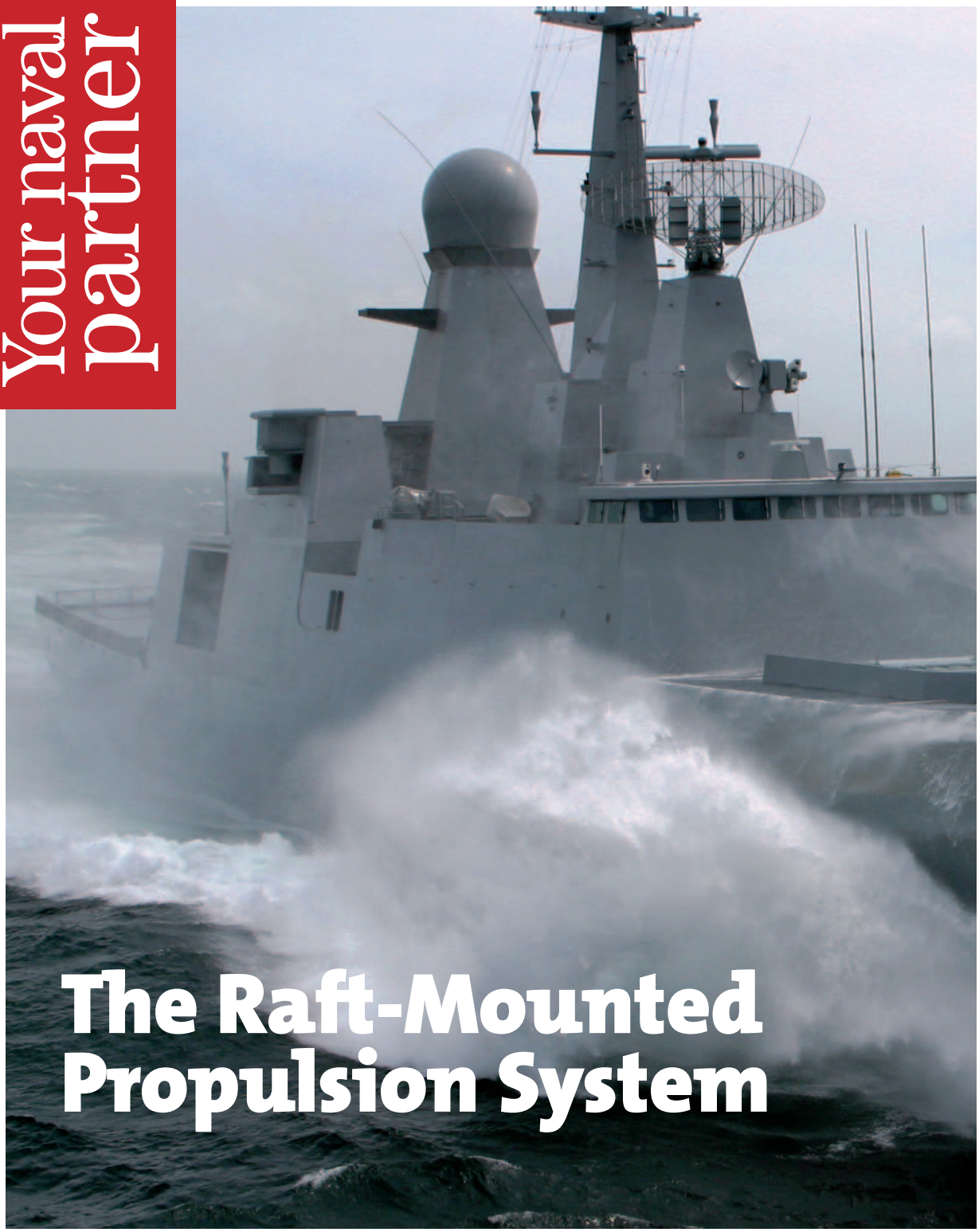
Your naval partner



The Raft-Mounted Propulsion System

STRENGTH at sea

DCNS

Silent propulsion meeting customer ASW requirements

Because combat vessels power & propulsion systems' performances are key factors to ships' mission success, DCNS imagines solutions meeting the harsh naval operational requirements.

The required ASW performances respective to shock resistance and noise & vibrations remain critical achievements. Compliance with such requirements in CODAD propulsion system arrangements generally sees the diesel engines elastically mounted by means of low-frequency mounts. But the reduction gear decoupling strategy (low or high frequency) is always the result of a compromise between structure-borne vibrations level and acceptable gearbox-thrust bearing flexibility / misalignment figures.

Meeting customer needs:
navies requiring a conventional propulsion system achieving minimum acoustic signature while capable of withstanding shocks likely to be encountered by a first line combat vessel have there found a solution. Designed and manufactured for purpose the system is fully integrated within the ship.

