submarines away from their naval bases. The vessel is in effect a force multiplier, enabling operations from ports not normally able to berth a submarine and remote basing where there are no ports at all. The tender vessel carries tugboats to assist in docking the submarines along side.



▲ Force multiplying Submarine Tender Vessel

Large hull doors fold down to enable easy access to and from the berthed submarine. The vessel is equipped with comprehensive resupply and maintenance facilities and has the capability to support special forces and their mission equipment.

Accommodation for two submarine crews in addition to the vessel's crew and special personnel is provided. A flight deck and hangar support medium size helicopters.

Patrol & Inspection Vessels

Complete concept design for the Australian Customs Service. The vessel was designed for patrol operations in the heavy seas of the Southern Ocean with good seakeeping performance.



▲ Blue water patrol vessel for Australian Customs Service

SAR & Emergency Response Vessels

KNUD E. HANSEN has made several studies, concepts and tender designs for the Danish Navy as well as other clients for SAR and Emergency Response vessels. These designs include Oil Recovery, Ice breaking, Emergency Towing and Firefighting functions.



▲ Coast Guard SAR vessel

Icebreakers & Polar Security

KNUD E. HANSEN designed the PC3 icebreaker for the Australian Antarctic Division which is one of the most powerful conventional icebreakers in the world today. The vessel can deploy a wide range of vehicles, including helicopters, landing barges, fast tenders and amphibious trucks to support base resupply operations and military / humanitarian missions.

The ship is equipped with offshore rated cranes, multiple scientific winches and a large moon pool for sampling equipment and remotely operated vehicles. The vessel's hybrid propulsion system enables both silent running for science operations and the high power for heavy icebreaking. Powerful thrusters enable DP2 dynamic positioning in the most demanding conditions of the Southern Ocean.

KNUD E. HANSEN together with Bollinger Shipyards L.L.C. supported US Coast Guard in the development of the Polar Security Cutter preliminary design and specifications. The vessel is designed for PC2 operations in the Antarctica and the Arctic.

▼ U.S. Coast Guard Polar Security Cutter



Naval Architecture & Marine Engineering for Naval Projects

Comprehensive design from Concept and Preliminary design to Functional design engineering.

Trade-off Studies

- Powering & propulsion configurations
- Engine & fuel optimization
- Energy Storage Systems
- · Multi-disciplinary evaluation of concepts & technologies

Technology Integration

- Accurate reservations at the concept design for Space, Weight and Power (SWAP)
- Solicitation of SSI packages for evaluation of optimum solutions
- Integration of equipment packages

Advanced Calculations

- Station & seakeeping calculations
- Performance, speed & power, consumption & range
- Finite Element Analysis (FEM/FEA)
- Computational Fluid Dynamics (CFD)

Navy Rules & Standards

- Classification of Naval ships: ABS, DNV, LRS
- Naval Standards: NAVSEA, NATO STANAG, DEFAUST
- National Rules: USCG, CFR, CCG, according to flag.

HVAC Systems Performance & Integrity by Design

KNUD E. HANSEN provides specialized HVAC consultancy and engineering for Naval projects. We understand the complexity and challenges of integrating HVAC systems into the overall vessel design from concept to completion. We provide a full range of design documentation as required for concept, preliminary, functional and detailed design.

We demonstrate agility in all project phases while ensuring reliable performance and integrity of the completed system. Our designs are supported with a complete range of calculations using specialized in-house tools. Our expertise in silent design ensures compliance with the most stringent noise limits.

We involve suppliers from early phase to find most efficient solutions. This provides reliable reservations for space, weight, and power (SWAP), and ensure efficient arrangements of trunks, ducts, fans and A/C rooms throughout the design process.

Detailed arrangements are developed from a variety of 3D software packages selected for compatibility with the Client's systems.

Our team is experienced with Navy rules and standards including:

- Citadel / sub-citadel and NBC filtering
- Classification of Naval ships: ABS, DNV, Lloyd's Register of Shipping
- Naval standards: US Navy DDS, NAVSEA, NATO STANAG
- National rules: CFR, CCG etc. as according to flag.

HVAC design services for Naval projects:

- Concept, Preliminary, Functional and Detailed Designs
- Arrangements
- System Diagrams
- Full range of design documentation
- Full range of design calculations
- Noise calculations
- Integration of equipment packages.

HVAC Design by KNUD E. HANSEN for HMS Queen Elisabeth aircraft carrier class ▼



HVAC Design by KNUD E. HANSEN for Type 26 Frigate V



HVAC Design by KNUD E. HANSEN for AOPS ▼





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