

Support strategy: the UK's Future Solid Support ships

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Last year's Strategic Defence and Security Review gave the green light to the procurement of three new large solid support ships for the UK's Royal Fleet Auxiliary. Richard Scott reports

Having launched its Military Afloat Reach and Sustainability (MARS) afloat support shipping acquisition programme more than a decade before, the UK government finally committed in its November 2015 Strategic Defence and Security Review (SDSR15) to move forward with the acquisition of three new Fleet Solid Stores (FSS) vessels to enter service with the Royal Fleet Auxiliary (RFA) from the mid-2020s.

Intended to replace the Auxiliary Fleet Support Helicopter (AFSH) vessels RFA *Fort Austin* and RFA *Fort Rosalie*, as well as the Auxiliary Oiler Replenishment (AOR) ship RFA *Fort Victoria*, the planned FSS ships represent the second component of a MARS project that has suffered numerous delays since its inception in 2002.

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MARS genesis

Owned and funded by the Ministry of Defence (MoD), the RFA is a civilian-manned organisation tasked to deliver worldwide logistical and operational support to the Royal Navy (RN). Its primary role is to supply the RN with fuel, ammunition and supplies, normally by replenishment at sea (RAS). It also transports British Army and Royal Marines personnel, provides support to training and exercises, and engages in counter-piracy and counter-narcotics operations.

It was as far back as July 2000 that the Ministry of Defence (MoD) commenced a series of options studies to inform future fleet replenishment and afloat support requirements. Those studies examined emerging capability gaps emerging from about 2010 (based on the then planned retirement dates of a number of existing RFA vessels) coupled to the need to introduce a modernised maritime logistics infrastructure to provide underway support to new RN platforms such as the Type 45 destroyer and the Future Carrier - the latter shortly to enter service as the Queen Elizabeth Class (QEC).

This early work led to the establishment of the MARS project in 2002. The headline goal was to replace the old and increasingly legislatively non-compliant RFA ships supplying fuel, food, ammunition and other stores to RN warships, while at the same time providing much enhanced logistic and aviation support capabilities to carrier strike and other expeditionary forces.

MARS passed through its Initial Gate milestone in July 2005. By that time concept phase studies had informed planning assumptions for a fleet of 11 ships variously providing fuel and other stores to the fleet, helicopter support, and sea-based logistics for deployed forces. These would comprise five Fleet Tankers for delivery in the period 2011-2015; three Joint Sea-Based Logistics (JSBL) vessels for delivery in 2016, 2017 and 2020; two FSS ships for delivery in 2017 and 2020; and a single Fleet Tanker (Carrier Strike) for delivery in 2021.

The two FSS ships and the final fleet tanker were primarily intended to support carrier operations. The JSBL ships - later re-designated as Combat Support Ship (Auxiliary) - were conceived to provide non-bulk consumables and forward aviation support as part of the amphibious task group.

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Requirements

With the MARS Tanker programme now in its delivery phase, attention has now turned to the acquisition of the three new FSS ships to replace *Fort Grange*, *Fort Rosalie* and *Fort Victoria*. It should be noted that one of the outcomes of the 2010 SDSR - which removed the requirement for concurrent, geographically displaced Carrier Strike and Littoral Manoeuvre task groups - was the merger of the FSS and the Combat Support Ship (Auxiliary) into a single class; the combined MoD/industry Naval Design Partnering (NDP) team was subsequently tasked to produce a series of designs based on the post-SDSR10 direction to assess the technical feasibility and cost implications of this requirement change.

The FSS vessels will deliver bulk ammunition, dry stores and food to support both the carrier and amphibious elements of the UK maritime task group. Indeed, the FSS capability is acknowledged to be a critical enabler for the UK's carrier strike force; the delivery of full operational capability as part of Joint Force 2025 is unachievable without at least one FSS ship being operational.

In advance of starting the FSS ship procurement activity, the MoD has already funded Rolls-Royce to develop, test and prove a next-generation Heavy Replenishment At Sea (HRAS) system that will allow loads of up to 5 tonnes to be transferred from the FSS. It is envisaged that the HRAS system will be fitted to the FSS vessels in order to enable them to deliver ammunition and stores at the necessary tempo and volume to support future carrier strike operations.

To mitigate the development risk, the MoD has funded a phased programme intended to progressively mature and prove the HRAS concept through a phased process of concept development, detailed design, manufacture, and shore trials. Following an initial competitive concept design phase, Rolls-Royce was in November 2006 downselected to undertake detailed equipment design. The company completed its detailed design contract in October 2007, submitting a costed production-ready HRAS design, along with the scope of work, required infrastructure and the associated cost to conduct trials. In January 2011 Rolls-Royce was awarded a GBP25 million contract by the MoD's Defence Equipment and Support (DE&S) organisation to build a new training facility at HMS Raleigh based around the HRAS land-based demonstrator equipment.