The Raft-Mounted Propulsion System (RMPS): an answer for Anti-Submarine Warfare (ASW) vessels

Specifics of such architecture remain within the rigid mounting of the twin diesel engines and reduction gear onto a common bedplate that is elastically mounted to the hull structure by means of low-frequency elastic mounts. Such arrangement provides:

- noise & vibrations signature reduction through the low-frequency common bedplate elastic mounting
- high-shock resistance by ability to cope with important deviations
- conventional reduction gear-thrust bearing coupling efficiency

Simplified integration:
such architecture modular design adds flexibility to the ship's building schedule. Integration and installation within the hull of the common bedplates pre-equipped with the reduction gear, the two diesel engines, and auxiliaries (lube & cooling units) are significantly made easier.

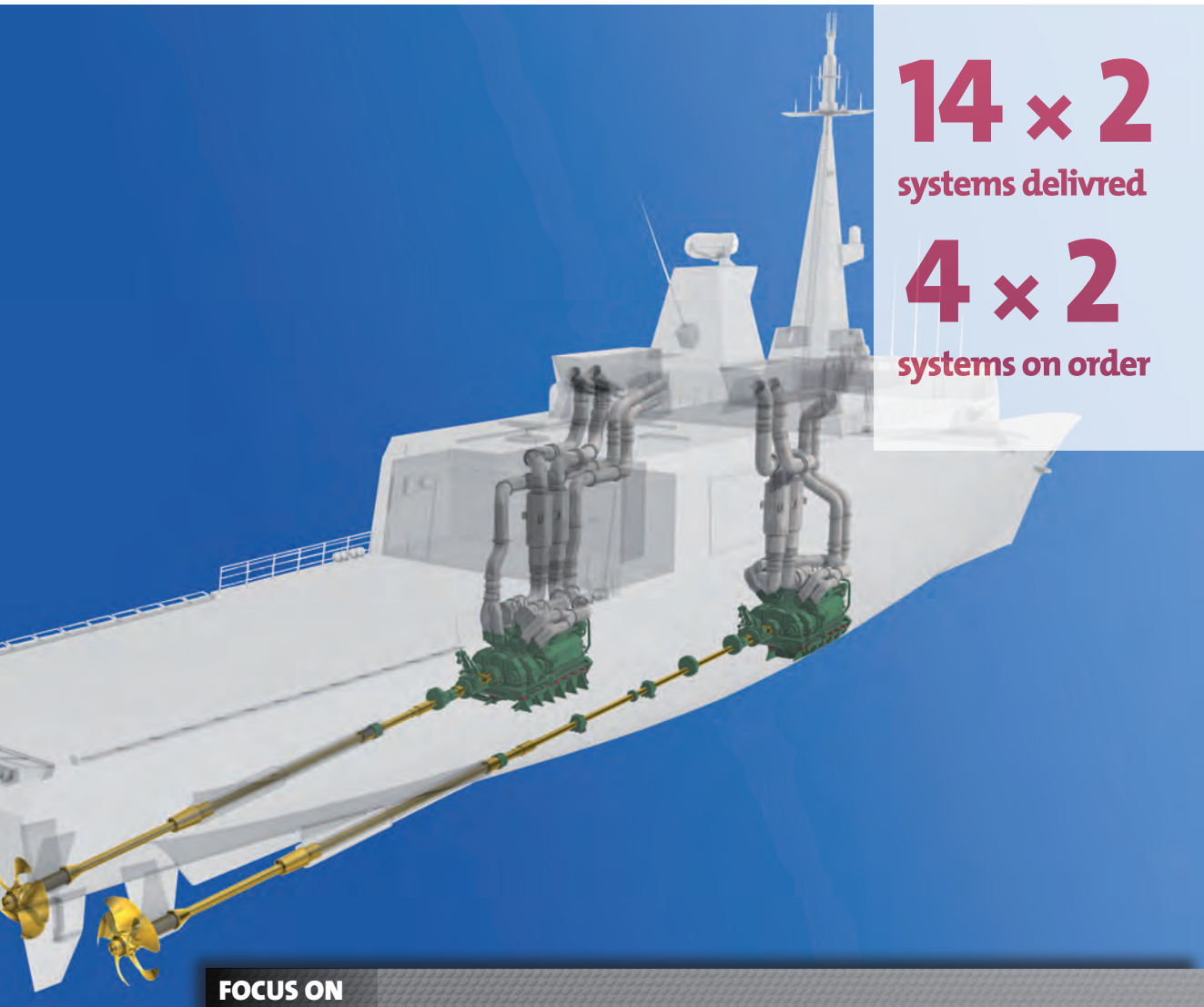
The following additional benefits were also witnessed:

- system performance and de-risking at early design stages
- possible use of COTS and / or customer equipment
- cost optimisation (maximum use of COTS components)
- easy system integration due to its modular design.

