



A GLOBAL FORCE 2011/12

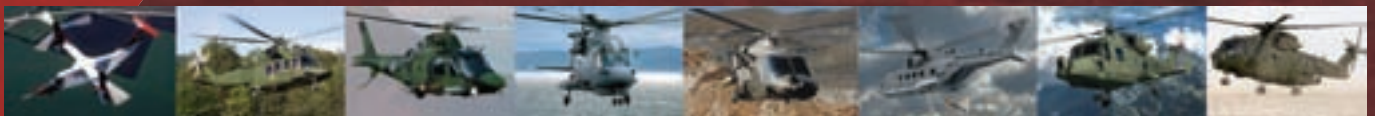




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A GLOBAL FORCE 2011/12

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Regenerating the Royal Fleet Auxiliary

Italian shipbuilding giant Fincantieri is promoting a European solution in its attempt to build a new generation of fleet tankers for the Royal Fleet Auxiliary, under the UK Ministry of Defence Military Afloat Reach and Sustainability programme

► Fincantieri's bid to win the contract for the UK Ministry of Defence's (MoD) fleet-replenishment tanker programme, known as the Military Afloat Reach and Sustainability (MARS) project, will centre on European alliances.

As Dr Giuseppe Bono, CEO of Fincantieri, explained: "A collaborative approach is important for this prestigious project to protect jobs in the UK, Italy and elsewhere in Europe, during an economic decline. Although we already have some agreements in place with leading UK firms, our door is open for further cooperation, to ensure we retain the excellence we have developed in the design and build of ships for the cruise and defence markets in Europe. This fountain of expertise could also be the basis for a stronger export drive from European industry."

Fincantieri is one of the world's largest shipbuilders with an enviable reputation for superb quality, on-time delivery and value for money. As well as being a market leader in cruise-ship construction, the firm's portfolio also includes both naval and offshore vessels, submarines, fast ferries, mega yachts, and semisubmersibles, plus a range of equipment including diesel engines, steering gear, fin stabilisers, propellers, and more.

Fincantieri has eight build yards in Italy and four in the US, where it is building the US Navy's ultra-fast Littoral Combat Ship (LCS), one of the most innovative naval vessels to be introduced in three decades.

EUROPEAN EXPERTISE

The first phase of the MARS programme involves the design and build of four replenishment tankers that will join the existing Royal Fleet Auxiliary (RFA) fleet in supporting the Royal Navy's global reach and sustainability strategy. One hundred per cent of Fincantieri's offer involves European equipment suppliers and specialists, such as Isherwoods,

Rolls-Royce and Cammell Laird. Alberto Maestrini, senior vice president, said: "If awarded the contract for MARS, it will give Fincantieri a greater presence in the European naval market and open the door to other job-creation opportunities. This is a case of combining skills and talents within the European shipbuilding industry. If we can use this expertise to optimise the design of the fleet tankers and reduce costs, we will have achieved something very special."

Fincantieri has constructed two NATO interoperable replenishment tankers for the Indian Navy to a design specification not dissimilar to that for MARS, and is one of the first shipbuilders to build naval tankers tailored to meet the new marine pollution (MARPOL) legislation governing the carrying of oil at sea, requiring double-hull construction. The MARS tankers will be larger and more militarised than their Indian counterparts, and will have some higher-performance features, such as a four-station Rolls-Royce electric RAS system, higher speed – in excess of 20 knots – and twin bridges for strategic battle command.

Reputation is everything for a shipbuilder, and Fincantieri is rightly proud of its 200-year history, building some of the most beautiful ships in the world, including the new *Queen Victoria* and *Queen Elizabeth* cruise ships for Cunard. It also builds mega yachts at its naval shipyard at Muggiano, near La Spezia, in a special, environmentally controlled construction hall, delivering the 134m motor yacht *Serene* – which is the most technically advanced vessel of her type – in August.

Dr Bono commented on the importance of building to customers' requirements, stating: "Although ultra-large yachts are very different from naval vessels, the quest for technological innovation, attention to detail, design optimisation and need to satisfy customers' expectations is similar. Whether the customer wants carbon fibre, stainless steel or 14-carat gold, they can

have it, and our skilled craftsmen will take the same great care and pride in the finished result, but of course, the cost will be different." Fincantieri has commenced cutting steel for a 140m mega yacht, *Victory*, that will be fourth in the world in terms of size, but will be unrivalled for quality.

