



# A GLOBAL FORCE 2012/13

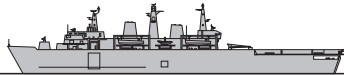


# ROYAL NAVY FLEET GUIDE

(as of 24/04/2013)

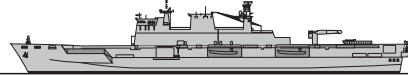
## SURFACE FLEET

### Amphibious Ships - Landing Platform Dock



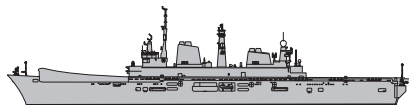
<b>ALBION</b>	<b>L14</b>	Displacement	19,500 tonnes
<b>BULWARK</b>	<b>L15</b>	Length	176 metres
		Beam	30 metres
		Complement	325 RN + 300 Troops
		Armament	Royal Marines, Landing Craft, Goalkeeper gun system, close-range guns

### Amphibious Ship - Landing Platform Helicopter



<b>OCEAN</b>	<b>L12</b>	Displacement	21,500 tonnes
		Length	208 metres
		Beam	35.7 metres
		Complement	265 RN + up to 700 air group and troops
		Armament	Royal Marines, Air Group, Landing Craft, Phalanx gun system, close-range guns

### Amphibious Ship - Landing Platform Helicopter



<b>ILLUSTRIOUS</b>	<b>R06</b>	Displacement	20,000 tonnes
		Length	210 metres
		Beam	36 metres
		Complement	682 RN + up to 366 air group and troops
		Armament	Royal Marines, Goalkeeper gun system, close-range guns, Air Group

### Type 45 Destroyers



<b>DARING</b>	<b>D32</b>	Displacement	7,350 tonnes
<b>DAUNTLESS</b>	<b>D33</b>	Length	152.4 metres
<b>DIAMOND</b>	<b>D34</b>	Beam	21.2 metres
<b>DRAGON</b>	<b>D35</b>	Complement	191
<b>DEFENDER</b>	<b>D36</b>	Armament	4.5 inch gun, Sea Viper anti-air missile system (Aster 15/30 missile), Phalanx gun system, Close-range guns, Lynx or Merlin helicopter - can receive Chinook/SKASaCs
<b>DUNCAN</b>	<b>D37</b>		

### Type 42 Destroyers



<b>EDINBURGH</b>	<b>D97</b>	Displacement	4,460 tonnes
(Decommissioning June 2013)		Length	141.1 metres
		Beam	15.2 metres
		Complement	269
		Armament	4.5 inch gun, Sea Dart anti-air missiles, Phalanx gun system, close-range guns, Lynx helicopter

### Type 23 Frigates



<b>ARGYLL</b>	<b>F231</b>	<b>SUTHERLAND</b>	<b>F81</b>	Displacement	3,500 tonnes
<b>LANCASTER</b>	<b>F229</b>	<b>SOMERSET</b>	<b>F82</b>	Length	133 metres
<b>IRON DUKE</b>	<b>F234</b>	<b>KENT</b>	<b>F78</b>	Beam	16.2 metres
<b>MONMOUTH</b>	<b>F235</b>	<b>PORTLAND</b>	<b>F79</b>	Complement	173
<b>MONTROSE</b>	<b>F236</b>	<b>ST ALBANS</b>	<b>F83</b>	Armament	4.5 inch gun, Harpoon anti-ship missiles, SeaWolf anti-air missiles, Stingray anti-submarine torpedoes, close-range guns, Lynx or Merlin helicopter
<b>WESTMINSTER</b>	<b>F237</b>				
<b>NORTHUMBERLAND</b>	<b>F238</b>				
<b>RICHMOND</b>	<b>F239</b>				

### Hunt Class Mine Countermeasures Vessels



<b>LEDBURY</b>	<b>M30</b>	Displacement	740 tonnes
<b>CATTISTOCK</b>	<b>M31</b>	Length	60 metres
<b>BROOKLESBY</b>	<b>M33</b>	Beam	10 metres
<b>MIDDLETON</b>	<b>M34</b>	Complement	42
<b>CHIDDINGFOLD</b>	<b>M37</b>	Armament	30mm close-range gun,
<b>ATHERSTONE</b>	<b>M38</b>		Seafox mine disposal system
<b>HURWORTH</b>	<b>M39</b>		
<b>QUORN</b>	<b>M41</b>		

### Sandown Class Mine Countermeasures Vessels



<b>PENZANCE</b>	<b>M106</b>	Displacement	540 tonnes
<b>PEMBROKE</b>	<b>M107</b>	Length	52.7 metres
<b>GRIMSBY</b>	<b>M108</b>	Beam	10.5 metres
<b>BANGOR</b>	<b>M109</b>	Complement	38
<b>BLVTH</b>	<b>M111</b>	Armament	30mm close-range gun,
<b>RAMSEY</b>	<b>M110</b>		Seafox mine disposal system
<b>SHOREHAM</b>	<b>M112</b>		

### River Class Offshore Patrol Vessels



<b>TYNE</b>	<b>P281</b>	Displacement	1,677 tonnes
<b>SEVERN</b>	<b>P282</b>	Length	79.5 metres
<b>MERSEY</b>	<b>P283</b>	Beam	13.6 metres
		Complement	30
		Armament	20mm close-range gun

### Offshore Patrol Vessel (Helicopter) Clyde P2000 Patrol Boats



<b>CLYDE</b>	<b>P257</b>	Displacement	1,962 tonnes
		Length	81.5 metres
		Beam	13.6 metres
		Complement	38
		Armament	30mm close-range gun

<b>ARCHER</b>	<b>P264</b>	<b>BLAZER</b>	<b>P279</b>
<b>BITER</b>	<b>P270</b>	<b>DASHER</b>	<b>P280</b>
<b>SMITER</b>	<b>P272</b>	<b>PUNCHER</b>	<b>P291</b>
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<b>TRACKER</b>	<b>P274</b>	<b>RANGER</b>	<b>P293</b>
<b>RAIDER</b>	<b>P275</b>	<b>TRUMPETER</b>	<b>P294</b>
<b>EXPRESS</b>	<b>P163</b>	Displacement	40 tonnes
<b>EXPLORER</b>	<b>P164</b>	Length	20.0 metres
<b>EXAMPLE</b>	<b>P165</b>	Beam	5.9 metres
<b>EXPLOIT</b>	<b>P176</b>	Complement	13
		Armament	.762 GP machine gun

### Gibraltar Patrol Boat Squadron



<b>SABRE</b>	<b>P285</b>	Displacement	24 tonnes
<b>SCIMITAR</b>	<b>P284</b>	Length	15.9 metres
		Beam	4.4 metres
		Complement	5
		Armament	.762 GP machine gun

### Ocean Survey Vessel



<b>SCOTT</b>	<b>H131</b>	Displacement	13,500 tonnes
		Length	131 metres
		Beam	21.5 metres
		Complement	63

### Coastal Survey Vessels



<b>ECHO</b>	<b>H87</b>	Displacement	3,470 tonnes
<b>ENTERPRISE</b>	<b>H88</b>	Length	90 metres
		Beam	16.8 metres
		Complement	44

<b>GLEANER</b>	<b>H86</b>	Displacement	26 tonnes
		Length	14.8 metres
		Beam	2.9 metres
		Complement	5

### Antarctic Patrol Ship



<b>PROTECTOR</b>	<b>A173</b>	Displacement	5,000 tonnes
		Length	99 metres
		Beam	18 metres
		Complement	88

## ROYAL FLEET AUXILLIARY

### Fleet Tankers



<b>WAVE KNIGHT</b>	<b>A389</b>	Displacement	31,000 tonnes
<b>WAVE RULER</b>	<b>A390</b>	Length	196 metres
		Beam	30.2 metres
		Complement	80 RFA + 22 RN (flight)
		Armament	Phalanx gun system, close-range guns

# A GLOBAL FORCE 2012/13

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- Piers and breakwaters
- Marine outfalls
- Lock gates

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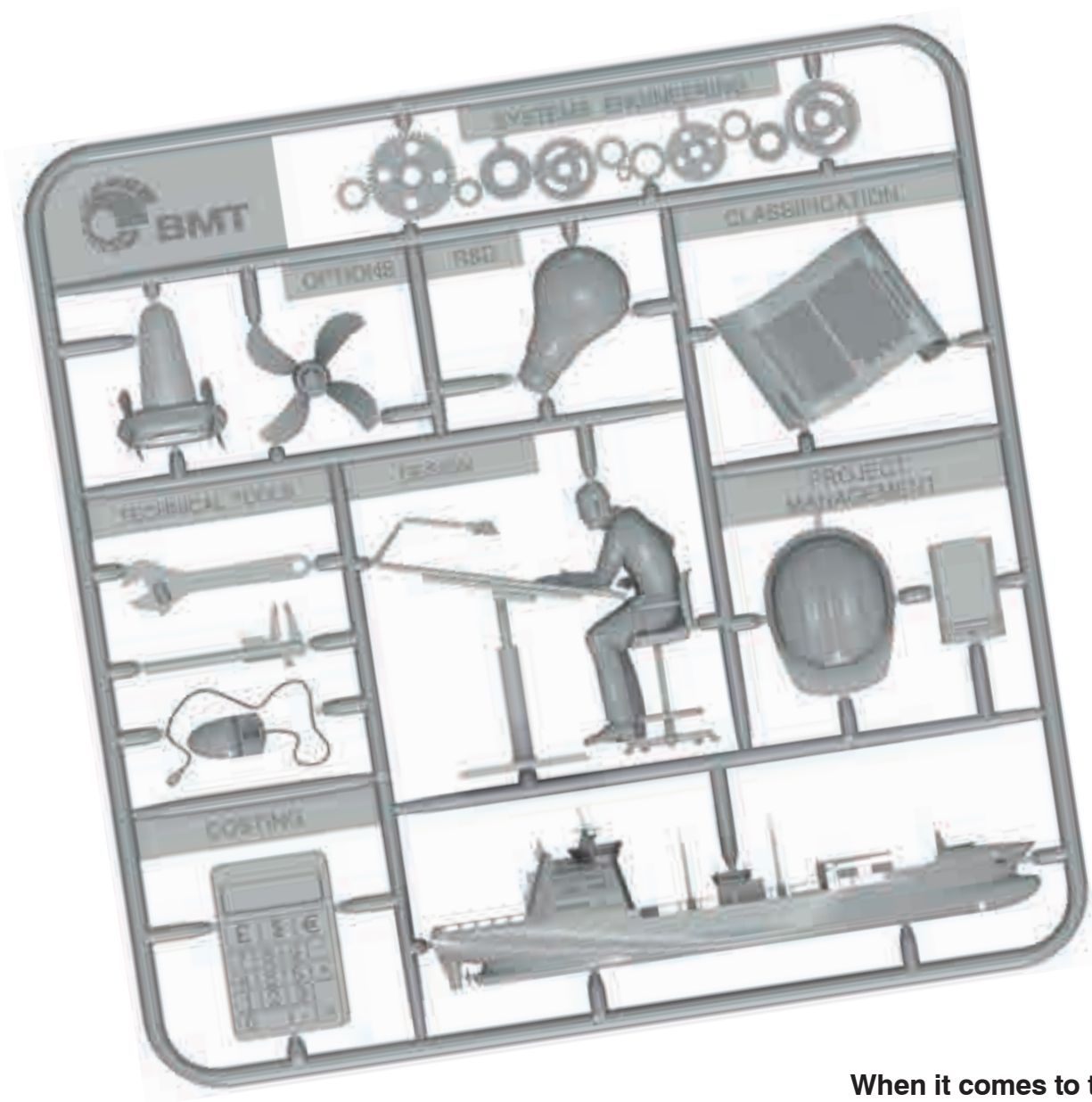
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# A sustainable future for the Royal Navy

Right Honourable Philip Hammond MP, Secretary of State for Defence



The vital contribution that the Royal Navy makes to the United Kingdom's national security is as varied as the threats are diverse. Whether it is Royal Marines and Sailors serving in Afghanistan, our maritime operations all over the world or delivering our nuclear deterrent – sustained for over 44 years without a moment's break – Britain is safer because of the outstanding work of the Royal Navy, and the civil servants and those in industry who support them.

Last summer, in addition to all of its other commitments, the Navy, along with the rest of the Armed Forces, helped provide the security for the Olympic and Paralympic Games. I saw for myself, onboard HMS OCEAN on the Thames and HMS BULWARK and RFA MOUNTS BAY off the South Coast, the utility of contingent maritime capabilities.

Indeed, contingent forces are becoming increasingly important in a world in which, as the Strategic Defence and Security Review describes, threats are many, varied and uncertain. We are entering a new phase which, with the end of combat operations in Afghanistan approaching, requires us to move towards a contingent posture.

Our response to this unpredictability is Future Force 2020: a blueprint for the powerful, adaptable, deployable and, crucially, sustainable Armed Forces we need. The maritime component will include the world's most advanced multi-role jets flying from 65,000 tonne aircraft carriers, support ships to sustain them, a fleet of brand new Astute submarines, Type 45 destroyers, helicopters, Viking all-terrain vehicles and Type 26 Global Combat Ships – the mainstay of the future Fleet.

For our nation to continue to benefit from the security that such forces bring, the foundation on which Future Force 2020 is built has to be a sustainable budget. Significant progress has been made in this area. For the first time in a generation the Defence Budget has been balanced. This has required tough decisions, including the decommissioning of some platforms and a reduction in manpower. As a result, however, the Royal Navy – and the industry, much of it UK-based, that supports it – can be confident that the formidable maritime equipment programme will be delivered with the right capability.

Sustainable Armed Forces must also continue the vanguard of balancing efficiency and effectiveness; maintaining the teeth with a smaller tail. Navy Command will receive new delegated budget responsibilities from April 2013 as part of the drive to improve efficiency and accountability. This means the Royal Navy will have greater responsibility for its own future, allowing it to consider how best to continue its long tradition of providing flexible capabilities.

Sea power is ingrained in the British psyche. The Royal Navy is – with good reason – one of our most respected institutions. Our challenge is to ensure that, as we transform defence together, the Navy remains a cornerstone of our national security. ●



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# Options and optimism

Admiral Sir George Zambellas KCB DSC ADC, First Sea Lord and Chief of Naval Staff



**A**s always, it is the Royal Navy's utility that drives our business and, in this respect, the past year is no exception. The Secretary of State's foreword captures accurately the breadth of the Royal Navy's achievements on operations around the world and, through continuing transformation, with such efficiency. So let me focus on the future.

Building on the Royal Navy's long and distinguished history, I see its evolution in terms of a Service that not only operates routinely and comfortably on our oceans and in key international straits, but also, when required, closer inshore by affecting what happens on the land, as much as at sea or in the air. After all, it is in the vicinity of the shoreline that people and politics meet, and therefore where the needs to prevent crises and respond to the unforeseen are most likely to materialise.

This is an evolution in which the delivery of the Naval Equipment Programme, in partnership with Industry, remains key. The Secretary of State has spelled out our long, unbroken and continuing role in Deterrence. In addition, we have other complex acquisition projects – Type 45 destroyers, Astute Class submarines, both Carriers, Type 26 Global Combat Ships, new aircraft, protected vehicles and our future support shipping – all of which account for a sizeable proportion of the Defence Equipment budget. This is a welcome and strategic commitment by our Nation, which will govern the future size and shape of the Royal Navy's contribution to the UK's security at home and overseas.

Yet equipment alone does not dictate the Navy's evolution as a fighting force. There is also the 'glue' that connects it up: better intelligence, communications, off-board surveillance, joint training, to name but a few enablers. But, even with the 'glue', the Royal Navy of Future Force 2020 will ultimately be determined by the attitude, optimism, creativity and confidence of the men and women who have chosen to pursue a career in the Service, as well as the civil servants and those in Industry who support it. Equally, the Navy's future depends on the support of our families.

Turning this ambition – of a Navy that provides the Government with even more options when seeking to influence events and livelihoods at sea and on land – into reality, will not happen overnight. But I am clear that this ambition forms the basis why the Royal Navy will, in support of our national interests, continue to win at and from the sea. As these pages illustrate, the Royal Navy has a battle-ready, maritime expertise based on centuries of success, and the courage to shape its exciting future with confidence. I believe that is good for us all – Navy, NATO and Nation. ●



## DEAR READER,

Welcome to the Royal Navy's 2012 /13 *A Global Force* yearbook. As ever, the Royal Navy and Royal Fleet Auxiliary have been extremely busy protecting the nation's national interests at home and overseas.

Over the period covered in this issue, the Royal Navy and Royal Fleet Auxiliary had sailors, marines and air crew at sea or deployed across the globe, in Afghanistan, the North and South Atlantic, the Mediterranean, the Gulf and the Indian Ocean. The RN continued to assist with the training of our partners around the world and we worked hard to maintain freedom of navigation for all to international sea lanes. Moreover, we contributed to the effort to reduce the threat of piracy and we worked with our allies to stamp out illegal acts at sea, such as narcotics and weapons smuggling, the trafficking of humans and terrorist activity. The RN delivered all the standing tasks required of us and kept a watchful eye over our overseas territories to make sure they were safe and supported.

I hope you will enjoy reading about the range of activities, highlights and successes that we have achieved since our last publication.

**Pauline J Aquilina**  
Editor, *A Global Force*

# Diary of events – 2012

## JANUARY



HMS PROTECTOR sails for the Antarctic

- **HMS ILLUSTRIOUS** completes sea trials as a high readiness helicopter and commando carrier.
- Type-45 destroyer, **HMS DARING**, starts debut deployment to the Persian Gulf.
- **RFA FORT VICTORIA** foils pirate assault in Indian Ocean and arrests 13 pirates.
- **Royal Marines** hold Olympic security exercise with police on the Thames.
- **Fishery protection** vessels arrest trawler after illegal nets are discovered.
- The Royal Navy's new ice patrol ship, **HMS PROTECTOR**, sails for the Antarctic.

## FEBRUARY



AW159 Wildcat trials on HMS IRON DUKE

- **HMS ARGYLL** joins a major exercise in Gulf to protect energy supplies.
- Danish forces train on **HMS ILLUSTRIOUS** during a visit to Copenhagen.
- **Britannia Royal Naval College** participates in the Thames Pageant.
- Government orders a new generation of 37,000-tonne Tide-class **RFA vessels**.
- Wildcat naval helicopter completes 20 days of trials on board **HMS IRON DUKE**.

## MARCH

- Nuclear deterrent submarine **HMS VENGEANCE** starts preparations for major refit.
- **HMS VICTORY** is transferred from MoD to a charitable trust but remains a commissioned Royal Navy ship.
- Royal Marines transit to Cold Weather training in Norway aboard **HMS BULWARK**.
- **Royal Navy SAR** helicopters help fire service to bring massive moorland fire under control in Scotland.
- **Second World War V2** missile found near Harwich made safe by Portsmouth Royal Navy bomb disposal unit.



Royal Marines come ashore in Norway

## APRIL

- **43 Commando** Fleet Protection Group, reformed at Faslane, becomes the largest unit in the Royal Marines.
- Portsmouth-based frigate, **HMS WESTMINSTER**, visits Mombasa to train with Kenyan forces and boost trade links.
- **Royal Navy parades** through London in honour of their successful operation off and over Libya in 2011.
- Europe's biggest military exercise, **Joint Warrior**, climaxes with Royal Marine assault on the west coast of Scotland.
- **Commando Helicopter Force** hosts 30th anniversary dinner in honour of Falklands Sea King (Junglies) helicopter veterans.

HMS ILLUSTRIOUS heads for exercise Joint Warrior



## MAY



The F-35B Lightning II undergoes tests

- Type-45 destroyer, **HMS DIAMOND**, fires her Sea Viper missiles for the first time, successfully destroying a target drone.
- UK Government confirms its intention to build two carriers with ski jumps and the selection of the **F-35B STOVL** multi-role jet aircraft.
- German Naval Sea King crew practise landing on **HMS OCEAN** during a three-day goodwill visit to Hamburg.
- The Olympic flame lands at **RNAS Culdrose** and is greeted by then Fleet Commander Admiral Zambellas and Deputy Prime Minister Nick Clegg.
- **UK Government** awards contracts for UK companies to design the next generation of nuclear deterrent submarines.

## JUNE

- RN provides **Royal Barge** Honour Guard for the Queen's trip down the Thames to celebrate her 60 years on the throne.
- Second and final tranche of **naval redundancies** announced with lower numbers than originally anticipated.
- **Royal Navy divers** and their Italian counterparts blow up a Second World War German mine off Sardinia's busiest port.
- The third Type-45 destroyer, **HMS DIAMOND**, sets sail on her maiden deployment to the Gulf to carry out maritime security patrols.
- The Armed Forces commemorate the 30th anniversary of the liberation of the **Falklands**.
- The chief of Staff of the Libyan Naval Force visits **HMS RALEIGH** and the Britannia Naval College to review training methods.



RANGER and TRUMPETER escort the Royal Barge

## JULY

- **829 Naval Air Squadron** and its Merlin helicopters set off for six-month counter-piracy duties in the Gulf.
- **Lynx Mk7 ZD282** is the last to fly with the Junglies as 847 squadron switches to the Mk9 ahead of its return to Afghanistan.
- **HMS OCEAN** takes up station on the Thames in preparation for her security role during the London 2012 Olympic and Paralympic Games.
- Royal Navy Sea Kings from **854 NAS** arrive at RAF Northolt to contribute to the aerial shield for the summer sporting events. In all some, 2,600 Royal Navy personnel were to participate in security duties.
- Attack submarine **HMS TURBULENT** is decommissioned just six months shy of 30 years in front line service.
- **HMS BULWARK, RFA MOUNTS BAY, RN P2000 patrol boats** and landing craft take up position off Weymouth as part of the Olympic/Paralympic maritime security shield.

## AUGUST



Lt Peter Reed wins an Olympic gold medal

- Royal Navy rower, **Pete Reed**, wins a gold medal as part of awesome foursome – Team GB coxless fours.
- Survey ship **HMS ECHO** makes historic trip to Libya, becoming the first Royal Navy vessel to visit the country after the fall of Gaddafi.
- Portsmouth-based Type 23 frigate, **HMS WESTMINSTER** returns from Gulf after seizing a £14 million drug cache and disrupting three potential pirate attacks.
- **F-35B** test aircraft drops its first practice bomb over a range in the eastern US seaboard in trials of the internal weapons bay.
- Malta convoy veterans honoured as black anchor is unveiled in **Valetta** as a memorial to their sacrifice 70 years ago.
- RN unveils the design of its next-generation frigate, the **Type 26**, after two years on the drawing board.
- Royal Marines Band joins nearly 1,000 other performers at the Edinburgh Tattoo in celebration of the **Queen's Diamond Jubilee**.
- **HMS DUNCAN**, the sixth and final Type 45 destroyer puts to sea for the first time.



## SEPTEMBER

- First **Merlin Mk3** helicopter flown by an all-RN crew takes to the skies in preparation for the Commando Helicopter Force transition to Merlins in 2016.
- Survey ship **HMS ENTERPRISE** sails to the Gulf with new 9m (30 ft) Spitfire survey boat on board to update charts for the UK Hydrographic Office.
- Royal Navy buys HM Ships **MERSEY, SEVERN** and **TYNE** River-class 'Cod Squad' fishery patrol vessels outright after a decade on loan from BAE Systems.
- **HMS AMBUSH**, the second of the Astute-class submarines leaves her BAE Systems Cumbrian boatyard for Faslane.
- 650 men from **40 Commando** take command of Nar-e-Saraj area of Helmand, Afghanistan at the beginning of a six-month deployment.
- The **Cougar 2012 RFTG** deployment in the Mediterranean commences, involving over 3,000 sailors and marines as well as units from the British Army and Royal Air Force.

## OCTOBER

- NATO's largest exercise, the UK-led **Joint Warrior** gets under way off the coast of Scotland.
- **HMS DIAMOND** joins two RN mine countermeasures ships and an RFA as 30 navies take part in the largest mine-hunting exercise in the Persian Gulf – IMCMEX12.
- The first eight crew members for the new aircraft carrier **HMS QUEEN ELIZABETH** assemble at Rosyth.
- £37 million contract agreed with **BAE Systems** to overhaul and upgrade the entire fleet of Royal Marine Viking tracked vehicles.
- The Type 45 destroyer **HMS DEFENDER** is handed over to the Royal Navy at a ceremony in Portsmouth.
- An Royal Navy **Lynx Mk8** helicopter deploys to the French frigate SURCOUF during patrols as part of the EU's anti-piracy Operation ATALANTA.
- Joint Anglo/French Exercise **Corsican Lion** kicks off in the Mediterranean as part of the Combined Joint Expeditionary Force preparations.



HMS DEFENDER sails into her new home in Portsmouth

## NOVEMBER



AAC Apache helicopters train on HMS ILLUSTRIOUS

- The largest section of the new aircraft carrier, **HMS QUEEN ELIZABETH**, sails down the Clyde to begin its 600-mile voyage to Rosyth.
- Secretary of State for Defence publishes '**Future Reserves 2020: Delivering the Nation's Security Together**'.
- British Army Apache helicopters from 656 Squadron Army Air Corps undertake live-firing exercise from **HMS ILLUSTRIOUS**.
- **RFA ARGUS** joins up with Dutch frigate VAN AMSTEL during counter-narcotics operations in the Caribbean.
- The Response Force Task Group completes the **Cougar 12** deployment and ships start to return to their bases.

## DECEMBER



Admiral Viktor Chirkov was hosted by the Royal Navy

- **HMS Duncan**, the sixth and final Type-45 destroyer, completes sea trials and prepares for handover to the Royal Navy in spring 2013.
- MoD signs £1.2 billion contract for the production of **HMS Audacious** – the fourth of seven Astute-class attack submarines.
- First Royal Navy pilot begins flight training on the **F-35B** Lightning II multi-role jet aircraft due to operate from the Queen Elizabeth carriers.
- **Admiral Chirkov**, Commander-in-Chief of the Russian Federation Navy, completes a four-day tour of Royal Navy establishments and ships.
- **Prime Minister David Cameron** announces the casting of the Arctic Convoy Star to be awarded to veterans of the Russian convoys during the Second World War.

# Operational overview 2012/13

Joint UK/US counter-narcotics operations and support to overseas territories in the Caribbean. See 'Surface vessels update'

Two airborne search and rescue (SAR) bases

UK/EU fisheries protection. See 'Smaller vessels'

Support to 2012 Olympic and Paralympic Games. See 'Operation OLYMPICS'

Twice-yearly 'Joint Warrior' training with allies and partners

Support to overseas territories in the Atlantic and anti-piracy operations. See 'Surface vessels update'

Defending the Falkland Islands and Antarctic territories. See 'Surface vessels update'



Stabilisation operations as part of the ISAF coalition in Afghanistan. See 'Naval support to Afghanistan' and 'Support to Afghanistan'

RFTG Cougar 2012 deployment in the Mediterranean and Gulf. See 'Generating the nation's contingent capability'

Mine counter-measures and maritime security operations. See 'Smaller vessels'

Anti-piracy operations with international partners



## The Fleet

Message from the Fleet Commander, Vice Admiral Philip Jones CB

2012 was – more than any other I can recall - the year in which the Naval Service really grasped a unique opportunity to reach out to the society from which we are drawn, and which we serve. Our scale of engagement with the public and the way people all over the UK responded to it, was pretty special – from the Diamond Jubilee and the Pageant on the Thames, to our provision of maritime security for the Olympics. I think the many elements of the Fleet involved in these UK-based activities played their part in getting an important and influential message across about the importance of the sea and how the Fleet protects UK interests globally. From the perspective of my responsibilities for generating naval forces, it was good to see the successful Trident missile firing by one of our Vanguard-class submarines off King's Bay, the acceptance of the first UK Lightning II aircraft, and the maiden deployments of a string of Type 45 Daring-class destroyers. Yet, the headline highlight for me has to be the Fleet's consistent delivery on operations across the board. It rarely attracts the attention it deserves, but it is the relentless dedication and professionalism of the many thousands of sailors and marines who spent much of 2012 deployed away from the UK on operations that is truly remarkable.

### RESPONSE FORCE TASK GROUP

I was delighted with COUGAR 12. The Response Force Task Group generated efficiently, and integrated well before heading into the Mediterranean as the UK's maritime force for contingency. A powerful mix of capabilities was embarked across the Task Group, including the Army Air Corps' Apache Attack Helicopters, used to such good effect from HMS OCEAN in operations off Libya in 2011. This time, HMS ILLUSTRIOUS was there in the helicopter-carrier role. COUGAR gave the opportunity to validate our specialist battle staffs and to exercise our Littoral manoeuvre capability through a range of amphibious activities; but it also gave us the chance to hone our other war-fighting skills – especially anti-submarine warfare and maritime aviation – with international partners. Notably, of course, with the French, under the auspices of the Combined Joint Expeditionary Force.

### THE GULF

It's no secret that the Middle East and the Gulf region in particular remains very much at the forefront of the Navy's thinking and activity – where it has been for many years. The reasons aren't difficult to work out: many, many thousands of UK citizens live there, close to a strategic chokepoint in an area susceptible to

bouts of instability. A range of UK interests are engaged there – security, trade, energy – so it's no surprise that we are focused on it. Security in and around the Gulf is a fundamentally maritime responsibility, one we share with many others: the Gulf States themselves, the US and others operating as part of coalition forces in the region. The evolving nature of the contribution we make is also significant: the Royal Navy's Type 45 Air Defence destroyers operating alongside US Navy Carrier Strike Groups; our attack submarines taking part in Anti-Submarine Warfare exercises; the surveillance work of our Merlin helicopters; and, a key asset, the Royal Navy Mine Counter Measures (MCM) Force stationed in Bahrain, which continues to work closely with our partners in the region to provide reassurance and training. The Gulf keeps us busy.

### THE ATLANTIC

We continue to support the Standing Commitments mandated by the Ministry of Defence throughout the Atlantic – North and South. In the North Atlantic, that has meant, not for the first time, committing a Royal Fleet Auxiliary to the range of tasks for which we are responsible, primarily Hurricane Relief and the UK maritime contribution to our counter-narcotics work. These operations – presence, surveillance, information-sharing and the interdiction of suspected drug smugglers – take place within a wider framework of international maritime cooperation, orchestrated through the US' Joint Inter-Agency Task Force (South), based in Key West, Florida.

In the South Atlantic, we continued to fulfil our long-standing commitment to the security of the South Atlantic Islands, alongside our Army and Royal Air Force counterparts with Type 42 and Type 45 destroyers, Royal Fleet Auxiliary tanking support, the Falkland Island Patrol Vessel, HMS CLYDE and, of course, the Ice Patrol Ship, HMS PROTECTOR.

Of particular note this year has been HMS DAUNTLESS, whose deployment 'down South' was in the context of an ambitious programme of engagement under the auspices of AURIGA 12. This demonstrated what can be achieved over a wide area by one ship operating alone, conducting a variety of operations and exercises including wider regional engagement, key leadership engagement, capacity building, maritime security operations, counter piracy and counter narcotics operations, in addition to supporting UK Trade & Investment through UK trade and defence sales, while also being a venue for diplomatic support. Additionally, the ship provided support to potential humanitarian disaster relief operations during the peak of the hurricane season,



Sea King Mk7s from 854 NAS joined HMS ILLUSTRIOUS's tailored air group for the COUGAR 12 deployment

and to remote South Atlantic Ocean Territories. This was not only a proving-ground for our ability as a navy to support Type 45 operating at range in the harshest of conditions, but it also demonstrated the Type 45's exceptional flexibility.

#### HOME WATERS

As I have mentioned above, I was delighted by the performance of our sailors and Royal Marines, our colleagues in the Royal Fleet Auxiliary and civil service, and industry partners throughout a summer of public events in the UK, which attracted a truly global audience. The involvement of the Armed Forces in the Diamond Jubilee and Olympics caught the national mood and will live with all of us for some time to come, I suspect. However, high-profile and welcome as this activity undoubtedly was, it does not detract from the important work being carried out elsewhere – without fanfare – by the Naval Service in the UK this year. The operational profile has included, as always, the surveillance, patrolling and protection of our waters and maritime resources, search and rescue and nuclear security, as well as being on standby to help mitigate the impact of the fuel shortages in the spring. But I should also draw attention to the continuous effort that characterises the Fleet's force-generation effort here in the UK.

#### THE FUTURE

As Fleet Commander, my job is to deliver a fighting Fleet that can meet the demands of government policy for defence, security and international engagement. While the job description is straightforward, the task itself is more complicated. Generating maritime forces involves the balancing and orchestration of many moving parts – qualified and experienced people; ships, submarines and aircraft; the performance of their on-board (and increasingly, off-board) weapons and sensors – and then fitting all that within a design for operations that might envisage us operating with other nations, our sister services and so on. My priorities have to be guided by that, because for the Fleet, success

is inevitably measured – first and foremost – in terms of operational performance. At the same time, it is no good delivering on operations if you cannot sustain that effort for the long haul when necessary – in the Gulf, in the Atlantic, protecting our national waters, providing the nuclear deterrent.

So after operations, my priority is leadership of our people – making sure that they have what they need to be effective, to develop their war-fighting skills, to be able to recuperate from operations and get the most from time with their families and loved ones. There are other imperatives to bear in mind, not least the delivery of the capabilities that we need in order to maintain a battle-winning edge. The trick is to be prepared to veer and haul in order to find the optimal balance, but my number one priority is operational delivery.

I'd like to extend my message to include our families, veterans and civilian colleagues, because I think – I hope – it is as relevant to them as it will be to our serving sailors and Royal Marines. If 2012 had a defining theme, it was that it showed the very public side of the Naval Service. The Diamond Jubilee and the Olympics offered exceptional opportunities for us to show a global audience what we do, every day, to protect the UK and its worldwide interests.

However, it was not the whole story, because virtually every aspect of our operational activity in 2012 – wherever we have been operating – has attracted a welcome degree of public attention and, I think, has helped to increase the public understanding of what we do. This utility, this operational capability has not been lost on other nations, either. But it doesn't come easily and we make great demands on our people and their families. So I've got two messages for those in the Fleet. First and foremost, I'd like to thank them for their service. Secondly, they should be proud of what they do, every day for Britain, and the style in which they do it. I believe that we are entering an era of great opportunity for our Service; make the most of it by being prepared to use your authority and experience as the UK's maritime domain experts. ●

# Generating the nation's contingent capability



**Robert Fox explains how the Royal Navy has developed an agile and flexible contingency force to counter international dangers under its Response Force Task Group concept**

**L**ate in October 2012, Royal Marines led by men of 539 Assault Squadron charged ashore on a beach in Corsica. They were flanked and supported in Exercise CORSICAN LION by colleagues of the elite French Marine Infantry. CORSICAN LION was the centrepiece of the major autumn Exercise Programme, COUGAR 12, to prove the new Combined Joint Expeditionary Force (CJEF) – the principal maritime part of the Anglo-French Military Agreement of 2010.

COUGAR 12 saw the deployment of more than 6,000 British and French personnel from all three services – the French led by a carrier group headed by *FS Charles De Gaulle*, and the British Amphibious Task group led by HMS BULWARK and HMS ILLUSTRIOUS in the role of a helicopter carrier.

**RFTG IN ACTION**

For the Royal Navy, COUGAR 12 was the major 2012 outing of the new Response Force Task Group (RFTG) – the major formation for flexible response by UK maritime forces to a broad spectrum of threats and emergencies. These threats might range from natural and man-made disasters and the sudden need for humanitarian relief, through to armed intervention in a hostile environment.

Interoperable procedures are practised when an Italian Sea King visits HMS ILLUSTRIOUS



A Royal Navy Commando puts evasion techniques into practice during Exercise ALBANIAN LION



A Royal Marine landing craft conducts cross-decking drills with a French landing craft in the background

According to the UK Task Group Commander in the exercise, Commodore (Cdre) Paddy McAlpine, OBE, ADC, both the British and French forces put in a stunning performance. "The French carrier strike group and our amphibious task group continued to provide a potent task force and the lessons we identified bode well for the future," Cdre McAlpine confirmed. The exercise was not confined to western Mediterranean waters. It concluded with an exercise with the Albanian Navy and a visit to Algeria. Towards the end, the Type 23 frigate HMS NORTHUMBERLAND deployed to duties east of Suez and joined the anti-piracy patrols off the coast of Somalia.

As COUGAR 12 progressed, other Royal Navy ships participated in providing security in the Gulf, off the coast of Somalia and in the South Atlantic – a mark of the Navy's global

reach. The units and ships in the Mediterranean, which could be reinforced at a few days' notice, were on alert for a sudden deterioration of the crisis in Syria.