While the QEC programme retains a 6-tonne transfer requirement, the HRAS demonstrator was built to a 5-tonne load limit. The MoD told *IHS Jane's*, "The HRAS Land Based Demonstrator equipment design is 6 tonnes de-rated to 5 tonnes; hence in principle a 6-tonne [load capacity] can be delivered for ship fitting and operational use should the logistic tempo demand it."

According to Rolls-Royce, the mechanical design of the HRAS prototype is unaltered from what was developed in the design phase. However, the motors and power electronics were de-tuned so as to reduce the overall power demand for land-based trials.

The land-based system, incorporating a complex hydraulic motion simulator system to replicate roll effects at sea, was used to capture real-time data on structural loadings to support fatigue determinations, provide data for ship structural integration, demonstrate system interoperability

and refine initial control system parameters. It was also used to demonstrate the safe operation of equipment, identify and eliminate operational issues, prove human factors analyses, and maximise crew utilisation.

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Solution space

Following on from the earlier NDP concept design studies, Frazer-Nash Consultancy (FNC) was in October 2014 awarded a study contract by DE&S Ships Commercially Supported Shipping to inform future logistics vessel concepts and development for the Theatre Maritime Sustainment capability sponsor in Navy Command. Part of this investigation sought to mature the 'solution space' for the FSS platform and inform project time, cost and performance assumptions for entering the Assessment Phase. Under this tasking the FNC conducted a market investigation for the provision of platforms from 2016-2030; identified candidate off-the-shelf vessel designs; considered options for the purchase/conversion of existing vessels; and provided indicative build costs and delivery timescales for UK, European and Far East build options.

IHS Jane's understands that the US Navy's Lewis and Clark (T-AKE-1)-class dry stores ship design represents the best approximation to the FSS outline requirement. Indeed, there is some suggestion that the possible lease of two T-AKE-1 vessels was one option considered prior to the SDSR15 decision to endorse a new-build FSS acquisition.

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Next steps

With SDSR15 confirming plans to move forward with the FSS programme, work is now being undertaken inside DE&S and the wider MoD to firm up the procurement strategy. "With Fleet Solid Support having been confirmed in SDSR15, planning is now underway to take that programme forward," a DE&S spokesperson told *IHS Jane's* in a statement, adding that the project "is currently going through the MoD approvals process in order to progress to the Assessment Phase".

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A land-based HRAS prototype has been installed at HMS Raleigh in Cornwall, southwest England. (Rolls-Royce)

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This FSS concept design was developed by the MoD-led Naval Design Partnering team in the wake of the amalgamation of the previously separate Fleet Solid Stores ship and the Combat Support Ship (Auxiliary) requirements into a single class. (Naval Design Partnering/MoD)

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RFA Fort Rosalie (centre) undertakes replenishment at sea operations with HMS Albion and HMS Ocean during Exercise 'Cypriot Lion' in May 2011. (UK MoD/Crown Copyright)

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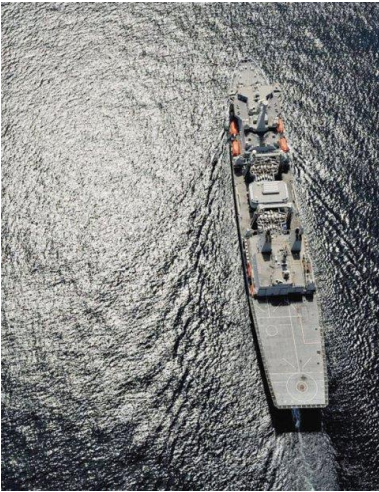
RFA Fort Austin, RFA Fort Victoria and the carrier HMS Illustrious (since decommissioned) are pictured here transferring stores and fuel during the 'Cougar 13' deployment. The new FSS vessels are seen as essential to sustain the RN's global reach. (UK MoD/Crown Copyright)

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RFA Fort Austin was commissioned in 1979. The ship, and sister RFA Fort Rosalie, will be over 40 years old by the time the replacement FSS vessels begin to enter service. (Richard Scott/NAVYPIX)

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The auxiliary oiler replenishment (AOR) ship RFA Fort Victoria was commissioned in June 1994 and completed an extensive GBP49.5 million refit at the start of 2015. Along with the auxiliary fleet support helicopter (AFSH) vessels RFA Fort Austin and RFA Fort Rosalie, RFA Fort Victoria will be replaced by the future Fleet Solid Stores (FSS) vessels in RN service from the mid-2020s. (UK MoD/Crown Copyright)

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