As a strategic partner of the Italian Navy, Fincantieri is accustomed to working closely with naval customers in planning and designing new combatants. Vessels completed for the Italian Navy in the past five years include: AAW destroyers *Andrea Doria* (D553) and *Caio Duilio* (D554), aircraft carrier *Cavour* (550) and U212A submarines *Salvatore Todaro* (S526) and *Scire* (S527), which were all built according to customer requirements, contract timescales and budget, with no liquidated damages claims.

Fincantieri is proud of its 200-year history, building some of the world's most beautiful ships

Fincantieri is the only European competitor left in the running for MARS and is up against South Korean shipbuilders Daewoo and Hyundai. Although the build cost between firms is likely to be similar, there is a distinct tax benefit for the EU in building the ships in Italy with UK support.

The UK is intrinsically linked to Italy and other European economies, and Fincantieri believes that the current economic climate supports the need for increased cross-border industrial cooperation, reflected in our MARS strategy, which is based on a European collaborative approach.

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Demonstrating the utility of maritime forces

The Right Honourable Philip Hammond MP, Secretary of State for Defence

Last year was an extraordinarily busy year for the Royal Navy. Who would have predicted that 2011 would see the most extensive use of gunfire by the Royal Navy since the Falklands? But the NATO campaign to protect Libyan civilians has seen just that. Operation UNIFIED PROTECTOR has demonstrated the utility of maritime forces as part of an integrated campaign.

The Royal Navy's contribution has been outstanding. From the delivery of long-range precision strike with submarine-based Tomahawk missiles, to the multiple other tasks performed off the Libyan coast, such as mine clearance, targeting coastal defences and enforcing the UN arms embargo – the Royal Navy has proven once again what a flexible and formidable force it is.

I want to take this opportunity to thank all those in the Royal Navy, Royal Marines and Royal Fleet Auxiliary for their hard work over the last year, not just on operations in Libya, but on tasks around the globe – maintaining the nuclear deterrent, tackling piracy, providing disaster relief – and, of course, conducting combat missions in Afghanistan, which 3 Commando Brigade Royal Marines, among others, did so effectively in Helmand in the summer.

The events in Libya and across the Arab world have underlined just how volatile the international security environment is. A National Security Strategy can analyse risk and lay down priorities, but it can never predict with complete certainty when and where threats to national security will occur that require the involvement of the UK's Armed Forces. We need our Armed Forces to provide the capacity for a broad and flexible spectrum of possible responses. I know this is a difficult time for the Armed Forces as we act to bring the Defence budget into balance and restructure for the future, but the adaptable posture set out by the Strategic Defence and Security Review is the right way to ensure that we sustain the capabilities and skills



The adaptable posture set out by the Strategic Defence and Security Review is the right way to ensure that we sustain the capabilities and skills required

required to protect Britain now and for the long term. This, of course, includes the ability to project power at considerable distance – before, during, and after any military intervention – and this means Britain must remain a maritime power.

Maritime power not only protects vital trade routes and, therefore, prosperity, it also enables us to gain access to, and operate in, other domains in far-flung parts of the world in support of a wide range of national and international objectives. It provides choice and flexibility without necessarily committing to a footprint ashore.

Sea-basing can overcome the challenges associated with securing access, air-basing and overflight permissions for combat operations. So I am clear that the Queen Elizabeth-class carriers, deploying the carrier variant of the Joint Strike Fighter and a mixed helicopter force, will be an integral part of Britain's future armoury – an armoury that will also consist of Astute-class submarines, new Type 45 destroyers, upgraded maritime helicopter fleets and,

soon after 2020, Type 26 Global Combat Ships, all enabled by new Fleet Support Ships.

