

Multi-mission capability

Chris Edmonds, DML Group Business Development Manager, looks at the benefits of the latest versatile surface combatant concept...

A new frigate concept unveiled by the DML Group at the DSEi show this year demonstrates the significant benefits afforded by an 'adaptable' or 'flexible' warship. Developed following a DML led study into the cost, operational and support issues associated with a versatile surface combatant, the concept design is aimed at being introduced early in the next decade.

Adaptability or versatility is very much the central tenet of the concept, which is known as 'FC65'. Its reconfigurability is evident across all aspects of the platform, from its mission roles and combat systems to the manning strategy, and even the shipbuilding approach.

Fundamentally, the principle is to provide an affordable and capable warship that addresses not only short-term capability but also an evolutionary development path to future requirements without costly re-fits, re-designs or new programmes. This is a vessel that can continue to play a key role in naval capability, long after more conventional platforms have perhaps become relatively less capable.

Versatile thinking

As a result of the study to examine the requirement, potential solutions, and costs and timescales of delivering capability, it became clear that reconfigurability was the route to deliver sustainable capability at lower cost. In particular, two critical findings underlined adaptability as a key requirement. First was a recognition of the fact that only the defined capability is needed at any one time, enabling excess capability to be minimised and so reducing costs. Second was the ability to address future uncertainties by being able to 're-role' to meet changing circumstances such as evolving threats, technology refreshes, obsolescence or shrinking budgets.

With this in mind, the FC65 design focuses on modularity and flexibility to deliver the desired reconfigurability. The modularity centres on simplifying installation, integration and removal of all capability, functionality and equipment within a complex system, while the drive for flexibility centres on exploiting the volume available to maximum advantage in the shortest possible timescales, across a range of mission roles.

The FC65 concept also draws on the best features of other successful naval programmes and current thinking. These include the Meko Concept (providing for ease of build,

adaptation to customers' needs and a modular combat system), Stanflex (standardisation of interfaces, bringing cost reduction), US research such as the MK41 launcher bringing standardised and flexible payload, and the LCS programme (where concepts to de-couple the platform from the payload are being considered).

Multi-mission capability

The FC65 offers high capability in both offensive and defensive roles. It has been optimised to allow sustained global operations with high endurance, and has the ability both to undertake a wide range of tasks unsupported and to command task group operations. Roles for which the FC65 can be configured range from benign and constabulary functions to precision land attack (strike), naval fire support, special forces insertion, anti-submarine warfare, anti-surface warfare, force projection, maritime interdiction and task force command.

Importantly, thanks to its reconfigurability, the FC65 is adept at all of these roles, but does not carry the weight, cost and crew 'penalties' that would be associated with the ability to undertake them all simultaneously, as would be the case with a more traditional vessel. Instead, the vessel can be optimised for specific roles, ensuring that the equipment and payload fit is available for the planned tasking.

The mission systems are central to the FC65's high level of adaptability. Critically, all systems feature open architectures to maximise the architectural modularity, and all weapons are selected on the basis of their versatility. Analysis of the weapons and sensor requirements against a range of scenarios has identified those systems that must be quickly and effectively embarked, and the optimum location to support easy transformation from one role to another.

The platform's modular combat system architecture incorporates a triple redundant data transfer system to all combat system equipment. The primary offensive capability is provided by the 32 Cell Mk 41 launcher, which itself provides for a range of mission specific missiles, and the five inch Gun with a range of projectiles including extended range munitions. Other weapons include two 30mm remote controlled guns, DLF, DLH and DLB decoys, and a ship torpedo launching system. Optionally, an S2087 towed array sonar is among the extensive sensors, weapon control and combat management systems featured.



All modular components are required to conform to certain architecture rules, namely the common interface network (if necessary via CMS interface units), a common point-to-point connection type (for high integrity interfaces to the OPS room), and the utilisation of a common console and common racks.

This approach enables, at ship level, rapid platform combat system component change and, at fleet level, a rapid change of role to reflect changing needs. It also means that combat system component production proving can be carried out ashore, and makes ship combat system integration, installation and set to work less complex. Moreover, technology insertion is no longer limited to major refit periods, and obsolescence management is improved.

The space, volume and payload capacities are equally key to the platform's valuable adaptability. With a reconfigurable internal cargo deck, the FC65 can be configured for any number of military or non-military tasks. At 40 metres long and 12 metres wide, the space is large enough to allow transportation of a wide range of vehicles, stores, boats, personnel or other cargo. It also has sea interfaces for the delivery of autonomous vehicles into the battlespace.

This extensive flexibility enables the FC65 to meet the capability requirements at the lowest fleet acquisition and whole life cost while also, coupled with the modular design approach, providing for a range of incremental acquisition options.

Additionally, a significant 'force multiplication' effect is provided by twin organic helicopters (two Merlin helicopters can be hangared and the flight deck is big enough to land the largest rotorcraft comfortably), high-speed combat and boarding boats (including twin special forces insertion craft), and the capacity to carry a wide range of off-board sensors in the form of UUVs, UAVs and USVs.

Propulsion system

To provide an optimum mix of power and efficiency up to 35kts, a twin MT30 gas turbine from Rolls-Royce with four Kamewa WJ180Sii waterjets are the most effective way of delivering the high powers into the water. A different

solution would be adopted for more conventional frigate/destroyer speeds of 28-29kts. With maximum flexibility again in mind, a notable feature of this CODLAG system is that when, not required for propulsion, power from the MT30 gas turbines can be converted into electrical power to be distributed around the ship. This additional electrical power (up to 10MW) could be used for, say, future weapons technologies requiring power beyond the range of the initially installed generation system, without re-engineering the propulsion or electrical systems.

Manning strategy

Recognising that the ship's high level of adaptability cannot be delivered without the appropriate manning structures, a further feature of the FC65 is flexible accommodation to allow the complement to swell or shrink, in line with the tasking requirements.

Accommodation has been designed for a crew of up to 148, made up of a core ship's company with specialist teams for specific areas, such as towed array sonar operators. In addition, rooms have been designed for flexible use with, for example, flag annex and sonar quiet room roles being dependent on the ship's mission. Flexible use has also been considered in the layout of equipment in all rooms to take account of the multi-role approach, and common consoles are used throughout the operations rooms. An on-board Common Synthetic Environment Control (CSEC) has also been supplied to design-in federated and confederated training.

Flexible build

The flexible approach that is central to the FC65's design can even be applied to the build stage, with a view to minimising the shipbuilding cost. The layout is based on five separate functional zones to derive benefits from 'regionalising' the ship systems. This allows for competitive build and procurement, and reduces build costs and time, while the rationalised systems further reduce costs.

Approaching 150 metres in length and with a displacement of 6,600 tonnes loaded, this innovative high-speed (35kts), long range (7,000 nautical miles endurance) warship is designed, above all, for affordability and adaptability – key features of the next generation of surface combatants.



Chris Edmonds
Business Development
Manager

DML Group
Devonport Royal Dockyard
Plymouth PL1 4SG

Tel: 01752 605665

www.devonport.co.uk