FROM OUR DESIGN PORTFOLIO

ICE MARINE DESIGN

THE THAMES CLASS OFFSHORE PATROL VESSEL

The Thames Class Offshore Patrol Vessel (OPV) has been designed to support a wide variety of naval and coastguard missions, including EEZ surveillance, coastal water security, safety at sea and humanitarian aid. The OPV design incorporates proven commercial ship design standards, equipment and technology to provide a cost-effective base vessel which can be readily adapted to specific needs and incorporate flexible mission modules to meet changing requirements.

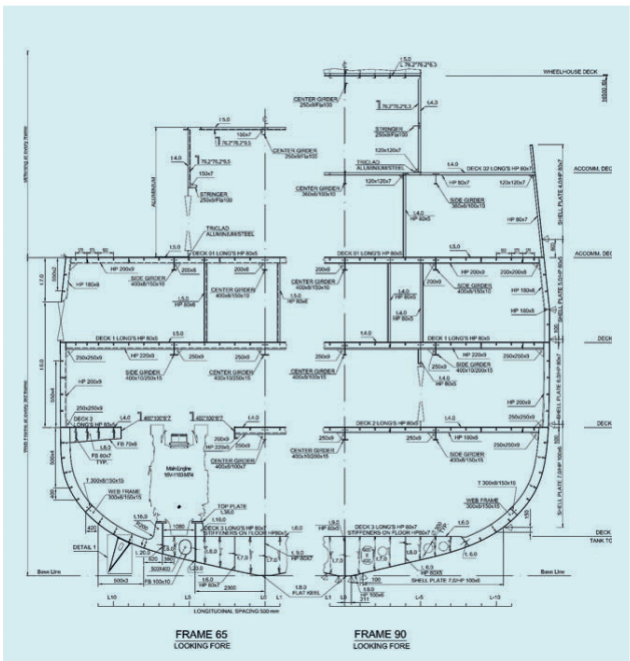
The 85.5 metre, abt. 2,000 tonne OPV has a top speed of 22 knots, with an endurance range of 4,500 nm, while accommodating a complement of up to 60 (male and female) with accommodation for an additional 30 auxiliary or special forces personnel.

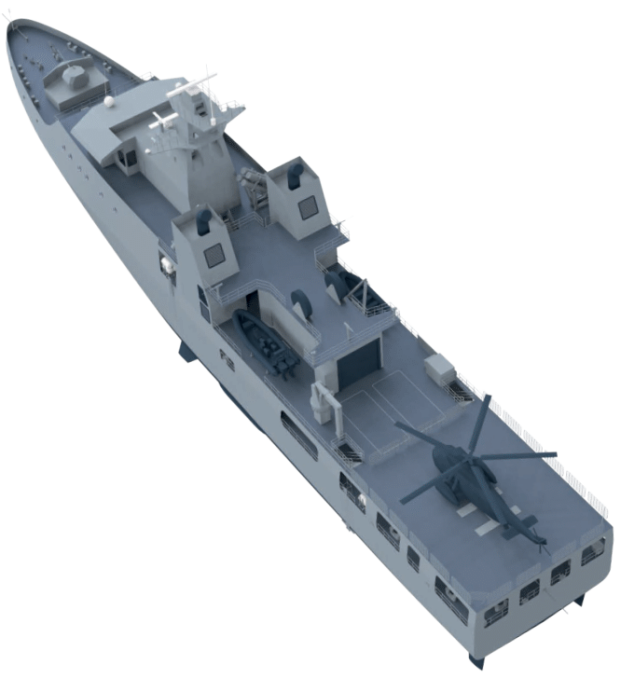
The vessel is equipped with an air and surface surveillance radar for the detection of low flying aircraft, a flight deck capable of handling a helicopter up to 11 tonnes (max. takeoff gross weight) and a hangar capable of accommodating a helicopter up to the size of a Sikorsky S-76C, or equivalent.