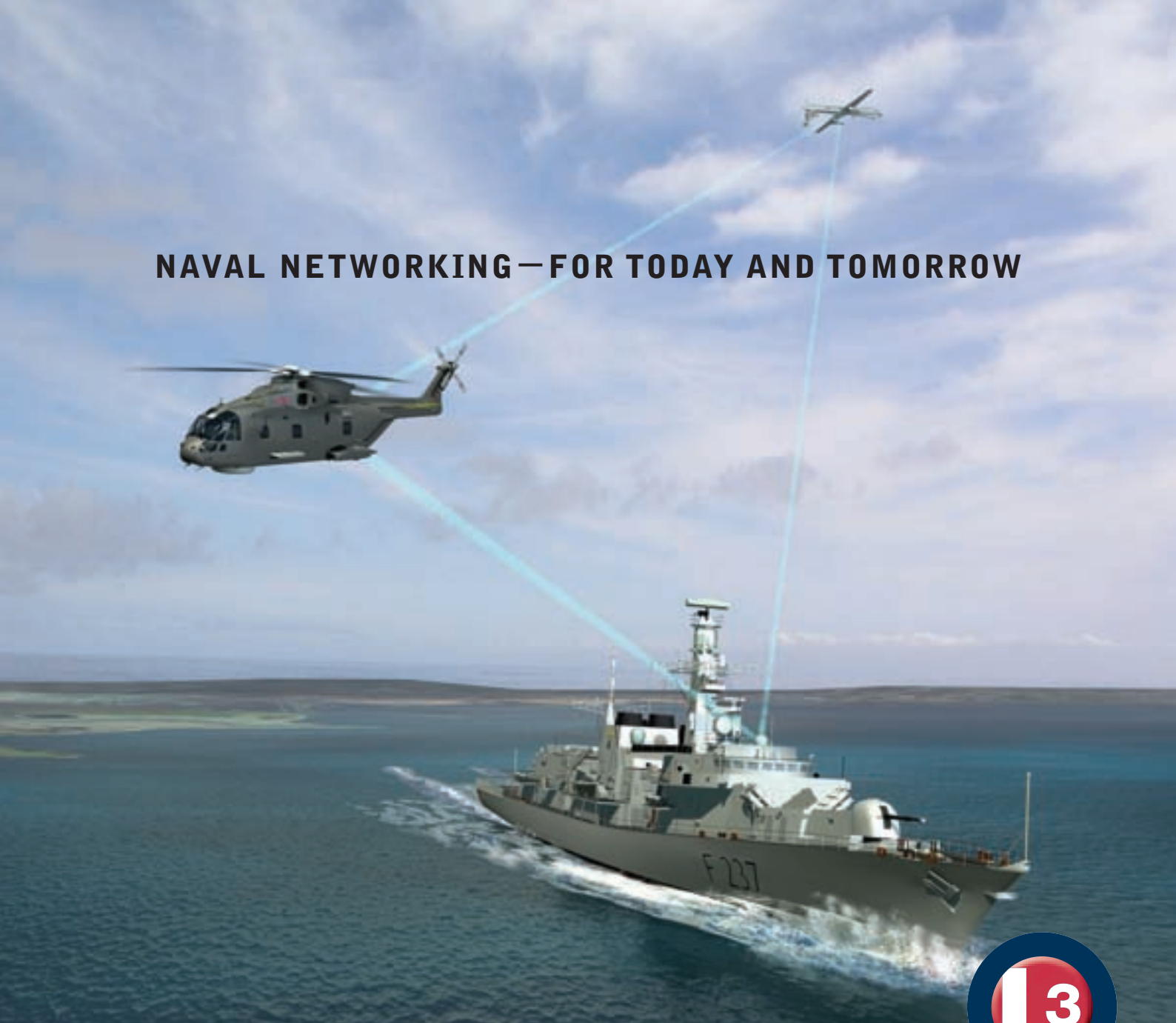
This will be an impressive and capable Fleet – one of the most powerful in the world – but it is the skill and commitment of the sailors and marines that will provide this hardware with purpose and direction. As this publication shows, the United Kingdom needs the Royal Navy, now and in the years ahead. I am determined that, as we move forward together, our national ambition is matched by our maritime ambition, to ensure that Britain remains strong and secure. ●

The Queen Elizabeth-class carriers will be an integral part of Britain's future armoury



Secretary of State for Defence Philip Hammond welcomes home the ship's company of HMS LIVERPOOL, following her participation in the support of Operation UNIFIED PROTECTOR in Libya

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Making a difference

Admiral Sir Mark Stanhope GCB OBE ADC, First Sea Lord and Chief of Naval Staff

World events over the past year once again served to remind us not just of the need to address the threats that we currently face, but of the importance of being able to respond to the unforeseen – the need for contingent capability. This edition of *A Global Force* captures that wide range of operational tasking in which the Royal Navy – by which I mean all elements that form the Naval Service – has been heavily and heroically involved, making a tangible difference in the process.