The concept of the RFTG is enshrined in the Strategic Defence and Security Review (SDSR) of 19 October 2010. To paraphrase the relevant section of the report's coverage of Naval Forces, the Royal Marines will provide one key element of our high readiness response force. They will be able to land and sustain a commando group of up to 1,800 personnel from the sea, along with their protective vehicles. They will receive logistics and command/control support from specialist ships, including a landing and command ship. This, the SDSR proposes, would allow the UK to conduct an operation on the same scale as that of the 2000 Sierra Leone operation.

On 2 November 2010, the publication of the SDSR 2010 was quickly followed by the Anglo-French military agreement, which further crystallized the concept of the RFTG as the cornerstone of the CJEF. Events were soon to drive common thinking well beyond the lessons that were learnt from the British intervention in Sierra Leone in 2000 as the template for the RFTG and the CJEF. The first major amphibious exercise of the new arrangement with the French forces – COUGAR 11 – had barely begun when the crisis in Libya broke.

British as well as French units were detached to assist in the Anglo/French-led operations to enforce a UN-backed no-fly zone against Colonel Gaddafi's forces. Crucial lead elements were the aircraft carrier *Charles De Gaulle* and the helicopter and commando carrier HMS OCEAN, with British Army Apache WAH-64D Longbow attack helicopters equipped with AGM-114 Hellfire missiles flying from its decks on missions against air defence and other installations.

## The introduction of the Type 45 air defence Daring-class destroyers hugely enhances the surveillance range of the force

The lessons from the successful multinational operations in Libya were still being absorbed when a further declaration of military cooperation was made after a highly successful summit at Lancaster House on 17 February 2012. In the light of experiences in Libya, the two governments made further steps, "to make the CJEF a real asset for our military operations in the future," as "an early entry force capable of facing multiple threats up to the highest intensity". The force would be able to operate bilaterally,

or within wider alliances such as NATO, the United Nations and the European Union. The French and British governments agreed a five-year cycle of major exercises and that the CJEF would have its own command and headquarters by 2016.

The order of battle for the Royal Navy's RFTG is based on the current naval equipment programme. The lead ship at present is the new Landing Platform Dock (LPD) – either HMS ALBION or HMS BULWARK, according to availability. The main helicopter force is to be embarked in a dedicated helicopter carrier, at present HMS ILLUSTRIOUS.

These lead elements are supported by at least two ships of the current force of 19 destroyers and frigates, and at least one, and possibly two, of the Bay-class Landing Ship Dock. The introduction of the Type 45 air defence Daring-class destroyers hugely enhances the surveillance range of the force, which is particularly valuable in congested areas such as the Gulf and the Red Sea. The force will also have support in surveillance and protection from the new force of seven Astute SSN (hunter-killer) submarines, which have now begun to enter service with the Royal Navy Fleet. The RFTG's capability and range will be further enhanced by the introduction of the Type 26 Global Combat Ship within the next 10 years.

However, the biggest game changer will be the introduction of the new Queen Elizabeth II class of aircraft carriers with the F-35 Lightning II. A switch back to the short take-off, vertical-landing (STOVL) type, as opposed to the conventional carrier version of the aircraft, means that the first of the ships is now expected to be operational by the end of 2018. Further to this, the move means that both carriers are likely to be commissioned and may even be capable of operating together.

The keynotes to the Navy's Response Force Task Group are flexibility and adaptability in size, shape and range. Global threats require global reach – which the Navy's Response Force has already shown it has every intention of meeting. ●

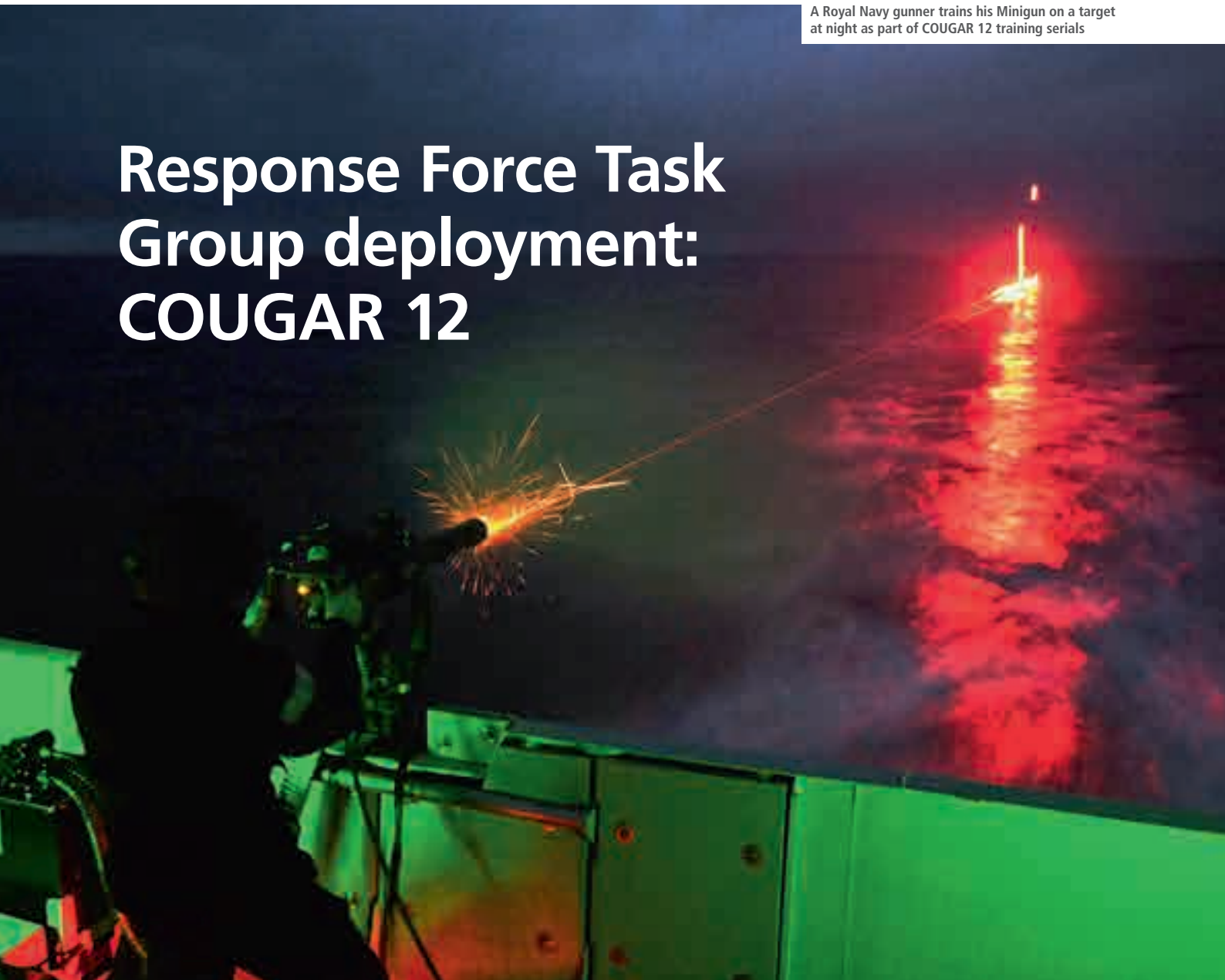


A British Army Air Corps Apache attack helicopter embarked on HMS ILLUSTRIOUS highlights the joint nature of the COUGAR deployment



A Royal Navy gunner trains his Minigun on a target at night as part of COUGAR 12 training serials

# Response Force Task Group deployment: COUGAR 12



**The 2012 COUGAR deployment helped to cement relationships with allies and confirm a credible amphibious contingent capability that can be deployed on high- and low-intensity operations. We take an insider's view of the range of activities that were delivered by the deployment**

**T**he UK's Response Force Task Group (RFTG) is a scaleable, very high readiness and credible maritime force, commanded by Commander United Kingdom Task Group (COMUKTG), Commodore Paddy McAlpine, OBE, ADC. The Task Group (TG) is capable of responding to crises and world events with an integrated force of ships, submarines, aircraft and Royal Marines. It is able to deploy globally in order to deter threats, reassure regional powers and stabilise potential hotspots. This UK

contingent capability that the RFTG offers is challenging and must be trained for, as it provides a political choice. The greatest value of the Navy will be found in the events that fail to occur because of its influence. The Royal Navy provides engagement without embroilment – no other service brings that, so the key output of this influence will remain that the Royal Navy has always been as good at preventing wars as it has at winning them.

Following its successful deployment to Operation DEFERENCE and Operation ELLAMY in 2011, the RFTG deployed on COUGAR 12 in October 2012 in order to interoperate with key UK allies and demonstrate the Royal Navy's amphibious capability. The deployment consisted of a series of exercises that simulated potential simple and non-enduring military interventions, while supporting a cross-government narrative through wider regional engagement and maritime security. The Task Group sailed to prepare to exercise its response to a wide range of tasks, including

the delivery of humanitarian aid and disaster relief and Non-combatant Evacuation Operations (NEOs) as a flexible, versatile, and interoperable maritime force.

The Cornwall coast provided the backdrop for extensive unit-level training and force integration at the start of the deployment, providing the opportunity to practise the complex art of amphibious operations. The Task Group then sailed for the Mediterranean, taking advantage of opportunities to prove its interoperability with Danish, French and Spanish warships en route, enabling the promotion of international partnerships.

### INTEGRATING CARRIER OPERATIONS

Exercise CORSICAN LION 12 was the flagship exercise for the Royal Navy in 2012. A key component of the 2010 UK and France Defence Cooperation Treaty, the Combined Joint Expeditionary Force concept provides an early entry military force capable of leading and conducting non-enduring complex intervention and humanitarian operations. The exercise included the French Carrier Strike Group, commanded from the French Flagship *Charles De Gaulle*, with an Anglo-French Amphibious Task Group that was

## COUGAR 12 demonstrated the flexibility, versatility and interoperability of the Royal Navy

commanded from the Royal Navy Flagship HMS BULWARK. Over the course of a week around Corsica, this first step in developing contemporary Anglo-French maritime interoperability exceeded expectations. The French Carrier Strike Group integration with UK platforms provided a valuable vehicle for the UK and France to integrate further their carrier operations. It also provided a first-rate vision of how the RFTG will look when the Queen Elizabeth Class aircraft carriers and the F-35B Lightning II jets are in service as we work towards Future Force 2020. The ability to deploy an integrated capable force with our allies is key to projecting influence at sea, from the sea, or on land, and to European defence cooperation overall. Working together gives the UK and France the flexibility and capability to conduct intervention



Royal Marines prepare to board a Commando Helicopter Force Sea King Mk4 'Junglie' during ALBANIAN LION

operations and, if necessary, military strikes, while supporting cross-government needs by conducting regional engagement, maritime security, evacuation, delivering humanitarian aid, or carrying out disaster relief.


After a short replenishment in Toulon, the RFTG sailed east to conduct an Anti-Submarine Warfare exercise with the French Submarine *Amethyste* under operational control of COMUKTG. The US 6th Fleet tanker, United States Navy Ship *John Lenthall*, replenished the force at sea before the TG went on to conduct wider regional engagement with HMS BULWARK and HMS ILLUSTRIOUS, visiting Corfu and Sicily respectively.

Concurrent to this, HMS MONTROSE, RFA MOUNTS BAY and MV HARTLAND POINT conducted pre-cursor operations for the main Landing Force exercise of the deployment – Exercise ALBANIAN LION 12. This was the key Lead Commando Group training for COUGAR 12, designed to demonstrate the full spectrum of Littoral Manoeuvre capability, that took place in Albania for two weeks of November. It enhanced an existing Z Coy, 45 Cdo RM exercise with support from the maritime flank through an over-the-horizon Pre-Landing Force and Lead Commando Group assault, leading to sustainment ashore and capacity building with Albanian Forces. While the Pre-Landing Force was operating at reach from the remainder of the TG, the Lead Commando Group remained in depth at sea, while a Tactical Liaison Recce Team deployed to conduct close inter-governmental liaison with the Foreign and Commonwealth Office and to consider a regional crisis-management plan and an NEO. The end of the exercise was marked by a successful visit by the president of Albania to HMS ILLUSTRIOUS. This amphibious exercise helped to strengthen the strategic partnership between the UK and Albania, with the Royal Navy's Lead Commando Group at the fore in a highly challenging operational scenario.

Throughout the COUGAR 12 deployment, the RFTG supported the NATO Operation ACTIVE ENDEAVOUR in the Mediterranean. This was an ideal opportunity for the RFTG to integrate into a multi-national surface warfare environment. Operation ACTIVE ENDEAVOUR is a NATO-supported operation in response to the threat of terrorism in the Mediterranean region, as it presents a natural barrier between NATO territory and many troubled regions. It is also designed to maintain the Mediterranean as an unrestricted legal traffic route that is not vulnerable to exploitation by terrorist groups that may aim to disrupt this critical trade area.

Following the two major exercises the RFTG visited Valletta, Malta. HMS ILLUSTRIOUS hosted an official reception attended by TRH the Earl and Countess of Wessex and the Maltese British High Commissioner. The reception preceded RFA MOUNTS BAY hosting HRH the Earl of Wessex in his role as Commodore in Chief of the Royal Fleet Auxiliary.

COUGAR 12 was a highly successful deployment, rekindling the amphibious capability and demonstrating the flexibility, versatility and interoperability of the Royal Navy while forward deployed, ready for contingent operations. It strengthened strategic relationships with key UK allies and has furthered the UK's interests around the Mediterranean. It provided assurance and operationally versatile war-fighting capabilities that can fight independently or as part of a multi-national force. ●



# Royal Navy support to Afghanistan

**From medics to infantrymen, helicopter crews to communications specialists, and logistics managers to explosive ordnance disposal experts, the Royal Navy contributes vast numbers of its personnel to the International Security Assistance Force in Afghanistan. Alan Dron reveals the full extent of the Senior Service's participation in Operation HERRICK**

**W**hen the Royal Navy's 3 Commando Brigade (3 Cdo Bde) deploys to Helmand province as it has done in 2006, 2009 and 2011, the Royal Navy's presence in the Afghan theatre grows to more than a third of the British uniformed contingent. Furthermore, on the last three occasions that the Brigade was in Afghanistan, the Royal Navy took command of the Joint Force Medical Group (JFMG), which tends to the wounded during the campaign.

The Royal Marines continue their support to the International Security Assistance Force (ISAF) mission even when 3 Cdo Bde has gone. In 2012, for

The Royal Marines deployed to Afghanistan once again in 2012 as part of HERRICK 17

The Royal Navy plays a prominent role in the Joint Force Medical Group, having led it on three occasions this decade



example, the 700-strong 40 Commando returned to the conflict as part of Combined Force NES (the Nar-e-Saraj district of Helmand province), undertaking a six-month roulement during HERRICK 17 to an area that is still highly contested by the Taliban.

However, it is frequently overlooked that the Royal Navy's support to Afghanistan extends beyond the Royal Marines and the JFMG. As well as contributing infantry to the effort, a significant portion of Royal Navy involvement in Afghanistan comes in the shape of helicopter support. Although most people think of the Lynx and Chinook (operated by the Army and RAF respectively) when helicopter support in Afghanistan is mentioned, Royal Navy Sea Kings are still an important part of the UK's helicopter force. Currently, 845 Naval Air Squadron (NAS) is supplying Sea King Mk4 troop carriers, while 857 NAS operates the Sea King Mk7 Airborne Surveillance and Control (ASAC) variant. 845 is one of two frontline Sea King squadrons of the Commando Helicopter Force.

The Mk4, known as the 'Jungly' after the Commando helicopter squadrons' historic role in the 1960s Borneo campaign, is used to transport not only troops but also their supplies, and can carry loads as large as a Land Rover. The Mk7 ASAC uses its Searchwater 2000 radar, housed in its distinctive black inflatable bag on the side of the fuselage, to track the movement of insurgents and pass intercept coordinates to friendly troops. A critical part of this work is dedicated to tracking down insurgents who plant the deadly Improvised Explosive Devices (IEDs) that have accounted for as much as 80 per cent of British casualties.

Although the Sea King is now an elderly design, "a massive amount of modifications have been made to allow them to operate effectively in hot weather and they're now considered pretty capable in that climate," says Captain Mike Walliker. "However," he adds, "people forgot that Afghanistan could be extremely cold in winter, which meant the helicopters had to operate in climatic extremes".

Other maritime support comes in the form of ships taken up from charter, which have Royal Fleet Auxiliary captains. At a level above individual posts there are a series of teams, including groups such as medics or members of the Fleet Diving Squadron. The latter provides a good proportion of bomb disposal and counter-IED operators in-country.

#### OTHER SUPPORT ROLES

The Royal Navy's presence in Afghanistan takes many forms. Individual Reserve and Regular naval personnel serve in roles such as medical or communications specialists, or help to mentor and strengthen the Afghan National Army.

Most of these individual posts are held by Royal Marines because of the nature of the campaign, but naval officers also handle joint-operations roles or rotational posts, "doing jobs that just require a certain level of grey cells, such as planning," explains Captain Walliker.

One such person was Commander Steve Tatham, officer in charge of 15 (UK) Psychological Operations ('Psy Ops') Group.

It's not often that a serving Royal Navy officer finds himself in charge of seven radio stations in a theatre of operations, but the personnel of the unit are using methods "at the softer end of the effects base", as Captain Walliker puts it, in order to try and positively influence Helmand's population.

The stations play a mixture of popular Afghan music and talk programmes, with residents invited to phone in and give their opinions of everything from the local healthcare and educational provision to politicians. They can even drop off requests for music in a special box stationed outside the camp gates. The overall aim is to promote civil society. Radio is an ideal way of doing this in an area where up to 80 per cent of the inhabitants is illiterate.

#### WINNING THE FIRMIN SWORD OF PEACE

Tatham found himself on the BBC, explaining the role of 15 Psy Ops Group after it won the Firmin Sword of Peace award for its efforts. The Sword is given to the unit or establishment of each Service judged to have made the most valuable contribution to humanitarian activities by establishing good, friendly relations with the inhabitants of any community at home or overseas. "Most of our work in Helmand is about talking to Afghans, and

### Providing information that is demonstrably accurate can assist in giving local residents a more sympathetic view of foreign forces

explaining and encouraging them to engage in the debate about what's happening in their country," Commander Tatham explains.

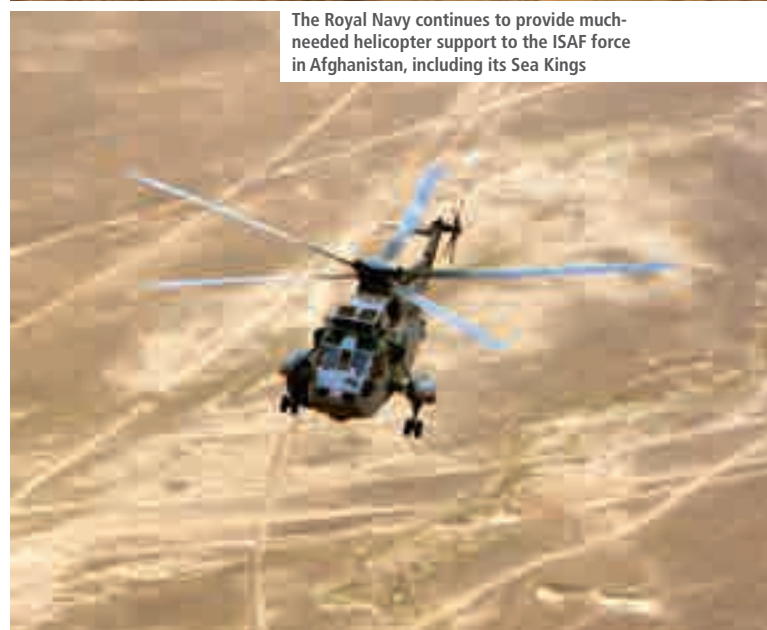
Although Afghans were aware that the radio stations were operated by ISAF, this did not dissuade them from listening in and participating. "Just the opposite – surveys have shown our radio stations are trusted and very popular indeed, because we're not frightened to engage in discussion about difficult issues. We will happily take phone-ins about the state of governance, and about security. In fact, the Taliban ring in occasionally and we will engage in debate with them.

"They'll ring in and complain that we shouldn't be discussing issues. And they will make veiled, or sometimes less-than-veiled, threats. Often they'll get engaged in forthright discussions with people, and it's very useful because very quickly the lunacy of their position becomes blatantly transparent, and it's an own goal for them," says Commander Tatham. Indeed, complaints from local residents rapidly followed whenever the stations went off air.

Royal Navy reservist Lieutenant Gemma Winterton ran one of the stations, Radio Tamadoun (Radio Civilisation), in addition to producing leaflets. "It's about understanding behaviour and people, though we're not psychologists," she told the BBC. "One leaflet campaign, for example, was to teach people in Helmand – including children – not to pull improvised explosive devices out of the ground, because it is a real problem out there." It all helps in trying to improve local



The Navy's first high-threat IED operators train for a six-month deployment to Helmand Province



The Royal Navy continues to provide much-needed helicopter support to the ISAF force in Afghanistan, including its Sea Kings

residents' perception of ISAF. Even if it does not bring people round to ISAF's side, providing information that is demonstrably accurate can at least assist in giving them a more sympathetic view of the foreign forces providing assistance to the Afghan government. This just shows that Royal Navy personnel do not need anti-ship missiles or torpedoes to make an impact. ●

# Operation OLYMPICS



**The part played by the UK Armed Forces in supporting the UK Police and other agencies to safeguard the London 2012 Olympics was the largest peacetime operation since the end of the Second World War. *Simon Michell* highlights the role of the Royal Navy, Royal Marines and Royal Fleet Auxiliary in this massive undertaking**

Perhaps the most visible Royal Navy presence at the London 2012 Olympic Games was Lieutenant Pete Reed MBE, who retained the Gold he first won in the 2008 Beijing Olympics competing in the coxless fours. Admirable as his efforts were, behind the scenes a further 2,600 sailors and marines were also making their presence felt, helping to ensure that the Summer sporting spectacular was played out safely and free from attack.

There is no doubt that the London 2012 Games presented a compelling target for a number of terrorist organisations and from what the Royal United Services Institute dubbed 'Lone Wolf Terrorists', who had returned to Britain after fighting in places such as Afghanistan, Somalia and Yemen. There is precedence for this type of threat. Attacks have been made on the Olympics in the past, including the 1972 Munich Games, where Palestinian terrorists kidnapped and killed members of the Israeli team. There was also a reported potential plot to blow up a nuclear reactor during the Sydney Olympics.

Holding a huge public event of this nature unfortunately carries considerable risk. That is why the armed forces were co-opted to help the police and other security elements to bring their particular expertise and equipment to the overall task of

protecting facilities and people. All in all, about 17,000 military personnel from the Royal Navy, British Army and Royal Air Force took part in Operation OLYMPICS, each applying their own specific specialities, but in an integrated and coordinated manner. The Royal Navy contributed a helicopter carrier, patrol ships, fast boats, helicopters, assault troops and divers.

The Royal Navy contribution was perhaps the most wide ranging. At the sporting venues, some 1,000 sailors and marines provided physical security to complement the private security firm – G4S, the Army, RAF and police. The Royal Navy's largest ship, the helicopter carrier HMS OCEAN, was moored at Greenwich in the Thames having carefully edged its way past the iconic flood barrier to act as a maritime logistics hub in support of the police security operation. It was home to some 550 military personnel, including Royal Marine snipers as well as Fleet Air Arm and Army Air Corps Lynx helicopters.

OCEAN was prepared for her Olympic deployment by Babcock under an extensive programme that included upgrades to fuel stowages and improvements to flight-deck communication systems to support flying operations, as well as extensive work on the accommodation facilities to prepare for the additional personnel that were hosted during the event. This was in addition to the installation of a 'London berthing arrangement', to allow the ship to moor up in the Thames and accept a large pontoon moored alongside with gangways providing access to the ship.

OCEAN was, however, not the only naval vessel to come to the Thames. Three P2000 Archer-class patrol boats, HM Ships BLAZER, EXPRESS and PUNCHER took station on the river, as did Royal Marines offshore raiding craft and landing craft vehicle personnel, which provided deterrence and interception capabilities.

The Laser Radials speed past HMS BULWARK as she guards Weymouth Bay



PA

Further to its water-based support, the Royal Navy also participated in the complex air-security operations, including the air exclusions zones that were put in place during the events. While RAF Typhoon jets were on guard to intercept any potential attack from fast-moving aircraft, Royal Navy and Army Air Corps Lynx helicopters on board OCEAN were on hand with their sniper teams to take on slower-moving general aviation aircraft that might have been used to prosecute an attack from the air. These were complemented by air and ground crew from 854 Naval Air Squadron and their Sea King Mk7 airborne surveillance and control helicopters, with their powerful side-mounted radar that is able to detect both air and ground targets. The Mk7 Sea Kings were part of a layered defence system that included RAF E-3D Sentry AWACS (Airborne Warning and Control System), as well as ground-based radar systems. While all this activity was going on above the waves, Royal Navy divers carried out underwater searches of key strategic locations ahead of the Olympic Torch flotilla and throughout the games. They also helped out by retrieving any equipment that was inadvertently dropped overboard.

#### WEYMOUTH BAY – SAILING REGATTAS

The task in Weymouth Bay was to ensure that the regattas could take place without disruption. This was of a different order to the Thames work, which was carried out in a narrow strip of water, albeit along a long stretch from Greenwich to Dartford. At Weymouth, the Royal Navy assisted the Dorset Police, Maritime and Coastguard Agency (MCA), Royal National Lifeboat Institute (RNLI) and UK Border Agency (UKBA) in keeping watch over the busy sea lanes around the UK's south coast. The Royal Navy amphibious assault ship, HMS BULWARK, played host to the

security command centre. From her operations room, the crew directed the movements of Royal Marines raiding craft and civilian launches and boats. In order to keep a close eye on what was happening in the waters in and around the Bay, live imagery was supplied by special cameras that were fitted to Fleet Air Arm



The Royal Navy's double Olympic Champion, Lt Pete Reed MBE, proudly displays the gold medals he won at Beijing and London

HMS OCEAN, moored up on the river Thames during the Olympics, was used as a base for security operations



Merlin helicopters constantly on patrol overhead. Once the Olympics were over, BULWARK moved to Portland Harbour to act as the command centre for the security of the Paralympics.

### **Lynx helicopters on board HMS OCEAN were on hand with their sniper teams to take on slower-moving general aviation aircraft**

One of the most remarkable features of the maritime element of Operation OLYMPICS was the role that was played by the newly established National Maritime Information Centre (NMIC), which was set up under the October 2010 Strategic Defence and Security Review. Based at the Permanent Joint Headquarters in Northwood, London, NMIC was responsible for monitoring the

thousands of ships that transited the waters along the south coast over the duration of the Games. It then coordinated the distribution of information to the numerous agencies involved so that an efficient response could be undertaken.

It is globally accepted that not only were the London 2012 Olympic and Paralympic Games a resounding sporting success, but also the huge security operation that was put in place was exceedingly well planned, coordinated and executed. The Royal Navy's part in this has been noted by the Brazilian Government, which has signed a cooperation agreement that will enable the Royal Navy to share its experience so that the Rio 2016 Games can benefit from the lessons learnt. Admiral Sir Mark Stanhope, former First Sea Lord, commented on the agreement: "The memorandum points out that there is an opportunity to work together, so that we can share the lessons that the Navy learned at the Olympics in London, and, professionally, allow companies to work together and share common practices to develop common skills, here in Brazil and in the United Kingdom." ●





## Operational Capability

Message from Rear Admiral Peter Hudson CBE, Assistant Chief of Naval Staff (Capability)

**T**here is no doubt in my mind that the pace of Royal Navy (RN) operations is not going to ease over the next few years. If anything, it might well ramp up as the nation's defence posture shifts from its main emphasis in Afghanistan, back to preparing our Armed Forces to meet the unexpected and unplanned – a concept we call 'contingency'. It is my role to make sure that the fleet, in all its guises – from submarines to aircraft, ships to Royal Marines – is delivered with the best equipment that we can afford, so that when manned with the right people, trained to the right standards, we can meet and sustain that potential rise in tempo.

I therefore welcome the changes which are due to be implemented this year, as a consequence of the Strategic Defence and Security Review (SDSR) and the recommendations of the Levene Report, which should enhance the RN's ability to control its destiny to a better extent than we have in the past. Having recovered from the bruising period that followed the 2010 SDSR we now have a clearer picture of what is demanded of us.

Accordingly, my team and I have an obligation to make sure that work under way to bring in new ships, to extend the lives of existing vessels, and to improve equipment and infrastructure supports the outputs demanded of us – all to time, to cost and to the right level of performance.

Despite the financial constraints imposed across defence in this time of national austerity, we have still achieved numerous successes. The new hunter-killer submarines of the Astute class are getting ever closer to beginning their operational lives. The first-of-class, HMS ASTUTE, is nearing the end of a comprehensive trials period and is expected to become fully operational early in 2013. HMS AMBUSH has joined her in the trials and she too will soon be ready for operations.

The Daring-class Type 45 destroyer programme is nearing the end of the manufacture phase and already three have deployed on operations – HM Ships DARING, DAUNTLESS and DIAMOND. Not only that, in 2012 we saw the completion of the new Upper Harbour Ammunition Facility at Portsmouth so that the Type 45s



On 5 July 2012, HMS DIAMOND replaced her sister ship, HMS DARING, on operations in the Persian Gulf

– as well as other vessels – no longer have to visit Marchwood Port in Southampton to embark weapons. This £18 million investment will save money and improve the RN's operational capability in the future. Naturally, the biggest and most important build programme currently under way is for the new aircraft carriers. Here too, huge strides have been achieved and the first of two ships, HMS QUEEN ELIZABETH, will be afloat in the not too distant future and shortly thereafter she will take to the seas to begin her own trials programme.

The SDSR profoundly changed the shape of the Fleet Air Arm, with the helicopter fleet reduced in size and the Harrier jet withdrawn from service. That said, the new F-35 Lightning II multi-role jet has begun its test phase and will join the first carrier before the end of the decade. Moreover, the hugely impressive new Wildcat helicopter conducted landing trials on board HMS IRON DUKE in February 2012, aircrew training begins this year and the programme is well on track to fully enter service in early 2015.

The delivery of the Seafox remotely controlled underwater vehicle to all mine-hunters was also completed in 2012. All this new kit cannot be put to best use if the sailors who operate it

## Despite the financial constraints imposed across defence in this time of national austerity, we have still achieved numerous successes

have not been properly trained, so the launch of the Maritime Composite Training Systems (MCTS) at HMS COLLINGWOOD and in Devonport at the back end of 2011 has had an enormous impact on the ability of the Flag Officer Sea Training's team to deliver the right quality of training for the service. It is an important facility that is already heavily used.

### ENHANCING CAPABILITY

At the same time that new equipment has been introduced, much hard work has been undertaken to maintain the quality of some of our older systems, land-vehicles and aircraft so that they maintain a sharp edge, fit for operations into the future. Upgrades to the MCM Force have included installing new 'Caterpillar' engines in the first of eight Hunt-class minehunters with the process very nearly completed on HMS CHIDDINGFOLD. The Type 23 frigates are in the midst of their own incremental upgrade and refurbishment process, with HMS IRON DUKE replacing her 996 radar with a brand new Artisan (997) radar, as well as a new command and control (C2) system. Like the Hunt-class, the Type 23s will shortly receive more capable, and efficient new engines and generators. They will also be fitted with the new Sea Ceptor anti-missile missile installed to replace Seawolf and a series of upgrades to accommodation, defensive aids fits and guns. They will still be in service in the 2030s; therefore it is essential that appropriate investment in improving their capability is undertaken.

In the air, the upgraded Merlin Mk2 anti-submarine warfare helicopters will re-enter service in 2013, and it is expected that we will commence the conversion of the Merlin Mk3 helicopters

transferred to the RN from the Royal Air Force into the ship-optimised Mk4 variant in order to compensate for the imminent retirement of the Sea King Mk4 fleet.

On the land, a contract with BAE Systems will put new life and improved systems into the Royal Marine's fleet of 99 Viking all-terrain vehicles that were so heavily used during a demanding four-year stint of service in Afghanistan. And, last but not least, with considerable work under way to develop a new generation of ballistic missile submarines, the process of establishing how to extend the lives of the existing four Vanguard boats has begun, so there is no risk of disruption to the Continuous At Sea Deterrent posture.

### FUTURE CAPABILITIES

Having spent the last two decades preparing for the introduction of replacements for our ageing attack submarines, air defence destroyers, aircraft carriers and assault ships, the Royal Navy's capability, certainly in terms of equipment, has been transformed. If we are to maintain our position as one of the world's most effective and capable maritime forces that process must continue. We are, therefore, now preparing for the design, build and introduction of the Type 26 Global Combat Ship to replace the Type 23s; thus preserving a flexible, adaptable and efficient fleet.

Finally, as we get ready to welcome the new aircraft carriers at the end of the decade, we must ensure that we have the appropriate support vessels to supply the food, ammunition and solid stores that they will demand. Having signed the contract in February 2012 to build four new double-hulled tankers (the Tide class) for the Royal Fleet Auxiliary (RFA), we are now moving to phase two of the Military Afloat Reach and Sustainability (MARS) programme and looking at new vessels to replace the RFA Fort-class supply ships. Likewise, analysis will examine how to adapt to changes in the way that mine-warfare is conducted and how we can exploit the growth in underwater technology and commercial systems. Ultimately, the ships will need to be replaced, but in the interim we intend to radically reform the way in which we prosecute the mine threat. We are conducting this analysis in coordination with the French as part of the Mine Warfare, Hydrographic and Patrol Craft (MHPC) programme – a further sign of the deepening relationship between our two navies.

### TRANSFORMING THE ORGANISATION

I referred earlier to the Levene Report, which has had a transformational impact on the way the Armed Forces are organised to deliver military effect. The essence of these reforms means that the HQ will have a far greater say in the way it manages structures, capability, makes choices and assigns financial resources, so that the custodians of the country's maritime power have greater authority in how it should be delivered. The money will remain scarce, but alongside colleagues in Defence Equipment & Support, we believe we can deliver and sustain world-class capabilities, as is befitting of a world-class Navy.

Radical as these modifications are, the RN has consistently proved it is capable of taking change in its stride and I am extremely confident that the maritime domain, which includes industry and the Ministry of Defence, will take up the challenge with the same enthusiasm, professionalism and good humour that I have witnessed throughout the last 12 months. ●



HMS DRAGON, the fourth Type 45 destroyer, leaves the Clyde on her way to Portsmouth

## Deploying a new class of destroyer

**With the Type 45 Daring-class ships now entering service, *Simon Michell* provides a review and explains the formidable capability that these ships are already delivering to the United Kingdom's defence**

**A**s HMS EDINBURGH – the last of the Royal Navy's Type 42 destroyers – comes to the end of her final deployment, a new generation of destroyers has entered service. The six Daring-class Type 45 destroyers, three of which began operational deployments in 2012, are the most advanced surface ships the Royal Navy has ever operated, and bring with them a game-changing capability. Their core role is as air-defence warships, which means they protect task groups, individual ships, and even land-based facilities from enemy aircraft and missile attack.

Third-in-class of the Type 45s,  
HMS DIAMOND, en route to the Gulf



They are, however, extremely versatile vessels that can handle a range of maritime tasks, from conventional warfare to general maritime security, anti-piracy, counter-narcotics, disaster relief and counter-terrorism duties.

The Type 45s are equipped with 48 anti-aircraft missiles, known as Sea Vipers, for the core air-defence role. However, they also carry two short-range Phalanx anti-aircraft cannons, as well as two 30mm machine guns, Rigid Hull Inflatable Boats, and a Lynx Mk8 or Merlin helicopter armed with anti-ship and anti-submarine weapon systems. These are complemented with an incredibly powerful radar system known as Sampson, and a computer-management system that links the radar, other sensors, communications and weapon systems together. Thanks to the powerful combination of this advanced technology they are also able to monitor and control aircraft in the air.

#### **HMS DARING DEBUTS**

Eleven years after she was ordered, nine years after the first steel was cut, six years since she was launched and three years after she made her debut in Portsmouth, HMS DARING began her maiden operational deployment in January 2012. This voyage took her from Portsmouth through the Mediterranean Sea, down

### **HMS DARING integrated with the Combined Task Force 150, which is tasked with maintaining maritime security by combating, among other things, piracy and terrorism**

the Suez Canal, into the Red Sea and the Gulfs of Aden and Oman. Once there, she joined in the international effort to ensure that the waters in one of the world's most strategically important regions are constantly patrolled, always navigable, and that the illegal acts at sea that are a feature of this region are contained. HMS DARING integrated with the Combined Task Force 150, which is charged with maintaining maritime security by combating, among other things, piracy, terrorism, and the smuggling of humans, drugs, and weapons. As part of this force, DARING was able to introduce herself to the coalition navies from Australia, New Zealand, Pakistan and Yemen, and invite their crews on board to take a look around and receive a briefing on the ship's capabilities.