Concept Design

Design Benefits

- Off-the-shelf commercially available equipment,
- Superior hull lines, CFD optimized,
- Low fuel oil consumption, high propulsive efficiency,
- Ease of access for inspection, maintenance and repair of all equipment and structure,
- Construction-friendly: ICE can assist with a transfer of shipbuilding technology, programme planning and procurement support, as necessary.





Principal Dimensions

Length o.a ..... 85.50 m
Length p.p ..... 80.00 m
Breadth mld. ..... 13.5 m
Depth mld. ..... 7.70 m
Draught, design ..... 3.70 m
Displacement ..... abt. 2,000 t

Tank Capacities

Fuel Oil ..... abt. 306 cbm
Fresh Water ..... abt. 43 cbm

Performances

Max. speed ..... 22 knots
Cruise speed ..... 12 knots
Endurance ..... 4,500 nm, 15 days

Seakeeping

Stabilizing system ..... Active fin

Propulsion System

Main diesel engines ..... 2 x 4,800 kW
Propellers ..... 2 x CPP, Φ 3.10 m
Bow thruster ..... 280 kW

Auxiliary Equipment

Power generation ..... 3 x 630 ekW
Emergency Gen. Set ..... 1 x 310 ekW

Accommodation

Fully heated and air-conditioned accommodation for a crew of up to 60 personnel in single, double, six and twelve berths cabins, mess rooms, recreation area, galley, laundry, gymnasium and fully isolated sickbay with treatment and recovery area.

The vessel is also equipped to accommodate an additional 30 embarkation forces and auxiliary support personnel.

Safety, Survivability

Main engines and generator sets located in two separate engine rooms. Life saving equipment as per rules.

Class – Lloyd's Register

✠100A1NS(SSC) Offshore Patrol Vessel, UMS, SA2, LAP, AIR

Operational Capacities

Spacious bridge, separate OPS room for surveillance and gun control.

Helideck equipped for landing and refueling for a helicopter up to 5.3 tonnes (max. takeoff gross weight) and tie down points of a helicopter up to 11 tonnes (max. takeoff gross weight).

Hangar capable of accommodating a helicopter up to the size of a Sikorsky S-76C, or equivalent.

Store crane facilities.

Below-deck spaces - multi-role or dedicated - for accommodation of an additional 30 auxiliary personnel and storage of mission equipment and packaged goods.

Aft deck space for 2 containerized mission modules.

Meeting room, briefing room, flight office and ship's office.

Nautical and Communication Equipment

Radio equipment according to GMDSS rules for A3 sea areas. Nautical equipment incl. integrated bridge system with X and S-band radars.

Military Communication System

Military communication system consisting of:

- V/UHF Transceivers
- Airband VHF
- MF/HF radiotelephone
- Message Terminal

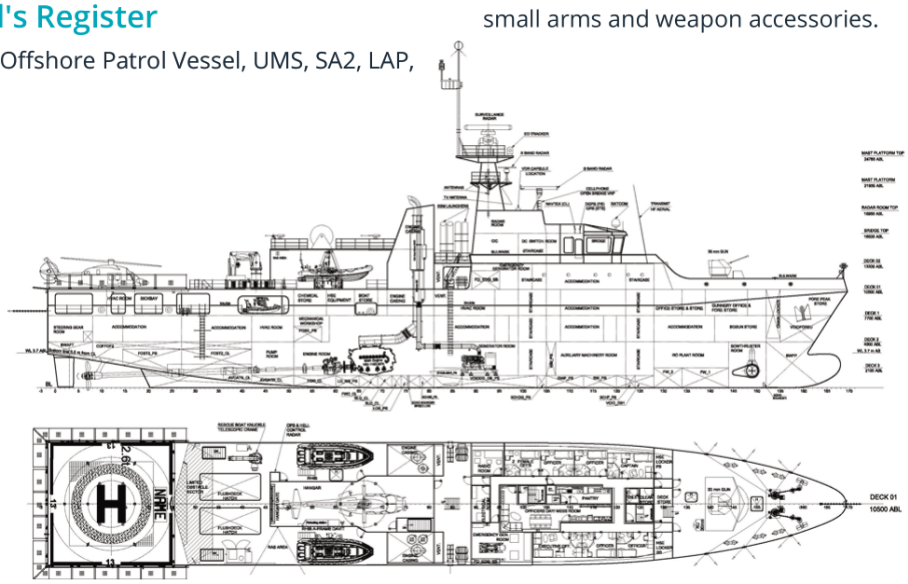
compatible to operate in military Tactical Data Link, connected to LINK 22 or equivalent.