No wonder the British public is so proud of its Navy, as am I and all those who serve – and with good reason. For much of 2011, around 8,000 sailors and marines – about a quarter of the Royal Navy – were deployed in protecting our nation's security and prosperity, bringing a degree of certainty to a world of uncertainty.

Take, for example, 3 Commando Brigade Royal Marines' achievements in central Helmand, Afghanistan, supported by the Fleet Air Arm, an unprecedented range of Naval units, and individual augmentees. In the summer of 2011, the cycle of violence in central Helmand was arguably broken: insurgent activity reduced by 45 per cent and significant quantities of explosive intercepted, the equivalent to eight months' worth of improvised explosive devices (IEDs), which will not now disrupt the everyday lives of the Afghan people.

And then, of course, in a world in which more than a third of our global gross domestic product is moved by sea, there is the constant need to ensure that our global trade and energy – upon which our nation's dependency increases with each passing year – flows uninhibited across the oceans, through international straits and in territorial waters. The worldwide menaces of piracy, terrorism and smuggling demand that the Royal Navy, working with many other navies, retains a vital persistent presence in the Indian Ocean, the Gulf, the Atlantic and the Caribbean. Helping to keep the seas safe, every hour of every day, in much the same way as we expect our streets to be safe.

But the past year has, above all, highlighted the importance of maintaining a capable maritime response force – consisting of ships, aircraft and Royal Marines – that can deploy at short notice, with the right blend of capabilities required to undertake a wide range of specific tasks. An innovation of the Strategic Defence and Security Review, established



The past year has, above all, highlighted the importance of maintaining a capable maritime response force that can deploy at short notice



The successful participation of helicopter carrier HMS OCEAN in the UN-mandated operation to protect Libyan civilians highlights the flexibility of today's modern Royal Navy

in 2011, the Response Force Task Group (known as the RFTG) can operate across the spectrum of conflict – from maritime strike to disaster relief, and from amphibious operations to civilian evacuation. It has successfully proven its value by undertaking separate, yet simultaneous, missions in different theatres (off Libya and east of Suez) and by contributing to joint and multinational operations. It has demonstrated the inherent mobility, versatility and interoperability of maritime forces.

Moreover, because these are the key characteristics of maritime power, the Royal Navy, in response to unfolding international circumstances earlier in 2011, quickly and easily switched the tasking of not only the RFTG, but also of deployed warships and submarines. This meant that, off Libya, for example, the Royal Navy evacuated civilians to safety in our frigates and destroyers, conducted long-range precision strikes from a submarine, undertook mine-clearance operations with our mine countermeasure vessels, and conducted embargo operations and naval fire support with our surface ships. Not to mention the support of attack helicopters and maritime surveillance missions from helicopter carrier HMS OCEAN.

In the years ahead, the UK's ability to respond in an uncertain world will only increase as the additional carrier strike capabilities bring welcome potency to the future delivery of maritime power from the sea, over land and in the air.

Indeed, while we have been setting our sights on reshaping the Navy for the future – by generating

the Future Force 2020, which details the size and shape of our future capabilities – 2011 has been a year of considerable challenge and change, just as the next few years are likely to prove. Understandably, this is an unsettling period for our people, whose professionalism, commitment and courage remain fundamental to the delivery of operational success.

And yet, while the transition to Future Force 2020 will not be easy, there remains significant activity, purpose and ambition, and, with it, much that our people, both our regular and reserve personnel, can look forward to with confidence.

From a platform perspective, the past year witnessed the achievement of significant milestones in our country's aircraft carrier programme as HMS QUEEN ELIZABETH fast becomes a reality and the first steel was cut for HMS PRINCE OF WALES. The White Ensign is now flying from the fourth of six Type 45 Destroyers and we have laid the keel for the fifth of seven Astute-class submarines.