**ASSURING THE UK’S ENERGY SUPPLIES**

The Gulf waters are extremely important to the United Kingdom and her allies, as they are home to the narrow Strait of Hormuz, which saw, according to Lloyds Maritime Intelligence Unit, an average of 17 million barrels of crude oil and petroleum products pass through it every day during 2011. It was therefore significant that DARING’s routine deployment to the region coincided with a number of Iranian military exercises that were signposted by the Tehran government as practise runs for closing down the Strait and cutting off access to what equates to 20 per cent of the world’s energy supplies. The UK Defence Secretary Philip Hammond countered this threat by categorically stating that “disruption to the flow of oil through the Strait of Hormuz would threaten regional and global economic growth. Any attempt by Iran to close the Strait would be illegal and would be unsuccessful.” The international coalition partners would act to dismantle any blockade with the vast array of assets that are constantly at hand in the area. The Royal Navy’s presence may not be as large as the US engagement, but it is worth noting that the step change in technology on board DARING and her ability to simultaneously counter fast-jet and sea-skimming missiles is comparable to sending five of the old Type 42 destroyers to the region.

The time spent on the Gulf deployment also enabled the ship and her crew to operate as the air-defence element of the US Carrier groups that operate in the region. Notably, DARING integrated with the US aircraft carrier, *USS Abraham Lincoln*, while her F-18 fast jets were undertaking strike missions in Afghanistan. DARING assumed the responsibility of Air Defence Commander for the whole of the northern Arabian Sea, checking in and out some 141 aircraft missions in support of troops on the ground in Afghanistan.

**ATLANTIC PATROL – SOUTH**

In April 2012, while DARING was basking in the warm waters of the Middle East, the second-in-class of the Type 45s – HMS DAUNTLESS – set off on her maiden operational deployment to the icy waters of the South Atlantic. Skipping over to Lisbon first, the ship then sailed to another of the world’s strategic hubs – West Africa. Here she maintained the Royal Navy’s vital work of cooperating with the navies in the region to help them train up for maritime security duties. West Africa endures some of the same challenges as the Persian Gulf – piracy, smuggling and terrorism. DAUNTLESS was able to share some of the Royal Navy’s long-held experience in this sort of work as she visited traditional allies such as Cape Verde, Ghana, Nigeria and Sierra Leone. In addition to the security work, DAUNTLESS also played host to local dignitaries in order to cement national friendship and regional ties, and during her time in Ghana she also hosted a Defence and Industry day in support of UK industry.

Having enjoyed the hospitality along the African coast, HMS DAUNTLESS set out on her next leg to the cold southern waters around the Falkland Islands, where she was to spend a period safeguarding the overseas territory, working alongside the British Army and Royal Air Force units that are stationed there.

Meanwhile, the third-in-class, HMS DIAMOND, was preparing to set off on her maiden deployment to the Persian Gulf. This

After 139 days, and 34,642NM, HMS DARING returns to her home base on completion of her maiden deployment



HMS DUNCAN is launched on the anniversary of the 1797 victory at the Battle of Camperdown over the Dutch by Admiral Duncan



gave her the opportunity to work with the Mk7 Sea King airborne surveillance helicopters. Combining the air surveillance capabilities of a Type 45 with the air and surface sensors of the Sea King Mk7 enables activities over a vast swathe of sea and air to be monitored, assessed and, if need be, addressed.

By the end of 2012, half the Type 45 fleet was operational and making a vital contribution to the UK’s international defence posture. In 2013, the rest of the 45s, DEFENDER, DRAGON and DUNCAN will be pressing ahead with their preparations to join their sister ships as part of the UK’s global maritime force. ●

Royal Navy Ice Patrol ship, HMS PROTECTOR, helps British Antarctic Scientists establish a temporary camp on James Ross Island while they survey the surrounding waters

## Surface vessels update



**Guarding overseas territories in the Antarctic, Caribbean, and South Atlantic is a standing task that requires meticulous planning and cooperation with allied naval forces. *Simon Michell* uncovers the scope of this effort**

**B**ritain has 14 overseas territories that it must protect and support – especially in times of need. The majority of these territories are in the Atlantic Ocean. Loosely speaking, there are three basic groupings: the Caribbean (Anguilla, Bermuda, Cayman Islands, Montserrat, Turks and Caicos Islands); the mid-Atlantic (Ascension Islands, Saint Helena and Tristan Da Cunha); and the South Atlantic (Falkland Islands, South Georgia and the South Sandwich Islands). In addition to these islands, Britain also has an Antarctic presence that primarily comprises climate scientists who man a number of research stations. Each of these groupings has their own specific needs, which the Royal Navy (RN) has been tasked by the government with supporting.

### THE CARIBBEAN ISLANDS

The RN and Royal Fleet Auxiliary (RFA) spend a lot of their time chasing drugs and hurricanes in the Caribbean. Each year, between April and October, the hurricane season can wreak havoc on the British Overseas Territories (BOTS). While 2012 was a relatively calm year for the British islands, mainland America suffered some serious damage – particularly from hurricane Isaac that also hit Cuba and Haiti. In 2011, however, the Turks and Caicos Islands were devastated by hurricane Irene, which closed down the airport, cut-off power supplies and brought about severe flooding. On that occasion, the RFA fast-fleet tanker WAVE RULER was on hand to bring in supplies and help with the rebuilding process.

The RN and RFA are extremely adept at this type of disaster-relief work, and practise the drills on a regular basis. Exercise TRAFALGAR at the RN Collingwood training centre takes place twice a year in order to hone these skills. The last training programme in October 2012 was based around a mock-up of Santissima, Trinidad, and enabled new recruits to get a realistic



RFA WAVE RULER resupplies a Royal Navy ship on guard duty over the Falkland Islands



50 Royal Navy sailors help out on the Turks and Caicos Islands after hurricane Ike



HMS WESTMINSTER intercepts a dhow in the Indian Ocean attempting to smuggle £14 million worth of pure heroin

feel for what a disaster operation is like. The exercise consisted of 10 stances that simulated a wide range of scenarios. These included patrol techniques, recovery of stranded personnel, damage to a hospital's infrastructure, resupplying tasks, and assistance to a major road traffic accident.

When the storm season has passed and the seas are calmer, the drug runners ramp up their illegal trade in life-crippling narcotics. This black-market activity not only affects mainland North America, but also the UK. Vast amounts of crack cocaine from illegal South American drugs factories end up on the streets of Britain and contribute to the ruination and blight of neighbourhoods and lives. Countering the drugs barons across the world is something of which the RN has a long tradition, with the Caribbean and the Indian Ocean being a focus for much of the activity. Over the years, the RN and RFA have made some spectacular drugs busts.

Countering the smuggling is a collective effort. Two key intelligence and coordination centres form the backbone in this struggle. Six years ago, the European Union established the

seven-nation Maritime Analysis and Operations Centre – Narcotics (MAOC – N) in Lisbon. The US Coast Guard runs the Joint Interagency Task Force (JIATF) South from Florida. Much of the intelligence that is used to intercept the smugglers is channelled through these two establishments, and acted upon by a mixture of predominantly British, Dutch and US maritime forces. Anyone wanting to see what a drugs bust at sea looks like should watch the YouTube videos of HMS IRON DUKE, which also highlight the role that Prince William played in the operation.

#### PROTECTING THE FALKLANDS

When not undertaking disaster relief and counter-narcotics duties, the UK naval ships that patrol the Atlantic also take the opportunity to visit friendly countries to enhance international relations, help to boost trade and assist with, or participate in, their training programmes. On 4 April 2012, one of the RN's newest and most capable ships, the Type 45 destroyer HMS DAUNTLESS, made her maiden deployment to the Falkland Islands and other parts of the wider South Atlantic, 30 years after

HMS DAUNTLESS sets out from Portsmouth to begin her maiden deployment to the South Atlantic



PA

the 74-day armed conflict to liberate the islands from the Argentine invaders. The protection of the Falklands is still very much a British priority, as the debate about her sovereignty tends to become quite heated from time to time. The current Argentine line is that they would like to see the Malvinas (as they call the islands) become part of Argentina. As if to emphasise this point, Argentina's President Kirchner clarified her thoughts towards British sovereignty during a memorial service to the Argentine casualties of the conflict, stating: "It's absurd that they [the British] maintain sovereignty over islands that are 14,000km away. Las Malvinas are a national, South American and global cause."

## **A sustained commitment to the BOTS is not something that the British Government is prepared to withdraw from**

The trip down to the Falklands was a gruelling test of the ship's capabilities, as well as an opportunity to engage with other nations along the way. The first half of the voyage took her down the west coast of Africa, where the ship and her crew were able to join in the international effort in another of the world's piracy hot spots – the Niger Delta. Activities of this nature highlight the range of uses that the ship can fulfil. DAUNTLESS is a flexible vessel, able to turn her hand to a range of humanitarian, soft-power projection and maritime-security tasks. In the words of the ship's former Commander, Captain Will Warrender, she is "more than just a platform to fight from".

The annual RN and RFA trips down to the South Atlantic are just one strand of the UK maritime commitment to the region, which see a number of ships rotating in and out of the waters. In 2012, HM Ships ECHO, EDINBURGH, MONTROSE and the nuclear-powered submarine HMS TALENT contributed to the effort, as did RFAs ARGUS and FORT ROSALIE. HM Ships CLYDE and PROTECTOR, however, offer a more persistent presence in the area. CLYDE, a modified River-class patrol ship, patrols the sea in and around the Falkland Islands for most of the year. With a larger flight deck than the other three River-class vessels, she is capable of providing air cover and aviation refuelling. Her crew also liaise with the troops stationed on the Falklands, and in September 2010 took the opportunity to train with them.

In the same month, the RN's newly commissioned Ice Patrol Ship, HMS PROTECTOR, set sail on her second deployment, having just returned from her first seven-month patrol in the summer. While in the Antarctic waters, HMS PROTECTOR played a major role in cementing relationships with an ally that is of growing importance to the UK – Brazil. When a research centre manned by Brazilian personnel caught fire on King George Island (one of the South Shetlands Group) with the loss of two lives, a 23-man team from the British ship went ashore to help douse the flames – a skill that every RN sailor, not surprisingly, spends a lot of the time practising.

The scope of the Atlantic and Antarctic activities is varied and often dangerous, but a sustained commitment to the BOTS is not something that the British Government is prepared to withdraw from. The many by-products of this mission are key to the UK's foreign policy and overseas-development ambitions. These patrols are part of a joined-up strategy to maintain Britain's influence in international affairs, while simultaneously ensuring the safety of the people who live in the BOTS. ●



The Hydrographic Squadron on exercise off the Devon coast – HM Ships ECHO, ENTERPRISE, GLEANER, ROEBUCK and SCOTT

# The Royal Navy's smaller vessels

**Large, heavily armed warships always capture the public's imagination and steal the limelight from the smaller ships that rarely make it to the pages or screens of the national media. However, the Royal Navy has a variety of smaller vessels that are equally as busy as the big ones and carry out important tasks for the nation on a daily basis, but without the recognition they so richly deserve. *Simon Michell* highlights the range of specialist ships that ply their trade under the radar while working for the benefit of us all**

**M**ore than 70 per cent of all fish landed in the European Union (EU) are caught in British waters, and at any one time there may be as many as 500 ships fishing in the seas around our island. Over the past few decades it has become increasingly clear that the pressure on fish stocks is unsustainable and that the measures and regulations placed on these fishing

vessels play a major role in the EU's attempts to rein in the relentless depletion of the stocks. It is all very well having rules and regulations, but they are meaningless if they are not enforced. The United Kingdom (UK) has numerous means of achieving enforcement, and a key plank in this strategy is the Royal Navy's Fisheries Protection Squadron, which is the oldest frontline fleet in the Royal Navy.

Three River-class Offshore Patrol Vessels (OPVs), HM Ships MERSEY, SEVERN and TYNE, were specifically built by Vosper Thornycroft and launched between 2002 and 2003 in order to undertake this role. They are tasked with enforcing UK and European regulations. To do this, they patrol as far out as 200 miles from the English, Northern Irish, and Welsh coasts on behalf of the Maritime Management Organisation. Scotland, as with many other areas of national responsibility, has its own arrangements for undertaking this vital job.

The men and women of the Fishery Protection Squadron are active at least 275 days a year. The work is varied but focuses on ensuring that nobody is getting away with flouting the rules.

Inspection teams board suspect vessels, often at night, to take a look at catches and verify that everything – log books, licences, net sizes – is as it should be. These teams have the authority to bring the captains to justice and escort their trawlers into a British port for a more thorough inspection.

## Inspection teams board suspect vessels to take a look at catches and ensure that everything – log books, licences, net sizes – is as it should be

In September 2012, the Ministry of Defence completed a £39 million deal to purchase the three River-class OPVs after a decade of leasing them from BAE Systems. The trio, known as the Cod Squad, will serve for at least another 10 years and will be available for more than fisheries protection, as they are very capable ships suited to a range of tasks. These include fire fighting, search and rescue, humanitarian relief operations, and various security missions.

### THE P2000 ARCHER-CLASS FAST PATROL BOATS

At just under 21 metres long, the Royal Navy's 16 Archer-class P2000 Fast Patrol Boats (FPBs) are some of the smallest vessels in the fleet. The primary role for 14 of them is to help train students in seamanship and navigation as part of the Universities' Royal Navy Units (URNU). But again, like the River-class OPVs, they can turn their hand to more warlike duties when needs be.

Two P2000 boats, DASHER and PURSUER, form the Faslane Patrol Boat Squadron, which stood up in March 2010 to protect the nation's nuclear submarines as they move in and out of the River Clyde to and from the Faslane base in Scotland. Prior to that, they had been protecting the British Sovereign Bases on Cyprus.

The URNU vessels can find themselves hosting up to a dozen students from the UK universities that they support. Once on board the undergraduates are trained in some of the skills necessary to keep a ship at sea for at least a weekend. This often involves relatively long voyages and stopovers in European ports.

During the 2012 Olympics, patrol boats BLAZER, EXPRESS and PUNCHER were deployed to the Thames to provide an extra layer of security alongside other Royal Navy ships. Further down south in Dorset, TRACKER, RAIDER and EXPLOIT helped to create the ring of steel around the sailing events off Weymouth.

## MINE COUNTERMEASURES

The Royal Navy operates two types of the world's most advanced mine hunters: the Hunt and Sandown classes. Their job is to use their high-definition sonar systems and other equipment to scour the sea for mines and explosives. These vessels are some of the busiest

in the fleet as, for more than six years, the Royal Navy has maintained a permanent mine-hunter presence in the Arabian Gulf to ensure that this vital waterway, through which roughly a quarter of the world's seaborne-traded oil and gas is transported, is safe for shipping.

Both the Hunt- and Sandown-class ships have recently received the brand new Seafox remotely controlled mine-disposal submersible that seeks out mines, and can also place a charge in order to neutralise them. This system was put through its paces during the 12-nation IMCMEX 12 (International Mine Countermeasures Exercise) that took place in September 2012.

The eight Hunt-class reinforced plastic-hulled ships are based in Portsmouth, from where they regularly patrol the waters off the British Isles and further afield, and are often called upon to make safe mines and other explosives that have lain on the seabed since the Second World War.

The Hunt-class mine-hunter vessel, HMS BROCKELSBY, was active during the UN-mandated operation to protect civilians during the Libyan insurrection, and was called upon to make safe a mine that had been seeded by pro-Gaddafi forces.

The seven Sandown-class minehunters, which form the Mine Counter Measures squadron 1 (MCM 1), carry out similar tasks. They are often to be found in the Mediterranean and Gulf. In 2012, Sandown-class HMS BLYTH took command of the NATO Standing Mine Countermeasures Group 2, which is on standby to respond to emergencies in the region.



Hunt-class mine-sweeper, HMS BROCKELSBY, sails out of the Clyde en route to sunnier climes

**PROTECTING GIBRALTAR**

Even smaller than the Archer-class FPBs are the two Scimitar-class patrol boats that form the core of the Royal Navy Gibraltar Squadron (RNGS) – HM Ships SABRE and SCIMITAR. At just under 16 metres long and displacing only 24 tonnes, they are well suited to the congested waters at the western opening of the Mediterranean. Not only do they provide force protection to visiting Royal Navy and coalition ships, they also keep a close eye on what is going on around the shores of the ‘Rock’ and the Strait of Gibraltar – joined in this vital work by three Pacific Rigid Inflatable Boats (RHIBs). There is plenty for the squadron to do, and when not carrying out their regular duties they are available to support training exercises taking place in the region.

When the Royal Navy’s latest destroyer, HMS DARING, paid a visit to Gibraltar in January 2012, SCIMITAR’s crew was tasked with ensuring that her transit in and out of the anchorage was safe. Before DARING left, the patrol boat made a dawn sweep with one of the squadron’s inflatables to make sure that there were no nasty surprises laying in wait. Having cleared the water, she and the RHIB then put the destroyer to test by simulating a series of terrorist fast patrol attacks; the sort of danger that might present itself during her future deployments. ●



HMS SCIMITAR from the Royal Navy Gibraltar Squadron speeds past the ‘Rock’

**SURVEY AND ICE PATROL VESSELS**

For centuries, the Royal Navy (RN) has surveyed the seas and oceans, producing highly accurate charts to enable its warships and commercial shipping to sail without fear of hitting obstacles lurking unseen beneath the waves. The information gathered by these ships is shared with the UK Hydrographic Office, which produces the world-famous paper and electronic charts that are used throughout the world’s navies and commercial fleets.

The smallest of the survey ships is the 14m inshore survey vessel, Her Majesty’s Survey Motor (HMSM) GLEANER – the only RN vessel that has visited Switzerland, having navigated her way up the Rhine. Other RN survey ships are much larger and range from the 90-metre HMS ECHO to the 131-metre HMS SCOTT – the RN’s only ocean-survey vessel and fifth largest ship in the RN fleet. The former, HMS ECHO, is not only a state-of-the-art oceanographic and bathymetric (water/salinity analysis) data gatherer, but she is also capable of supporting the mine and amphibious warfare operations.

Together, the RN’s survey ships maintain a relentless process of updating RN charts to keep in touch with the changing shape of the ocean and seabeds, as well as the sudden appearance of man-made obstacles, including shipwrecks. As the situation around the waters of the Persian Gulf is becoming ever more uncertain,



Royal Navy Hydrographic vessel, HMS SCOTT, moored off Port Lockroy in the Antarctic

HMS ENTERPRISE spent much of 2012 analysing the seabed to ensure that it is safe to transit.

In addition to these survey vessels, the RN also leases the survey and ice patrol ship, HMS

PROTECTOR, which patrols and surveys the Antarctic and South Atlantic, maintaining a UK presence off the Falkland Islands and supporting the international community in the region.

# Our Astute Partnership

AMETEK SCP and BAE Systems proudly support the Royal Navy



AMETEK SCP provides support to BAE Systems with hull penetrators and associated cable assemblies for the Royal Navy's ASTUTE Class of nuclear attack submarines – the largest and most powerful attack submarine ever built in Britain for the Royal Navy. Construction of the ASTUTE Class submarines is regarded as one of the most challenging design and engineering projects ever undertaken.

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*“AMETEK SCP remains a valued supplier to the Astute programme and provides key engineering expertise across all boats.”*

*“AMETEK SCP dedication to quality and post-sales support has proven to be invaluable to the Astute programme.”*

**George Teasdale,**  
Head of Supply Chain,  
ASTUTE,  
for BAE Systems –  
Submarine Solutions



## The Submarine Service

Message from former Rear Admiral Submarines, Ian Corder

**W**ith the 2011 conflict in Libya, ongoing operations east of Suez, the enduring requirements of Continuous at Sea Deterrence (CASD), other operational patrols and a plethora of trials and training, these past 12 months have been as busy and demanding for the submarine service as any I can remember.

Against such an unremitting operational tempo, the very first thing I want to do is stress just how much the performance of our people on these operations continues to surpass all expectations. As I meet the crews returning home after long and gruelling

periods under the sea, it is clear to me that everyone understands the relevance of their missions and how they benefit not just the security of the United Kingdom, but also that of our partners, allies and friends. Over the past year, Royal Navy submarines have played a vital part in monitoring and patrolling unstable and volatile maritime real estate all over the globe, while delivering assured, credible and sustainable deterrence through both conventional and nuclear weapon systems. While all our crews, across both the SSBN (Trident nuclear deterrent) and SSN (strike and hunter-killer) forces, are working extremely hard and spending



HMS VANGUARD returns to her home port of Faslane on the Clyde

The Royal Navy is building seven nuclear-powered Astute-class attack submarines



## The first in our new class of hunter-killers, HMS ASTUTE, continues to make very satisfactory progress on her sea trials

a very considerable portion of their lives away from home and family, I can't overstate the extraordinary level of professionalism, commitment and determination I see them display day in, day out.

Sticking with this theme of people, late 2011 saw the decision taken to open up service in submarines to females. This decision, which will now ensure that we are able to recruit tomorrow's submariners from the very best of both genders, was taken after exhaustive research to ensure that this can be done without any undue risk to physical health. We are now absolutely confident we can press ahead and start the process. Consequently, the first female officers have now been provisionally identified and will begin their training shortly. I expect them to be reporting onboard their first submarine, a Vanguard-class SSBN, towards the end of

2013. I firmly believe that this is an exciting moment for the submarine service, and welcome the clear commitment by those currently serving to make it a keen success.

Moving to the specifics of operations, the SSBN force has now maintained continuous deterrent patrols under Operation RELENTLESS for 44 years without a single break. The four SSBNs of the Vanguard-class are rapidly approaching their 100th patrol and should achieve that milestone in early 2013 – the year that, coincidentally, also marks the 50th anniversary of the Polaris Sales Agreement between the UK and the US. Within the 2012 patrol cycle, HMS VIGILANT successfully emerged from her long overhaul and refuel in Devonport and was firmly on track to re-join the operational cycle.

As far as the operational SSN force is concerned, the Trafalgar-class boats have continued to perform with distinction. Their contribution to Operation Ellamy off Libya was particularly noteworthy. Not only did HMS TRIUMPH launch numerous operational Tomahawk Land Attack Missile strikes against strategic pro-Gaddafi targets, but between them, TRIUMPH and TURBULENT maintained continuous patrols off the coast for the next five months. Significantly, it was a Royal Navy submarine that first detected attempts by Gaddafi forces to seed the waters off their coastline with mines that, if successful, could have seriously impacted efforts to get much-needed humanitarian supplies to the population. Sadly, this year has also seen the departure from service of HMS TURBULENT – the second of our T-Class SSNs to enter service – after 28 distinguished years in service. She completed her final few months in commission as she would have wished: on frontline operational patrol.

Looking to the future, it is also pleasing to note that the first in our new class of hunter-killers, HMS ASTUTE, continues to make very satisfactory progress on her sea trials, and remains on track to enter operational service in the middle of 2013. It is hugely exciting to see the impressive new capabilities of the Astute class becoming more obvious every day we operate them at sea. Second-in-class HMS AMBUSH will benefit greatly from our experiences with her elder sister and will enter operational service close on her heels. Complementary to the introduction of the Astute class, and every bit as important for the future of the submarine community, is the geographical consolidation of the submarine force through the Submarine Centre of Specialisation in Faslane. Here too plans remain firmly on track; we intend to have all operational submarines based there by 2017, and will work to optimise supporting infrastructure accordingly.

But returning to where I started, all these truly impressive results are only possible through the hard work and persistence of our men (and shortly women) and the support of their families. Accordingly, we are taking great pains to ensure sufficient recruitment, training and operational opportunities to man the service, while also offering the best possible conditions of employment and career progression. Over the past years we have put in place a number of measures to encourage capable and committed young people into the submarine service and then to retain them. 'Jetty bulges' in the training pipeline have been aggressively attacked, and although challenges remain, I am confident that we are ensuring the smooth flow of the brightest and best to man tomorrow's submarine service. ●

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The second Astute-class attack submarine, HMS AMBUSH, sails into Her Majesty's Naval Base Clyde for the first time

# Patrolling the seas





**The Royal Navy operates three classes of submarine – the Trafalgar, the Astute and the Vanguard. Alan Dron takes a look at each class and reviews the process of preparing for the next generation of ballistic missile submarines to ensure the Continuous at-Sea Deterrent is maintained under Operation RELENTLESS**

**F**ew weapon systems are more flexible than submarines. Not only can they switch between multiple missions like surface warships but, uniquely, a potential adversary need only believe a submarine may be in the vicinity for that suspicion to alter his strategic or tactical thinking.

The Royal Navy (RN) is in the process of renewing its nuclear-powered Fleet submarines (known colloquially as hunter-killer boats), and is taking the first steps towards replacing the vessels that carry the nation's nuclear deterrent.

At present, the RN fields three classes of submarine. The Trafalgar-class Fleet submarine has been in service since the 1980s and will gradually be replaced by the Astute class, the first of which is currently undergoing trials. The Vanguard class is the platform for the Trident D5 nuclear deterrent; early engineering work is under way for the so-called 'Successor class' that will replace the Vanguard from 2028.

Five Trafalgars remain in service, four of which are fitted with the world-leading Sonar 2076 for their anti-submarine (ASW) and anti-surface vessel (ASuW) warfare roles. While ASW and ASuW tasks remain important for the Trafalgar class, since the end of the Cold War they have increasingly been used in support of maritime joint operations.

These vessels have fired Tomahawk cruise missiles against targets in conflicts ranging from Kosovo to Afghanistan, and the Second Gulf War to Libya. Apart from Tomahawk, the Trafalgar's primary weapon is the Spearfish torpedo. Mines can be carried in lieu of other weapons. As they reach the end of their operational lives they will be replaced by the Astute class, seven of which will be built.

"HMS ASTUTE is 75 per cent through her sea trials," says Captain David Pollock, deputy assistant chief of staff underwater (mine-hunting, hydrography and anti-submarine warfare). "She's obviously had an extensive series of sea trials, undertaking key 'first-of-class' work as well as checking her own systems are certified and capable. AMBUSH, the second of the class, was around 18 months behind her when launched, but she won't have to do all of the trials ASTUTE is undertaking, so they will enter service within a couple of months of each other, in early to mid 2013."

Three further examples – ARTFUL, AUDACIOUS and ANSON – are under construction, while the first items have been ordered for the sixth submarine. The final Astute is due to enter service in 2024.

At 7,400 tons dived, the Astute class is the largest Fleet submarine ever to serve with the RN, at nearly 30 per cent larger than the Trafalgars. Its powerplant is the Rolls-Royce PWR2 reactor, which will not require refuelling throughout its entire service career. As part of her sea trials, ASTUTE undertook a 142-day deployment to North America in 2012. She sailed 16,400 miles, deep dived, took part in exercises against the US Navy's newest Virginia-class hunter-killer, the *USS New Mexico*, and fired both torpedoes and missiles. Her then commanding officer, Commander Iain Breckenridge OBE, says: "We fired off four Tomahawks aimed at a corner of Eglin Air Force Base (Florida) to test for accuracy, and we fired six Spearfish torpedoes, including the first salvo firing by a British submarine for 15 years. We met and surpassed every expectation. This is a submarine of tremendous capability."

The RN intends to move both the Astute and Trafalgar classes to Faslane from Devonport. All RN submarines will be based at Faslane by 2017, together with the Sandown-class Mine Counter Measure vessels that ensure the safety of the Firth of Clyde approaches to the Faslane base.

HM Submarines' soubriquet of 'The Silent Service' is never better illustrated than by the activities of the Vanguard class, which undertakes the UK's nuclear-deterrent patrols. For obvious reasons, little is divulged of the activities of the four boats that undertake lengthy patrols as the ultimate guarantors of the UK's national security.

VANGUARD, VICTORIOUS, VIGILANT and VENGEANCE can each carry 16 Trident D5 ballistic missiles, with each missile capable of carrying 12 warheads, although under 2010's Strategic Defence and Security Review, the UK government has capped the number of missiles carried at eight and the number of warheads at 40. In autumn 2012, VIGILANT successfully launched an unarmed Trident D5 in the first test firing for three years, to confirm the credibility of the deterrent. Known as 'bombers' (rather than 'boomers' as they are termed in US Navy parlance), at 15,900 tons dived the Vanguards have almost exactly twice the displacement of the latest Type 45 destroyers and are as long as helicopter and commando carrier HMS ILLUSTRIOUS.

In 2012, VIGILANT emerged from its three-year Long Overhaul Period (Refuel), with VENGEANCE taking her place for her refuelling and modernisation at Devonport. The Vanguards will be operational well into the 2020s. Such is the lead time required



A Vanguard-class submarine's crew ensures the nation's nuclear deterrent is always ready



The Trafalgar-class attack submarine, HMS TRENCHANT, begins another patrol



## The MoD has placed a £600 million contract with Rolls-Royce to produce new reactor cores for the final Astute-class hunter-killer, AJAX

to produce replacements – the Successor class – that early work on doing so is under way, with several major developments in this process taking place in 2012. In May, the Ministry of Defence (MoD) awarded £350 million worth of contracts for design work on the Successor to BAE Systems, Babcock and Rolls-Royce.

Secretary of State for Defence, Philip Hammond says that this was “an important step” towards renewing the UK’s nuclear deterrent. As part of the Conservative-Liberal Democrat coalition agreement, a final decision on replacing Trident will not be taken until 2016, after the next general election. However, design work has to start now in order to meet the planned in-service date if the decision to go ahead with the replacement is taken.

The MoD has placed a £600 million contract with Rolls-Royce to produce new reactor cores for the final Astute-class hunter-killer, AJAX, as well as the first of the Vanguard-class replacements.

The Rolls-Royce deal secures 300 jobs and funds an 11-year refurbishment of the defence firm’s plant at Raynesway in Derby. Replacing the existing infrastructure with state-of-the-art nuclear reactor core-production facilities will cost around £500 million. Announcing the contract, Hammond said: “Having balanced the MoD’s books we can now invest in vital strategic capabilities to meet the present and future defence needs of the UK.” October 2012 saw an additional £350 million worth of funding for the next stage of design work for Successor class announced. ●

# The United Kingdom's nuclear deterrent



**The Royal Navy has been entrusted to deliver the United Kingdom's nuclear capability through its Continuous at-Sea submarine patrols under Operation RELENTLESS. Peter Long reviews the current state of the programme and reveals the next step in this critical national-defence concept**

**T**he Royal Navy has made key moves in maintaining the Vanguard class of submarines that delivers a continuous at-sea deterrence, while the government has announced major investments to prepare for a decision on a future fleet of nuclear missile boats. HMS VIGILANT, a ballistic missile submarine (SSBN), completed in late October a successful test firing of an unarmed Trident II D5 missile at a US test range off the coast of Florida. "It was a significant step in bringing back VIGILANT into the operational cycle," says Commander Jon Boyle. The test was a first firing of a Trident missile by a Royal Navy submarine in three years, and marked a major step for the Vigilant after a big refit.

VIGILANT went into a major overhaul at Devonport Naval Base three years ago under a £350 million contract with Babcock Marine. After some 2.2 million man hours, the 15,000-ton submarine returned to service in June 2012 with a new Rolls-Royce-designed core reactor, improved strategic weapons equipment, and a tactical weapons-command system. The boat and crew are working up to full readiness after the refit, Commander Boyle confirms. HM Ships VANGUARD, VICTORIOUS, and VIGILANT have now undergone refit, which has included installing a new core reactor, designed to provide "fuel for life", according to Commander Boyle. The fourth in the Vanguard class, HMS VENGEANCE, went into refit in Spring 2012 and will be out of service for three and a half years while the Babcock

The Royal Navy is the UK's sole operator of the nation's Trident II intercontinental ballistic missile

HMS VANGUARD, launched in 1992, is the oldest of the four 'bombers' in the Royal Navy's nuclear deterrent force



Marine team work on a similar £350 million overhaul.

The new core reactor that is being installed in the V-class missile boats is the same as that being fitted in the Astute nuclear-powered attack (SSN) submarines.

The seven hunter-killer boats in the Astute class are vital to the nuclear-deterrent force, as they act as escorts and are used to train personnel to crew the missile submarines, nicknamed 'bombers'.

The Astute programme received a boost when the government announced on 10 December 2012 £2.7 billion of investment, with a £1.2 billion contract for BAE Systems to build HMS AUDACIOUS, the fourth boat, and a further £1.5 billion towards early-build work on boat five, ANSON, and long-lead items for the sixth and seventh submarines, as yet unnamed.

The Vanguard class is expected to stay in service until 2028, and work is being done to prepare for a replacement – the Successor boats. "We are making progress in the Assessment phase to enable the government to make its decision in 2016,"

says Commander Boyle. A Main Gate decision in 2016 will be the key move by the government to launch construction of the new generation Successor SSBN boats. Commander Boyle is happy to confirm that "the assessment phase is going to plan".

Studies in the early design phase – known as Initial Gate – are being done to prepare for a launch decision. The work allows orders to be placed for long-lead items so the first new Successor missile boat can be delivered in 2028 as planned. As part of the stream of preparatory work, the Ministry of Defence (MoD) awarded on 29 October 2012 a £315 million contract to BAE, at Barrow, for further design and development on the Successor project. "The design phase is gathering momentum, and behind the scenes we are working hard to maintain this by ensuring we have the correct skills and resources in place," BAE Systems Maritime Submarines Managing Director John Hudson said at the time. The October contract followed a £328 million design contract awarded in May 2012 to BAE Systems Maritime.



Royal Marines escort HMS VICTORIOUS as she departs Her Majesty's Naval Base Clyde



Also as part of the work to prepare for the 2016 decision, the MoD signed an 11-year contract for around £1.1 billion with Rolls-Royce Power Engineering for its nuclear reactor core facility at Raynesway in Derby.

“Treaty obligations and security considerations necessitate the maintenance of an indigenous reactor-core production capability to support the UK’s nuclear submarine flotilla,” Secretary of State for Defence Philip Hammond said in a written statement to parliament in June 2012. Around £500 million will go towards regenerating the Raynesway site, with a rebuild of the facilities.

The site has built all of the Royal Navy’s nuclear reactor cores since the first nuclear boat, HMS DREADNOUGHT, but new facilities are needed to meet safety standards set by the Office of Nuclear Regulation.

The remaining £600 million is earmarked for maintaining reactor-core production at the site until March 2023. The facility will build the reactor cores for the Astute and Successor boats.

### One of the decisions in the next parliament will be the requirement for a future nuclear warhead to replace the payload on the Trident D5 Missile from Lockheed Martin

One of the decisions in the next parliament will be the requirement for a future nuclear warhead to replace the payload on the Trident II D5 missile from Lockheed Martin.

The Atomic Warfare Establishment, Aldermaston, plays a key role in the nuclear warhead. It is involved in everything from design and component manufacture through to service support, decommissioning and disposal.

Although government owned, the Atomic Warfare Establishment is managed under a contractor-operated arrangement, with a consortium equally owned by Lockheed Martin, Jacobs Engineering and Serco. The government awarded an initial 10-year contract to AWE Management Ltd in 2000, which now runs to March 2025.

As part of a ‘responsible stewardship’ of the stock of warheads, British engineers will work with French counterparts under the Teutates project at the Valduc site, near Dijon in central France. The project, which uses high-powered lasers and underwater effects to model the behaviour of warheads, is part of maintaining and demonstrating the effectiveness of the deterrent. For the government, the nuclear deterrent is seen as a core capability.

“The government’s position on this is very clear,” said Hammond on 29 October 2012. “We are committed to maintaining a continuous deterrent, based on the Trident missile.” He went on to reassert that “the strategic nuclear deterrent is a vitally important part of our defence. It is the ultimate guarantee of our independence and our freedom. It costs us overall, year-on-year, about six per cent of the total defence budget, and that buys us the ultimate guarantee.” ●

The Astute build programme  
is back on schedule

# Astute: bringing a new class of submarine into service



**The story of Britain's new generation of nuclear-powered attack submarines, the Astute class, highlights a maxim – a nation that is capable of designing and building the most complex machine that mankind has ever invented, should not allow the people who hold that knowledge to leave without first passing it down. *Christina Mackenzie* explains**

**“**In 1999, the Vanguard-class ballistic-missile submarine programme came to an end, and from that moment the UK's submarine design and build know-how began to dissipate,” explains Commander Stuart Capes, Submarine and Anti-Submarine Capability Manager. The challenges faced by the Astute programme that followed on from the Vanguard project are largely attributable to this loss. To make good this loss, a plan was put in place to fill the gap. Prime contractor BAE Systems acquired a computer-aided design system, CADSS5, in the US to help put the programme back on schedule. Another strand to the plan was to buy in some of the know-how that was lost from the US. Consequently, General Dynamics Electric Boat Division was awarded contracts in 2003 and 2004 worth \$196.8 million (£122.4 million) in order to support the project team with submarine design, production and construction expertise. The overall result is that the programme is now back on track, and the first boat, HMS ASTUTE, will be fully operational in mid 2014 – about nine years later than originally expected.

