

naval forum UK

BAE proposes third generation gun for T45's

The Royal Navy has never made any secret of its desire to fit the Type 45 class with a new generation medium calibre gun, and BAE System's may have found an affordable solution.

Even before the Type 45 destroyer project was launched in 1999, the RN was seeking a replacement for the elderly Vickers (now BAE Systems) 114mm (4.5 inch) Mk8 gun, with a particular emphasis on providing more effective naval gun fire support against land targets and an ability to fire extended range guided munitions.

Early studies favoured a 155 mm weapon and there was no shortage of proposals from manufacturers, particularly BAE Systems Royal Ordnance. However the MOD was unable to fund the associated development costs, and in the context of the Type 45 destroyer there were concerns that the very large magazine of a 155 mm weapon would use up the space reserved for 16 extra VLS cells for deep strike missiles.

Thus, for the first three Type 45 units the Royal Navy reluctantly agreed to adopt the upgraded Mod 1 version of the 114mm Mk8 gun. This incorporates various improvements to improve reliability and maintainability and reduce weight, and has a new angled low-profile gun shield. It is also capable of firing new High Explosive (HE) Extended Range rounds, which incorporate a base-bleed unit and a redesigned shell body ammunition with a maximum range of 27km.



The Mk 8 Mod 1 and AS90 gun systems (MoD, BAE Systems)

For later Type 45 units (and possible retrofit to the earlier ships), the RN continues to seek a replacement for the

Mark 8 gun, and in early 2003 a licence built version of United Defense's lightweight Mk.45 5-inch/62-caliber Mod 4 (ERGM capable) gun - which is widely used by the US Navy - emerged as strong contender. This system offers significantly improved firepower and capability compared with the Mk.8, combined with low cost and moderate size and weight compared with a new 155mm gun. Even better, a study showed that the Type 45 design has sufficient weight and space to take both a Mk.45 5" gun and the extra VLS cells. The immediate availability of the Raytheon Systems Extended Range Guided Munitions (ERGM) EX-171 "smart" round for the Mk.45 was also emphasised. Team Naval Gun UK (consisting of United Defense, Alvis and DML) lobbied hard in favour of the Mark 45 solution but a decision by the MOD has been repeatedly delayed.

BAE Systems has submitted numerous proposals for a new naval 155 mm gun system for the Type 45, and in collaboration with DERA and French company GIAT it has recently been involved in a jointly funded study to assess future naval fire-support requirements for the Royal Navy.

A key driver for the programme is to examine the feasibility of using standard 155mm ammunition in a naval environment; this would provide commonality with land-based ammunition stocks. The development of charge-handling technology able to achieve an adequate rate of fire (in the order of 20rds/min) has been identified as a major challenge. A range in the order of 100km is the eventual target.

At the end of 2004, RO Defence (now part of BAE Systems Customer Solutions and Support – CS&S) submitted to the MOD an intriguingly simple proposal known as the 155 Third generation Maritime Fire support (155 TMF). The suggestion is to replace the 114 mm gun in the Mk 8 Mod 1 mount with the 155 mm/39-calibre gun used in the British Army's AS90 Braveheart self-propelled gun. Apparently studies have shown that the

mounting and trunnions of the Mk 8 are strong enough to cope with the extra recoil, and that the weight increase is small: the upgraded system will weigh 24.5 tons compared with 22.5 tons for the 4.5 inch Mk 8 Mod 1 and 26.4 tons for the original Mk 8 Mod 0. The biggest modification will be changes to cope with a double-stroke loading cycle, which will reduce the Rate of Fire to perhaps 12 rounds per minute, another change would be modifying the gun shield for higher elevation angles. The weapon will fire existing projectiles with ranges up to 30

km. BAE Systems believes that this hybrid solution offers the MOD a significant enhancement to the range and lethality of the RN's naval gunfire support capability at very modest risk and cost – the system having 80% commonality with Mk8 Mod 1. And already BAE Systems can see a fourth generation development of the Mk 8 system in prospect, incorporating a fully automated magazine and supply system, and a 52 calibre extended range ordnance gun barrel capable of in excess of 40 km.

The RN Looks to the Future

The Royal Navy has started to come to terms with the demise of the Future Surface Combatant (FSC) programme (cancelled in November 2004) and is now considering how to fill the gap that it has left.

As late as 13 December 2004 the Minister of State for the Armed Forces, Mr. Ingram, was stating that “the Future Surface Combatant (FSC) programme ...is still in its concept phase. ... decisions have not yet been taken on funding for either its assessment phase or the main investment phase”, but the near simultaneous stand down of the GSC Integrated Project Team told a somewhat different tale.