Considerable progress is also being made with regard to the upgrade of our helicopter fleet, the design of our 13 new multi-role Type 26 global combat ships, four fleet tankers and three support ships, as well as the successor deterrent submarines.

Just as the Prime Minister, speaking at the Lord Mayor's banquet in London, believes that "this country has always been at its best when it projects its influence", I also believe that this nation's Navy is – day in, day out – a compelling expression of this country's influence. The Royal Navy remains a truly global force, and these pages tell you why. ●

In the years ahead, the UK's ability to respond in an uncertain world will only increase

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ASMAR is a leading Chilean company specializing in a wide spectrum of comprehensive solutions for the worldwide ship owning community ranging from ship maintenance, repair, conversion, upgrading and modernization of all kind of ships up to Panamax size. It has over a hundred years of experience in docking activities for the naval and commercial sectors and a sound reputation in the both markets worldwide.

Shipyard facilities and services

The company has facilities strategically located along the Eastern South Pacific Coast in Valparaíso Talcahuano and Punta Arenas (Chile). In total, the company has a stable and skilled workforce of over 3.000 professionals, technicians and specialists. It also has Commercial Agency networks covering 45 countries around the world.

The benefits of ASMAR's unparalleled, one-stop maintenance facilities continue to be reaped by all its worldwide customers as far afield as the Americas, the Caribbean, The Far East and Europe. ASMAR provides full line maintenance support to the Chilean Navy and foreign navies, National and International shipping companies, fishing fleets and scientific research vessels that merge with different transoceanic and operational destinies in the Pacific and the Antarctica.

ASMAR Industrial Plant in Valparaíso specializes in afloat ship repairs. It also manufactures PUMAR® RIB boats.

The principal shipyard of the group is ASMAR Talcahuano, located in the central part of Chile. Being the largest facility along the Eastern South Pacific coast, it can accommodate vessels up to Panamax size. It also has floating docks, berths and mooring sites, floating and portal cranes and a wide spectrum of workshops including electronics, electrical, mechanical, metallurgical, diesel and gas engines, machine shops, piping and boilers, carpentry etc. It has earned a reputation for world class maintenance and meticulous attention to details and has attracted over 60 international customers. This has been achieved by a combination of excellent facilities and the remarkable adaptability, vigour, skill and efficiency demonstrated by its skilled and competent employees who have reached world-class levels of competitiveness.

ASMAR undertakes scheduled and unscheduled maintenance, major modifications, refurbishments on all types of vessels not exceeding Panamax size. Including sending on-site work parties to customer directed locations.

This yard also performs New Construction of Naval and Commercial Vessels in accordance with Customer Specification and Classification Societies and all Statutory Regulations.

In Punta Arenas, ASMAR operates the southernmost ship repair yard with a dry docking system consisting of a marine railway for ships up to 3,570 tons with 9 docking positions, and a 300 m berth with the necessary services for afloat repairs.

All of the three shipyards have achieved ISO 9001:2000 Certification and ISPS Code Approval and we are fully aware of our environmental obligations.

The Valparaíso and Talcahuano Plants also boast Nationally Accredited Calibration Laboratories which ensures that all inspection, test and measuring equipment used to verify dimensional and performance characteristics are fully calibrated ensuring that the customer receives consistently accurate, reliable and extraordinary service.

ASMAR's customers can also take advantage of the benefits to be obtained as a result of the network of Free Trade Agreements that the Government of Chile has with the European Free Trade Association, Canada, Mexico, Korea, China and the United States of America, which has placed it in a privileged position as a leading world trader and a strategic business base in the region.

ASMAR is well prepared and eager to comply with all the requirements of International Markets. ASMAR ensures delivery is on time, to specification and at a highly competitive price. Our greatest challenge is to continue to improve, so as to deliver the best of service to all our customers worldwide.

The constant modernization of its facilities with state-of-the-art technologies and equipment, the permanent training of its workforce in the country and abroad, the specialization of the production and management lines with the highest quality standards together with the diversification of its shipyards, give ASMAR the adequate capacity to serve its clients from the five continents.



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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, and provides 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.



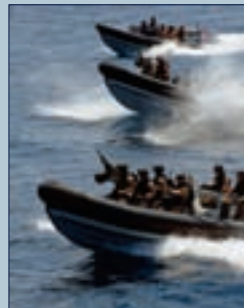
PROVIDING HUMANITARIAN ASSISTANCE

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.