For instance, hull-side RMPS introduction was performed for some of the Saudi Arabian SAWARI 2-type frigates.

Complete system life-cycle assistance:
DCNS customer assistance provided a full set of services for system integration, setting to work, and trials (HATs & SATs) up to final vessel commissioning. Crew training was performed for demanding navies such as that of Taiwan.

Transfer of involved technology has also been provided to customers national vessels building. This is currently the case for the Indian shipbuilder.



14 × 2
systems delivred

4 × 2
systems on order

FOCUS ON

System enhancement & innovation for customer benefit:

The RMPS benefited from the constant component upgrades and technology progress. All ship's specifics have been taken into account such as reduction gear ratio, required thrust (for the vessel nominal speed), and particular system integration constraints.
The system is designed and manufactured for easy installation within the hull structure. It can be introduced either conventionally from the deck or from the hull-side and includes solid-state modules for lubrication and cooling.
The shaft power regulation system is also a live example of an add on propulsion control enhancement that can be supplied with the RMPS.

A sea-proven propulsion solution for satisfied customers

Beyond contract commitments, sea trials remain a real trade-off opportunity between the ship's crew and DCNS commissioning team. Nothing can be more enriching than such corresponding shared experience.
Gilles Ferron (propulsion system project manager) states: « Through the days spent onboard with the crew during the commissioning trials delivering the ship, we have exchanged a lot of information relative to the propulsion control system. This could be compared to an onsite training in real operating conditions for Saudi Navy sailors while providing us ways for further enhancements of our systems. Such exchanges strongly contributed to mutual understanding and respect».

Advanced Power Regulation System for energetic performance optimisation.

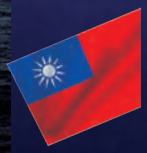
DCNS has put together a real-time Diesel Engines (DE) speed control fully interfaced with the ship's main propulsion control & monitoring system for stabilising propulsion engines power. Based on engine speed and propeller pitch data provided by the corresponding sensors and the relevant set points additional corrections are computed and issued. The DE power regulation system helps:

- avoid DE overload situations, hence reducing engine breakdown risk and early wear out
- reduce propeller pitch changes and the control mechanism wear
- enhance ship maneuverability figures
- provide automatic shaft power balancing
- reduce fuel consumption
- increase ship nautical performances, particularly turning radius and heavy seas sailing

The advanced power regulation system designed for the RMPS solution provides enhanced vessel performance respective to energy saving, acoustic signature, and propulsion system maintenance. System trials on the French Navy Guepratte frigate confirmed such features.

FRANCE
La Fayette class

La Fayette	1996
Surcouf	1997
Courbet	1997
Aconit	1997
Guepratte	2001



TAIWAN
Kang Ding class

Kang Ding	1996
Si Ning	1996
Kun Ming	1997
Di Hua	1997
Wu Chang	1997
Chen te	1998

4 navies selected RMPS

SAUDI Arabia
Al Riyadh class

Al Riyadh	2002
Makkah	2003
Al Dammam	2004

INDIA
4x 2 systems on order

The French Navy La Fayette-class frigates were to be equipped with a CODAD propulsion for optimising fuel consumption. A Raft-Mounted Propulsion System (RMPS) was selected for fulfilling ASW requirements. The foreseen resulting discretion of such solution would outperform that of existing similar vessels ensuring the client navy meet current and upcoming operational challenges. Such performances were confirmed during FOC sea trials. French Navy people promoted the ship concept upon the Taiwan Navy that accepted the RMPS as an additional asset for their stealth Kang Ding-class frigates. Later on, the Saudi Arabian Navy chose the same system for the Al Riyadh frigates. Performances at sea and vessel operators' enthusiasm increased interest for such solution leading to ongoing and further orders. But beyond performances, it is the customer relationship high quality with DCNS that made RMPS so successful resulting in 14 ships commissioned and 4 more on order. Customers' commitment during project eased understanding naval requirements and specifics. Based on such experience, DCNS strives to keep and enhance a very good relationship with its customers ensuring the systems delivered fully meet their needs.

STRENGTH at sea

DCNS is Europe's key global player providing high-value-added naval defence systems. The Group offers the world's navies a turnkey approach to warships, including all related equipment and services. As prime contractor, designer, builder, and integrator, the Group masters the overall value chain and life-cycle of naval systems, from initial design to full operational maintenance.

An international player

DCNS' capacity for innovation allows it to respond to the complex challenges of navies around the world by proposing cost-efficient integrated solutions, which are both interoperable (air/naval/land) and applicable to inter-allied operations.

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