With FSC effectively defunct, the RN is now revisiting proposals for a Service life Extension Programme (SLEP) for all the thirteen Type 23 frigates that will remain in service after this year. Studies have already begun in to what is being termed a Capability Upgrade Programme (CUP) - this will modernise the vessels, enhance their weapon systems, and extend their service life to 30 plus years. The work will include a Block 3 upgrade to the GWS.26 Seawolf missile system in order to counter anticipated anti-ship threats post-2015. A decision on whether to proceed with the CUP could be made as early as the end of this year.

In addition to the Type 23's, the Royal Navy also operates four Type 22 Batch 3 (T22B3) frigates, which are currently due to pay-off between 2015 and 2018. It is likely that these will probably be replaced rather than SLEP'ed, with industrial considerations playing an important role in the final decision. If replaced, thinking is currently focusing on adopting an off-the-shelf design as an interim escort solution. A variant of the Type 45 destroyer has been adopted for the base-line, but at this

early stage no option is being ruled out, and foreign designs such as the French-Italian FREMM multi-role frigate will also be assessed. Compared with the existing ships, the RN is seeking much improved land attack and aviation capabilities.



An early FSC design concept

(DERA)

Eventually, the RN wants to replace the Type 23 Frigates with what is now being termed the Versatile Surface Combatant (VSC), this will have many of the capabilities previously envisaged for FSC. However the planned in-service date for the first VSC unit is post-2020, and it will be several years before even Concept Phase studies begin.

Last year the Ministry of Defence (MOD) requested information and design concepts from industry in relation to a prospective “Global Corvette” requirement, but there is now little belief in industry that this idea will go any further with the demise of FSC and the MOD's constrained budgetary situation.

Project Update

Military Afloat Reach Sustainability (MARS)

The MARS project remains in the final stages of the Concept Phase as its Initial Gate approval continues to slip. The expected in service date for the first ship is now early next decade, Once Initial Gate approval is given, the DPA has stated that it will place a contract for a non-technical “Project Friend”, to help MoD and Industry alike

to understand and implement an alliance approach. Other commercial activities include the identification, selection and award of contracts for 4 possible Integrators; the award of numerous technical studies contracts to inform and support the MARS requirement; and a design/development contract to achieve more efficient, and greater capacity, when replenishing at sea (Heavy RAS).

RN Merlin's Set for a Face Lift

Recent months have seen several major milestones in the life cycle of the Royal Navy's Merlin HM Mark 1 helicopter.

On 21 October 2004 the final planned Merlin squadron commissioned. The 829th squadron will eventually provide Merlin flights to six Type 23 frigates and its formation marked the realization of a staff requirement first issued by the Royal Navy some twenty seven years ago. But looking to the future, 10 November 2004 saw Lockheed Martin UK Ltd submit its proposal for the Royal Navy Merlin Capability Sustainment Plus (Merlin CSP) program.

The Merlin HM Mk1 entered Royal Navy service in 1998 and the last of the 44 helicopters ordered was delivered as recently as 2003, although 2 aircraft have been lost in crashes. However, the EH101 (the manufacturers designation for the helicopter) design originated in the early 1980's, with the first prototype flying in 1987, and some systems in the Merlin are becoming technically obsolete and difficult to maintain. There is also a desire by the RN to improve the versatility and multi-role capabilities of the helicopter. The Merlin HM1 was originally designed as a dedicated anti-submarine variant of the EH101, but its actual use is far more varied and includes surface surveillance and control, search and rescue, vertical personnel and stores transfer, and troop carrying.

In June 2003 Lockheed Martin UK Ltd, teamed with Westland Helicopters Ltd (now AgustaWestland), was awarded by the MOD a 18-month Assessment Phase study worth approximately £18 million to evaluate obsolescence issues with the Merlin HM1, and assess possible upgrades.

Lockheed is now proposing an update the Merlin HM Mk 1 computer architecture and flight controls, and to install a multi-mission sensor suite including an electro-optical sensor. The Merlin CSP is expected to better adapt the Merlin to the littoral underwater and surface battlespace and enhance the utility of the helicopter in other roles such as supporting civil authority. It is also hoped that the whole-life costs will be reduced and the overall reliability of the systems will be increased substantially. In addition the aircraft's weight will be decreased, thereby allowing an enhanced payload or increased time on station.

The upgrade addresses obsolescence issues in the Merlin mission suite by adopting an open systems computer architecture ready for both technology refresh (processing power and speed upgrades) and technology insertion (new sub-systems and functions). The new computer architecture will have processing capacity and memory size more than 250 times greater than current Merlin systems. An improved human machine interface (HMI) also promises reduced operator workload - as

mission systems become more versatile so the need for intuitive interfaces increases. Considerable attention will be paid to reducing operator workload whilst making simultaneous control of multiple and diverse missions a realistic possibility.