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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 sea – our nation's lifeline

Some 90 per cent of the UK's trade depends on the sea, including critical oil and gas supplies. *Simon Michell* describes what the sea means to the UK and how the Royal Navy is an integral part of the international effort to tackle piracy and terrorism, as well as the trafficking of people and drugs

Without the global shipping industry, “half the world would starve and the other half would freeze”. This quote, taken from the International Chamber of Shipping website, is a stark reminder of the interdependence between nations for food, fuel, raw materials and finished goods. Each year, some 90 per cent of global trade is shipped on around 50,000 cargo vessels. These vessels can cost as much as \$200 million each, while the largest of them can carry enough oil (300,000 tonnes) to heat a city for an entire year or enough grain (200,000 tonnes) to feed the population of Manchester for the same amount of time.

Following the end of the 2008-09 recession, global shipping returned to growth in 2010 and, although the trends are somewhat patchy, future growth patterns appear robust for the foreseeable future. United Nations estimates put annual freight volumes at more than \$400 billion – the equivalent of five per cent of the entire world economy.

Despite continued nervousness and uncertainty, there remains one constant: that moving goods across water is still the cheapest and most efficient way of conducting world trade. It costs, for example, a mere \$10 to transport a tonne of iron ore from Australia to the United States; or to put



it another way, shipping a can of beer on the same journey costs just one cent.

In what can only be described as chronic sea blindness, the average person in the UK fails to associate their ability to function on a daily basis with the vast ports industry. It is a safe bet that a large proportion of the wine, meat, fruit and vegetables in their local supermarket, the gas for their central heating, the petrol for their daily commute, the TV and probably the car, all spent part of the journey to their home in a ship.

THE SEA AS A SOURCE OF ENERGY

Energy, in particular, is a prime example of our dependence on the sea. There is little recognition that, since the middle of the last decade, Great Britain has imported more oil, gas and coal than it has exported. In fact, according to the House of Commons *Energy Imports and Exports* Standard Notes of July 2010, the decline in the productivity of the North Sea oilfields resulted in Britain becoming a net oil importer as long ago as 2006. The same notes highlight how the UK is ramping up imports of coal and Liquefied Natural Gas (LNG).

Although some of the LNG is piped under the North Sea from Belgium, the Netherlands and

Norway, the UK has just opened up three new LNG ports at the Isle of Grain, Milford Haven and Teesside. These are designed to take a new class of LNG vessels from places as far away as the United States and North Africa. They are a vital element in the UK's diversified energy strategy.

BRITAIN'S CENTRAL ROLE

For centuries, Great Britain has been at the centre of the global maritime community. It was in recognition of this fact that the International Maritime Organisation was headquartered in London in 1959, having first been formally established in 1948. Even today, London controls about 20 per cent of the total world fleet, and employs close to 5,000 people in the associated trades.

On a domestic level, the UK's 600 ports handled 501 million tonnes of freight traffic in 2009; although this figure was lower than in 2008, it was, according to the Department for Transport, more than any other European country. Volumes are now growing again and in the year ending in the first quarter of 2011, tonnage was up three per cent, compared with the equivalent period in 2010.

It is perhaps surprising to many to learn that the British maritime industry is such a key sector in the

The UK's port of Felixstowe is one of the busiest in Europe and handles more than 40 per cent of British imports and exports

Recognition of Britain's integral place in the global maritime community saw the International Maritime Organisation located in London in 1959



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The world's main sea lanes have to pass through numerous choke points

UK economy. The Oxford Economics 2010 report into the industry points out that there are close to 500,000 people engaged either directly or indirectly in the combined UK ports and shipping sector. This is more than the pharmaceuticals, restaurant and publishing industries. Moreover, with a direct contribution to UK gross domestic product of £25 billion in 2007, it is the fourth largest employer.

Another aspect of the sea that should also receive some consideration is the wealth it represents to the UK in terms of marine wildlife stocks, minerals, oil and gas. The UK has extensive rights to Exclusive Economic Zones (EEZs) around its mainland and its overseas territories. When you include its overseas territories, the UK has the fourth largest EEZ area. Significantly, the zones in the South Atlantic and Indian Ocean are larger than the homeland zone. With the first-ever oil deposits successfully brought to the surface in the North Falklands basin in June 2011, this region has again emerged as a potential flashpoint in international relations, particularly with Argentina, which has never dropped its claims to British territories in the South Atlantic.