Armament and Sensors

The ship is designed to be equipped with:

- 1 x 30 mm Gun
- 3 x 12.7 mm Machine Guns
- Integrated Command and Control System – consisting of Electro-Optical (EO) System for surveillance and tracking, Fire Control Systems (FCS) and air and surface Surveillance Radar.
- Designed to accommodate future installation and integration of two (2) SSM systems (2 x double launchers), IFF, TDL and ESM Suite systems.

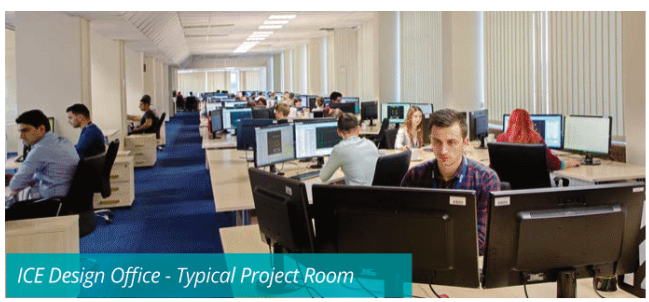
The Vessel is equipped with magazine stores supporting the 30 mm Gun and the 12.7 mm Guns and a safe store for small arms and weapon accessories.



ICE GROUP CAPABILITIES AND RESOURCES

ICE has extensive experience from basic and detail design and tank testing of a range of naval ships including torpedo boats, patrol boats, missile patrol vessels and minesweepers. In the UK, ICE participated in the joint "NATO frigate" development programme and more recently in the new air defence Type 45 destroyers for the UK's Royal Navy as well as in the two new Queen Elizabeth Class Aircraft Carriers. As a design subcontractor for major defence contractors, ICE has also done design for Offshore Patrol Vessels (OPVs) for the Middle East and the Americas as well as basic design assistance for a series of vessels for the US Navy. ICE executives have personal experience from managing design, construction and refit of many naval vessels ranging from submarines to helicopter carriers.

ICE Main Design Office



ICE Design Office - Typical Project Room

Offshore Patrol Vessel (OPV) 90m

Mid-Shore Patrol Vessel (MSPV)

Ocean Patrol Vessel (OPV) 99m

Type 45 Destroyer

Experimental Type 5000 light frigate undergoing tests in ICE's 280 m long ITTC-approved towing tank. The tests were part of a joint research project among BAE Systems, Wartsila and ICE to determine optimum propulsion configurations for a new class of fast frigates.

ICE MARINE DESIGN

ENGINEERING CERTAINTY

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With a 55-year track record and an annual output having exceeded 700,000 professional engineering man-hours, the International Contract Engineering (ICE) Group is Europe's largest independent ship design consultancy. We provide high-calibre multi-discipline design services to yards and owners in the commercial shipping, defence and offshore energy industries, ranging from conceptual studies and Class drawings to detail design and production information. We cover a full range of naval architecture and marine engineering disciplines such as hydrodynamics, structural, mechanical, piping, electrical, instrumentation, outfit and HVAC. Our experience includes gas carriers, passenger vessels, navy and coast guard ships, chemical tankers, drill ships, FSO/FPSOs and a range of other vessels. We also have available proprietary designs that can be adapted to clients' requirements.

With our head office in the Isle of Man and engineering facilities in Romania and Croatia, we provide high quality design and engineering at very competitive prices.