An early Merlin CSP concept

(Lockheed Martin UK)

The Merlin CSP project is being given enhanced importance by the Royal Navy because of the comprehensive review of the MOD's helicopter requirements being currently undertaken by the Future Rotorcraft Coherency forum. The forum is trying to rationalize projects that total nearly £4.5 billion in to a solution that fits within the £3 billion budget available over the next decade for new helicopters. There is considerable speculation that the Royal Navy's Surface Combatant Maritime Rotorcraft (SCMR) project will be the principle victim of the review, leaving no specific replacement for the versatile Lynx HAS.3 and HMA.8. No replacement would make the RN increasingly reliant upon the Merlin to fill in a broad range of roles as the Lynx begins to leave service from about 2009.

If as expected the MOD decides to proceed with Merlin CSP, Lockheed Martin will be the designated prime contractor and lead systems integrator in a strategic business alliance with the Merlin's air vehicle designer and manufacturer, AgustaWestland.



Lockheed Martin, AgustaWestland and Thales UK also see an opportunity to sell the Royal Navy 6-12 additional

new-build Merlin airframes. The unexpected success in Gulf operation of the Merlin in the surveillance and control role has reinforced the opinion of many inside and outside of the Royal Navy that the most logical and lowest risk replacement for the services existing Sea King Airborne Surveillance and Area Control (ASaC) Mk 7 is a variant of the Merlin fitted with improved radar and mission systems. Some of the current Sea King ASaC.7 airframes are now nearly 30 years old. However progress on what is officially termed the Maritime Airborne Surveillance and Control (MASC) project remains very slow, partly due to lack of funding and partly due to a close linkage with the Future Carrier Project (CVF) which is itself not progressing as rapidly as was hoped. Currently in the Concept Phase, MASC is scheduled to pass Initial Gate and enter the Assessment Phase in the middle of this year. The in-service date is now apparently delayed from 2012 to 2015.

As well as traditional Airborne Early Warning and Control solutions such as the Merlin ASaC, the Defence Procurement Agency (DPA) wants to fully evaluate

radical and transformational solutions for MASC, and determine whether or not some or all of the MASC user requirements could be met by alternative means and systems. For example the £21 million Joint UAV Experimentation Programme (JUEP) is looking at the potential of using Unmanned Air Vehicles to deliver a system, which would be able to meet the MASC requirements in full or large part, and at an attractive (lower) cost than manned aircraft. On 4 November 2004 Thales UK, Boeing and QinetiQ signed a contract with the MoD for the Maritime Unmanned Air Vehicle (UAV) strand of the JUEP. The team, led by Thales UK and to be known as Team JUEP, will fly the Boeing ScanEagle UAV in a maritime role to identify the joint service operational requirements for future maritime UAVs. Interestingly, a Sea King ASaC.7 will also be involved in the trials and will play an important role in investigating the contribution UAVs can make to maritime network enabled capability.

UK News Bites

- **10 January 2005** QinetiQ announced that it had sold the trimaran Research Vessel *Triton* to UK company, Gardline. Gardline's clients include the Maritime and Coast Guard Agency and it is expected that this unique vessel will be used for hydrographic survey work. Originally built by Vosper Thornycroft and completed in 2000, RV *Triton* conducted a highly successful two-year trials programme proving the concept of using a multi-hull design for future warships.
- **23 December 2004** Rolls Royce announces that it had signed offshore contracts worth around £160 million for UT-Design vessels and equipment for the offshore market in the second half of 2004. Anders Almestead, President - Offshore, said: "Demand in the last six months has been much greater than anticipated, a reflection of the strengthening market." Rolls Royce has signed 26 contracts with Norwegian, Brazilian, Indian, Singaporean and Spanish shipyards for offshore service vessels, new vessel types and ship equipment for owners in Norway, Singapore, Spain, Italy, Britain, India and the USA. A total of 50 UT-Design vessels are currently being built or are under planning.



- **10 December 2004.** A revised agreement was signed between Swan Hunter and the MOD in relation to two Bay Class LSD(A)s currently being built by Swan Hunter for the Royal Fleet Auxiliary. The £160m project went over budget after problems adapting an off-the-shelf design. Under the new contract the Government will pay £84m to the yard. Swan Hunter will also pick up part of the additional costs.

- **10 December 2004.** The UK MOD announced that the 18,500 tonne LPD HMS *Bulwark* had entered service. Built in Barrow-in-Furness by



BAE Systems, HMS *Bulwark*, is based at Devonport. She is the second and last of a new class of amphibious assault ships, and joins her sister ship HMS *Albion*, which was accepted into service last July.

- **8 December 2004** DML Group said that it was expecting good news in relation to its bid for the contract to supply and support Shaman Communications Electronic Support Measures (CESM) systems. The Shaman contract, declared by the MoD to be in excess of £100 million, is for the project management, supply, installation and support of the CESM systems designed to provide a sophisticated communications capability that will be installed in Royal Navy Type 23 frigates and Type 45 destroyers, and includes all software, testing, trials integration, training and support. An announcement is due from the MOD in early 2005.

Naval Forum UK – January 2005

AMI International

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