Currently, the two submarines at sea, ASTUTE and AMBUSH, have not yet been operationally handed over to the Royal Navy. The third vessel – ARTFUL – is scheduled to come out of the shipyard at the end of 2014, with AUDACIOUS, ANSON, AGAMEMNON and AJAX following at two-year intervals, replacing, on a one-for-one basis, the Trafalgar-class submarines.

“The plan is to get the seven delivered before building begins on the ‘Successor Project’ to replace the four Trident missile-carrying Vanguard-class submarines,” says Commander Capes, adding that “the expectation is that each of the four Vanguards will be replaced”. That will keep the UK's core submarine industry going until 2035. The October 2010 Strategic Defence and Security Review slowed the Astute production schedule down to avoid producing another gap in the submarine construction industry's design/manufacturing roster, which had become likely due to delays in the Successor programme.

The Review therefore extended the build time for the Astute programme by a further 96 months, including a 13-month deferral of boat four – AUDACIOUS. There is an impact to this decision that has not gone unnoticed by the National Audit Office, which reported that the downside of this

extension is that the Royal Navy “will have to use older boats beyond their out-of-service dates, work the smaller fleet of Astute submarines harder, or reduce scheduled activity for submarines”. Put another way, “the Astute-class submarines may not meet the Royal Navy's requirement for sufficient numbers of submarines to be available for operations over part of the next decade”.

#### **WELCOMING WOMEN ABOARD**

Today, the ASTUTE and AMBUSH boats are undergoing sea trials managed by BAE Systems, but crewed by the Royal Navy. Handover of both vessels is expected in the middle of 2013. “They will then be truly naval vessels,” exclaims Commander Capes.

The 7,000-ton, 97-metre long boats can be crewed with a minimum of 98 men, with a full contingent comprising 138 people. In what has become a historic decision, women will be allowed

**To undertake their anti-surface, anti-submarine and land-attack missions, ‘attack boats’ have a total of 38 weapons aboard: Tomahawk missiles and Spearfish wire-guided torpedoes**

to become crew members of Royal Navy submarines by the end of 2013. They will crew the Vanguard-class submarines first, but from 2016, after modifications are made to the sleeping and wet-room/toilet areas, they will be welcomed onto the Astute class. Commander Capes points out that it is, not surprisingly, “very sparse” aboard a submarine. That said, however, these boats “are a step change from the Trafalgar class because they are much stealthier and quieter”. Even if the main role of the Astute is not to remain permanently hidden and silent in order to deliver a nuclear missile – that role is played by the Vanguard-class nuclear-powered ballistic missile submarines – considerable investment in time and money has been made to achieve noise quietening. So, for example, Astute does not have a traditional external propeller, but

The 7,400-tonne attack submarine HMS AMBUSH sails into her homeport at Faslane



Naval ratings undergo rigorous training at the Astute Training Facility in preparation for operations



BAE Systems Maritime – Submarines' massive Astute production facilities at Barrow-in-Furness

BAE SYSTEMS

rather an encased one that acts more like a turbine. This enables the boat to travel through the water at speeds of up to 30 knots.

Another difference is that this is the first UK submarine that has no hull-penetrating mast. The optronic mast replacing the traditional periscope has two digital cameras with thermal and low-light imaging options. However, the whole concept behind these vessels is found in their generic name: 'attack boats'. To undertake their anti-surface, anti-submarine and land-attack missions they have a total of 38 weapons aboard: Tomahawk missiles and Spearfish wire-guided torpedoes kept in six torpedo tubes. The Tomahawk was first test fired from HMS ASTUTE in November 2011. But the single most important element aboard is the sonar – so important that: "We won't go to sea if it doesn't work," according to Commander Capes.

During the boat's expected operational life, which is about 25 years, the nuclear-fuel cells will never have to be recharged or changed. And, because the vessel does not need refuelling, its range is limited only by the amount of food and drink that can be carried aboard, which is about 90 days' worth.

Like all vessels in the Royal Navy, there is an expectation that the Astute-class submarines will be further modernised over their service lives. For example, if and when even more advanced sonars, missiles and torpedoes become available, they could be fitted into the Astutes, ensuring that "the UK Submarine Service will be able to provide the UK's strike capability for many years to come", as Commander Iain Breckenridge OBE, HMS ASTUTE's commanding officer in November 2011, proudly explained. ●





# The Royal Marines

Message from the Commandant General Royal Marines, Major General Ed Davis CBE

**A**fter 17 months in post as Commandant General, my judgment is that the Royal Marines continues to be recognised as one of the country's finest institutions and the UK's premier land-warfighting force. We are in good shape. Every day those who matter, be they politicians, military chiefs or, vitally, the British public, never cease to be impressed by the quality and dedication of the steely, smiley boys and girls who make our Corps so unique; attributes they continue to vividly demonstrate day in, day out.

Whether the people of this country are exposed to the unyielding endeavours of 40 Commando, now two-thirds through their third six-month tour in Afghanistan; or 43 Commando Fleet Protection Group and 539 Assault Squadron's rogue craft 'interdiction' capability in support of the police during last summer's London Olympic Games; or the outstanding grading achieved by Commando Training Centre in a recent OFSTED inspection; or the national triumph that was the Royal Marines Band Service's performance throughout Her Majesty's Diamond Jubilee celebrations, their ethos, spirit and skill continue to ensure

that the reputation of the Royal Marines has never been greater. It is a much-envied reputation that we must guard tenaciously in the knowledge that the Corps exists today, indeed flourishes today, not because of who we, the Royal Marines, know we are, or what we know we can do, but because of who the people of our nation believe we are and what they believe we can do.

Conceptual, physical and moral challenges lie ahead; especially as our nation copes with the human and institutional fallout from the Iraq and Afghanistan campaigns. Over the past 12 years the Corps has overcome relentless pressure. Forever changed by the experience, hundreds of returning Royal Marines and their families face long-term, life-changing physical and mental health issues. As a Corps and as a nation, we have no greater responsibility than meeting the through-life needs of each and every one of these selfless Commandos who gave their all to secure our nation's future. We must heed the words of former US President George Washington when he counselled: "The willingness with which our young people are likely to serve in any war, no matter how justified, shall be directly proportional to how they perceive the



Royal Marines conduct an amphibious assault as part of Exercise ALBANIAN LION

Royal Marines join the Second Infantry Regiment of the French Marine Corps on Exercise CORSICAN LION



Veterans of earlier wars were treated and appreciated.” Alongside looking after our injured Royal Marines and their families, the overriding national and defence challenge is to plot an assured course through the greatest period of austerity in over a generation: austerity not just in our time, but for our time. Accordingly, since the last Strategic Defence and Security Review (SDSR), the Corps has been playing its part in the pan-Defence endeavour to ‘balance the books’, and thus establish the resource baseline for contingency operations in the post-Afghanistan era.

### **Keeping the quality and belief of our people as the Corps’s centre of gravity, we will learn the relevant lessons and address our shortfalls exposed by the past 12 years**

As this work matures we are increasingly able to focus on delivering what we can afford, rather than defining what we can afford. Between now and the next SDSR in 2015, we need to map out the blueprint for how the Royal Marines will need to evolve to remain at the heart of our nation’s ability to respond to crises both at home and abroad. Set in a context where defence’s contribution to the national well-being is shifting from long-term occupation to short-term intervention, I envisage the Corps – operating as part of the Naval Service’s Response Force Task Group (RFTG) in a

mutually supported/supporting manner, with the leading elements of Army and RAF Responsive Forces – occupying the capability gap between Special Forces’s ‘discretion’ and the Army’s ‘mass’. This is something we have done successfully for many years in partnership with the amphibious forces of countries such as the US, the Netherlands and France. I would argue that the RFTG has already proven its unique utility in the post-Afghanistan era through its contribution to NATO’s Operation UNIFIED PROTECTOR during the Libyan National Transitional Council’s fight to remove Colonel Gaddafi from power and, more recently, through its provision of ‘in-extremis’ military support to the police on the Thames or in Weymouth Bay during the 2012 Olympics.

This will entail change – something that the Royal Marines have always been good at. Change, not in the fundamentals of the Commando ‘Distinction’ as forged at the Commando Training Centre, maybe not even in what we deliver, but certainly in how and with whom we deliver it. Keeping the quality and belief of our people as the Corps’s centre of gravity, we will learn the relevant lessons and address our shortfalls exposed by the past 12 years of fighting in Iraq and Afghanistan. And, having worked hard to retain our core amphibious skills throughout, I judge it will not take the Royal Marines long to be able to apply them to the maritime power projection operations – at sea and from the sea – that we will inevitably be asked to conduct in response to emerging crises on the global stage. Our ultimate objective as we approach our 350th birthday in 2014 is a Royal Marines Corps still at the forefront of keeping our nation and its people safe and prosperous. I look forward to achieving this objective with anticipation and confidence. ●

A Royal Marine from 4 Assault Squadron stands guard aboard HMS BULWARK during the Response Force Task Group COUGAR 12 deployment



## Reforming the LCG into the RFTG

**Simon Michell** explores how the regeneration of the Marines' amphibious role is progressing in terms of its integration with the Response Force Task Group and the Anglo-French Combined Joint Expeditionary Force

**R**egularly deploying the Royal Marines to the frontlines of the inhospitable terrain of land-locked Afghanistan was an uncompromising act of national commitment. The UK was willing to face down the Taliban with some of its fiercest and most able soldiers. The fact that the 'Royals' have fought with distinction is in no doubt. They have made a huge impact on the

lives of the Afghan people and have been a key element of the International Security Assistance Force (ISAF) coalition, which is helping to stabilise one of the world's most dangerous places.

The unintended consequence of that decision, however, is that if you take maritime warriors away from their spiritual home – the water – for prolonged periods, you run the risk of turning them into just another light infantry battalion. This is not what they are intended for, nor is it what the taxpayer expects from their hard-earned money.

The challenge, therefore, has always been to try and retain a seed-corn cadre of marines who retain that specialist skill of fighting from and at the sea, while also supporting the Afghan mission. This has become an even more pressing requirement with

The Lead Commando Group trains with French Marines on the Island of Corsica during the COUGAR 12 deployment



the recent standing up of the Response Force Task Group (RFTG) fleet of assault ships, frigates, destroyers, submarines and support vessels that make up the nation's primary crisis-response force. The RFTG concept was validated in 2011 when, on its first deployment – COUGAR 11 – the fleet was re-tasked to support Operation ELLAMY, the UK's contribution to the UN-mandated Operation UNIFIED PROTECTOR, to safeguard Libyan civilians from pro-Gaddafi forces.

Although the RFTG is a joint effort that draws upon both sister services – significantly the British Army and its Apache land-attack helicopters from 656 Squadron Army Air Corps – the main land-assault component comes from the Royal Marines Lead Commando Group (LCG), which has been mandated by the

British Government to remain at very high readiness. That is to say that it must be able to deploy within five days of tasking.

The LCG is drawn from one of the three Commando (Cdo) units that make up the core infantry capability, 3 Commando Brigade. The two that are not acting as the very high-readiness element cannot relax as they must be able to deploy within 20 days. According to Major General Ed Davis CBE, Commandant General Royal Marines: "Throughout the 10 years of campaigning in Iraq and Afghanistan, we have worked very hard to maintain this seed-corn amphibious capability, and our ability to bring together an effective maritime fighting force in quick time." Over the past couple of years the Corps has trained with the US Marine Corps at their Camp Lejeune in North Carolina, and gone on to use the



Royal Navy Sea King helicopters help the Royal Marines practise evasion



British kit is transferred onto a French landing craft during Exercise CORSICAN LION

2012 Exercise JOINT WARRIOR off Scotland to cement the LCG concept, ready for 45 Commando to act as the LCG on the COUGAR 12 RFTG deployment, which began in September 2012.

#### THE ANGLO-FRENCH EXPEDITIONARY FORCE

At around the same time as the SDSR was being published in November 2010, the British and French Governments signed a number of industrial and defence cooperation agreements. One of these called for the creation of a joint Anglo-French rapid-reaction force that would, according to the British Government, act as “an early entry force capable of facing multiple threats up to the highest intensity, available for bilateral, NATO, European Union, United Nations or other operations”. Known as the Combined Joint Expeditionary Force (CJEF), it faced its first real test during the COUGAR 12 deployment. Exercise CORSICAN LION saw the Royal Marines practise a scenario where the LCG and its supporting elements worked alongside the French Army’s 9 Marine Infantry Brigade to see how the two forces could combine to confront rogue elements of a failing state, where piracy was threatening to bring about serious regional instability. This was the culmination of months of preparation, and there were key technical issues that needed to be ironed out for a combined assault force to be delivered ashore. Interoperability is never easy, especially when the cooperating forces are using different equipment, albeit under the framework of NATO standards. These NATO standards will, however, form the bedrock and basis of the future cooperation between the nations.

For the exercise to be really successful, a joint command, control and communication (C3) protocol and operating practice had to be set up. In the months preceding, therefore, both sides conducted a lot of low-level interaction, primarily to discuss basic principles (doctrine) and communications. Then C3 liaison team

nodes, together with national equipment, were embedded in both the British and French HQs so that the two forces could get used to each other’s systems and work out how to blend them so that the CJEF could be commanded as a single force through both the French and British structures. This needed to be robust and flexible, as there were a number of different targets that needed to be attacked both on land and at sea. The complexity was extreme.

CORSICAN LION was the first of many exercises that both countries will under take in order to bring about the CJEF.

### The main land-assault component comes from the Royal Marines Lead Commando Group, which has been mandated by the British Government to remain at very high readiness

For some in the Royal Marines who had only experienced land-based counter-insurgency operations in Afghanistan, it was the first time they had got their boots wet. Moreover, the first CORSICAN LION has enabled both sides to take stock and work out how realistic the CJEF vision is, and what subsequent steps are necessary to take if the vision is to be fully achieved.

What the exercise clearly showed, however, is that the Royal Marines have not lost their appetite for amphibious warfare, and some of the skills that had grown rusty are being brought back with renewed vigour. After years of campaigning on land, the Royal Marines are now embarked on a future where their core amphibious skills will be used to deliver security and prosperity to the United Kingdom. ●



# Supporting Afghanistan – 40 Commando

**The Royal Marines were back in Afghanistan in 2012 as part of HERRICK 17. *Simon Michell* reveals how they prepared for yet another deployment to southern Afghanistan and the contribution that the 'Royals' are making in this theatre**

It is sometimes forgotten that the Royal Marines (RM) began their involvement in Afghanistan way back in November 2001, when 40 Commando (Cdo) helped to secure Bagram airfield, while other Royal Marines embarking on the Royal Navy's first purpose-built amphibious assault ship, HMS FEARLESS, acted as a contingency force in what was effectively the beginning of the 'War on Terror', following the 9/11 attacks on the US.

Since those early days, the RM have regularly been back to Afghanistan as part of what is now known as the six-monthly UK

Operation HERRICK deployments. In 2011, 3 Commando Brigade (3 Cdo Bde) led the British/coalition forces in Helmand Province on HERRICK 14, with 42 and 45 Commandos contributing to an overall force of more than 6,000 British and coalition personnel. This enabled those troops in Helmand to move into the population pockets of towns and villages to first clear out insurgents, and then provide tangible and enduring protection from the Taliban so that the process of rebuilding Afghanistan and its own national forces could be substantially reinvigorated.

HERRICK 14 was an extremely important deployment. It coincided with a change in emphasis for the International Stability Assistance Force (ISAF) coalition to a population-centric counter-insurgency strategy, where success was not measured in terms of Taliban casualties, but rather in the enhancements that the ISAF forces were introducing into the country, such as improved infrastructure, hospitals, schools and a return to economic activity.

Royal Marines driving a Supacat Jackal high-mobility, all-terrain vehicle at daybreak in Afghanistan



During HERRICK 14, the UK and US forces deepened their collaboration and worked far more closely alongside each other than previously. This had a powerful effect, and was recognised by the influential British-American Forces Dining Club with the 'Historical Significance Award', which is given to outstanding British and American units that have contributed to the success of the US-UK alliance and have set an example for other military commanders to follow.

Major General Ed Davis CBE, who led 3 Cdo Bde throughout HERRICK 14, and who has since been promoted to head the Royal Marine Corps as their Commandant General, explains the cooperation in these terms: "3 Cdo Bde was sitting in the middle of Helmand between two large US Marine Corps units, one to the north and the other in the south. However, we were able to remove all synthetic boundaries between the separated USMC units, as well as from between us and those US units. This allowed

us to harness the additional efficiency and effectiveness. It showed what you can achieve if there is a mindset to integrate both doctrinally and tactically." According to Major General Davis, this was extremely powerful. It was, he suggests, a huge factor in what HERRICK 14 achieved – an overall 43 per cent reduction in violence. Its effects do not stop there, however, as the experience will also be invaluable for the reinvigoration of the European amphibious initiative, as well as the creation of the Anglo-French Combined Joint Expeditionary Force.

#### **40 CDO IN AFGHANISTAN**

Either side of HERRICK 14, 40 Cdo also played a significant role in the country. In April 2010, it replaced the 3 Rifles Battlegroup in Sangin – a small but hitherto incredibly unstable and violent part of Helmand. In the six months it spent there it undertook more than 1,000 foot and vehicle patrols, despite the increasing risk of

40 Commando undertake live firing training in the Mojave desert during Exercise BLACK ALLIGATOR



improvised explosive devices (IEDs), which have been responsible for as much as 80 per cent of the casualties suffered by ISAF forces. This effort was a significant enabler for the rebuilding of that part of the war-torn country, and witnessed the once-bustling bazaar spring back into life.

During 2012, 40 Cdo was back in training for a return to Afghanistan in October 2012, where it would take charge of the Nar-e-Saraj district from the Grenadier Guards. The Taunton-based marines moved some 650 men to join Danish colleagues

### **Exercise BLACK ALLIGATOR enabled the Cdo to practise with the full range of weapons in its inventory**

at Main Operating Base (MB) Price. Here, they spent the next six months looking after a large area of central Helmand, through which the strategically and politically important Highway 1 runs and where the second largest city of Gereshk, which forms the economic hub of the province, is located.

The Cdo was well prepared for this work, having undertaken some gruelling pre-operational Mission Specific Training (MST) in both the UK and in the US. Exercise PASHTUN DAWN on Salisbury Plain, Wiltshire, represented the final rehearsal for 40 Cdo before setting off for Afghanistan. In what turned out to be a very wet affair, the marines practised the skills they would need to keep

themselves and others safe and healthy. This included training with helicopters and practising IED drills, as well as making sure that everyone understood what their mission was and what they were expected to achieve in Afghanistan.

Surprisingly, southern England can mimic some elements of the Afghan climate, particularly the rain and floods. However, acclimatising to the hot and dry environment was done as part of Exercise BLACK ALLIGATOR, in California's Mojave Desert at the US Marine Corps Air Ground Combat Centre live-firing rifle and artillery ranges. The November 2011 exercise enabled the Cdo to practise with the full range of weapons it has in its inventory, as well as relearn some desert-fighting skills and go over extraction drills used to get injured personnel off the battlefield and into the hands of medical staff.

While in California, 40 Cdo also conducted some joint training with 1st Battalion, 7th Regiment of the US Marine Corps. This was not a coincidence, as during the 40 Cdo's previous deployment to Afghanistan they worked closely with other units from the 7th Regiment. This was once again an excellent opportunity to further embed the spirit and reality of the cooperation that has become a feature of the Afghan ISAF mission. The regular contribution the Royal Marines have made to the Afghan mission exemplifies the can-do spirit of the Corps and is, without doubt, a decisive factor in the enormous international effort to bring one of the world's poorest countries back into the international fold. This in itself is a major contributor in combating not just terrorism, but also the heroin trade – the source of which can be traced right back to the poppy fields of Afghanistan. ●





## The Fleet Air Arm

**Message from Rear Admiral Russ Harding OBE, Assistant Chief of Naval Staff (Aviation and Carriers)**

**H**aving taken charge of the Fleet Air Arm (FAA) in September of 2012, I have spent the last three months visiting the men and women who keep the FAA running at a high tempo. These trips have taken me to the east and west coasts of America, to both of our air stations in the United Kingdom and to HM Ships ILLUSTRIOUS and BULWARK. It was a great pleasure also to visit the French aircraft carrier, *Charles de Gaulle*, as she was exercising in the Mediterranean with the Royal Navy's Response Force Task Group's COUGAR 12 deployment – a visible sign of the continuing cooperation between our two navies.

I continue to be impressed by the high quality professionals operating, maintaining and supporting aircraft in the Naval Air Squadrons and Air Stations. The visits have highlighted how active the Fleet Air Arm is in contributing to operations worldwide at sea and ashore and equally as important, how the Fleet Air Arm has an exciting future.

Last year saw continued support to Operation HERRICK in Afghanistan, with the Sea King Mk4s of the Commando Helicopter Force supporting the operations of ISAF troops in Helmand Province, and the Sea King Mk7 providing overland surveillance support resulting in regular interceptions of narcotics and weapons. At sea we have continued to provide Merlin and Lynx helicopters to deploy globally, embarked in surface ships of the Royal Navy (RN) and Royal Fleet Auxiliary (RFA) as they undertake defence tasks across the globe. Particular areas have included the South Atlantic, Caribbean and Gulf regions where they have contributed to Maritime Security Operations aimed at countering illegal trafficking of drugs, weapons and people.

Beyond these operational duties, 2012 also saw some of the greatest UK public events in decades – the Queen's Diamond Jubilee and the Summer Olympic and Paralympic games. The FAA played a key role in the UK security organisation to safeguard the



Fleet Air Arm Sea King Mk7 ASAC helicopters embarked on HMS ILLUSTRIOUS during Exercise CORSICAN LION

The first AW159 Wildcat to be delivered to the Royal Navy takes to the skies on her maiden flight



games with RN helicopters and crews from across the various aircraft types, operating from HMS OCEAN in the Thames and HMS BULWARK in Weymouth Bay, as well as from land bases, providing both a surveillance and response aviation capability.

#### MAINTAINING THE AIRBORNE CAPABILITY

Just as the submarine and surface fleets have taken delivery of new and refurbished vessels, so too is the FAA upgrading its capability. The Merlin Mk2 Capability Sustainment Programme is well underway with the first Mk2 aircraft having been recently delivered to RNAS Culdrose aiming towards full operational capability in 2014.

### Looking further out into the future, the FAA is preparing itself for the introduction of the two new Queen Elizabeth-class carriers

Staying with the Merlin fleet, Commando Helicopter Force, air crew and maintainers are now feeding into RAF Benson to start preparing for the transferral of the Merlin Mk3 to the RN. There will be a two-part upgrade package to the aircraft that will transform it into the Merlin Mk4 and enable it to undertake ship-borne operations. The cockpit will be updated to the same standard as the Merlin Mk2, and the fitting of folding tails and heads will allow the aircraft to be stowed below decks at sea.

Moving to the Lynx replacement, I signed off the safety statement in late 2012 that will enable us to begin factory-delivered training at the AgustaWestland site in Yeovil for the first batch of Wildcat helicopter trainers. Indeed, as an example of just how common the Land and Maritime variants of Wildcat are, the first FAA pilots to be trained in Wildcat will fly the Army AH Mk1 variant as this will be available first.

Looking further out into the future, the FAA is preparing itself for the introduction of the two new Queen Elizabeth-class carriers that will come into service at the end of the decade. Despite the withdrawal of the Harrier and the disbandment of the Naval Strike Wing, there has been no break in fixed-wing pilot recruitment and training. A small number of RN pilots are flying F-18 Hornets operationally with the US Navy. Personnel are also heavily engaged in the F-35B Lightning II programme with RN pilots and maintainers in the first training unit, VMFAT-501, at Eglin Air Force Base. Together, the RN and RAF have developed a comprehensive plan for the introduction of the Lightning II. We are standing up F-35B maintenance units from both the RAF and RN. Some of these men and women have transferred to a US-based training establishment which may be there for up to six years before transferring back to the UK. In addition, we are now in the process of setting up the test and evaluation squadron to be followed by the UK Operational Conversion Unit.

The past 12 months have been one of the busiest periods in the FAA's recent history. I am incredibly proud of the men and women who continue to step up to the daily challenges and meet every task that is asked of them with enthusiasm for the future and a sense of the heritage they stem from. I remain confident that this professional attitude and can-do spirit will ensure an exciting future for all who serve in the FAA. ●

A computer-generated image of HMS QUEEN ELIZABETH sailing out of Portsmouth Harbour



# Introducing the Queen Elizabeth class with its Lightning II F-35Bs

**The Royal Navy is gearing up for the introduction of the Queen Elizabeth-class aircraft carrier and its air group of powerful Lockheed Martin F-35B Lightning II fighters. *Martin Temperley* reveals the latest progress on this critical project**

**H**MS QUEEN ELIZABETH and her sister ship PRINCE OF WALES are the largest warships ever built for the Royal Navy. The first ship, QUEEN ELIZABETH, a 65,000-ton super carrier, is scheduled to enter the water in 2014. Equipped with F-35B Lightning II multi-role jets and Merlin helicopters, the carriers will also be capable of operating British Army Apache and Royal Air force Chinook helicopters. The first ship is scheduled

to be handed over to the Royal Navy in 2016. At sites in the United Kingdom and United States, preparations are well under way for the introduction of the F-35B, while the carrier's procedures are also being perfected.

The F-35B is a short take-off and vertical landing (STOVL) stealthy single-seat fighter. It is an Advanced STOVL design, achieving vertical lift through an engine-driven fan behind the cockpit and with a swivel-duct nozzle at the tail, unlike the Sea Harrier's 'four poster' design. In UK service it is known as a Joint Combat Aircraft, because it will be jointly operated by the Royal Navy and Royal Air Force.

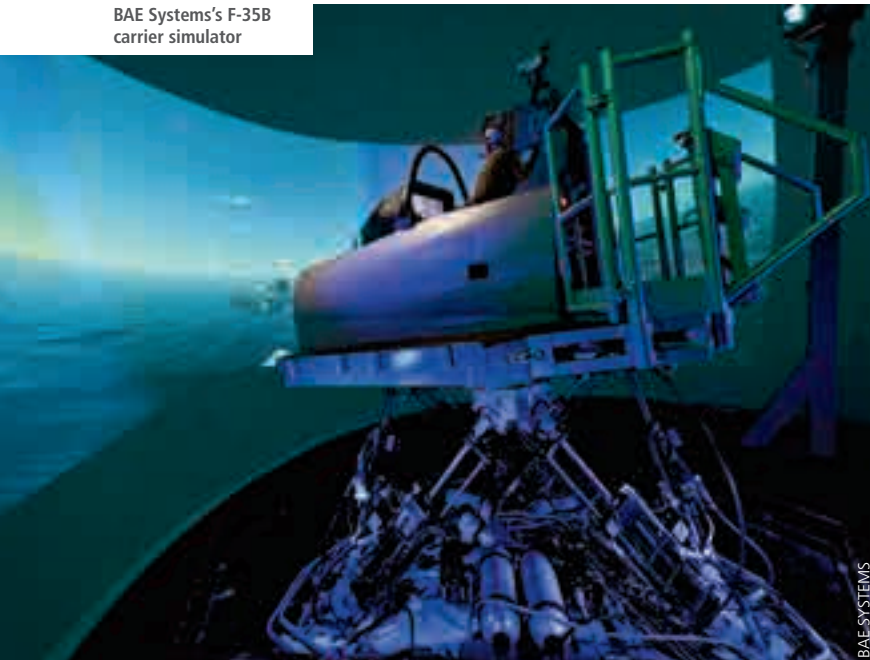
Its Pratt & Whitney F135-PW-600 turbofan engine is the most powerful aero powerplant ever fitted to a fighter, producing 25 tons of thrust, and making the F-35B the first truly supersonic

The F-35B undergoing suitability tests aboard the *USS Wasp*



LOCKHEED-MARTIN

BAE Systems's F-35B carrier simulator



BAE SYSTEMS

Lt Cdr Ian Tidball, joins US F-35B training squadron (VMFAT-501)



BAE SYSTEMS

STOVL fighter anywhere in the world. The F-35B is set to be the first stealthy aircraft to be operated by the UK, and the UK's F-35Bs will be the first to operate outside the US.

By October 2012, the UK had taken delivery of two F-35Bs, and these are initially to be attached to US Marine Corps Fighter Attack Training Squadron 501 (VMFAT-501) in Florida for pilot training. More aircraft are being delivered in 2013.

Former Royal Navy Fleet Commander, now First Sea Lord, Admiral Sir George Zambellas, said at the handover of the first F-35B in July 2012: "Jets at sea offer unmatched persistence and can guarantee the delivery of airpower around the globe. With the advent of Lightning II, UK defence has its opportunity to maximise the utility of our carriers and this extraordinarily capable aircraft through a range of sea and land basing options. The result will be a strategic capability that will deliver for many decades to come."

At the handover, Secretary of State for Defence, Philip Hammond, underlined the Royal Navy's commitment to fast-jet operations, and delivered the message of carrier air power: "The F-35 will give us a leading role in maritime power projection."

Carriers and fixed-wing aircraft are the most important instruments of power projection in an age when defence of the UK must start far from UK shores. The versatile F-35B, with its capabilities as both an air superiority fighter (air-to-air capabilities against hostile aircraft) and as a precision strike tool (against targets on land and at sea), supports that requirement, as does the carrier's capability to carry Apache and Chinook helicopters as an airbase afloat for expeditionary warfare.

#### PREPARING FOR THE CARRIERS

One of the first steps in preparing for the Queen Elizabeth-class carriers has been the opening in 2012 of an engineering development facility for the mission system, which is the carrier's nerve centre. It combines systems for air-traffic control, navigation, tactical picture compilation, communications and mission planning for the F-35 fighters and for the Merlin helicopters. This facility, at shore base HMS COLLINGWOOD in Hampshire, is completing engineering tests and trials using the same equipment that will be fitted to QUEEN ELIZABETH in Rosyth, Scotland. One of the ship's unique features is two, instead of one, 'island' superstructures on the flight deck, and the mission system will occupy the rearmost island, which is devoted to flying operations.

Being located in HMS COLLINGWOOD, it allows Royal Navy trainees to take part in large-scale trials from the start. The Royal Navy says: "By manning every Operations Room position with Royal Navy personnel ensures the equipment can be tested and loaded to its full capacity – something that has never been done before with previous mission systems."

The first classes of UK maintenance personnel to work with the F-35B have completed courses at Eglin Air Force Base in Florida, and one pilot each from the Royal Navy and RAF started instructor pilot training on the F-35B in late 2012, making them the first international instructors trained on the fighter.

Even after the ending of the Joint Harrier force in January 2011, when the Royal Navy's 800 Naval Air Squadron disbanded, the Fleet Air Arm kept a core of almost 40 fixed-wing pilots, several of whom have been assigned to training programmes

The QUEEN ELIZABETH's new cap tally



### The F-35B's Pratt & Whitney F135-PW-600 turbofan engine is the most powerful aero powerplant ever fitted to a fighter, producing 25 tons of thrust

with the US Navy and are keeping their skills sharp by flying the F/A-18C Super Hornet fighter. Some of those pilots will go on to fly the F-35B, and more pilots will be recruited.

Royal Navy maintainers began training on the F-35B at the Academic Training Center at Eglin in July 2012. When the F-35B is operated from the new carrier, Royal Navy personnel in the trade of Air Engineering Technician will be in the ship to look after the aircraft. This trade covers mechanical, electrical, avionics or weapons specialities. Trade courses on the F-35, which are first a matter of 'instructing the instructors', are being steadily stepped up during 2013.

The ship's company has already started to assemble, with a team of eight Royal Navy personnel wearing the cap tally 'Queen Elizabeth' working with the Aircraft Carrier Alliance shipbuilders at Rosyth since 2012. They are developing operating procedures and routines in advance of when the ship is handed over, which is scheduled for 2016.

The second ship in class is HMS PRINCE OF WALES, now under construction and scheduled to be commissioned in 2018. Before then, in 2015, further orders for the F-35B are expected to follow the 48 currently in the programme, and the UK's supercarrier force will rapidly become operational. The F-35B will provide a faster route to carrier operational capability than the conventional take-off and landing F-35C, which was once schemed. These would have required catapults and arrestor wires to be fitted to the carrier, delaying its entry into service. ●

# Joint and combined helicopter operations



A French Navy NH90 Caiman helicopter being guided onto the deck of HMS ILLUSTRIOUS as she transits the Mediterranean

**The use of British Army Air Corps Apache attack helicopters against Gaddafi forces in Libya, flying off the Royal Navy's HMS OCEAN, represented the start of a new era in joint operations. Likewise, the combined British Army Air Corps Apache and French Army Tigre attack helicopter sorties were a foretaste of a much closer relationship between the two countries, as *Ian Frain* explains**

**A**s mass revolt and popular uprisings spread across the Middle East, United Nations (UN) Resolution number 1973 was passed on 17 March 2011 by the UN Security Council, establishing a no-fly zone and giving the go-ahead for the use of all necessary means to protect the civilians within Libya from Colonel Gaddafi's forces. Gaddafi responded to the unrest by conducting a campaign of terror against the Libyan people, brutally attempting to quell the burgeoning revolution. The world was appalled. NATO's response was Operation UNIFIED PROTECTOR, designed to defend the Libyan civilian population.

HMS OCEAN set sail in April 2011 as part of the COUGAR deployment with the Response Force Task Group and, after a work-up period, she was diverted to conduct missions in support of NATO's Operation UNIFIED PROTECTOR. Embarked for the first time operationally was the Army Air Corps's (AAC) AgustaWestland WAH-64D Longbow Apache AH Mk1 from 4 Regiment Army Air Corps. The main aim of the AAC was to conduct strikes against Gaddafi's forces in what was the first operation in which the Longbow Apache were to be used from the sea in combat. The British Army attack helicopters aircraft were armed with AGM-114 Hellfire anti-armour missiles, CRV-7 rockets and 30mm chain guns. The Apache fleet had prepared in advance for this type of mission and had undergone sea trials as far back as 2006 where, in the November of that year, the AH Mk1 made its first landing on the now decommissioned HMS ARK ROYAL.

The WAH-64D Longbow Apache worked in conjunction with 857 Naval Air Squadron (NAS) AgustaWestland Sea King Mk7 Airborne Surveillance and Control (ASAC) helicopters from HMS OCEAN, which were the 'eyes and ears' of the fleet. Their role was to provide airborne cover during the air strikes into the heart of enemy territory and to prepare safe entry and exit routes in and out of the Libyan airspace. The ASAC Sea Kings played a crucial part of the Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) framework in supporting UNIFIED PROTECTOR, alongside their Royal Air Force (RAF) colleagues who flew the Sentinel R1 and E-3D Sentry. The ASAC Mk7 had come a long way from the original Sea King Airborne Early Warning (AEW) variant of the Mk2 that was hurriedly put together as a reaction to the lack of AEW coverage during the Falklands Conflict.

#### STRIKE ONE

On the night of 3 June 2011, the French Army Aviation Corps (ALAT) launched Aérospatiale Gazelle and Eurocopter EC665 Tigre attack helicopters from the assault ship, *Tonnerre*, in a coordinated action with the Longbow Apaches. These were the first operational sorties of the campaign for the AAC, for which their task was a strike against a land-based radar installation

and a military checkpoint located around Brega. The mission was a complete success and the helicopters subsequently returned safely to their respective ships. This was to become one of the many successful missions performed by the AAC and French ALAT crews during the operation.

In the days and weeks that followed, a number of high-valued targets such as Command, Control and Communications (C3) facilities, Multiple Launch Rocket Systems and an assortment of armoured vehicles were destroyed by the attack helicopters. The Eurocopter Tigre has similar armament to the Apache AH.1, with 30mm cannon and Hellfire, as well as similar avionics, as the Apache crews wear the Integrated Helmet And Display Sighting System (IHADSS), while the French crews wear the Thales Top Owl helmet-mounted display.

At the same time as the air strikes were being flown over Libya, there was also a maritime embargo to be enforced and the usual routine monitoring by the NATO allies. On 13 June 2012, a Royal Navy submarine on routine surveillance had noted that several high-speed inflatable craft (commonly used by Gaddafi's Special Forces) were approaching Misrata with the intention of resupplying an artillery unit. Apache crews were scrambled to intercept, resulting in the sinking of the boats by 30mm fire. Following on from this, the Apache crews engaged a self-propelled anti-aircraft system based on the coast.

