

# C-SHARP® HULL SHAPE

UNRIVALLED ALL-ROUND PERFORMANCES



## THE CHALLENGE

C-SHARP® (Combined-Speeds Hull with All-Round Performances) is a state of the art patented hull shape jointly developed by PIRIOU and KERSHIP to solve the main challenges affecting high speed ships:

- unbalanced working profiles as high speed vessels commonly spend 90% of operating time at slow speed
- poor autonomy and performances at patrol speed due to hulls only designed for high speed
- poor ability to operate on-board equipment under usual speed and sea state conditions

## THE EMERGENCE OF C-SHARP®

Based on their long established know-how regarding high speed ships, PIRIOU, KERSHIP and the LHEEA research laboratory (Ecole Centrale Nantes, French Technical University) joined forces to change the high speed ships design philosophy.

The following innovative arrangements were implemented on the C-SHARP® hull in order to get a vessel with optimal performances over the entire operational range.

These devices can be installed separately or in combination:

- an innovative fore hydrodynamic bow
- an advanced hydrodynamic stern

- Innovative high speed hydrodynamic bow and stern
- Installed separately or in combination, ideally suited for retrofitting purposes (stern only)
- First hull with all-round performances:
  - Autonomy: increase of 10 to 30% at patrol speed
  - Seakeeping: peak accelerations reduced by 10 to 20% on rough seas
  - On-board equipment operability: drastic reduction of the mother ship wake and approx. 20% reduction of the relative movements on rough seas

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## C-SHARP® DEVELOPMENT AND TESTING

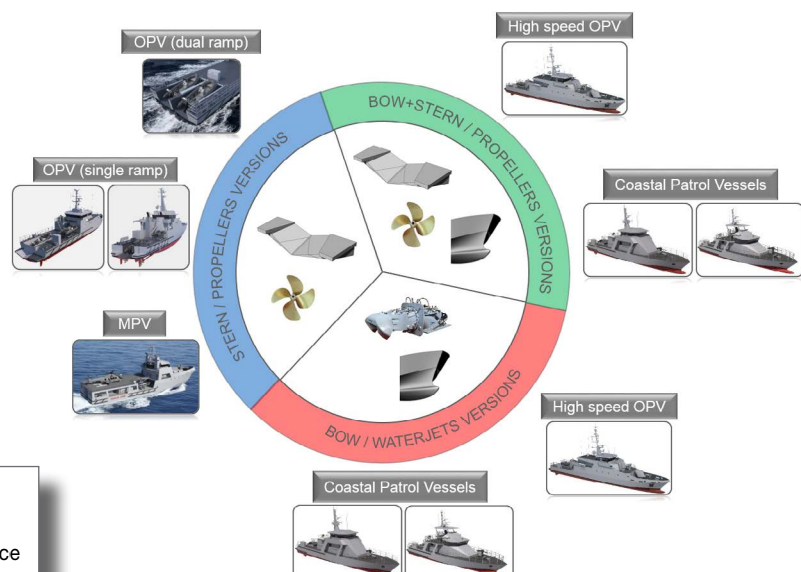
Proving the C-SHARP® concept consisted in systematic comparisons with conventional shapes:

- advanced computations performed on fluid dynamics softwares
- extensive towing tank and seakeeping model tests performed at the LHEEA laboratory

As a result, the C-SHARP® hull proves to be the best compromise for powering, seakeeping and critical on-board equipment operability criteria thanks to:

- significantly reduced resistance, especially at patrol speeds, with class leading fuel autonomy (10 to 30% gain)
- significantly reduced ship wake and aft peak vertical accelerations at patrol speeds (10 to 20% gain), reduced relative movement between launched equipment and mother ship (approx. 20% gain), resulting in an unprecedented capacity to safely operate RHIBs or on-board systems
- outstanding performances at higher speeds, even on rough seas

The C-SHARP® concept is currently being deployed on KERSHIP vessels range and is also ideally suited for retrofitting purposes (stern only).



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