In the 22 missions carried out during UNIFIED PROTECTOR, the Apache force hit more than 100 targets, firing 99 Hellfire missiles and 4,800 30mm cannon rounds. The resounding success of this part of UNIFIED PROTECTOR has also produced two firsts – namely the use of the AgustaWestland WAH-64D Longbow

**In the 22 missions carried out, the Apache force hit more than 100 targets, firing 99 Hellfire missiles and 4,800 30mm cannon rounds**



French Tigre attack helicopters began operations with British Army Air Corps Apaches during Operation UNIFIED PROTECTOR



A new era of maritime helicopter strike missions has begun with Army Air Corps Apaches embarked on Royal Navy carriers

Apache AH.1 operating from an assault ship engaging land and sea targets, and working with the French ALAT Eurocopter Tigre force flying from the safety of a French assault ship in combat. Although there were many perceived complexities and problems associated with deploying the AH Mk1 at sea, these were overcome, resulting in mission success during UNIFIED PROTECTOR. In light of this, it is important to note that an amphibious assault operation requires a significant amount of Close Air Support (CAS) in order to achieve mission success.

The close cooperation between the United Kingdom and France was cemented during the previous year, when both nations signed an historic agreement in November 2010. This relationship was even further embedded during Exercise CORSICAN LION in October 2012, which saw Royal Navy Sea King Mk4 'Junglies' land on the French aircraft carrier *Charles de Gaulle*, and French NH90 helos were welcomed on board HMS BULWARK during practice combined assaults on a fictitious failing state that was harbouring pirate forces. This highly complex exercise marked a first test of the newly established Combined Joint Expeditionary

A Commando Helicopter Force Sea King Mk4 prepares to take off from the French aircraft carrier *Charles de Gaulle*



Force between the UK and France. Activities of this kind will strengthen the NATO alliance's ability to address the range of threats that are becoming a feature of the 21st century – regional instability, terrorism, piracy, and natural disasters. ●





## The Royal Fleet Auxiliary

Message from Commodore Bill Walworth CBE, Head of the Royal Fleet Auxiliary

Once again, the Royal Fleet Auxiliary has contributed to the nation's defence while providing excellent value for money with high levels of ship availability, well-trained crews and a vision for the future. Having contributed to the Libyan mission in 2011, our small fleet of ships has remained very busy across the globe, undertaking not just our core task of replenishing Royal Navy ships and those of our international friends with supplies and fuel, but also counter-narcotics, maritime security, anti-piracy and disaster-relief missions.

For a large part of 2012, RFA FORT VICTORIA played a vital role in the UK's contribution to the international effort to combat the rising scourge of piracy. At the beginning of the year she was engaged in NATO's Operation OCEAN SHIELD off the Somali coast, before re-rolling as the flagship for the Combined Task Force 151 in the Gulf. This significant tasking included a first for the RFA, as the Royal Thai Navy's Rear Admiral Tanin Likitawong used

the ship as his command centre in order to supervise this coalition counter-piracy effort. The Gulf waters also saw RFA CARDIGAN BAY, based out of Bahrain, assisting with the intensive mine countermeasures operations that are a feature of those waters. Thanks to her considerable aviation capabilities, US minesweeping helicopters were hosted on the ship, as were a mixed complement of Royal Navy regulars and reservists, and Royal Marines.

On the other side of the world, RFA FORT ROSALIE patrolled the North Atlantic and Caribbean. Again, this was a very successful deployment that saw Prince Edward based on board while he was acting on behalf of Her Majesty the Queen during the Diamond Jubilee celebrations in the West Indies. A very important feature of the North Atlantic patrols is the counter-narcotics work that is controlled out of Key West in Florida under the supervision of the Joint Interagency Task Force South, with which I am proud to say the RFA has been heavily involved over



RFA FORT VICTORIA undertakes a Replenishment at Sea and a Helicopter Delivery Service

the past few years. The RFA also continued to provide vital humanitarian relief during the hurricane season, which has seen a string of storms and hurricanes impact the region. During the year, we also had the honour of participating in the US Navy's bicentenary with RFA ARGUS, home to the First Sea Lord for the celebrations in Baltimore. Further south, RFA GOLD ROVER accompanied Royal Navy vessels in defence of the Falkland Islands.

The high tempo of operations culminated in the summer, with RFA supporting the maritime-security effort that was put in place during the London 2012 Olympics and Paralympics. RFA MOUNTS BAY was the logistics hub for the ships down in Weymouth, working alongside HMS BULWARK.

## The RFA has been put through an independent benchmarking process that has confirmed that we are an efficient organisation

Like the rest of the uniformed services, the RFA is playing its part in helping the nation balance its budget and reduce the massive debt that has risen over the past years. We have managed to reduce our running costs by approximately £18 million a year – which is a 10 per cent reduction in our overall spend. This sometimes painful adjustment has been achieved through lower staffing levels, more efficient use of fuels, and an examination of our ship maintenance packages. Moreover, I have put in place a 'change team' that is helping me to improve our manning levels and systems, as well as our training requirements. This team will also ensure that having implemented the transformation, the RFA will still deliver the outputs that we have been asked to provide.

Recruitment and retention of our people has therefore been a particularly challenging area. However, we are now back on the front foot and our recruiting plan for 2013 and beyond includes officer cadets, direct-entrant officers, and ratings across all specialisations. The good news behind this is the introduction into service of our four new Tide-class tankers that will enter service in 2016, demonstrating that we are an organisation with a positive future. On a related theme, the RFA has been put through an independent benchmarking process that has confirmed that we are an efficient organisation able to carry out our work as cost-effectively as a commercial maritime entity.

### COMMITTED TO AN RFA CAREER

I do not underestimate the challenge our recruiters will have in achieving our targets at a time when opportunities in the commercial sector are healthy, but I am confident that the RFA will continue to attract quality people who want a seafaring career with variety. Turning specifically to retention, we are pressing ahead with promotion boards across all specialisations. It is true that some of our sailors have decided to pursue career opportunities in other areas of the maritime industry or ashore. However, the overwhelming majority of our people are committed to a full career with the RFA. I sincerely believe that our officer cadet and rating training now is among the very best in the industry, especially for our engineer trainees. These men and women have a clear path from the day they join us as cadets through to becoming chartered engineers by the age of 30, without having incurred huge student tuition-fee debts.

I have no doubt that the RFA remains an efficient, fit-for-purpose, well-trained and well-manned organisation that will be able to work alongside the new aircraft carriers when they enter service at the end of the decade. I would therefore like to sincerely thank everyone for a fantastic effort over what has been a busy but very exciting year. ●



The Royal Fleet Auxiliary is fully engaged in the UK's counter-piracy effort

The Royal Fleet Auxiliary is responsible for keeping Royal Navy and allied ships supplied with fuel and stores at sea



## Integrated support

**Commodore Bill Walworth CBE, Head of the Royal Fleet Auxiliary, explains to *Ian Gould* how the organisation operates as an integrated part of the United Kingdom's naval forces**

**T**he use of government-owned ships to support the Royal Navy dates back to the 17th century, but it is only about 30 years ago that many people in the United Kingdom first learnt about the Royal Fleet Auxiliary (RFA) through its admirable participation in Operation CORPORATE.

In 1982, the RFA played a key role in the campaign to repossess the Falkland Islands in the South Atlantic from occupying Argentine forces. However, this action brought about the realisation that at that time, the RFA did not really know much about warfare. Moreover, the Royal Navy (RN) – and by implication

the services as a whole – had significant supply chain vulnerabilities. The potential for increased risk to supplies had risen through Britain's continuing withdrawal from many of its overseas bases, according to RFA commanding officer, Commodore (Cdre) Bill Walworth CBE. The RN realised that, if it was to operate at sea in times of conflict without strategic stores located around the globe, the fleet would have to rely on supplies carried from home or provided by civilian-crewed RFA ships.

This joint recognition stimulated increasing investment in equipment and training that has permitted the RFA to sail as an integral part of the RN fleet without hazarding operations. The flotilla comprises more than a dozen vessels – including tankers, dock landing ships, replenishment, aviation training/casualty receiving and forward repair ships. Some of these ships are now reaching the end of their operational lives and, consequently, new tankers are on order.



RFA CARDIGAN BAY resupplies USS DEVASTATOR during the International Mine Counter Measures Exercise



Type 45 destroyer, HMS DIAMOND, begins a replenishment at sea with RFA WAVE RULER



“The sliding scale of activity has accelerated in the past 10 years,” says Cdre Walworth, explaining that today’s RFA results from 30 years’ training for the operational environment. Without doubt, the global recession has placed pressure on government budgets and the RFA did not escape reductions to its financial and human resources. As in its sister services, this has led to a thorough reappraisal of the way it operates, and it is likely that new processes and procedures will be adopted in 2013.

#### GETTING BACK ON TRACK

“We’re at last taking forward some of the major projects needed to operate inside our budget and to recover from the reduction in our numbers. Promotion boards are in full swing, which ought to encourage everyone to recognise that we’re back on track,” Cdre Walworth told *Gun Line*, the RFA newspaper, in September 2012. According to the Head of the RFA, the organisation is talking to ships and maritime trades unions about a system to meet more exacting levels of efficiency. It has also reinvigorated the review of how stores and munitions loads are managed and expects to introduce new arrangements in 2013.

Twenty years ago in 1993, the RFA became more integrated into the RN structure when it was made responsible directly to the

Commander-in-Chief Fleet, according to Cdre Walworth.

“We operate at sea in the same chain of command as all other UK defence forces.” Accordingly, senior RFA personnel play a role in Navy Command Headquarters at Whale Island in Portsmouth.

Historically, the greatest challenge has been to participate fully in RN operations while also maintaining the RFA’s identity and ethos, says Cdre Walworth. He believes that the RFA is not disadvantaged, and regards the integration at Navy task force and headquarters levels as pretty complete, and yet nevertheless likely to continue evolving.

For example, RFA entrants receive RN training; ratings go to HMS RALEIGH at Torpoint in Cornwall; while officers attend Britannia College, Dartmouth and Fleetwood Nautical College. This provides core maritime skills and an overview of RN tasking, which are essential to achieving joint operational effectiveness, and contributing to what Cdre Walworth calls an extremely cost-efficient resource with a huge capability.

Although RFA personnel are civilians, with procedures following international maritime and merchant-shipping safety regulations, they work in a military context that includes discipline. Crucially, their personal employment contracts commit crews to working under war-like conditions.

A computer-generated image of a MARS tanker alongside a Type 45 destroyer



BMT DEFENCE SERVICES

Having entered public consciousness some 30 years ago while supporting the Falklands campaign, the RFA's profile has not been maintained, and Cdre Walworth accepts that the Auxiliary's work can become hidden in the public's broader awareness of defence matters. That said, its place in the public consciousness may receive a boost as it prepares to receive new vessels.

#### MARS MISSION

The first steel for the initial batch of Military Afloat Reach and Sustainability (MARS) highly survivable fleet-replenishment tankers is scheduled to be cut on 24 June 2014. Designed by British Maritime Technology (BMT) Defence Services, these vessels are to be built in South Korea by Daewoo Shipbuilding & Marine Engineering (DSME). Despite being built in an overseas yard, a substantial amount of the MARS ships' completion work will be performed in the UK. British contractors will be used to fit some of the kit that will enable them to operate alongside their RN sister ships and organisations – in particular communications systems. RFA TIDESPRING, the first of these new tankers, is planned to enter service around July 2016.

MARS ships will play a major role in supporting RN global operations, assisting, for example, the carrier programme and

amphibious manoeuvres. Cdre Walworth sees these modern, very efficient and environmentally safe vessels as enabling the RFA to limit the logistical drag on a task force, and acknowledges that planning assumptions have changed over time. Six fleet-replenishment tankers will be needed to meet the needs of Future Force 2020, comprising four MARS vessels and two other tankers.

Recognising that an evolving plan could change, Cdre Walworth says that RFA MARS Solid Support Ship vessels should enter service in the middle of the decade. They will carry solid stores and munitions needed by the RN's new Queen Elizabeth-class aircraft carriers. Each vessel will have two helicopter-landing pads, known as spots, as well as a substantial aviation complex, including flight deck, hangar and workshops.

Cdre Walworth is at pains to emphasise the Auxiliary's belief in current strategies. As he wrote in *Gun Line*: "We have to stay cost-effective [and] what we are planning will set us up for the future. All the plans have been generated with a sustainable future in mind. I believe passionately in the people of the RFA, the way we operate and our place in the nation's life. We would not be putting ourselves through this unless convinced it is both good for the future of the RFA and the taxpayer. We have a fantastic and worldwide reputation in our field. We must stay ahead." ●

RFA FORT VICTORIA's Royal Marine boarding team from the Fleet Standby Rifle Squadron apprehended 13 Somali pirates

# Delivering capability to the Royal Navy



**Ian Gould talks to the Head of the Royal Fleet Auxiliary, Commodore Bill Walworth CBE, to find out how the Auxiliary is assuming greater responsibility for ensuring maritime security across the globe and has earned an enviable reputation as a pirate-busting organisation**

**T**he Royal Fleet Auxiliary (RFA) has demonstrated its value and versatility by providing a command platform for international anti-piracy and counter-narcotics operations, delivering capability in an effective but different way. Already fully integrated into the Royal Navy (RN) command and control system

– and therefore established as a vital part of UK maritime operations – the Auxiliary deployed RFA FORT VICTORIA in 2012 to act as flagship for counter-piracy work in the Gulf of Aden and the Somali Basin off the Horn of Africa.

The everyday activity of the Ministry of Defence-owned (but civilian-manned) RFA flotilla is to furnish RN ships with supplies – usually through replenishment at sea (RAS) operations – to transport Army and Royal Marine personnel and to support training exercises. The primary role for FORT VICTORIA, one of the most versatile ships in the British Fleet, is RN logistic support and seaborne delivery of fuel, stores and ammunition, while she can also operate up to five helicopters and accommodate a full command staff. “She is the RFA’s highest-profile vessel and



can lead a group of other ships, making full use of her military satellite-communications capacity," says the Head of the RFA, Commodore (Cdre) Bill Walworth.

**THE RFA AND THE ROYAL THAI NAVY JOIN FORCES**

As the flagship of Combined Task Force 151 (CTF 151), RFA FORT VICTORIA embarked a multi-national battle staff under Rear Admiral Tanin Likitawong, the Royal Thai Navy's Counter-Piracy Task Group Commander. The three-month operation strengthened ties with naval forces in the region, and further developed communication and collaboration within the merchant-shipping community. Embarked staff included Thai commanders and representatives from the Danish, Dutch, Italian, South Korean and US navies.

RFA FORT VICTORIA on counter piracy operations



**COMBINED MARITIME FORCES**

CMF is a unique naval coalition that is dedicated to the promotion of security in more than 2.5 million square miles of international waters in the Middle East and West Asia. Its main areas of focus are fighting terrorism, preventing piracy, reducing illegal activities at sea and promoting a safe maritime environment. Response times to incidents have been actively reduced through a focus on international cooperation and coordination.

CTF 151 is one of three CMF task forces. It was set up in January 2009 to deter, disrupt and suppress piracy, protect any nation's maritime vessels and secure freedom of navigation for all. The task force's area of operation encompasses more than a million square miles of ocean within the greater CMF operational area.

In the words of Captain Ian N Pilling RFA, then Commanding Officer of FORT VICTORIA, it was a unique opportunity for the ship to contribute to the Bahrain-based Combined Maritime Forces (CMF) – an international partnership that is led by the US: "Having a multi-national staff in a UK asset typifies the co-operation and professionalism that exists between the maritime nations." The period marked the first time that an RFA vessel had acted as a foreign-led task force flagship, and the first time that the Royal Thai Navy had assumed a CTF command.

A major factor in the RFA's performance and its ability to serve in multi-national forces lies in its recent history. Today's flotilla benefits from 30 years of training to operate with the RN fleet. Accordingly, the modern RFA has, "the knowledge and equipment to conduct maritime security operations alone without necessarily having the support of a warship", says Cdre Walworth. He points out that this means that the RFA can be applied across a wide range of tasks, including providing command and control, as was demonstrated last year.

Cdre Walworth says that only the US has a comparable force – in its Military Sealift Command. The Military Sealift Command operates a very much larger fleet of about 100 non-combatant, civilian-crewed ships. The role that these ships fulfil is to replenish US Navy ships, conduct special missions,

strategically position combat cargo at sea and move military cargo as well as supplies for deployed US forces and coalition partners.

Commenting on his CTF 151 command when handing over to his successor – Rear Admiral Anho Chung of the Republic of Korea Navy – at Bahrain in June 2012, Rear Admiral Litikawong

## A major factor in the RFA's performance and its ability to serve in multi-national forces lies in its recent history. Today's flotilla benefits from 30 years of training

said: "The success of the counter-piracy mission is based on the strength of the multi-national staff and the support which RFA FORT VICTORIA was able to give as my flagship." RFA commander Cdre Walworth CBE concludes: "Our reputation has been enhanced by FORT VICTORIA acting as flagship for the Royal Thai Navy command of the counter-piracy effort off Somalia." ●

A Royal Navy Lynx Mk 8 departs FORT VICTORIA



## FORT VICTORIA HOSTS US NAVY HELICOPTERS

During RFA FORT VICTORIA's period as the Combined Task Force 151 (CTF 151) flagship, its suitability for the role was illustrated by the experience of US Navy Helicopter Maritime Strike Squadron Seven Seven (HSM 77), which embarked on the British vessel for two weeks at the request of CTF 151 commander, Rear Admiral Tanin Likitawong of the Royal Thai

Navy. Led by Lieutenant Commander (Lt Cdr) Aric Edmondson, this was the first US helicopter detachment to be embarked on an RFA ship.

Carrier Strike Group 9 and Carrier Air Wing (CVW) 2 deployed Sikorsky MH-60R Seahawk helicopters onto the RFA flagship. According to unit Commanding Officer Commander Brent Gaut, "The presence of CVW 2's HSM-77,

Detachment 5 aboard RFA FORT VICTORIA was a major milestone for the squadron." Indeed, it contributed significantly toward US-UK interoperability in the area.

Detachment 5 was chosen because the MH-60R's primary missions are surface and anti-submarine warfare. HSM-77 was tasked with providing FORT VICTORIA with counter-piracy surface-surveillance coordination flights in three operating areas, and to show that US Navy helicopter squadrons can successfully prepare, deploy, operate and disembark a detachment from foreign vessels.

"It was clear upon arrival that the aviation spaces were excellent," said Lt Cdr Edmondson. "For cruiser/destroyer pilots, the FORT VICTORIA flight deck was large and made for an outstanding forward-afloat staging base."

During its deployment, the HSM-77 detachment was instrumental in the liberation of a pirated motor vessel in the southern half of the North Arabian Sea. FORT VICTORIA and other coalition surface vessels 'canvassed' the area in order to locate and assist three merchant ships in distress. An MH-60R intelligence, surveillance and reconnaissance mission identified a vessel under pirate control and the location of a pirate mother ship, providing information that enabled a coalition boarding team to free the captured ship.

U.S. NAVY



Members of USN Helicopter Maritime Strike Squadron Seven Seven embarked on Royal Fleet Auxiliary FORT VICTORIA during operations with CTF 151





## Materiel Support

Message from Vice Admiral Sir Andrew Mathews KCB, Chief of Materiel (Fleet)

Over the past 12 months we have faced enormous challenges. In the midst of some of the most wide-ranging changes ever made to the defence community in the United Kingdom, the men and women who are tasked with supporting the Royal Navy's (RN) ships, submarines, helicopters, weapon systems and bases have done an incredible job. As we went through the painful process of saying goodbye to colleagues and friends, those of us who remain have had to ensure that we got the day job done, that every piece of equipment and RN facility was adequately supported, and that the complex task of introducing new platforms and weapon systems continued on course and according to schedule.

The last year has been an unsettling period, but I genuinely feel that the worst is behind us, and that not only have we kept

our heads above water, we have also made significant improvements to the way in which we do things. There are numerous areas where substantive gains have been made. We have begun to get a much firmer grip on the items we hold in storage and made targeted and focused improvements to our equipment planning and maintenance.

We are not alone in having to endure budget cuts and manpower losses. Almost every western nation is going through a similar experience, but despite that, there has been a raft of good news. The Royal Navy's future is tethered to the success of the new Queen Elizabeth aircraft carriers, and I can confirm that we are back on track to deliver these two ships on time and to budget. Having reverted to the jump-jet version of the F-35 Lightning II multirole aircraft, we are now building both ships with



Computer-generated image of the Type 26 Global Combat Ship, which will replace the Type 23 frigates

**OUR FOUNDATION IS OUR TECHNOLOGIES  
OUR MISSION IS EXPANDING YOUR CAPABILITIES**



Scott Safety, formerly Scott Health & Safety are world leaders in the design and development of Respiratory Protection Equipment (RPE). We have a detailed understanding of the physiological and psychological burden RPE can place on users. That is why we test in the field. And we apply what we learn there - as well as emerging research and technologies to every design to ensure capability, functionality and comfort. Irrespective of whether your requirement is for CBRN protection, Breathing Apparatus for EOD, USAR, damage control, fire-fighting or for specialist applications Scott can meet your requirements - comfortably.

Secretary of State for Defence, Philip Hammond, has announced funding for the next stage of design work for the Successor deterrent submarines



a fast jet capability, instead of just one. This move will offer the government options when it comes to the next Defence Review in 2015 on whether the nation can afford to operate both ships.

Another highlight is the fact that all six Type 45 Daring-class destroyers are now in the water, with two of them, HM Ships DARING and DAUNTLESS, having already completed operational deployments. The fifth ship in the class, HMS DRAGON, entered service ahead of schedule in April 2012. We now move on to the Type 26 Global Combat Ship, which will replace our existing

## **The Wildcat helicopter that will replace the Mk8 Lynx is now flying and production is in full swing with deliveries due in 2013**

Type 23 frigates. There is much to report here as we received approval in May 2012 to move to the next stage of the programme. For the first time in the history of RN shipbuilding, we will present the government with a plan that includes the entire through-life costs of these vessels, which will be of great help to future budgetary planning.

Our building of the seven Astute hunter-killer submarines is also well on track. Having learnt the lessons of how a break in submarine manufacture can cost both time and money, as well as put our ability to complete such a high-end industrial programme in jeopardy, we have dovetailed the final phase of the Astute build

programme with the initial phase of the next-generation nuclear deterrent Successor submarines. The announcement in October by the Secretary of State for Defence, Philip Hammond, for additional funding for the design of the Successor boats will sustain some 1,200 jobs. This is on top of the 10,000 British workers involved in the production of the aircraft carriers.

It is often overlooked that defence makes a significant contribution to the UK's overall industrial capability and our worldwide reputation for advanced technology projects. The UK's major role as a Tier 1 partner in the F-35 Lightning II jet is yet another example of the wealth of industrial and technological know-how that resides in this country and which is playing its part in helping us out of the economic downturn.

Our ability to build helicopters is another undoubted sign of our industrial strengths. The RN's own helicopter community has seen a lot of advances throughout the year. The Wildcat helicopter that will replace the Mk8 Lynx is now flying and production is in full swing with deliveries due in 2013. The upgraded Mk2 Merlin helicopters will also start deliveries to the RN in 2013, and with the transfer of the Mk3/3A from the Royal Air Force, the RN will now take the lead with these aircraft.

There is much more that I could mention as you will see from the articles in this publication, but it remains for me to remind everyone that we have a challenging and full programme ahead of us. To succeed, we need to remain flexible and embrace change as well as the opportunities it brings. If we focus on outputs and principles, and always seek to understand the strategic intent of our actions, we will have played our part in ensuring a bright and exciting future for the Royal Navy. ●

Artist's impression of aircraft carriers  
QUEEN ELIZABETH and PRINCE OF WALES

# Carrier strike



**Britain looks set to rebuild a major aircraft carrier capability by the end of the decade. *Nick Childs* reports on how the programme has evolved and where it stands currently**

It has been another year of upheaval for Britain's long-running effort to produce a new generation of big aircraft carriers. The dramatic progress that has been made in what remains the country's most significant and hotly debated new defence equipment project also promises a major shift in both the real and public perceptions of the programme over the coming 12 months.

One of the most significant decisions to emerge from the 2010 Strategic Defence and Security Review (SDSR) was a switch in the variant of the F-35 Lightning II Joint Strike Fighter to be operated from the new carriers. The coalition government ditched the short take-off and vertical landing (STOVL) B version in favour of the conventional carrier version, the F-35C.

However, by early 2012, it became clear that the F-35B was back from the dead. The new Secretary of State for Defence, Philip Hammond, was intent on a major U-turn, chiefly due to reportedly burgeoning ship conversion costs required to equip the one planned operational carrier with the US-designed electromagnetic catapult system (EMALS) and advanced arrestor gear.

The proposed U-turn carried with it considerable political sensitivity. It also sparked a heated and at times acrimonious debate. Proponents of the 'cats and traps' F-35C approach continued to argue for both the tactical and strategic significance of its better range and payload, as well as the greater interoperability that it offered with the US Navy.

However, on 10 May 2012, citing "unacceptable" growth in the estimated cost of the 'cats and traps' ship conversion – which had increased, it was said, from £1 billion to £2 billion for just one carrier – Philip Hammond confirmed the U-turn.

The Secretary of State for Defence also suggested that there would be increased delays if Britain stuck to the F-35C, with no



One of five of the QUEEN ELIZABETH blocks is unveiled at BAE Systems Govan shipyard



Block LB04 leaves the Clyde in November 2012 on her way to Rosyth



new carrier capability before 2023; whereas because HMS QUEEN ELIZABETH would be able to operate the STOVL F-35B, trials could instead begin with this variant in 2018 for operations from 2020.

The government also dangled the carrot of being able to afford to maintain a continuous carrier capability, by keeping the second ship ready for operations when the first was undergoing maintenance. However, a final decision on that will come only at the time of the 2015 SDSR. Despite the programme changes, it is significant that the 2010 SDSR included a strong re-affirmation of the strategic rationale for a carrier strike capability.

#### **FLEXIBILITY AND CAPABILITY**

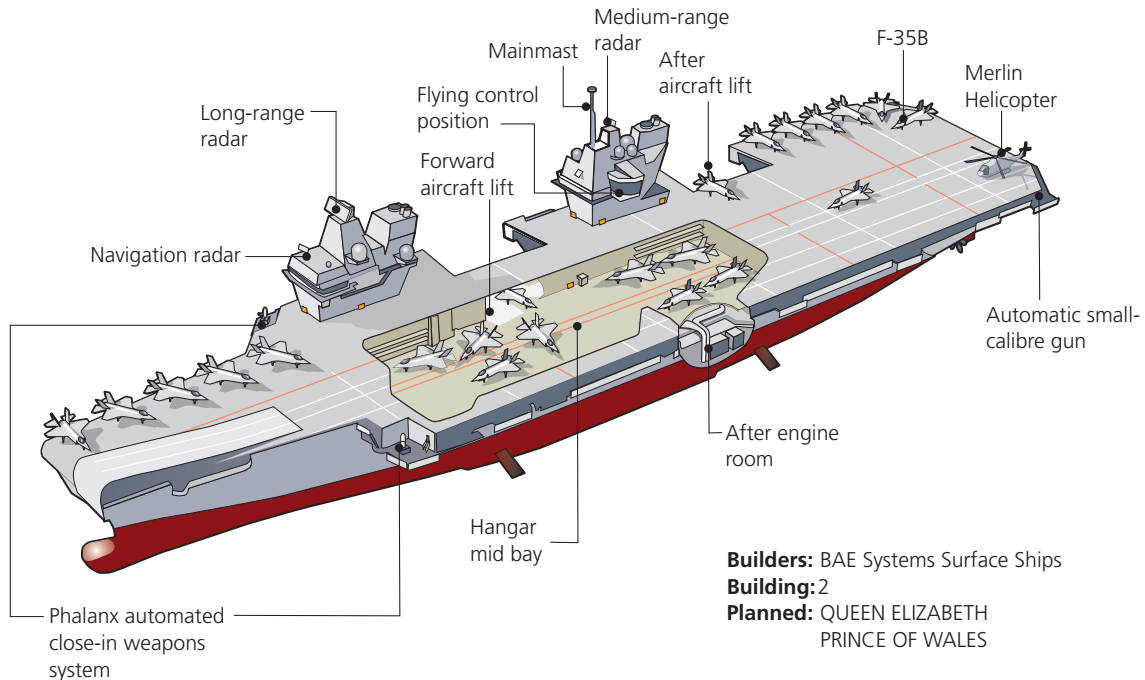
At 65,000 tons, the new ships are three times the size of the Invincible-class carriers that have served for the last three decades. HM Ships QUEEN ELIZABETH and PRINCE OF WALES represent more than just straight replacements. These ships are about re-establishing a level of carrier strike capability – and hence of power projection, independent if necessary of foreign basing

rights or a significant military footprint ashore – not seen as far as Britain is concerned in more than a generation. Further to this, they will also offer a much greater level of flexibility and capability for a whole range of other tasks.

That vision has finally begun to take on a very real and increasingly massive form. Clearly, the carriers' supporters are hoping that, pretty soon, people will begin to notice, and that the tone and nature of the debate about the ships will also start to shift. Most specifically, construction of HMS QUEEN ELIZABETH had progressed to the point where, by late 2012, the majority of the blocks for the forward part of the ship had been assembled in the dry dock at Rosyth in Scotland. The blocks amounted to some 20,000 tons – which is already close to the size of the RN's current largest warship, HMS OCEAN.

The first major part of the aft end of the ship, Lower Block 04, another 10,500 tons, had also been delivered. The same would soon be the case for the ship's two islands. Thus, the first of the Queen Elizabeth-class (QE) carriers is finally beginning the transformation

## QUEEN ELIZABETH CLASS



**Displacement:** 65,600 metric tons (full load)  
**Length:** 284m (932ft)  
**Beam:** 39m (waterline) 73m overall  
**Draught:** 11m

**Decks:** 16,000m<sup>2</sup>  
**Speed:** 25+ knots  
**Range:** 10,000 nautical miles  
**Capacity:** 1,450  
**Complement:** 600

**Aircraft carried:**  
 40 (50 full load) aircraft  
 36 F-35 Lightning II  
 4 Airborne Early Warning aircraft

PRESS ASSOCIATION GRAPHIC – SOURCE: ROYAL NAVY

from a huge assembly kit into the giant new aircraft carrier that has been talked about in abstract for so long. Major blocks of the second vessel are also well advanced, waiting for assembly to begin.

Another significant milestone occurred in October, when the first members of the ship's company of HMS QUEEN ELIZABETH arrived in Rosyth. The eight crew members were led by Captain Simon Petitt. It is expected that, by the end of 2013, that this number will have grown to between 75 and 80 people. It will be the job of Captain Petitt and his growing team to learn about the ship and her technology, and to write the operating policy and procedures that will enable her to come into service in 2020.

### F-35B DELIVERIES BEGIN

Also significant was the delivery of Britain's first F-35B, in a ceremony in Fort Worth, Texas, in July – an event that was attended by Philip Hammond. Despite the U-turn on the F-35 variant, the US Navy has stuck to its offer to provide pilot training and other carrier crew opportunities, so that the British can maintain carrier-operating skills. The French Navy will also offer what assistance it can from its own carrier capability.

Yet, with Britain for the moment still committed to buying only 48 F-35s initially, in a joint project with both the RN and the RAF, debate continued behind the scenes over operational issues. How many jets would normally be based at sea, and in what

circumstances? Hammond appeared to settle that argument at the beginning of November. In a speech in London he declared that, "when deployed outside home waters, the new carrier will routinely have Lightning II jets embarked with personnel from both services". He also confirmed that the normal number of jets

## It is significant that the 2010 SDSR included a strong re-affirmation of the strategic rationale for a carrier strike capability

would be 12, but with the ability to surge when necessary, and the QE class will be able to accommodate up to 36 F-35s.

Hammond also gave the strongest hint to date that the RN would keep both carriers available for operations. The cost of maintenance and a skeleton crew for the second ship would be, he said, a "modest" £70m. In his opinion, that was "an extremely good investment" to have a continuous carrier capability and the ability, "in extremis", to surge to two carriers at a time of tension. For the RN, that would clearly be a tantalising prospect. But it is beginning to take on a tangible shape. ●

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# F-35 Lightning II: plan B up and running



On 19 July 2012, the UK Secretary of State for Defence, Philip Hammond, addresses the audience as he takes delivery of the UK's first F-35B jet



**Peter Grant reveals how the Royal Navy's next multi-role jet aircraft programme is taking shape as British personnel begin training for its operation, and looks at when it will be ready to fly off the new Queen Elizabeth-class aircraft carriers**

Some readers may be surprised to learn that the Fleet Air Arm's next fixed-wing combat aircraft – the Lockheed Martin F-35B Lightning II – is not just another purchase from a US production line. It is, in fact, a joint development in both industry terms and service involvement. Originally known within the Ministry of Defence (MoD) as the Joint Combat Aircraft (JCA), the F-35B, designated Lightning II, will be a joint procurement for the Royal Navy (RN) and the Royal Air Force (RAF).

One military test pilot is already flying the pre-production development test aircraft at Pax River, and two British pilots – one from each service – are due to enter the training pipeline to fly the UK's first two production aircraft at Eglin Air Force Base (AFB) in the United States (with a third in the pipeline). The technical training of 60 engineering personnel – a mix of RN/RAF personnel – is already under way. UK flying started in December 2012, as part of a joint endeavour with the United States Marine Corps (USMC) personnel, where all assets and personnel will be operated on a pooled basis. The aim of the training effort with the USMC is to enter the official Operational Test and Evaluation period around 2015.

The F-35 is the winner of a US programme known as the Joint Strike Fighter (JSF), which had its origins in the mid-1990s. UK involvement began in December 1995, through the signing of a Memorandum of Understanding (MoU) with the US, committing the UK to a four-year weapons system concept demonstration (WSCD) phase, which saw two competing designs evaluated.

A formal Request for Proposals for the JSF was issued in June 1996 and, on 16 November 1996, it was announced that Boeing (with its X-32 design) and Lockheed Martin (with its X-35 design) had been chosen to participate in the WSCD. Each company would build three demonstration aircraft: a conventional take-off and landing (CTOL) airframe, an advanced short take-off and vertical landing (STOVL) version and a carrier-based CV variant. Each competitor selected Pratt & Whitney to supply what became the F135 turbofan as the main powerplant.

By June 1997, British Aerospace (now BAE Systems) and Northrop Grumman had joined Lockheed Martin's development team and the X-35 design had been frozen. The first prototype X-35A made its maiden flight on 24 October 2000. By 22 November 2000, after 25 flying hours, the X-35A returned to Lockheed Martin's Palmdale works to be converted to X-35B STOVL configuration. This

version is the same airframe as the A-model, but with a broader and higher spine behind the cockpit to accommodate the engine-driven lift fan – which gives it the STOVL capability but at the cost of displacing some fuel – and a shortened cockpit canopy. The engine also features a Three Bearing Swivel Module at the exhaust that points the main jet efflux downwards, which, together with the lift fan, allows it to hover. The X-35C carrier-based CV version flew on 16 December 2000. Hover-pit trials of the X-35B began in late December 2000 and, on 23 June 2001, the first brief vertical take-off and landing took place, followed by a sustained hover flight the next day. Testing of the X-35B had concluded by 30 July 2001.

With the award of the System Design and Development (SDD) contract to Lockheed Martin on 26 October 2001, the X-35 was declared 'winner' of the JSF contest, becoming the F-35, with Pratt & Whitney receiving a contract for the associated F135 powerplant. In all, 19 development aircraft have been delivered for the SDD phase. Three variants are being produced: the F-35A land-based CTOL version for the US Air Force; the F-35B STOVL version for the USMC, RN and RAF; and the F-35C CV version for the US Navy.

The aircraft was christened Lightning II in July 2006, echoing the Lockheed P-38 Lightning and the English Electric Lightning. The end of that year saw the signature process initiated for the MoU covering the F-35's Production, Sustainment and Follow-on Development (PSFDMoU) phase to cover the through-life support and acquisition of the aircraft, with the US and UK joining forces with other international partners – Australia, Canada, Denmark, Italy, the Netherlands, Norway and Turkey. The PSFDMoU established a collaborative partnership where they would seek to maintain commonality through-life and share a single global support solution.

#### THE BENEFITS OF PARTNERSHIP

Being a Level One partner in the F-35 project brought with it the opportunity to include UK requirements for the aircraft's parameters into the joint operational requirements document. Put another way, it was designed as much for the UK's circumstances as for the US forces.

While the RN's Fleet Air Arm gave up its dedicated Sea Harrier FA.2 in March 2006 and lost the Harrier GR.9A in December 2011 (dates not foreseen in 1995), the first two examples of the replacement F-35B Lightning II are now in British



LOCKHEED-MARTIN

The F-35B goes through short take off and vertical landing serials on USS WASP



LOCKHEED-MARTIN



United Kingdom Royal Air Force Squadron Leader, Jim Schofield, flew the first British F-35B Lightning II on 23 July 2012

U.S. AIR FORCE



F-35B BK-2 begins its ferry flight to Eglin Air Force Base

LOCKHEED-MARTIN

hands. The first of three operational test F-35B models for the UK, ZM135 (company identification BK-1) flew from Lockheed Martin's facility at Fort Worth, Texas, on 13 April 2012, having been officially handed-over to the UK MoD on 19 July and transferred to Eglin AFB for training. By 19 October, the second UK F-35B (ZM136 / BK-2) had arrived at Eglin. The third aircraft, ZM137 / BK-3, flew on 2 April. The first order for production F-35B aircraft, sufficient to form the UK's first operational unit, is expected by the end of 2013.

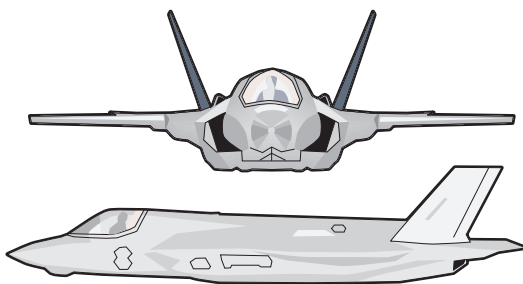
The F-35 is a Fifth Generation fighter optimised for low-observability (or stealth). It has a mid-wing, trapezoidal plan configuration with twin fins and an internal weapons bay, powered by a Pratt & Whitney F135 turbofan engine, rated at 28,800lb st without afterburning and 40,000lb st with full reheat. It has a sophisticated radar and avionics suite, including the APG-81 radar with an active electronically scanned antenna, allowing it to engage air and ground targets at long range, while also providing situational awareness for enhanced survivability. Other systems include the AAS-37 electro-optical Distributed Aperture System, providing the pilot with a unique protective

knowledge of the F-35 before undertaking Operational Test on a joint operational unit from mid 2014. Beyond Operational Test, the UK's first operational squadron will form in the US from 2016 as part of a joint effort with the USMC, transitioning back to the UK in 2018. To be RAF Marham in Norfolk, it will work up as an independent unit aiming to attain a land-based Initial Operating

## Being a Level One partner in the F-35 project brought with it the opportunity to include UK requirements

Capability (IOC) by the end of 2018, which matches the arrival of the first of the new aircraft carriers, HMS QUEEN ELIZABETH, when embarked flying trials will get under way. It is planned to reach maritime IOC by 2020.

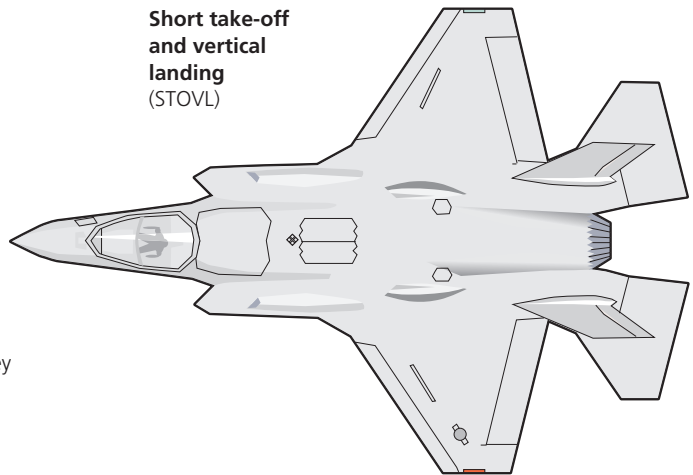
### F-35B JOINT STRIKE FIGHTER



**Wing span:** 35ft  
**Length:** 50.5ft  
**Wing area:** 460ft<sup>2</sup>  
**Internal fuel:** 13,325lbs  
**Speed:** Mach 1.5 / Mach 1.8+ (1,200mph)

**Engines:** Pratt & Whitney F-135 turbofan  
**Max altitude:** 50,000ft  
**Armament:** Paveway IV, AMRAAM, ASRAAM

Short take-off and vertical landing (STOVL)



PRESS ASSOCIATION GRAPHIC – SOURCE: GLOBALSEcurity.ORG

sphere around the aircraft for missile warning, navigation support and night operations; the AAQ-40 Electro-Optic Targeting System, a passive and complementary system to the radar; and a comprehensive electronic warfare suite.

"Be in no doubt, this is a very exciting aircraft," says Squadron Leader Jim Schofield, the first UK F-35B test pilot, writing in *DESider*, an MoD magazine. "Information from all of these sensors is combined to provide a seamless multi-spectral picture of the battlespace. From a pilot's view, the situational awareness is breathtaking," he observes. Flying the aircraft, he says, is "a wholly stress-free affair", adding that "the F-35 is the easiest aircraft to fly of the 80 or so I've flown by a large margin, allowing the pilot to focus his mental capacity on warfighting rather than 'just' flying".

Once the first UK pilots have completed their training at Eglin, which began on 19 March 2013, they will be used as instructor pilots to train USMC colleagues, gaining experience and

Speaking to *Global Reach*, Commodore Rick Thompson RN, head of the JCA Lighting Project Team at the MoD, was enthusiastic over not just the capability that Lightning II will bring to the UK, but also the joint nature in which it has been procured and is being introduced into service thus far. "The success of this small team spread across the US and UK is its truly Joint nature, delivering the OT aircraft on time and within budget," he said. "It is impressive what can be achieved when you have a single joint vision with Royal Navy, Royal Air Force and US Marine Corps pilots, maintainers and logisticians all working together in a 'purple' environment to deliver a common, world-beating capability."

The F-35, Thompson said, "is capable, survivable and based on commonality across all three variants to ensure affordability. It will contribute to the widest range of operational roles, ashore and afloat, and has been optimised for expeditionary warfare." ●

# The Type 45 Daring-class destroyers

A Sea Viper anti-aircraft missile blasts out of one of HMS DIAMOND's silos before destroying a target drone

**As the final Type 42 air defence destroyers leave service, Alan Dron explains how their replacements, the Type 45 Daring warships, will make an impression on the fleet**

**G**enerally hailed as one of the most capable air defence vessels in the world, the Type 45s bring a step-change in capabilities over their predecessors to the Royal Navy (RN). With highly advanced powerplants, radars and weapon systems, they will be a powerful addition to RN or coalition task forces for several decades to come.

The design was developed after the RN decided to pull out of the proposed joint programme with France and Italy to build Horizon-class destroyers. It was felt that the Horizon's design would be too cramped for the RN's requirements. The main remaining point of similarity between the vessels is their anti-air missile system.

Despite being significantly larger than the Type 42s that they replace – displacing around 8,000 tons compared with 5,200 – the application of stealth technology on the Type 45 means that it has a smaller radar signature than its predecessors. Vertical surfaces and radar-reflecting right angles have been reduced to a minimum, while as many external fittings as possible, such as the deck equipment and ship's boats, have been hidden away behind superstructure panels in order to give the Type 45s the maximum degree of stealth.

The Type 45's powerplant is a new, all-electric system that is designed to be both efficient and extremely quiet. A combination of two Rolls-Royce WR-21 advanced marine gas turbines and two Wärtsilä 12V200 diesel generators provide electrical power to a high voltage system. This supply then delivers power to two Converteam advanced induction motors, each with an output of 20MW (27,000hp).

The WR-21s, which draw technologically on Rolls-Royce's extensive experience with the highly successful RB211 and Trent airliner turbofans, have intercooler and exhaust recuperator (ICR) heat exchangers to reduce the Type 45s' fuel consumption by around 30 per cent over earlier powerplants – a major saving

over the ships' lifetimes. This all adds up to a cruising speed of 17 knots using all-electric propulsion, and a declared top speed of 27 knots. However, during her sea trials HMS DARING is reported to have exceeded 30 knots.

As air defence vessels, the main armament of the Type 45s takes the form of the Sea Viper surface-to-air missile system, formerly referred to as PAAMS (Principal Anti-Air Missile System). Designed to provide an air defence 'umbrella' to a task force – primarily based around the Queen Elizabeth-class carriers when these enter service around the end of the decade – the Sea Viper system combines what the manufacturer, BAE Systems, describes as the world-leading Sampson radar with a Sylver silo complex and the Eurosam consortium's Aster missiles.

**A COMBINED DEFENCE SYSTEM**

Sampson, an active electronically scanned array (AESA) radar housed within a distinctive globe atop the forward mast, is a multi-function sensor that can simultaneously detect and track hundreds of targets out to 400km.

Some reports show that Sampson to be capable of tracking an object that is as small as a cricket ball moving at Mach 3. AESA radars differ from the more traditional systems in that they have hundreds of small transmitter/receiver modules which direct their signals by emitting separate radio waves. Furthermore, to complement the stealthy nature of the vessel itself, Sampson spreads its signal emissions across a band of frequencies, which makes it very difficult to detect over background noise. It is paired with the S1850M long-range radar, which is housed on the aft mast.

The Aster missiles – 48 are shipped in individual silos in a foredeck 'missile farm' – are a mix of Aster 15s (with a range of 2-30km) and longer-ranged Aster 30s (3-120km). They are designed to be capable of dealing with a wide range of air threats, including incoming supersonic sea-skimming anti-ship missiles. For last-ditch anti-air defence, the Type 45s also mount two Phalanx close-in weapons systems with six-barrelled 20mm Gatling cannons that can fire up to 4,500 rounds a minute.

As the Type 45s are likely to find themselves in low-intensity situations at some time in their careers, they are also equipped

The BAE Sampson AESA radar can track hundreds of airborne targets as far away as 400km



A Sea Viper missile speeds towards a target from HMS DARING



BAE SYSTEMS

HMS DARING's Lynx Mk 8 helicopter armed with Sea Skua anti-ship missiles



with two Oerlikon KCB 30mm cannons, plus two 7.62mm Miniguns. The Oerlikon cannons are smaller calibre versions of the Phalanx that follow its rotating multiple barrel principle. General-purpose machine guns can also be mounted for close-in defence.

### As air defence vessels, the main armament of the Type 45s takes the form of the Sea Viper surface-to-air missile system

Rounding out the gun armament is the RN's standard 4.5 inch Mark 8, which is housed in a foredeck turret. This fires shells out to 12nm (22km, or 27km with an extended range round). The gun is the Mod 1 variant. The Mark 8's faceted turret contributes to the ship's overall stealth characteristics.

#### ANTI-SHIP AND DECOY SYSTEMS

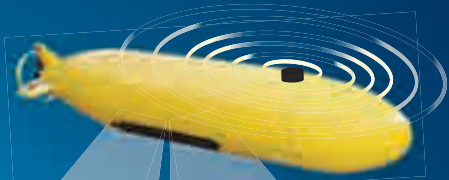
Currently, the only anti-ship missiles carried by the Type 45s are the BAE Systems Sea Skuas on the ships' AgustaWestland Lynx

HMA8 helicopter. The ships are outfitted 'for but not with' eight Boeing AGM-84 Harpoon anti-ship missiles that may be installed during future refits. The ships also have the capability to carry the US-built Tomahawk cruise missile, although this would require the current A50 Sylver launcher to be replaced with the longer-length A70 model.

The Lynx can alternatively carry two BAE Systems Sting Ray lightweight anti-submarine torpedoes. On Type 45s, where the Lynx is replaced by the larger AgustaWestland EH101 Merlin, the complement of torpedoes doubles to four, although the Merlin does not mount the Sea Skua.

Other, passive defence systems comprise the Sea Gnat launcher, firing a mixture of chaff, flares and other decoys, a floating decoy system that gives off a large radar contact and the Surface Ship Torpedo Defence system, which deploys acoustic decoys to 'spoof' incoming torpedoes.

Automation on board means that the Type 45s have a crew of just 190, in contrast to the older Type 42s, which have a complement of between 270 and 300 personnel. The smaller crew means that the individual crew members have considerably better accommodation. Should things get really tricky, the Darings are capable of carrying up to 60 Royal Marines. ●



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# Astute submarines



**With the second Astute-class submarine at sea on trials, the transformation of the Royal Navy's nuclear-powered hunter-killer submarine force continues to make significant strides, as Nick Childs reports**

One of the capabilities that still sets the Royal Navy (RN) apart from most other navies is its fleet of nuclear-powered hunter-killer submarines, known as SSNs (Ships Submersible – Nuclear). With the transition of that capability to the new Astute class from the long-serving 'T' and 'S' (Trafalgar and Swiftsure) class boats now well and truly under way, a very significant element of the future RN is beginning to take shape.

HMS ASTUTE herself first went to sea in 2009, and was commissioned into the RN in August 2010. A major hurdle for her

on the way to acceptance into full operational service was a 142-day trials deployment across the Atlantic from late 2011 into 2012. The deployment included 77 days spent at sea. Among the highlights was a first-of-class firing of Tomahawk land-attack cruise missiles (TLAMs) – a total of four Tomahawks was launched – and the firing of six Spearfish heavyweight torpedoes, including the first salvo firing by a British submarine for 15 years. ASTUTE was put through her paces in other ways, including diving deep, and exercising with one of the US Navy's newest submarines, the Virginia-class SSN *USS New Mexico*.

According to ASTUTE's commanding officer at the time, Commander Iain Breckenbridge OBE, the Americans were "taken aback" by the range and capability of the British submarine's sonar. In total, ASTUTE covered 16,400 miles during the deployment, before returning to her home base on the Clyde for a maintenance period. In September 2012, the second of the Astute class, HMS AMBUSH, sailed into the Clyde for the first time to begin sea trials.



The Royal Navy's new hunter-killer submarine, HMS ASTUTE, is one of the world's most advanced submarines



BAE SYSTEMS

HMS ASTUTE and her six sisters, at 7,400 tons submerged displacement, are a dramatic 50 per cent bigger than the preceding 'T' boats. With almost 20 years having past since the last arrival an SSN, ASTUTE's entry into service has not been without its difficulties. As a result, her trials programme has been protracted, and her operational debut has been delayed as various issues have arisen that had to be addressed. Still, she is on schedule to become operational in early 2013.

The 'A' class represents quite a step-change in capability, especially in the context of the developing post-Cold-War world. During that time, the RN's SSNs focused almost exclusively on the single task of countering Soviet submarines. Since then they have morphed into being one of the most potent power projectors, as they are capable of rapid response, launching cruise missiles, gathering intelligence and deploying Special Forces. Further to this, they are still, perhaps, the most formidable of modern platforms for traditional naval warfare.

The enhancements embodied in the Astutes are particularly significant in these areas. They will be much more capable at delivering Special Forces and their equipment than their predecessors. With even more emphasis being placed on the gathering of intelligence, surveillance, target acquisition and reconnaissance (ISTAR), the Astutes have a new combat system and array of sensors and communications. HMS ASTUTE is also proving that the new class will be exceptionally stealthy, particularly in terms of its noise signature.

Weapons stowage is also up by more than half compared with the 'T' boats – they carry a maximum combination of 38 Tomahawk missiles and Spearfish torpedoes, compared with a previous total of 24. This will provide a new level of flexibility for commanders, especially on long and remote deployments.

Maintaining a nuclear-powered submarine force is without doubt a hugely expensive and complex business. Even though conventionally powered submarines have improved significantly in

HMS ASTUTE launches a Tomahawk land-attack cruise missile from beneath the waves



capability and sophistication in recent years, they still cannot match the SSN's ability to deploy rapidly over great distances, unsupported and covertly if necessary, and to remain on station for prolonged periods. As it is the current government's stated aim to remain a global player, these are significant attributes. Another significant advance for the 'A's is that their reactor cores are designed to last for the duration of their operational lives without refuelling.

### **HMS ASTUTE is proving that the new class will be exceptionally stealthy, particularly in terms of its noise signature**

The government confirmed in the 2010 Strategic Defence and Security Review (SDSR) that there would be a total of seven Astutes. That is probably the critical minimum necessary, with the delayed introduction of the successor Trident submarines, to maintain the essential production 'drumbeat' required in order to sustain industrial skills. Some question whether it will be sufficient

to fulfil all the varied tasks that are required of the SSN force. At the very least, it will be a challenge for the 'A' and the remaining 'T' boats over the coming years.

The foremost commitment for the SSNs is to support and help safeguard the Trident force. They are also required to maintain a patrol capability in the Atlantic, including the South Atlantic. Furthermore, there is the significant new commitment to maintain a permanent TLAM-equipped capability east of Suez, where the submarine on station also supports maritime security operations, as well as strategic surveillance and intelligence-gathering activities.

The first two Astutes are now at sea, and AMBUSH should be handed over to the RN in mid-2013. Construction and assembly of the third, HMS ARTFUL, has largely been completed at BAE Systems' Barrow-in-Furness yard, with the focus switching to commissioning the submarine's systems. Her planned in-service date is 2015. Of the other boats currently under construction, the fourth, HMS AUDACIOUS, was due to receive her final major modules – the command deck and the main propulsion machinery package – before the end of 2012. The keel of the fifth boat, ANSON, was laid in October 2011.

The Astutes will remain a major programme until the last of the boats enters service in 2024, and they will be a significant mainstay of the Fleet for a lot longer. ●

# Wildcat on the prowl

**The Royal Navy's next-generation anti-surface vessel helicopter is now in production and well on the way to entering service. Ian Frain explains why the helicopter will be such a potent weapon**

**T**he AgustaWestland Lynx battlefield and naval helicopter has been a successful and vital part of the Fleet Air Arm (FAA) and Army Air Corps (AAC) for three decades. The FAA put the aircraft straight into action during the 1982 Falklands conflict where, armed with the new Sea Skua anti-shiping missile, one sunk an Argentinian patrol vessel and damaged another. The naval Lynx also played a successful role in the 1991 Gulf War, where six aircraft were responsible for 15 Iraqi ship kills, and in the post 9/11 climate the aircraft has performed well during Operation IRAQI FREEDOM and ENDURING FREEDOM.

Wildcat undergoes landing trials on RFA ARGUS

The AW159 Wildcat will replace the Lynx Mk8 (pictured)



The Commando Helicopter Force (CHF) also uses the army Lynx in both the anti-armour and trooping role, supporting amphibious operations from Operation SAFE HAVEN, post-Gulf War, to Operation IRAQI FREEDOM, where 847 Naval Air Squadron engaged and destroyed a number of tanks. In 1986, the Lynx claimed fame when development aircraft G-LYNX, flown by Chief Test Pilot Trevor Egginton, broke the world speed record for a helicopter by achieving a speed of 249.1mph (400.87 km/h).

Both naval and battlefield versions of the Lynx have seen upgrades over the decades, with the former having enjoyed considerable export success to countries as diverse as Brazil, Germany, Netherlands, Norway and Pakistan. The arrival of the Super Lynx then saw it exported to the Republic of Korea, Malaysia, Oman, South Africa and Thailand in the last decade. In the early 1980s, Westland promoted the Lynx-3 – a private

venture that was built to demonstrate the expanding potential of the aircraft as one of the prototypes was flown with AGM-114 Hellfire anti-armour missiles, like those featured on the AH-64 Apache, and Stinger air-to-air missiles. Unfortunately, a lack of orders meant the project was discontinued and eventually the aircraft found its way into the International Helicopter Museum.

#### **FOLLOWING IN THE LYNX'S FOOTSTEPS**

The next generation of rotorcraft to operate from the new generation of frigates and destroyers will be the AgustaWestland AW159 Wildcat. This helicopter will face tomorrow's challenges while continuing the successful heritage of the Lynx. At a distance, it looks similar to the Battlefield Lynx AH.9 and the Super Lynx 300, but closer up there are differences such as the twin stabiliser on the tail boom, which is similar to that proposed



Head-on image of the AW159 Wildcat



A 31-strong test team carried out extensive trials of Wildcat on board HMS IRON DUKE

on Lynx-3 of the 1980s. Instead of the Rolls-Royce Gem engines that powered the Lynx for years, it now has twin LHTEC CT800-4N engines, while the composite main rotors are British Experimental Rotor Programme (BERP) blades. There is also a much more powerful tail rotor. In terms of manufacturing the airframe, all the components have been marinised, and the maximum all-up mass has been increased to six tonnes, resulting in enhanced performance and operational capability.

Wildcat has a crashworthy airframe structure, crew and troop seats, while the landing gear has a robust design for ship-borne operations. There is ballistic tolerance protection built into the design, wire-strike protection as well as engine exhaust infra-red (IR) suppression. The Royal Navy, and in particular the Royal Marines, routinely carry out operations in contrasting conditions – from hot-and-high environments to the freezing Antarctic, so the airframe has been cleared to operate from extremes of -26 to +50 degrees centigrade.

The cockpit design comes with larger doors to help with getting in and out, and pilot workload is considerably eased through the installation of four 10x8 inch active matrix liquid crystal displays and a helmet mounting sight (HMS). In the heart of the Wildcat's systems are dual-mode and a multitude of redundancy systems. These include an aircraft management system (AMS) equipped with dual redundant control systems and standby flight instruments. The navigation suite is similar to that of the AW101 Merlin Mk2, with the installation of the embedded GPS and an inertial navigation system. The communications suite comprises Dual VHF/UHF inclusive of VHF tactical capability and high frequency.

The 21st century battlefield has become a digitised battlespace where the rapid processing of information is critical to the success of the mission, whether on land or in a maritime environment. Accordingly, the mission system architecture includes a tactical processor with mission data recorder and digital map, as well as a tactical data link. As with the Super Lynx

and Lynx HM Mk8, there is an electro-optical device with television, infra-red and laser range finder/designator. Not omitting the Anti-Submarine Warfare (ASW) and Anti Surface Warfare (ASuW) roles, the Wildcat has dipping sonar and 360 degrees full-surveillance radar.

With the introduction of the Thales Lightweight Multi-role Missile (LMM) – more commonly referred to specifically as Wildcat's Future Anti-Surface Guided Weapon (FASGW-L) – the 'teeth' of the helicopter, weighing in at 13kg, is the LMM/FASGW-L, a laser beam-riding missile with a range of up to eight kilometres and packing a mighty punch with a three-kilogramme

## Both naval and battlefield versions of the Lynx have seen upgrades over the decades, with the former having enjoyed considerable export success

shaped-charge warhead. The missile, which is smaller and almost a third the weight of the AGM-114 Hellfire anti-armour missile – as carried by the Army Air Corps (AAC) AgustaWestland WAH-64D Longbow Apache – means that the Wildcat could carry around 14 of these missiles compared with eight Hellfires. The FASGW-L is a true multi-role weapon system as it cannot only be used against surface targets of fixed installations or fast boats, but also against aerial threats including helicopters and unmanned aerial vehicles (UAVs).

It has to be said that with recent anti-piracy operations in the Horn of Africa and CHF missions in both Afghanistan and Iraq, as well as counter drug missions in the Caribbean, the future of the Royal Navy's Fleet Air Arm is in no doubt secure, with the Wildcat being reborn when it enters service in 2013 and is deployed to front-line units which will form in 2015. ●



# The Merlin Capability Sustainment Programme

**Although to many people the Merlin helicopter may still seem like a new aircraft, it has been on front-line active service for over a decade. In order to keep it in the skies for another 20 years, Lockheed Martin has taken on the task of revamping the helicopter. *Ian Frain* takes a look at what this entails**

**F**or nearly three decades after its debut, the Sea King helicopter was the leader in Anti-Submarine Warfare (ASW) and Anti-Surface Warfare (ASuW) in both the Royal and Italian navies. However, back in 1977, the Ministry of Defence

(MoD) issued a requirement for a new ASW helicopter that was to replace the Sea King in order to match the advances of modern technology and the growing Soviet submarine threat. EH Industries, which was made up of Westland Helicopters from Yeovil in the United Kingdom and Agusta from Cascina Costa in Italy, was formed in the early 1980s to look ahead with a view to replacing the Sea King in the 1990s. From these early developments, the EH101 was conceived.

The end of the Cold War – which culminated in the disintegration of the Warsaw Pact and the dissolution of the Soviet Empire – meant that the submarine threat was somewhat reduced. But, in the aftermath of the first Gulf War, the Fleet Air Arm Merlin



The Merlin Mk2 capability sustainment programme will keep the helicopter in operation for another 20 years and more

squadrons have demonstrated the aircraft's flexibility on land as well as at sea through operations in the Balkans, Afghanistan, Iraq and counter-piracy activities in the Horn of Africa. The multitude of tasks that are carried out by the AgustaWestland AW101 Merlins include surveillance and reconnaissance (fitted with the Wescam LX-15 turret), troop carrying, search and rescue (SAR) and counter-drug operations in the Caribbean.

In terms of engines, the Merlin is the only military helicopter in the West with three powerplants, apart from the Sikorsky CH-53E/MH-53E Sea Stallion/Sea Dragon, which is in service with the United States Marine Corps and United States Navy.

The airframe has demonstrated its robustness from operating in the harsh environments of the North Atlantic to the extreme heat of the Persian Gulf, with temperatures ranging from minus 40 degrees to ISA +35 degrees. The design of the Merlin encompasses the unique British Experimental Rotor Programme (BERP) blades, which are also fitted to the smaller Lynx and Wildcat helicopters. These provide an improvement in performance and lifting capabilities. The aircraft is operated as

single pilot instrument flight rules (IFR), as the normal complement is that of pilot, observer and aircrewman, with the advanced avionics and glass cockpit playing a major role in easing pilot workload. Despite its relatively large airframe, the Merlin is capable of operating from Type 23 frigates.

In order to keep the Merlins flying beyond 2030 and to give them enhanced warfighting and other mission capabilities, the £750 million Merlin Capability Sustainment Programme (MCSP) upgrade package was awarded in 2006. Under the contract, Lockheed Martin has begun a programme to enhance and develop the current multi-role capability in order for the Merlin to maintain not just its ASW and ASuW capabilities, but also its ability to undertake a range of other tasks including humanitarian operations, counter-terrorism and counter-piracy missions. A new open mission system architecture has been designed to be adaptable and flexible in order to meet the changing demands of these missions. For example, the current Blue Kestrel radar capabilities will be expanded and improved and faster system processing capabilities, such as track-while-scan performance and

Merlin Mk2 helicopters underwent sea trials on HMS ILLUSTRIOUS in September 2012 to assess the aircraft's new navigation system



the Thales processing suite, will be introduced for the ASW role. This suite is able to detect objects through shallow water, and has tracking algorithms and an acoustic processor able to undertake active dipping sonar and sonobuoy processing.

The battlespace will be managed using Lockheed Martin's new tactical management computer, which has been supplied from the company's Owega facilities. This hardware is embedded with a digital map that is based on the PC/104 processor cards, communicating through an Ethernet switch.

### **Altogether, the Merlin Capability Sustainment Programme contract will upgrade 30 aircraft in the fleet at a saving of £500 million**

The powerful human interface incorporating seven 1024x768 pixel XGA multifunction flat-panel displays, with touch-screen technology and a new navigation suite takes the reduction of operator workload to a new dimension. The latter will include an embedded GPS/inertial navigation system (and standby GPS), with a new air data computer. Altogether, the MCSP contract will upgrade 30 aircraft in the fleet at a saving of £500 million, while the ongoing support costs could be reduced by as much as £75 million.

In October 2010, the first Mk2 Merlin successfully completed its maiden flight, and in September 2012, a standard development aircraft, ZH826 completed the shipboard flight trials on HMS ILLUSTRIOUS. The first deck landing was carried out on the third of the month, followed by two weeks of trials consisting of 10 sorties. The exercise was overseen by the Combined Test Team and carried out in the area between the edge of the Atlantic and Plymouth. The purpose of the trials was to evaluate the embedded GPS/INS at sea under different test profiles.

At the same time as the MCSP contract was being signed, Lockheed Martin Integrated Systems UK was awarded a 25-year Integrated Merlin Operational Support (IMOS) contract by AgustaWestland for the Fleet Air Arm's Merlins. This comprehensive contract covers everything from training to servicing and component supplies. The second part of the IMOS contract, which will run during the last five years, relates to avionics support for the Merlins.

AgustaWestland has partnered with Total Support Services (TSS), which comprises SELEX Galileo, Thales UK, General Electric and the Defence Support Group for the avionics side, while Lockheed Martin will deliver the training element with the full support of the Merlin mission and training systems in place at Royal Naval Air Station (Culdrose).

The planned introduction for front-line operations sees the new Merlin Mk2 entering service in 2013, with full operational capability expected to follow in 2014. ●



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## **BAE SYSTEMS**

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# Developing frigates

**Modularity, exportability and adaptability are the three key pillars of the frigate replacement programme. Julian Moxon offers an update on the design and development concept, and takes a look at the overall capabilities that the new frigates will bring to the Royal Navy**

**F**rigates have performed vital roles for the Royal Navy since the 18th century, when their long, low design with a single gun deck gave them higher speed and manoeuvrability than the heavier, multi-gun deck battleships. In Nelson's navy they were known as the 'eyes of the fleet', a term that will apply as much to the new Type 26 frigates that are currently being designed.

From 2021, the Type 26 will replace the current Type 22 Broadsword and Type 23 Duke-class frigates. The totally new vessel will be capable of dealing with threats from the air, sea and submarine environment.

## COMBINING STEALTH WITH FLEXIBILITY

Forming the backbone of the future fleet, the initial design of the Type 26 Global Combat Ship was recently revealed to have similar stealth features to those of the Type 45 Daring-class destroyer, which is now entering service. The 350-strong combined Navy, Ministry of Defence and BAE Systems team that is working on the future frigate is now preparing the detailed specifications. The new frigate will be 15m longer and 500 tonnes heavier than the current Type 23 ships that it will replace, at 148m and 5,400 tonnes respectively. It will be armed with an air defence missile system, a medium-calibre main gun and the latest radar and sonar sensors. A multi-role helicopter will be carried aboard and there will be space for equipment such as drones for air, surface or even underwater missions.

According to First Sea Lord Admiral Sir Mark Stanhope, the Type 26 frigates will "be capable of operating independently for significant periods or as part of a task group and will play a major role in the defence of this country for many years." He adds that the new frigates will be "multi-mission, designed for joint and multinational operations across the full spectrum of warfare, including complex combat operations, maritime security operations such as counter-piracy, as well as humanitarian and disaster relief around the world."

For now, 13 Type 26s will be ordered from prime contractor BAE Systems on a basis of one-for-one replacement for the Type 23s, although the final number has yet to be confirmed and will be announced along with the go-ahead decision, probably in 2015.

The Global Combat Ship programme has already undergone some significant changes. In 2006, an integrated project team was established to clarify the requirements for ensuring the long-term capabilities of Navy warships and to identify a solution



to the Key User Requirements previously identified in what, until then, had been known as the Future Surface Combatant programme, which was cancelled in 2004. The resulting Sustained Surface Combatant Capability (S2C2) pathfinder project closed down in 2007 after creating a new blueprint for the navy's surface fleet based on three ship types that are optimised for high-end warfighting, stabilisation operations as well as various policing and minor combat tasks.

The programme name was changed following the Strategic Defence and Security Review (SDSR) carried out by the newly formed coalition government in 2010. This reflected the better all round capability planned for the new ship – although it retains an anti-submarine warfare bias, as highlighted by the '20 series' type number. The initial Ministry of Defence Gate Business Case was

The Type 26 Global Combat Ship is due to enter into service with the Royal Navy after 2020



approved in 2010 for a four-year assessment phase package of work with prime contractor BAE Systems. To date, there has been no official approval to build the Type 26 class, but the planning assumption is that the first ship will enter service in 2021, with subsequent ships to be constructed at a rate of approximately one per year thereafter.

The last of the Type 22 frigates, HMS CORNWALL, was withdrawn in April 2011 after an illustrious career that ended with a six-month counter-piracy deployment near the Suez Canal. The planning assumption with this model is that the Type 23s will be progressively withdrawn following the introduction of the Type 26, while maintaining the required number of surface combatants throughout the changeover. According to the Navy, this process should take around 13 years.

## The Type 26 Global Combat Ship was recently revealed to have similar stealth features to those of the Type 45 Daring-class destroyer

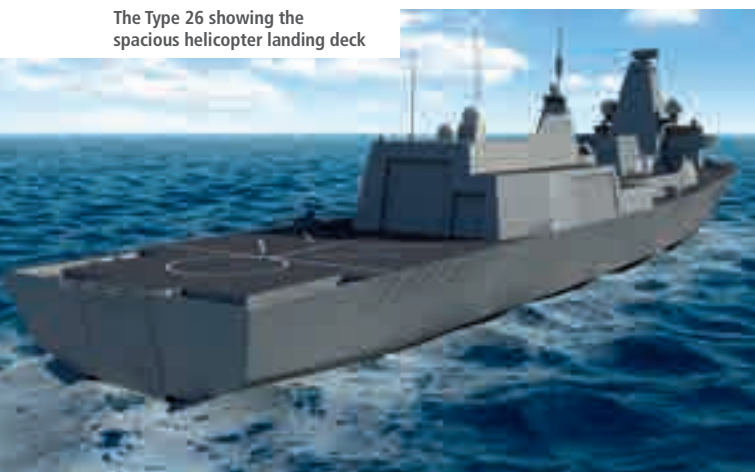
Whereas the Type 23s were designed as anti-submarine warfare platforms, retaining a general purpose capability, the Type 26 will be what the Navy calls a “versatile multi-mission combatant with a strong warfighting ethos and an anti-submarine pedigree. There is increased emphasis on versatility, with the adaptability to change roles and capabilities depending on strategic circumstances.”

Air-defence, air traffic management and anti-ship capabilities will be provided by the BAE Systems Artisan 997 medium-range 3D radar



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The Type 26 showing the spacious helicopter landing deck



The design of the Type 26 draws on experience gained both from the Type 45 destroyers and from the Type 23s still in active service. They will, for example, incorporate radar cross-section reduction features from the Type 45 and underwater noise limitation characteristics from the Type 23. Most importantly, the design will incorporate a 'flexible mission space', which could house additional boats, unmanned vehicles or containers with modular capability packages.

A further design innovation is the space that has been created for a vertical missile silo and a larger flight deck that is capable of

embarking large rotor craft such as the Merlin or Wildcat helicopters. It will include a more advanced waste management capability and better accommodation than the Type 23, along with improved communications, platform management systems and fire-fighting and damage control systems.

Additional specifications include: a combined diesel-electric and gas propulsion system, the BAE Systems Type 997 Artisan radar, a Sea Ceptor missile system, and developments of the Type 2050 and 2087 sonars and of the DNA2 Combat Management System. It will also include a new medium-calibre gun which will offer greater range and lethality than the existing 4.5in gun.

Air defence capability will be provided mainly by the MBDA Sea Ceptor, for which a £483 million contract was announced in January 2012. The vertically launched system is designed to deal with multiple simultaneous incoming targets at a distance of up to 12 miles from the ship. The MBDA Sea Ceptor will replace the battle-proven Seawolf system.

Anti-submarine capability will be provided by the upgraded sonar, in addition to the Merlin helicopter, while equipment to deal with surface attack will be based on the current Navy suite of close-in weaponry and improved situational awareness tools.

As the Type 26 joins the Type 45 destroyers now in service, the new shape of the modern navy will be seen not only visually, in the stealthy, low-radar cross-section designs of both classes, but operationally, in the huge capability improvement required to deal with the ever-changing threat scenario. ●

# Avrotech

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# Hythe Marine

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After recent work on HMS Daring, Hythe Marine received

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## Putting people first

Message from Vice Admiral David Steel CBE, Second Sea Lord and Chief of Naval Personnel and Training

Over the past 12 months, the men and women of the Royal Navy, the Royal Marines and Royal Fleet Auxiliary, so brilliantly supported by our Civil Service colleagues and industrial partners, have achieved an enormous amount. I am immensely proud of the professionalism of all our people and it never fails to astonish me just how brilliant they are in delivering against the huge demands placed upon them. As a Service, we have continued to defend the nation's interests at home and overseas, while also participating in a year of memorable public events, as 2012 saw not just the Queen's Diamond Jubilee celebrations, but also the Olympic and Paralympic Games. The Royal Navy, quite rightly, played a key role in helping to ensure that these amazing events in our nation's calendar were delivered in a spectacular, safe and enjoyable way.

However, I am also aware that we have endured another year of cutbacks to our fleet and manpower, as well as another year of the pay freeze and reductions in allowances. As regrettable as all of this has been, it is yet another way in which the Navy has joined in the national effort to try and rebalance the country's finances and get the UK back into a more healthy fiscal and

### **Retention is my over-riding priority for the next few years, as the Navy and Marines continue to be so busy around the world**

competitive position. Thankfully, for the Navy at least, the redundancy programme is coming to an end. The need to start bringing manning levels down by approximately 5,000 personnel by 2015 has been painful, but by managing the reduction in a careful and planned way, we have been able to reduce the number of redundancies required to around 1,300 personnel – some 60 per cent of which were agreed on a voluntary basis. Of course, for the remaining 40 per cent of people who faced enforced departure this was an unwelcome disappointment, but I hope that the terms of their redundancy package helped to take the edge off what was indeed a very bitter pill. Over the next few years we may need to call upon the redundancy process again but only in a very limited way, and affecting only those at the most senior levels and some in specialist roles that cannot be sustained.

Having learnt from past miscalculations, I have always been absolutely clear about the need to keep recruiting men and women into the Service, even while we are in a process of manpower reductions overall. For a service that must grow its talent from the most junior levels (we cannot recruit the skills inherent in our leading hands and lieutenants sideways from the civilian employment market), it is vital that we maintain a healthy recruiting programme to ensure that we retain the full suite of required skills and experience. Thankfully, our manning is in very good shape. In 2012, we hit our recruiting targets – apart from in the marine engineering field, where we managed 97 per cent of target. Traditional areas of manning difficulty, such as air crew and submariners, are no longer as challenging as they once were. An earlier initiative to allow direct entry into the Submarine Service has ensured a very positive effect on numbers. We are also moving forward with the process of deploying female personnel into both our ballistic missile nuclear deterrent submarines and our attack flotilla. In the autumn of 2013, the first three female officer submariners will join a Vanguard-class boat for its operational deployment. They will be followed soon after by 15 ratings. In 2016, female personnel will start to join submarines of the Astute class.

The flip side to recruitment is retention. Retention is my over-riding priority for the next few years, as the Navy and Marines continue to be so busy around the world. Put bluntly, we cannot afford to lose the highly trained, motivated and professional people that we enjoy at a time when the demands on our Service are so great. Furthermore, training an officer or rating is both expensive and time consuming. It makes clear sense that the Royal Navy and Royal Marines should do everything possible to make sure that we keep our highly skilled and experienced personnel for as long as possible. The skills we teach sailors and marines will make their transition to civilian employment relatively easy, but it is my job to make sure that we can make service in the Royal Navy and Royal Marines as attractive as possible for as long as possible, to ensure that we deliver our operational output in the world-class way that we are recognised for.

I realise that for many, the strain of having to cover the jobs of the almost 10 per cent of naval personnel who are augmenting front-line operations can at times become an overwhelming burden. Likewise, the frequent change in jobs and work location is also making it difficult to enjoy a stable home life with partners and family. That is why we are pressing ahead with the concept of



'Centres of Specialisation'. By moving all of the submarines to Faslane in Scotland and by concentrating the majority of the surface fleet in Portsmouth and Devonport, we will enable officers and ratings to spend longer in one location and therefore be more able to put down roots, buy a home and enjoy a more stable family life. We will, of course, still offer the 'global adventure' for those who are not yet ready to settle down!

It is not just about those who are currently in uniform. I am also determined to ensure that those who leave the Service feel as much part of the Royal Navy family after departing as they did while in uniform. I will therefore be working with the Royal Naval Association and the Association of Royal Naval Officers in particular, as well as other service associations, to see what more we can do to make this so. The appointment of a new Director for

Families in the HQ will also allow us to work even more closely with the Naval Families Federation to make sure that our families are supported, kept informed and that they feel even more a part of our wider naval family than they may have done in the past.

Having endured a period of transformation, uncertainty and, for many, disappointment and anxiety, we can now look forward to a period in which the Royal Navy enjoys stability, a modernised surface and submarine fleet, new and better helicopters, improved equipment for the Royal Marines and of course – by the end of the decade – the introduction of the Queen Elizabeth aircraft carriers and their complement of F-35 Lightning II fighters. This reinvigorated Navy will enable us to continue our long tradition of delivering security to the nation while offering a fantastic career with amazing opportunities to our outstanding men and women. ●

Naval recruits brush up their parade skills at HMS RALEIGH



# Recruitment – matching requirements with resources





**Jill Taylor finds out how the recent defence cuts have affected the shape of the maritime services, and how the recruitment process is changing in order to meet the demands of the future, both in terms of the skill sets required and the channels through which potential recruits are targeted**

**T**he manpower cuts imposed by the UK Government's defence reforms have hit the Royal Navy hard. The force is losing almost 17 per cent of personnel between 2010 and 2015, compared with 15 per cent from the Royal Air Force and about seven per cent from the Army. This burden is particularly onerous considering that the Navy has traditionally relied on a large and agile fleet to provide a deterrent, often preventing conflict by virtue of its presence. As a result, the focus is now on making sure that the force has the right recruits in place to provide an effective force regardless of fleet size.

The Navy is shedding about 5,000 personnel from all ranks in order to bring total numbers down to 30,000 by 2015. At the same time, it has to ensure it has the right skills to man the ships of the future. "The Navy has a pyramid structure," explains Captain (Capt) Mike Davis-Marks, Director of Naval Recruiting. "There are lots of recruits at the bottom, rising to fewer at the top. Like all three services, we are a bottom-fed organisation. We do not recruit sideways. In any one year, 2,000 to 3,000 people leave the Navy naturally, and we need to replace these with fresh recruits, grown from the bottom up. You need to do that at any stage of the economic cycle, whether you are making people redundant or not."

#### MEETING REQUIREMENTS

Capt Davis-Marks says the Navy is on track to recruit 2,900 personnel in 2012 and will meet the skill sets required with the exception of one or two highly specialised placements. The requirements are identified roughly four years in advance to enable Capt Davis-Marks and his team to target their recruitment drive. "You can have the best training organisation in the world, but if you don't get recruiting right, you might as well go home. The recruiting operation is essential to maintain the high calibre people that we have manning the Navy."

So, given the resources devoted to training new recruits, is the Navy trying to redeploy some of those made redundant? In some specialised areas, this has been possible, for example across jobs where similar skill sets are involved.

Following the retirement of the fixed-wing Harrier aircraft from the Invincible-class light aircraft carriers in 2010, Fleet Air Arm personnel were offered the opportunity to retrain as helicopter pilots. Many of those people are now helping to

fill vacancies in an expanding helicopter fleet, and they will play a part in the broader range of operational capabilities onboard the two new Queen Elizabeth-class aircraft carriers from 2020. While this strategy works with a small number of highly qualified personnel, the age profile for the majority makes it uneconomical.

The particular challenge just now is letting people know that the Navy is recruiting. Defence cuts have led to the misconception that the service is not looking to take on new personnel. This applies to the Navy, the Royal Marines and the Royal Fleet Auxiliary. Furthermore, these marine services tend to be out of the public eye – sailing the high seas – rather than visible in the home environment. The Royal Marines can be mistakenly labelled as Army, and the Fleet Arm as Air Force, rather than naval forces. Each one calls for a particular marketing approach to appeal to the right audience.

The four-year target provides a broad indication of the number of recruits needed against different trades. In addition, entry requirements vary according to the nature of the recruit. Basic health and fitness standards apply to virtually all applicants, but a more stringent academic level may be introduced for posts such as medical or technical roles, and have to be flexible to reflect changing requirements.

"There has been a move towards more technical ratings and officers," comments Capt Davis-Marks. "There is an increasing technical requirement for our future fleet, and the ratio between junior and qualified ratings is changing." To some extent this can be captured by modifying the entry standards, but the Navy also employs a series of psychometric tests. "We need people who have a level of intellect, but more importantly, character and common sense. We have a range of tests to determine that," he explains. Often, he is looking for ratings that have the ability to "take the lid off a jar of pickle but not necessarily know the square route of the volume of it."

#### FUTURE RECRUITS

The personnel on the Type 45 Destroyer, the Navy's latest warship, are indicative of this trend. "We are a technical service, so we need a level of technical expertise or intelligence. The Type 45 Destroyer is manned to suit the latest requirements. In five years' time, we will be manning to meet the demands of the future carrier capability." Staff requirements, however, will remain multi-disciplinary.

Royal Navy personnel practise their skills on the new Maritime Composite Training System



BAE SYSTEMS

## When the Navy identified a shortage of engineers three years ago, it developed an application for the iPhone that was designed to appeal to technical minds

A much bigger change is taking place in the recruitment process itself. Time spent developing the website has shifted to new media outlets, including Facebook and smartphones.

The Navy is intent on engaging young people through interactive campaigns based around social media, and it is starting to reap the benefits of this new marketing strategy. "Our core target market is 16 to 24 years and there are 13 million youngsters in this age group in UK. We can specify

a target audience, based on age, ambition and outlook. We use different messaging and channels to reach the different groups."

When the Navy identified a shortage of engineers three years ago, it developed an application for the iPhone that was designed to appeal to technical minds. The Engineering Challenge 'app' pictured the user onboard a ship and presented a number of operational challenges. In the first month, the game achieved 80,000 downloads, which translated into 1.5 million page impressions on the engineering website.

The Navy went from having a deficit to meeting its engineering targets within two years. The application has since been rolled out to all smartphone brands and a derivative was launched recently to teach people how to play music. The Navy is hoping to attract more recruits into its band service.

With tools such as this at its disposal, Capt Davis-Marks expects the Navy will continue to "recruit the right number of the right quality of people with the right expectations." ●

# FOST training

**Christina Mackenzie looks at the broad spectrum of Royal Navy preparation conducted by the Flag Officer Sea Training organisation**

Originally established in 1958, Flag Officer Sea Training (FOST) has a long-standing, worldwide and hard-earned reputation for excellence in the complex task of preparing ships and their crews for the rigours of sea-based warfare, peace-keeping and humanitarian relief missions. Currently, FOST is also responsible, in some form, for all training across the Royal Navy – from turning civilians into sailors and marines to preparing all ships, submarines and marine units for global deployments and combat operations, as well as providing sought-after training for our allies.

## **INTELLIGENT WARRIORS**

Unveiling the Commando Memorial in 1952, The Queen Mother observed that: “The Commandos were raised in urgent, clouded days; they

FOST checks how the crew of HMS ILLUSTRIOUS deal with multiple fires and floods



## One of the bedrocks of the Royal Navy is Operational Sea Training – the process of getting ships and submarines ready for the front line

hardened themselves for battle by sea, land or air, in which nothing was certain except the hazards they would face". This ethos is still very much alive today, explains Lieutenant Colonel (Lt Col) Nick Griffiths, HQ lead for Royal Marines training within FOST. "We're looking for intelligent warriors who are fit, mentally agile and who can successfully complete a mission after being told what to achieve not how to achieve it."

Despite the brutal training and high-risk missions, there is no shortage of candidates to wear the green beret. Recruiting is very

buoyant, "and we have more candidates than we need," Lt Col Griffiths remarks. Still, of those who start the 32-week training course for troops, 39 per cent do not finish. "Some 25 per cent go of their own accord and 14 per cent are deemed unsuited for medical, academic or psychological reasons," says Lt Col Griffiths. The "fallout rate" amongst trainee officers is very slightly higher at 40 per cent. "Even so, there's been a real change in our approach: we've moved from weeding-out to training-in and there is more onus on the instructors – who all have a minimal rank of corporal – to get the recruits through."

### MAXIMISING SUCCESS

The first filter for candidates is the Potential Royal Marines Course. This is a series of mental and physical tests, but the aim, Lt Col Griffiths says, is to "maximise success". Those who get through this filter then embark on the 32-week training course. According to 'Jaimie' a landing-craft operator who joined the Royal Marines

at 19, the training is very hard but progressive: “the first few weeks are mostly learning to look after yourself, but after that you step it up and start going out into the field for weeks on end”. Weeks one to 15 are dedicated to fundamental training, while advanced infantry skills are taught in weeks 15 to 30.

The culminating point is week 31, during which the trainees must complete a nine-mile speed march carrying 22lbs (10kg) and a rifle; a Tarzan assault course carrying the same equipment; an eight-mile cross-country endurance course; and finally, a 30-mile daytime march across Dartmoor to be completed in eight hours for troops and seven for officers. Once all the candidates have arrived there is a ceremony in the field to award them the coveted green commando beret.

### TRAINING OUR ALLIES

Every year there are four or five places for non-British officers on this course, but for those allies who want Royal Navy training without becoming a commando, 60 to 70 places are available at Britannia Royal Naval College in Dartmouth every year. The international contingent generally accounts for 25 per cent of the initial officer training course, and this provides significant mutual benefits for both the international and Royal Navy cadets; fostering operational and cultural experiences for future combined efforts.

Head of International Defence Training and Partnering Commander Scott Sellars, says the 30-week course is in high demand from international navies, “because of the Royal Navy’s reputation as a purveyor of world-class maritime training.” The course is fully integrated and all Royal Navy and international cadets work together to complete exactly the same training to the same high standard. The only difference is that an English-language and military preparatory course is available for those who wish it, prior to commencing the initial officers’ course.

During the sea training phase, everyone lives in messdecks and learns about the basics of working at sea, including doing the jobs that ratings normally do, “because they must understand how the ship works.” Commander Sellars concedes that the “greatest difficulty for the internationals is linguistic and cultural.” Despite this, it was a Lebanese cadet who won the Queen’s Sword for being the best cadet of the year in 2009.

### OUT TO SEA

One of the bedrocks of the Royal Navy is Operational Sea Training (OST) – the process of getting ships and submarines ready for the front line. Described by some ships as ‘pre-season training’ for their front-line duties, OST has been a cornerstone of preparing ships for deployment for the past seven decades. In its current form it is directed by a captain and his team from Devonport Naval Base and is typically an eight-week package/exam for frigates and destroyers. It is replicated for minesweepers, patrol vessels and submarines in the Clyde. The training offered by the FOST staff is used by myriad allied navies beyond the Royal Navy: German, Dutch and other NATO ships regularly train alongside their British allies and have exchange or liaison officers embedded within the FOST HQ. Additionally, the Americans are increasingly planning to reinforce US training with the UK FOST brand.

Rear Admiral Clive Johnstone CBE, the current FOST, comments that “in the past, perhaps when the world was a more



The Commando Test Week includes a gruelling assault course

stable place, ships saw getting through OST as an end in itself. What clearly matters more is what they do ‘out there on deployment’. The mission at FOST is to get the ships operating to their limits in order to deploy successfully and return safely on completion – not just to pass an assessment off Plymouth. It is also to get people to think. It is hard to remember sometimes that different peoples around the world generally want to be friends and not enemies – we train captains, their ships and ship’s companies to listen, watch and think. A strategic crisis must not be triggered by the lack of intelligence or cultural awareness, or the inadvertent tactical cock-up.”

Rear Admiral Johnstone continues: “The FOST Command has established a worldwide reputation for excellence and is a role model for numerous navies around the world. To maintain our position at the forefront of world naval training and to retain its relevance in the modern world, naval training must remain at the forefront of our thinking.” ●

Royal Naval Reservists will play a larger role in maintaining naval capability in the future



## A more prominent role for the Reserves

**A key tenet of government policy regarding the future of the Armed Forces is the greater dependence upon reserves to help rebalance the interaction between the military and the nation. Colonel Rory Bruce of the Royal Marines Reserve and Deputy Commander of the Maritime Reserves tells *Jill Taylor* how this challenge will be met**

All three services are in the process of increasing the contribution made by reservists following the publication of the *Independent Commission to Review the UK's Reserve Forces* report in July 2011. The government announced in July 2012 that it accepted the broad thrust of the report's recommendations and proceeded to produce a green paper, *Future Reserves 2020: Delivering the Nation's Security Together*, which it published in November 2012.

The Maritime Reserve is due to increase the number of trained individuals from the baseline figure of 1,847 to 3,100 over the next six years. This is expected to deliver about 12 per cent of the total maritime force, or between 500 and 550 personnel that are ready to deploy on an annual basis. The size of the challenge is magnified by figures which show Royal Navy Reserve trained-strength currently stands at around 1,400 and Royal Marine Reserves at 460, both of which are short of where they should stand. "The growth required over this period is pretty considerable," comments Colonel Rory Bruce, Deputy Commander Maritime Reserves and Head of Royal Marines Reserve. "We need to recruit at least 500 people a year into the Reserves for the next few years."

### THE CIVILIAN SPECIALIST SKILL SET

Work has already started, says Colonel Bruce, and there is a noticeable change at Navy Command Headquarters. "The mindset is shifting and they have signed off plans to incorporate and utilise

Reserves in several key capability areas. They are beginning to think about the opportunities they need to develop for these people and how they can integrate Reservists into future deployments over the years ahead." Specific capabilities such as cyber skills, medicine and media operations are among target areas that are not easily sustained within the regular force, but can be supplied by the civil sector.

"We've not previously had the funding streams that we now have under Future Reserves 2020. We've just started to receive the money to invest in recruiting, training, improving infrastructure at our units and enhancing the way our reserve units work." Over the next 10 years, the Navy will receive £96 million of the £1.8 billion allocated by the government for new equipment, infrastructure and training for the Reserves. The Royal Naval Reserve training unit in Newcastle, HMS CALLIOPE, is among the first sites to benefit from a refurbishment programme to enhance training facilities serving recruits in the north-east of England. Meanwhile, HMS WILDFIRE in Northwood has just added new classrooms, IT suites and teaching facilities to improve training for reservists based in Middlesex, Hertfordshire, Buckinghamshire and Berkshire. "Integration of the Maritime Reserves into the 'whole force' is now one of the Naval Service's top priorities," says Colonel Bruce.

The Navy has followed a unique approach with its reserves, and tends to deploy individuals in specialist areas where they become an integral part of the regular force, rather than using the Army construct of deploying formed units. Trained Royal Marine Reserves, for example, have worked on the front line as riflemen next to their regular counterparts on Operation HERRICK in Afghanistan for many years. Counter-piracy operations in the Gulf include Royal Navy Reserves on a day-to-day basis. Specialist skills are also evident in the Royal Naval Reserve Air Branch, based at RNAS Yeovilton and at Culdrose (ashore and afloat), which has supported the Fleet Air Arm in times of stretch for many years. It is staffed by pilots, engineers and maintenance crew, all of whom are ex-regulars with expertise in airborne operations using legacy equipment. The Air Branch has proved itself highly successful in extending the life of existing equipment, and releasing regulars for training on new systems.

#### ENHANCING THE TRAINING INFRASTRUCTURE

This concept is expanded under the government's Future Reserves 2020 vision, but with a much larger contribution by the civil sector. "We have set particular growth targets in areas such as information and intelligence, logistics and medical skills," explains Colonel Bruce. "For example C4ISTAR (command, control, communications, computers, intelligence, surveillance, target acquisition and reconnaissance) is a growing area for everyone, not just the military." The challenge he faces is making sure the reservists are properly trained and have the correct skill sets to do these jobs. "A large part of the investment is ensuring our reserve training is fully compliant with the procedures in use by the regular force, and that the governance and assurance mechanisms are managed by the same people," says Colonel Bruce.

The Royal Marines Reserves (RMR) have always used the same training facilities as the regulars, and operate to standards set by the Royal Marines Commando Training Centre (CTCRM) at

Lympstone in Devon. They deploy alongside their regular counterparts and have a long tradition of assimilation into front-line units. At the time of writing more than 30 were engaged alongside regulars participating in the BLACK ALLIGATOR training exercise in the Californian desert. Future Reserves anticipates some 630 RMR on the trained strength by 2020, a 20 per cent hike over current levels.

In contrast, the more diverse Royal Naval Reserves is spread across approximately 15 regional locations, some of which are co-located with their RMR counterparts and with regular units. So while the main training establishment at HMS RALEIGH in Plymouth accommodates regulars and reserves, many locations, such as Chatham and Swansea, comprise entirely of reserve units. Applying the same standards and governance to all units is increasingly important as the Navy attempts to grow its reserves by half as much again.

### Over the next 10 years, the Navy will receive £96 million of the £1.8 billion allocated by the government for new equipment, infrastructure and training for the Reserves

"The next two years are all about stabilisation and reinvigoration," explains Colonel Bruce. "We've just kicked off a major recruiting campaign for the Maritime Reserves, to be delivered on a sequenced, regional basis. At the same time, our training experts are working with Flag Officer Sea Training's (FOST) staff to work out how we can expand the training pipeline and enhance the proposition for individuals. We want to get more reservists through in a manner which is recognised, assured and governed by the Royal navy." This work includes restructuring the



Royal Navy Reservist divers carry out checks on HMS OCEAN as she stands on guard for the Olympics



Bear Grylls, an Honorary Lieutenant Commander in the Royal Naval Reserve drops in at the north-east's naval reserve unit in Gateshead – HMS CALLIOPE

initial training package to make it more modular and accessible. It has to be more flexible to fit in with the lifestyle of the reservists and of their employer as well, mindful of limited availability and mobility. Ultimately, more resources are required to ensure that more reservists can pass through the training pipeline.

#### AMENDING GOVERNMENT REGULATIONS

Meanwhile, the government has proposed regulatory changes to permit greater ease of mobilisation and better employee protection. While for the Army this includes extending the number of training days to 40 a year, it also proposes the introduction of a national Kite Mark scheme in order to bring recognition to participating companies. The green paper sees the Reserve service as an opportunity to gain new skills which can feed back into the workplace. It also suggests linking apprenticeships with the Reserve service, and even suggests changing national insurance contributions in favour of employers of reservists.

“As a former managing director myself, I know that companies can find huge benefit, for example when individuals

acquire skills such as project management, negotiating, diplomacy, confidence and leadership. Without fail, those who have had people deploy or complete their training, have all noticed the advantages.” Colonel Bruce says successful completion of full pre-deployment and capability development training courses, plus a single deployment is the equivalent of £18,000 in professional training costs that an employer might have spent. The challenge lies in imparting this message to the wider community.

The Ministry of Defence's (MoD) 'Partnering for Talent' initiative is designed to deepen the relationship between industry, academia and the Armed Forces. It already sees close cooperation between the NHS and MoD, but is expected to attract other major employers, such as BT and major defence equipment manufacturers. “A lot of key technological development is driven at the military sharp end. There is an obvious partnership between large British companies and the MoD through this programme.” The outcome of the Future Reserves 2020 consultation paper will play a central role in securing the right balance between sharing the cost of skills development and reaping the benefits. ●



# A new communications and engagement strategy for the Royal Navy



The Royal Navy's interactive website is central to its public relations and recruitment

## The Royal Navy has recently published a new communications and engagement strategy designed to improve awareness and understanding of the crucial role it plays in protecting our country's interests

The nature of recent military campaigns has tended to make headlines of land and air operations which, as far as many of the public are concerned, have little to do with the Royal Navy. In fact, the Royal Navy has been continuously involved in Operation HERRICK in Afghanistan.

Taking its lead from the Future Navy Vision, the term 'Royal Navy' reflects all arms of the Naval Service, which includes the Royal Marines and Royal Fleet Auxiliary. The force also routinely

deploys to the South Atlantic, the Caribbean, the Mediterranean, the Indian Ocean and the Persian Gulf. The communications challenge for the Royal Navy is to explain effectively the utility of maritime power projection and its relevance, not only to the general public, but also to those who have the potential to shape the delivery of the future Royal Navy. This has been a longstanding issue for the Royal Navy, and as a result, the First Sea Lord has appointed Commodore (Cdre) Gary Sutton to the new post of Head of Royal Navy Communications. In his new position, Cdre Sutton has been tasked with giving the service's communications and engagement effort a high-level makeover.

"The Armed Forces enjoy a strong reputation and anecdotal evidence indicates impressive levels of public sentiment and favourability for the Royal Navy," says Cdre Sutton. "Clearly we must sustain this public support, but also focus our efforts



As head of the Royal Navy's communications, Commodore Gary Sutton is responsible for getting its message out to the wider world

on how we shape our messaging to resonate with our key audiences and improve understanding and awareness of the relevance of the Royal Navy," he continues.

Cdre Sutton states that communications and engagement have been recognised as vital elements that are essential for sustaining Royal Navy operational capability, by promoting and explaining the maritime case and encouraging opinion in favour of Defence in general and the Royal Navy in particular.

However, Sutton also acknowledges that in the current fiscal environment the Royal Navy has to deliver maximum value for money for defence and he needs to ensure the Royal Navy's role and value is demonstrated not only within the Ministry of Defence but also to other Government departments.

## The communications challenge for the Royal Navy is to explain effectively the utility of maritime power projection

"We now have a National Security Strategy that relies on a strong maritime contribution," Sutton explains, "and fundamentally, the Royal Navy needs to be well understood by those that have the greatest influence over our strategic future, as well as the public at large."

In the past, Royal Navy communication and engagement activity had been functionally, geographically and hierarchically dislocated. While there had been lots of good work, it had often lacked focus, with no single authority to coordinate activity. It also endeavoured to target too broad an audience, with much of the emphasis on satisfying mainstream media, with messages that were often too complex and inconsistent.

Sutton's first task, he explains, was to establish a strapline from the Royal Navy 'narrative' and the Future Navy Vision – a simplified core message and a set of aligned supporting statements to explain what the Royal Navy is about. The strapline 'Protecting our Nation's Interests' was devised as the core message and as the answer to the question 'why navy?'. The supporting statements provide more detail.

"While the core message should underpin even our most sophisticated messaging, at its basic level, it should be added to ship and unit briefs, press releases, 'ship open to visitors' boards, and a host of other applications," Cdre Sutton explains. "Royal Navy personnel would be expected to be very familiar with its content." The core message is supported by a set of six supporting statements that reinforce the message both for an external audience, but also to ensure that internal audiences are able to develop the argument coherently and consistently. They highlight the key roles and capabilities of the Royal Navy in preventing conflict, providing security at sea, promoting partnerships, providing humanitarian assistance and protecting the UK economy, as well as stressing its readiness to fight.

Cdre Sutton then turns his attention to defining the Royal Navy's key audience groups, starting with decision makers and opinion leaders and working on through naval personnel, their associated community and, of course, key media outlets, which Cdre Sutton still considers to be a vital audience, but as he puts it, no longer the only route to market.

### A CHANGE OF TACK

Young people are a group that receives special attention, particularly through social media channels because, as Sutton points out, not only are they of recruitment target age, but they also have a wide range of views, a longer term outlook and have little if any nostalgia for the service and its 'legacy' role.

And finally, Sutton stresses, amongst this, the message needs to reach Royal Navy personnel themselves. "Our own people need to be our most powerful advocates and are vital to the success of this strategy. Kept well informed, they are far more likely to be better motivated and more vociferous advocates of the Royal Navy. We need to educate and instil – at every level – our core messages, the importance of engaging with external audiences and pressing the Royal Navy case."

Sutton insists that, although his approach is a clear change of tack from previous communications strategies, it is in effect just learning from best practice, by drawing together and centrally managing the instinctive engagement that is already undertaken across many areas of the Royal Navy Command.

"Put simply, while the Royal Navy has enjoyed an enviable reputation for being the best at what we do, it has never been more important to promote collectively, in the strongest possible terms, the Royal Navy's contribution to defence, security and the UK's prosperity," says Cdre Sutton.

While acknowledging that there is a lot more work to do in order to deliver these improvements, Cdre Sutton is confident that with a coherent and defined strategy, owned at the highest level and supported with a redesigned organisation, firm foundations are in now in place to ensure Royal Navy communications and engagement activity supports the future Royal Navy. ●



# PROTECTING OUR NATION'S INTERESTS

As an island nation, our prosperity and security is totally dependent on our ability to access the sea. The UK is reliant on a stable global market for the raw materials, energy and manufactured goods that underpin our way of life and, in a globalised world, we must have the ability to respond to any event that threatens our economy or national interests. That is why the Royal Navy is globally deployed and has a range of versatile ships, submarines and aircraft operated by highly professional Sailors, Airmen and Royal Marine Commandos. The Royal Navy continues to police the use of the sea in partnership with allies and retains the unique ability to influence events at sea, on land and in the air, providing real flexibility of choice to both military and political leaders.

## THE ROYAL NAVY IS:



### PREVENTING CONFLICT

The Royal Navy prevents conflict by being globally deployed in order to deter threats by reassuring regional powers and stabilising potential hotspots. The coercive nature of a credible military force at sea has significant worth in reinforcing political will.



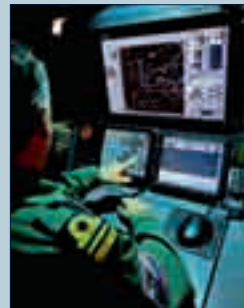
### PROVIDING HUMANITARIAN ASSISTANCE

The Royal Navy provides humanitarian aid and relief from the sea without the need to draw on a country's infrastructure or resources.



### PROVIDING SECURITY AT SEA

The Royal Navy is at sea every day, working with international partners to provide global maritime security where it is needed.



### PROTECTING OUR ECONOMY

The Royal Navy contributes to the stability and economic prosperity of the UK by being deployed around the globe in order to protect trade routes and guard the flow of energy resources into our ports.



### PROMOTING PARTNERSHIPS

The Royal Navy promotes stable and cooperative relationships with friendly and neutral nations around the world through working together, training together and determining common understanding.



### READY TO FIGHT

The Royal Navy is ready to fight and win in combat at sea, on land or in the air.

## THESE ARE ENABLED BY:

Our Sailors, Aviators and Marines, who are a highly skilled and efficient force. They are the lifeblood of our service, able to adapt to whatever the mission demands, and are key to delivering success anywhere in the world.

The charity's patron, Her Royal Highness the Princess Royal, hands out awards to those who have raised funds



## The Royal Navy and Royal Marines Charity (RNRMC)

**Robert Robson, Chief Executive of the RNRMC, highlights the strong growth in charitable activities over the course of 2011**

In 2011, four significant developments enabled the RNRMC to increase income and therefore our ability to distribute grants to those in need of our help. Our supporters across the Royal Navy, Royal Marines and in the corporate world were able to raise more money for us than ever before: the RNRMC is now the formal grants administrator for all of Greenwich Hospital's contributions to naval charity; Help for Heroes channelled funds

via RNRMC grants to assist those wounded in action; and the fundraising campaign in support of our subsidiary, the Royal Marines Charitable Trust Fund (RMCTF), had a very successful year.

### AWARDING GRANTS

By the end of 2011, the RNRMC and its partners had given out over £6.2 million in awards and grants. Amongst these, we now award grants to over 18 independent charities, consolidating our position as the major grant maker to naval beneficiaries.

Not only were our income and grants up significantly, but we also progressed well in the journey towards becoming the single-focus umbrella charity for the service. We made strong progress



### RNRMC INCOME AND EXPENDITURE DURING 2011



Investment: £2,403k (26%)  
 Donations: £2,854k (31%)  
 Grants received: £3,137k (33%)  
 Payroll Giving schemes: £936k (10%)



Benevolence: £3,372k (55%)  
 Amenities: £2,006k (32%)  
 Sports: £423k (7%)  
 Dependants: £318k (5%)  
 Prizes: £76k (1%)

Source: RNRMC Annual Review 2011

Note: New funds transferred in for RMCTF of £7,694k have been excluded from the income figures to enable comparison to previous year

to create an efficient shared support team for the RMCTF, while leaving their trustees in charge of their own business. We also welcomed our involvement with the business community in the south-west, who form the "C Group that supports the Royal Marines". Our strategic relationship with the WRNS Benevolent Trust also proved a significant success.

#### SUPPORTERS OF THE RNRMC

Other notable events over the course of 2011 included the first Supporters Event in the presence of our Patron, Her Royal Highness the Princess Royal, and our first trustees meeting at the home of the submarine service in Faslane. We were also chosen as a strategic partner by the Royal Edinburgh Military Tattoo and received a large donation from the Tattoo in recognition of our work in Scotland.

We are naturally extremely grateful for all the money that we receive through a wide range of donations, as well as charitable events and activities. I would, however, like to particularly thank all those serving in the Royal Navy and Royal Marines who have

generously agreed to support us through donations made directly from their salaries via the Payroll Giving scheme. We now have over 10,000 sailors and marines regularly donating in this way, and we hope to be able to raise this figure to 20,000 over the coming years. We will also be making a major

**Not only were our income and grants up significantly, but we also progressed well in the journey towards becoming the single-focus umbrella charity for the service**

push to involve the retired community in our story and in our fundraising plans. For a more detailed view of where our funds come from and the causes to which we dedicate them, please visit our website: [www.rnrmc.org.uk](http://www.rnrmc.org.uk).



## National Museum of the Royal Navy

A message from the Director General of the NMRN, Professor Dominic Tweddle

**W**ithout doubt, the highlight for the National Museum of the Royal Navy (NMRN) in 2012 was the completion of the complex deal to transfer Nelson's flagship, HMS VICTORY, from the Royal Navy to the museum. We were able to achieve this in record time with the generous help of the Ministry of Defence (MoD) and the Gosling Foundation Limited that each gifted the NMRN £25 million. This world-famous vessel will remain a commissioned Royal Navy warship and will retain her RN crew, but the NMRN will be responsible for looking after her fabric and wellbeing.

Transferring the Trafalgar veteran was not the only major achievement of the year. We also managed to raise almost all of the £6.5 million needed to secure the future of the 67-year old A-class submarine, HMS ALLIANCE, which we have been restoring and hope to re-open in 2014 at the museum. In addition, during the past year, my team and I were also in negotiations with the MoD on a plan for the ministry to gift the museum the light cruiser, HMS CAROLINE. I can confirm that parliament agreed the transfer at the end of 2012, and so now the last survivor of the



HMS Victory remains a Royal Navy commissioned warship, but will be looked after by the NMRN



The project to retrieve HMS HOOD's bell continues

Battle of Jutland will have a secure future. Working in tandem with the Department for Enterprise, Trade and Industry in Northern Ireland, we will seek to establish her as a visitor attraction in Belfast. We are grateful to the National Heritage Memorial Fund, which has agreed donate £1.1 million to safeguard the ship while we raise the extra money needed to complete restoration work. A grant application has therefore been made, and if all goes well the programme will be completed by 2016. On a slightly less grand scale, we hope to restore and re-launch the RN's last remaining steamship, the First World War Pinnace 199, in 2013.

#### TELLING THE NAVY'S STORY

As well as restoring and exhibiting ships and submarines, the museum also has a wealth of artefacts, many of them in storage, which we exhibit to the nation. In order to enable us to put more of these treasures on display, we have managed to raise £4 million of the £4.5 million that is required to create 900 sq m of gallery space at the Portsmouth site, and work is under way on developing new galleries – telling the story of the Navy in the 20th and 21st centuries.

When the galleries open in June 2014, we will use them to tell the story of the Royal Navy from 1900 to the present day. Through a mixture of objects, art, personal mementoes and commemorative items – many of which have never been on display before – we hope to show how naval culture has seeped into almost every aspect of British life and how the RN has played a fundamental role in securing our way of life and our freedom. Along with world-class permanent exhibitions, we will run a rotation of temporary exhibitions that will commemorate specific events or periods. Naturally, the centenary of the start of the First World War is very much on our minds, as is the commemoration of Gallipoli in 2015.

## We have a five-year plan to move the Royal Marines Museum onto the Portsmouth site from its current location in Eastney

Many of *A Global Force's* readers will have seen the *Channel Four* documentary that followed the 2012 attempt to raise HMS HOOD's bell. Although we were beaten by the weather on our first endeavour, I can confirm that we will be having another go. Thanks to a very generous offer by Paul Allen, the Microsoft co-founder, who funded our first attempt, we are planning to try and retrieve the bell in 2013.

Although we had a very busy time in 2012, we are not resting on our laurels. The future looks every bit as exciting as the past few years. We have a joint working party with Hampshire County Council, which is helping us to transfer the coastal-bombardment vessel M33 to the museum. We are trying hard to complete the process so that we can open her up to visitors in time for the Gallipoli exhibition. In addition, we have a five-year plan to move the Royal Marines Museum onto the Portsmouth site from its current location in Eastney. And, while we are doing that, we also intend to make a major investment in the Fleet Air Arm Museum to create a new entrance. This is an extremely exciting project as we hope to put on display in the newly constructed atrium, an artefact that harks back to the very birth of carrier strike operations – the last remaining First World War aircraft lighter.

Preserving the nation's naval history is a never-ending challenge. But, with the help of our committed staff, volunteers, generous donors and sponsors, the National Museum of the Royal Navy will ensure that the history of the RN is kept alive for the generations that follow. ●

# Falklands 30



Royal Marines wait on HMS HERME's deck for their turn to embark on Fleet Air Arm Sea King transport helicopters



**With the 30th anniversary of the Falklands Conflict marked in 2012, *Martin Temperley* looks at the Royal Navy's pivotal role in transporting and protecting the men and equipment necessary to recapture the islands from the invading Argentine forces, and uncovers the enormous effort that was required in order to undertake this successful operation**

**T**hree decades ago in April 1982, Argentinian forces invaded the distant overseas British territories of the Falkland Islands and South Georgia. In those Cold War years, the Royal Navy was not expecting to have to mount an expeditionary effort to recapture territory as its main focus was on countering Soviet forces in the eastern Atlantic and English Channel.

Consequently, there was an emphasis on anti-submarine warfare and mine countermeasures, which at that time were considered to be the most likely threats facing the UK and its NATO allies.

Although the Royal Navy maintained a capability to act globally and independently, the conflict in the Falkland Islands between 2 April and 14 June 1982 raised the toughest possible challenges to the adaptability and versatility of British naval power.

However, with Argentine forces on the islands quickly reaching 8,000 troops (rising to 11,000), the decision was taken in London to assemble a task force of ships, enabling a force of mostly Royal Marines and Paratroopers, as well as an Army Infantry Brigade to be landed.

The scale and scope of the task was enormous, as the Royal Navy was to be responsible for protecting the Royal Fleet Auxiliary ships and merchant vessels that were transporting and landing the British land forces. From the outset it was clear that powerful Argentinian air units flying from bases on the mainland – the nearest of which was less than 450 miles (720km) away – would seek to repel the Royal Navy's long-range operation, as would the forces deployed on the Falklands. Naval vessels from Argentine bases were also capable, should they choose to do so, of opposing the British task force sent to the islands.

#### ORDER OF BATTLE

The Royal Navy task force was to eventually comprise 32 warships together with 22 Royal Fleet Auxiliary supporting ships, and a host of chartered merchant vessels. The opening move, launched before the main task force departed UK shores, was the deployment of three nuclear submarines to the South Atlantic, one of which was HMS CONQUEROR. In late April, the frigates ANTRIM and PLYMOUTH and the ice-patrol ship ENDURANCE supported by RFA TIDESPRIING disembarked a party of Royal Marine Special Forces on South Georgia, with the intention of retaking the island.

Prior to this, a 200nm (370km) maritime exclusion zone around the Falklands was declared by the UK Government on 12 April to keep the waters clear of shipping. This was later extended to a total exclusion zone on 30 April, giving notice that any unauthorised vessel or aircraft entering the area would be liable to attack. On the first day of May, the leading ships of the task force arrived off the Falklands. Almost immediately, Fleet Air Arm (FAA) Sea Harrier fighters from the aircraft carrier, HMS HERMES, attacked Argentinian positions on the islands, while other Sea Harriers from another Royal Navy carrier, HMS INVINCIBLE, flew protective combat air patrols over the

task force, and the destroyer GLAMORGAN, together with the frigates ARROW and ALACRITY, started a shore bombardment. The conflict began to escalate with Argentinian Mirage, Dagger, A-4 and Canberra aircraft launching attacks on the task force – three of which were shot down by the FAA's Sea Harriers.

#### THE CONFLICT INTENSIFIES

On 2 May, the Argentinian Navy light cruiser, GENERAL BELGRANO, which was steaming towards the exclusion zone, was torpedoed and sunk by the hunter-killer submarine CONQUEROR. On 3 May, Lynx helicopters from destroyers GLASGOW and COVENTRY attacked and damaged patrol vessels using missiles. The following day, the Type 42 air defence destroyer, HMS SHEFFIELD, was hit by an Exocet missile launched from an Argentine Super Etendard jet and severely damaged, sinking some days later.

Meanwhile, in the mid-Atlantic, the amphibious component of the task force assembled at Ascension Island. This force comprised assault ships FEARLESS and INTREPID, RFAs STROMNESS and TIDEPOOL, and logistics landing ships SIR BEDIVERE, SIR GALAHAD, SIR GERAIN, SIR LANCELOT, SIR PERCIVAL and SIR TRISTRAM, the liner CANBERRA and other merchant ships, including ATLANTIC CONYAYOR, a container vessel converted into an aircraft support ship.

The amphibious force was to deliver 3 Commando Brigade, made of Royal Marine 40, 42 and 45 Commandos, as well as 2nd and 3rd Battalions of the army's elite Parachute Regiment. Escorting frigates were ARDENT, ARGONAUT and ANTELOPE. This force joined the battle force and entered Falkland Sound between the islands before steaming into San Carlos Water, where the initial landings were to take place. Troops were



The Argentine cruiser ARA GENERAL BELGRANO lists following a torpedo attack by HMS CONQUEROR

HMS HERMES's deck is a hive of activity as preparations to go to war are put in place



PA

## The conflict in the Falkland Islands raised the toughest possible challenges to the adaptability and versatility of British naval power

embarked in assault craft, and an amphibious operation on 21 May landed 3 Commando Brigade on East Falkland. This was largely unopposed from the land, but hotly contested in the air. Nonetheless, a beachhead was quickly established.

### PROTECTING THE BEACHHEAD

The fiercest stage of the campaign for the Royal Navy came as it fought to protect the beachhead and itself against attack. Intensive Argentinian air strikes followed during the next week. Sea Harriers from the two carriers continued to shoot down attacking A-4 and Dagger aircraft, as did missiles and gunfire from the destroyers and frigates.

The frigate ARDENT was mortally damaged by bombs on 21 May, ANTELOPE on 23 May, and the destroyer COVENTRY

and ATLANTIC CONVEYOR on 25 May. HM Ships ANTELOPE, ANTRIM and ARGONAUT were all severely damaged.

In order to reinforce the land campaign, elements of two British Army Guards regiments from 5 Infantry Brigade were landed at Bluff Cove, transported by SIR GALAHAD and SIR TRISTRAM. Tragically, these RFA landing ships came under air attack on 8 June. SIR GALAHAD was set ablaze, and SIR TRISTRAM was severely damaged.

The conflict ended in mid-June. It was a full test of naval capabilities with many dimensions. Some actions occurred in full global view with television coverage, others were never visible or subject to contemporary report. There were old-fashioned naval actions, such as shore bombardment by naval gunfire, there were secret Special Forces operations mounted by naval helicopters and covert surveillance patrols by nuclear attack submarines.

The Islands now have a far more robust defence infrastructure and capability, making another successful invasion by a foreign state very difficult. However, the requirement for the type of expeditionary warfare skills and assets that were exemplified by the Falklands' Operation CORPORATE has grown ever more necessary if the UK is to play a full part in safeguarding security in an uncertain world. ●

The 30th anniversary commemorations for the Falklands conflict took place in 2012



PA

## Operation CORPORATE remembered

**Three decades after the liberation of the Falkland Islands by a British expeditionary task force, a memorial was dedicated at the National Memorial Arboretum in Staffordshire, while other services took place around the United Kingdom and in the South Atlantic. *Simon Michell* reports on a very special year of remembrance**

**B**etween 2 April and 14 June 1982, some 258 British lives were lost and over 700 other personnel were wounded retaking the Falkland Islands from the Argentinian invaders. Those who lost their lives included members of all three armed services, the Royal Fleet Auxiliary and three Falkland Islanders. Although this was very much a joint forces effort, more than

18,000 men and women of the Royal Navy played a pivotal role in getting the British forces to the islands and protecting them en route as well as in theatre. 3 Commando Brigade also contributed significantly to the land battles that resulted in the ousting of the enemy forces.

Memorial services have been held each year around the country and in the Falklands to remember those who fought and paid the ultimate sacrifice. Since the islands were retaken there have been a number of monuments established in the United Kingdom, such as the Falkland Islands Memorial Chapel at Pangbourne College in Berkshire, the plaque in the Crypt of St Paul's Cathedral in London and the memorials on islands in the South Atlantic that witnessed the events themselves. On 20 May 2012, however, a new memorial was dedicated at the National Memorial Arboretum in Staffordshire to create a place where

The curved wall of Cotswold stone faces a rock taken from the South Atlantic



people can go to remember and pay their respects. It is also a peaceful sanctuary for those who lost friends and family to visit and contemplate the fallen, many of whom are buried 8,000 miles away on the Falkland Islands.

#### THE 30TH ANNIVERSARY REMEMBRANCE SERVICES

The establishment of the new memorial coincided with the 30th anniversary of the liberation of the islands, and so there was an added poignancy to the many activities that took place to commemorate the occasion during the year. Having made such a substantial contribution to the campaign that removed the Argentine forces from the islands, it is no surprise that the Royal Navy planned and hosted several of their own services to mark the event, as well as participating in the joint commemorations that took place. The dedication of the National Falklands Memorial at the Arboretum at midday on 20 May followed an earlier service that was held there to mark the start of the British invasion on 2 April. During that service a candle was lit and kept alight for the length of the conflict – 74 days. Hundreds of current

### The establishment of the new memorial coincided with the 30th anniversary of the liberation of the islands, and so there was an added poignancy

and ex-service personnel and their families attended the dedication ceremony at the Arboretum while the band of Her Majesty's Royal Marines Portsmouth created a musical backdrop.

A month later, in the South Atlantic, Falkland islanders, veterans and serving personnel gathered around Port Stanley's Liberation Monument on 14 June to mark the anniversary of the final day of the conflict. Following a service in the nearby Christ Church Cathedral, veterans of the 1982 conflict led a military parade to the monument to pay tribute and lay wreaths in honour of all those who lost their lives.



The Memorial Avenue at RNAS Yeovilton commemorates the 12 who were lost from the station during the conflict

## NATIONAL FALKLANDS MEMORIAL

Established through the efforts of the South Atlantic Medal Association 1982, the Falklands Memorial at the National Memorial Arboretum is one of 200 memorials that honour the nation's fallen.

The monument's design mirrors that of the commemorative wall at the Falkland Islands's San Carlos cemetery. A seven-foot high curved wall, hewn out of Cotswold stone, faces a rock taken from the Falkland Islands. In front of the wall, two granite benches allow visitors to contemplate the lost and remember all those who served in the six organisations, who are commemorated on the granite plaques, which are aligned on the wall.

### ROYAL NAVY SERVICES

Some 8,000 miles back across the Atlantic, the Royal Navy made a personal tribute to those of the naval family affected by the tragic events. The Sandown-class minehunter, HMS PENZANCE, paid a four-day visit to Swansea, where the Welsh port paid respects to the fallen. Lieutenant Commander Alex Bush led members of his ship's company in attending the SAMA 82 30th anniversary Service at St Mary's Church. After the service a reception was held on board the minehunter, to which a survivor of the sinking of HMS COVENTRY, Commodore Jamie Miller, was invited.

Another survivor of a sinking, Admiral Sir Michael Layard KCB CBE, was guest speaker at a ceremony held in Falmouth by the Royal Naval Association. The Admiral was senior naval officer on the ATLANTIC CONVEYOR when she was struck by two Exocet missiles and sunk. His graphic account of the events gave those in attendance pause for thought and a snapshot of what it was like to be involved in such harrowing events.

At Bickley, 42 Commando (Cdo) Royal Marines staged their own touching service in which some 300 attendees, including

serving Marines, conflict veterans, family members and VIPs participated. A parade was held, and the Commanding Officer of 3 Commando Brigade during the conflict, Major General Julian Thompson CB OBE, took the salute. This was followed by a march-past and wreath-laying in the memorial garden that 42 Cdo have created with funds they raised themselves.

The importance of naval air power can never be overestimated when considering the success of Operation CORPORATE. The Sea Harrier jets alongside the Sea King and Lynx helicopters played an absolutely critical part in the campaign. Indeed the islands could not have been recaptured without them. The Sea Harriers alone accounted for the downing of 20 enemy aircraft. His Royal Highness the Duke of York, who saw active service flying a Sea King with 820 Naval Air Squadron in the South Atlantic War, was guest of honour at the Fleet Air Arm (FAA) Memorial Church service at St Bartholomew's, in Yeovilton, on 14 June. The actions of the 1,400 FAA members and the 126 aircraft that were deployed in the South Atlantic were duly commemorated nine days later at the Royal Naval Air Station Yeovilton Air Day. ●

# The Royal Navy celebrates the Queen's Diamond Jubilee

**As Her Majesty Queen Elizabeth II celebrated her Diamond Jubilee in 2012, the Royal Navy played a vital role in the national events to commemorate her 60 years on the throne. *Samantha Chapman* details the special work that the Royal Navy carried out during the celebrations**

**O**n 19 May 2012, hundreds of Royal Naval personnel joined their Army and RAF colleagues to march as a group of 2,500 through Windsor town centre before arriving at the castle. Here, they mustered in front of Her Majesty the Queen and Prince Philip, as well as 3,000 military personnel, their families and veterans.

Leading the march on the day for the other two services, the Navy was represented by five platoons consisting of general surface ships personnel in the first, submarines and Fleet Air Arm



The Royal Barge MV Spirit of Chartwell approaches London's Tower Bridge on the river Thames

in the second, the Royal Marines Band Collingwood and Plymouth third, 42 Commando Royal Marines in the fourth and finally Royal Naval Reservists and Royal Fleet Auxiliary.

The Fleet Air Arm was also represented in the Berkshire skies as part of a specially designed formation flypast with 80 current and historic tri-service aircraft spelling out '60' and 'ER'. An aircraft from each force – Merlins, Sea King Mk7s or 'Baggers', Sea King Mk4 'Junglies' and Lynx Mk8s – took their place near the front as a diamond formation.

Lieutenant Graham Cannell, 848 Naval Air Squadron (Junglies) deployed to Afghanistan in 2010 and 2011, and now works at RNAS Yeovilton training future pilots. According to the Afghan veteran, "It's a great opportunity to take part in such a historic event. I am proud to be representing the Royal Navy in front of the Queen and also this is a way of saying thank you for all Her support to the Armed Forces over the years. I have taken part in many different operations around the world – flying troops around Afghanistan, counter-piracy patrols in the Gulf and worked with the British Antarctic Survey in South Georgia, so this ceremonial work is very different for me, but very rewarding."

Broadcast live by the BBC, this was the first time that all three services had visited the Queen for a dedicated event. A fortnight later, amid one of the wettest weekends on record, the Royal Navy again led from the front by providing the Royal Barge Honour Guard to escort the Spirit of Chartwell along the Thames for the River Pageant.

#### THE THAMES RIVER PAGEANT

As the Spirit of Chartwell was carrying the Royal Party, HMS PRESIDENT, the Royal Naval Reserves shore establishment near Tower Bridge, the Guard (made up of two P2000 patrol boats), HM Ships TRUMPETER and RANGER, two Picket Boats, two Rigid Inflatable Boats from HMS DIAMOND and four Off-shore Raiding Craft from 539 Assault Squadron Royal Marines was followed by The Massed Bands of Her Majesty's Royal Marines, who piped the boats along the river.

The weekend's Jubilee celebrations had begun on Friday 1 June 2012, when the RN's newest warship, HMS DIAMOND, fired a 21-gun salute in honour of Her Majesty as she entered



RN P2000 Patrol craft HMS TRUMPETER (pictured), escorted the Royal Barge during the Queen's Diamond Jubilee River Pageant



HMS ILLUSTRIOUS towers over HMS DIAMOND during a street party aboard the ship in Portsmouth's Royal Navy Dockyard

Portsmouth Naval Base. A flypast of four RN Merlin and Lynx helicopters hovered above the ceremonial entrance in a diamond formation. "It was fantastic to see such a great maritime event at the heart of the Diamond Jubilee," HMS DIAMOND's then commanding officer, Commander Ian Clarke, told the BBC when they interviewed him live on the day.

Just two days later, a million people lined the banks of the river to watch the flotilla of tugs, steamers, pleasure craft, dragon boats, kayaks and RN minehunter HMS HURWORTH weave their way through the Thames.

The pageant officially started at 14:40 BST, with the ringing of the Jubilee bells and the boats sailing from Battersea Bridge.

It ended about three and a half hours later after the final vessel passed under Tower Bridge shortly after 18:00. As the Royal Barge sailed past HMS BELFAST – the RN's largest Second World War cruiser now moored up on the Thames, Royal Navy veterans and Sea Cadets piped Her Majesty The Queen, His Royal Highness The Duke of Edinburgh and members of the Royal family, giving them the traditional Naval three cheers.

After travelling at the head of the pageant, HM The Queen left the Spirit of Chartwell and was escorted into the naval regional headquarters, HMS PRESIDENT, by then First Sea Lord Admiral Sir Mark Stanhope GCB OBE ADC, where she then watched the rest of the boats sailing past. Royal Naval Reserves





Members of the Armed Forces mustered in the grounds of Windsor Park in celebration



Three of HMS DIAMOND's crew share a cocktail to celebrate the Queen's Diamond Jubilee



**The weekend's Jubilee celebrations had begun on Friday 1 June 2012, when the Royal Navy's newest warship, HMS DIAMOND, fired a 21-gun salute in honour of Her Majesty**

formed a Guard of Honour at PRESIDENT to receive the Queen, where they presented the Queen's Colour of the RNR in Her presence for the first time since it was given to them the year following her Golden Jubilee in 2002.

Commanding Officer of HMS PRESIDENT, Commander Eugene Morgan said: "It's a great honour for HMS PRESIDENT to host Her Majesty on this special day. I am most proud of all the maritime reserves who worked so hard to make today such a success."

Lieutenant (Lt) Tony Scott, a Royal Naval Reservist based at PRESIDENT, was part of the pageant as one of the rowers on the unit's cutter, ARTHUR TISDALL VC, which is named after a Naval Reserve officer who was awarded the nation's highest honour

during the Gallipoli landings. After rowing the cutter from Battersea to Tower Bridge and beyond, Lt Scott, whose full-time job is as a Global Enterprise Architect for Arup, said, "Flying the White Ensign in the middle of the Thames is a once-in-a-lifetime opportunity. We were able to salute the Queen at the very start at Battersea Bridge and also at PRESIDENT. The atmosphere was absolutely superb, it was so well organised and even when the heavens opened there was nothing that could dampen our spirits."

Sadly, the finale of a planned aerial spectacular by the Fleet Air Arm – a nine helicopter-strong diamond formation led by Second World War bi-plane Swordfish – had to be cancelled due to the stormy weather conditions. ●

# Preserving the Royal Navy's aviation heritage



Armed with rockets, a Royal Navy Fairey Swordfish of 836 Naval Air Squadron lands on MAC ship ANCYLUS in the North Atlantic in 1943

### **Sue Eagles of the Fly Navy Heritage Trust explains how the protection provided by the Fleet Air Arm during the Battle of the Atlantic helped convoys to reach Britain with their vital supplies, enabling the Allies to launch the invasion of Europe**

**M**ore than 40 Naval Air Squadrons of Albacores, Avengers, Barracudas, Corsairs, Fulmars, Martlets, Sea Hurricanes, Seafires, Swordfish and Wildcats flew some of the most hazardous missions imaginable during the arduous Atlantic campaign that spanned the Second World War. The stakes were perilously high. Britain was in danger of running out of food, oil and military supplies.

#### **THE NEED FOR CARRIER-BORNE AIRCRAFT**

With the larger fleet aircraft carriers deployed elsewhere, the Fleet Air Arm, displaying typical resolve and determination, rose to the challenge. Desperate times called for desperate measures and early in the war, under the Admiralty's direction, reinforced Sea Hurricanes were carried to the Eastern Atlantic and Bay of Biscay areas, and launched by rocket-powered catapult from merchant ships. The pilots of these aircraft were extraordinarily courageous as they took off, knowing that on completion of their mission they had no recovery option other than to ditch or bale out and hope to be picked up by a passing ship. For a short time, these Catapult Armed Merchant (CAM) vessels and Naval Fighter Catapult Ships (NFCS) were vital for keeping the Condor threat at bay until sufficient escort carriers and aircraft became available to tip the balance back in the UK's favour.

One of the major problems faced by the Allies was the lack of long-range aircraft able to provide air cover in the mid-Atlantic and on the Gibraltar route. In the 'mid-Atlantic gap' – the 500 mile-wide stretch of ocean in the middle of the North Atlantic, the U-boats had almost complete freedom to operate; freedom to surface; and also to recharge their batteries and communicate by radio with their home bases. The pressing need to provide air cover for convoys clearly demonstrated the strategic importance of a combination of long-range shore-based and carrier-borne aircraft working with Allied anti-submarine surface forces.

#### **THE FAIREY SWORDFISH HELPS TURN THE TIDE**

From 1941 onwards, the escort carriers bore the brunt of the campaign and their aircraft sank 13 U-boats, and shared in the destruction of 10 others. Captain Eric Brown CBE DSC AFC RN, who flew Martlets from Britain's first escort carrier, HMS AUDACITY, and carried out several vicious and highly successful strikes against shadowing Condors, described landing on the pitching and rolling decks of these carriers as 'terrifying'. From 1943 onwards, hastily converted merchant ships called Merchant Aircraft Carriers (MAC ships) were also brought into service, but they were small. A typical deck length could be as short as 410 feet, compared with 500 feet for an escort carrier. However, the Fairey Swordfish proved outstanding operating from MAC ships. Indeed, with its low speed and impressive manoeuvrability it was the only aircraft available that could fly from these short decks and have enough fuel and weapons load to be viable.

These fabric-covered bi-planes and their aircrews, many only 19 or 20 years old, flew in open cockpits in all that the North Atlantic could throw at them – thick fog, mountainous seas and bitter cold, to fend off attacks by U-boats. The bravery of the Fleet Air Arm pilots was little publicised and many did not live to see the fruits of the victory that they helped to secure. Very often they crash landed back on deck and maintenance crews worked on exposed flight decks in sub-zero temperatures, handling freezing metal by torch light to get the aircraft repaired and ready to take off again at first light. While considered obsolete at the beginning of the war, the Swordfish proved effective in the Anti-Submarine role and the tireless efforts of these unsung heroes slowly and perceptibly helped turn the tide of the war.

This was no quick, decisive campaign. It was a relentless struggle and losses were high. Unlike the Battle of Britain, which was over in a matter of months, the Battle of the Atlantic went on for the entire six years of the war. During this long struggle, over 5,000 merchant ships and 188 RN warships were sunk, but the essential supplies and reinforcements continued to get through, and by the spring of 1943, air cover, including that provided by the Fleet Air Arm, began to have a dramatic effect in stemming convoy losses. Innovation also helped to improve the odds, with the development of radar allowing aircrews to detect U-boats on the surface. Rockets and homing torpedoes proved potent additions to the aircraft's armament.

The contribution made by naval aviation was substantial and should never be forgotten. In addition to protecting Atlantic and Arctic convoys, the Fleet Air Arm also played a major role in hunting and disabling the heavily armed German Battleships,

### **The bravery of the Fleet Air Arm pilots was little publicised and many did not live to see the fruits of the victory that they helped to secure**

*Bismarck* and *Tirpitz*, which, had they been allowed to roam the Atlantic, would have done more damage than innumerable U-boats. The story of the Fleet Air Arm in the Battle of the Atlantic is a compelling one, of young men flying outmoded aircraft against a determined and well-equipped enemy, in the worst flying conditions in the world... and winning. ●

*Swordfish W5856, the oldest surviving Swordfish in the world, will fly in the 70th Anniversary of the Battle of the Atlantic events in London and Liverpool in May 2013.*

*Preserving the Nation's Naval Aviation Heritage is the work of the Fly Navy Heritage Trust, a registered charity that provides financial support to keep the Royal Navy's historic aircraft flying as a living reminder of the important part played by naval aviation in the nation's history. To make a donation to keep the Swordfish flying in memory of all those who lost their lives in the icy waters of the Atlantic, please contact the Fly Navy Heritage Trust, RNAS Yeovilton, Ilchester, Somerset BA22 8HT. Tel 01935 842005 or email sue.eagles@fnht.co.uk*

An Atlantic convoy on its way to Great Britain is monitored by the battleship HMS KING GEORGE V

© IWM A003623

# The Battle of the Atlantic

**Winston Churchill regarded victory in the Battle of the Atlantic as absolutely imperative if the Allies were to defeat Nazi Germany. Had the Germans successfully blockaded imports to the UK, there is no doubt that Britain would have been knocked out of the war, as Dr Malcolm Llewellyn-Jones from the Naval Historical Branch explains**

**A**lthough the Battle of the Atlantic raged over the whole war, the turning point for the Allied victory can be clearly seen to have occurred in 1943. This year started with German U-boats having the upper hand. Almost half a million tons of shipping was lost in March alone, but by May this figure

was reduced by two thirds. In the same month, Allied powers sunk 43 German submarines in the Atlantic. Such was the devastating impact of these losses that the German Navy's Commander in Chief, Admiral Dönitz, recalled his boats. Although he eventually sent them back out to continue harassing Allied shipping, they never again posed the threat that might have changed the course of the war in Europe.

The victory over the U-boats in the Battle of the Atlantic was not the result of a single dramatic event. It was the culmination of a series of hard-fought Allied tactical successes that were overlaid by organisational and technical improvements, and underpinned by rigorous training.

The enemy was the German submarine 'Wolf Packs' that were on the verge of severing Britain's lifeline to her Empire and those

parts of the world from where either resources were drawn or troops were deployed for battle. Paradoxically, the situation was not helped when Germany declared war on the US four days after the Japanese attack on Pearl Harbor on 7 December 1941. From then on, U-boats had carte blanche to strike at shipping off the east coast of North America. As a result, in 1942, U-boats sank 6.25 million tons of merchant shipping. This heavy loss, combined with the large diversion of shipping to the Allied invasion of North Africa (Operation TORCH) in November 1942, led to a serious deterioration of the British import situation.

However, several important Allied developments took place during the spring and summer of 1942. Not the least of these was the installation in February 1942 of a shore-based group tactical training facility, known as the Western Approaches Tactical Unit (WATU), in Liverpool under Captain Gilbert Roberts RN. In addition, a new forward-firing anti-submarine mortar system, Hedgehog, was deployed for the first time and, in March, the first sighting of a U-boat occurred as a result of detection by the newly developed electronic high frequency direction finder (HF/DF) system. As more ships were fitted with this sensor, its tactical use became ever more important in warning convoy escort groups of U-boat concentrations.

When combined with the use of the Type 271 high-definition warning radar, now being widely fitted in escorts, and improved Group training, these technical improvements began to give the escorts greater confidence in countering U-boats – especially those that were attacking at night on the surface. RAF Coastal Command, too, was being equipped with more effective, longer-range aircraft carrying better sensors and weapons.

#### A DEDICATED OFFENSIVE ESCORT SUPPORT GROUP

In September 1942, the Admiralty was finally able to form the dedicated 20th Escort Group capable of being sent to reinforce threatened convoys with the object of sinking U-boats rather than providing purely defensive support. This Support Group was under the command of the experienced Commander GN Brewer, RN. Support was provided to several convoys during the month, however, the Group was soon broken up in order to provide some of the close escorts needed to shepherd the 'Torch' convoys from late October 1942.

Shore-side tactical training was extended to Group training at sea in January 1943 with the appointment of Captain AJ Baker-Creswell, RN, as the Training Captain in Western Approaches Command. Moreover, critical organisational changes brought about by the March 1943 Washington Allied Anti-submarine Conference sorted out the confused command structures on the Western side of the Atlantic, and gave the British, along with the Canadians, control over the North Atlantic trade routes. Simultaneously, the Admiralty was increasing the size of ocean convoys, which raised the volume of supplies reaching Britain's shores while, at the same time, improving the safety of the merchant ships and releasing some escorts to form support groups, which, in turn, further secured the safety of the convoys.

In the British Admiralty's April 1943 Monthly Anti-Submarine Report, the Admiralty, with considerable prescience stated that, "Historians of this war are likely to single out the months of April and May 1943 as the critical period during which strength began



An officer and rating on board HMS TRACKER plot the course of anti-submarine patrol aircraft in the North Atlantic

© IWM A019748

to ebb away from the German U-boat offensive, not because of the low figure of shipping sunk which, for the whole world area, did not much exceed a quarter of a million tons; not because of the satisfactorily high number of U-boats sunk, which was again well above the average for the last 12 months; but because, for the first time, U-boats failed to press home attacks on convoys when favourably situated to do so."

This decline in the enemy's willingness to engage was according to the Admiralty, "...a striking tribute to the weight of the offensive measures concerted so effectively by support groups and VLR [very long range] aircraft..." and escort carriers. But, at the same time, the Admiralty sounded a note of caution. While

### **Victory over the U-boats in the Battle of the Atlantic was not the result of a single dramatic event. It was the culmination of a series of hard-fought Allied tactical successes**

the balance appeared to be swinging towards the Allies, the German ability to recover meant that the Allies' growing advantage might only be temporary. In fact, the Germans did try to resurrect their campaign on the North Atlantic convoy routes in the autumn, but suffered an even heavier defeat at the hands of powerful Allied sea and air forces.

In a decision as significant as the German Air Force Commander, Hermann Goering's order to terminate the Battle of Britain more than two years earlier, Admiral Dönitz abruptly decided to transfer most of the U-boats on the North Atlantic convoy routes on 24 May 1943 to areas where escort forces were, he hoped, less powerful. In conceding defeat, the Commander in Chief of the German Navy played a major part in enabling the Allies to mount the invasion of Europe a year later with the D-Day landings in June 1944. ●

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## Support Tankers



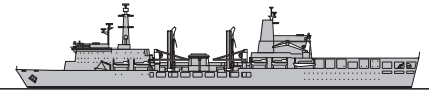
<b>ORANGELEAF A110</b>	Displacement	40,870 tonnes
	Length	170.7 metres
	Beam	25.9 metres
	Complement	59
	Armament	Close-range guns

## Small Fleet Tankers



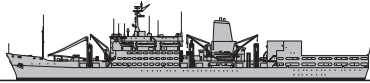
<b>GOLD ROVER A271</b>	Displacement	11,522 tonnes
<b>BLACK ROVER A273</b>	Length	140.6 metres
	Beam	19.2 metres
	Complement	54
	Armament	Close-range guns

## Fleet Replenishment Ships



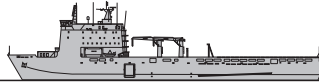
<b>FORT VICTORIA A387</b>	Displacement	31,570 tonnes
	Length	204 metres
	Beam	30.3 metres
	Complement	104 RFA + 21 Civilian stores personnel + 142 RN
	Armament	Phalanx gun system, close-range guns

## Fleet Replenishment Ships



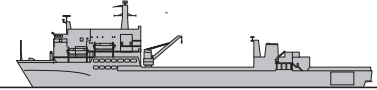
<b>FORT ROSALIE A385</b>	Displacement	23,482 tonnes
<b>FORT AUSTIN A386</b>	Length	185 metres
	Beam	24 metres
	Complement	150 RFA + 22 Civilian stores personnel + 68 RN
	Armament	Close-range guns

## Landing Ship Dock



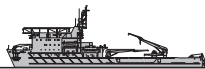
<b>LYME BAY L3007</b>	Displacement	16,160 tonnes
<b>MOUNTS BAY L3008</b>	Length	176 metres
<b>CARDIGAN BAY L3009</b>	Beam	28.4 metres
	Complement	80(RFA) + up to 359 troops
	Armament	Royal Marines, Landing Craft, up to 150 light vehicles or 24 Main Battle Tanks, Phalanx gun system, close-range guns

## Aviation Training and Primary Casualty Reception Ship



<b>ARGUS A135</b>	Displacement	28,080 tonnes
	Length	175 metres
	Beam	30 metres
	Complement	86 RFA + up to 306 RN (flight)
	Armament	Close-range guns

## Forward Repair Ship



<b>DILIGENCE A132</b>	Displacement	10,765 tonnes
	Length	112 metres
	Beam	28.2 metres
	Complement	60 RFA, up to 130 RN
	Armament	Close-range guns

## SUBMARINE SERVICE

### Vanguard Class - Ballistic Missile Submarines



<b>VANGUARD</b>	Displacement	16,000 tonnes
<b>VICTORIOUS</b>	Length	149.5 metres
<b>VIGILANT</b>	Beam	12.8 metres
<b>VENGEANCE</b>	Complement	132
	Armament	Trident D5 missiles, Spearfish torpedoes

### Trafalgar Class - Fleet Submarines



<b>TIRELESS</b>	Displacement	5,000 tonnes
<b>TORBAY</b>	Length	85.4 metres
<b>TRENCHANT</b>	Beam	9.8 metres
<b>TALENT</b>	Complement	110
<b>TRIUMPH</b>	Armament	Spearfish torpedoes, Tomahawk land attack missiles

## Astute Class - Fleet Submarines



<b>ASTUTE</b>	Displacement	6,700 tonnes
<b>AMBUSH</b>	Length	97 metres
<b>ARTFUL (Building)</b>	Beam	11.3 metres
<b>AUDACIOUS (Building)</b>	Complement	116
<b>ANSON (Building)</b>	Armament	Spearfish torpedoes, Tomahawk land attack missiles
<b>Boat 6 (Planned)</b>		
<b>Boat 7 (Planned)</b>		

## ROYAL MARINES

### Combat



40 Commando RM	760 Personnel
42 Commando RM	650 Personnel
43 Commando Fleet Protection Group RM	730 Personnel
45 Commando RM	570 Personnel

Either 40, 42 or 45 Commando RM at very high readiness as Lead Commando Group

### HQ Combat and Combat Service Support Units



HQ 3 Commando Brigade	60 Personnel
30 Commando IX Group	350 Personnel
Commando Logistics Regiment RM	600 Personnel
539 Assault Squadron	80 Personnel

Commando Helicopter Force  
24 Commando Regiment Royal Engineers (ARMY)  
29 Commando Regiment Royal Artillery (ARMY)

## FLEET AIR ARM

### Sea King Mk4 - Assault



<b>845 Naval Air Squadron</b>	Crew	2 pilots, aircrewman
<b>846 Naval Air Squadron</b>	Length	22.2 metres
<b>848 Naval Air Squadron</b>	Span	18.9 metres
	Speed	120 knots
	Propulsion	2 Rolls Royce Gnome gas turbines
	Payload	27 troops or 2,700 kg equipment
	Armament	.762 General Purpose Machine Gun

### Sea King Mk5 - Search and Rescue (SAR)



<b>771 Naval Air Squadron (Culresce, Cornwall)</b>	Crew	2 pilots, observer (navigator/tactician), aircrewman (winchman)
<b>Gannet SAR flight (Prestwick, Ayrshire)</b>	Length	22.2 metres
	Span	18.9 metres
	Speed	120 knots
	Propulsion	2 Rolls Royce Gnome gas turbines

## Training and Ceremonial



Commando Training Centre RM (CTCRM)  
1 Assault Group RM  
Royal Marines Band Service

## Sea King Mk7 - Airborne Surveillance and Control



<b>849 Naval Air Squadron</b>	Crew	Pilot, 2 observers (tacticians)
<b>854 Naval Air Squadron</b>	Length	22.2 metres
<b>857 Naval Air Squadron</b>	Span	18.9 metres
	Speed	120 knots
	Propulsion	2 Rolls Royce Gnome gas turbines

## Merlin Mk1 and Merlin Mk2



<b>814 Naval Air Squadron</b>	Crew	1 Pilot, observer (tactician), aircrewman (sensor operator)
<b>820 Naval Air Squadron</b>	Length	22.9 metres
<b>824 Naval Air Squadron</b>	Span	18.6 metres
<b>829 Naval Air Squadron</b>	Speed	167 knots
	Propulsion	3 Rolls Royce RTM322 gas turbines
	Armament	Stingray torpedoes, depth charges

## Lynx Mk8



<b>702 Naval Air Squadron</b>	Crew	Pilot, observer (tactician), 15.2 metres
<b>815 Naval Air Squadron</b>	Length	12.8 metres
	Span	15.0 metres
	Speed	245 knots
	Propulsion	2 Rolls Royce Gem gas turbines
	Armament	Stingray torpedoes, depth charges, Sea Skua anti-ship missiles, M3M machine gun, .762 General Purpose Machine Gun

## Lynx Mk9A



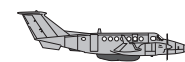
<b>847 Naval Air Squadron</b>	Crew	2 x Pilot
	Length	15.2 metres
	Span	15.2 metres
	Speed	120 knots
	Propulsion	2 LHTEC CTS800-4N gas turbines
	Armament	M3M machine gun, .762 General Purpose Machine Gun

## Wildcat



<b>700 Naval Air Squadron</b>	Crew	Pilot, observer (tactician)
	Length	15.2 metres
	Span	12.8 metres
	Speed	160 knots
	Propulsion	2 LHTEC CTS800-4N gas turbines
	Armament	(Planned) Future Anti-Surface Guided Weapon, Stingray torpedoes, depth charges, M3M machine gun

## Avenger



<b>750 Naval Air Squadron</b>	Crew	1 pilot, 2 observers, 2 student observers
	Span	17.65 metres
	Speed	245 knots
	Endurance	6 hours
	Propulsion	2 x Pratt & Whitney turboprops
	Capacity	2 crew + 6 passengers



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