RECOGNISING RESPONSIBILITIES

With rights come responsibilities, and the UK is tasked with managing these vast areas to ensure that they are not illegally exploited or damaged. More than this, the UK, as a major naval power, also has a duty to the international community to help maintain stability on the seas. Stock market crashes

have shown how the financial markets crumble under the faintest whiff of crisis or uncertainty. The problem is that although the sea represents a lifeline to the law abiding, it also presents huge opportunities to those who seek to use it for unlawful purposes. Piracy, terrorism and smuggling offer huge potential for instability and crisis.

The surge in piracy off the coast of Somalia and West Africa is a massive concern for the shipping industry. Nothing is sacred; even the UN's food relief ships have been taken hostage. And the stakes are incredibly high. When news of the capture by pirates of the supertanker *Sirius Star* hit the headlines in 2008, the loss of its \$100 million worth of oil sent the price of a barrel up by a dollar.

The Royal Navy and the Royal Fleet Auxiliary (RFA) are at the very forefront of the various international efforts to combat illegal acts at sea. As part of NATO, they patrol the Mediterranean to deter and defend against terrorist activity. The two fleets are also engaged with a wider coalition of nations in the Arabian Gulf to ensure that vital oil and gas supplies can continue to flow unimpeded.

Counternarcotics operations are also constantly being performed in the Caribbean, alongside US and Dutch forces. In fact, wherever these threats emerge, the Royal Navy, supported by the Royal Fleet Auxiliary, is never far from hand. The work that is being carried out to keep the sea safe and open for legitimate use is covered in closer detail in a series of articles later in this publication. ●

Developing Columbia's maritime industry

▶ Cotecmar is the science and technology corporation for the development of Colombia's naval, maritime and riverine industry. It was created in 2000 with the following purposes:

- To provide the naval power required by the nation
- To participate in the development of the maritime power;
- To strengthen maritime interests;
- To activate Colombia's naval industry;
- To promote research into industry-related problems.

With the creation of Cotecmar, a strong partnership was born between the Colombian Navy and the Academy. This is

why three of Colombia's best universities are included in the company's capital stock.

Over the past decade, Cotecmar has developed powerful riverine and maritime defence systems that can help other countries to reduce terrorism threat levels.

THE RIVERINE COMBAT FLEET

Heavy Riverine Support Patrol Unit (Patrullera de Apoyo Fluvial Pesada – PAF-P)

For patrol and surveillance operations in shallow waters, Cotecmar has developed the PAF-P. This ship can carry a crew of 33 in complete safety thanks to its heavy armour and rapid-fire weapons systems.

Support, Resistance and Power – three words that perfectly describe the PAF-P.

Outfitted with state-of-the-art technology, this mobile operations base can play a key role in national security and defense.

Light Riverine Support Patrol Unit (Patrullera de Apoyo Fluvial Liviana – PAF-L)

This ship provides logistical support for combat operations that target extremely violent organisations. It is built by the Colombian Navy and is protected by NIJ Level 3 rifle-resistant armour. In deep water it can reach a top speed of nine knots.

The deployment and attack capabilities of the PAF-L have been tested in combat zones. Its heavy-weapon systems and 19-day autonomous cruising capability allows its crew members to support any military mission at sea or on rivers.

River Patrol Launch (Lancha Patrullera de Río – LPR)

The 40-foot River Patrol Launch with its five days' autonomous cruising capability, tested under extreme combat conditions, is a strategic platform ideally suited to surveillance, intelligence, communications and command-and-control operations.

Level 3 armour, made up of non-metallic lightweight panels. Machine guns and grenade launchers constitute the LPR's all-purpose firepower and support capability.

The River Patrol Launch has an innovative steering system that allows it to make 360-degree turns without losing track of the enemy. Low water levels in rivers pose no problem for this ship. Its compound sandwich structure protects against hull damage even when under a heavy load or at high speeds, and its dual water-jet propulsion system drives the River Patrol Launch up to 29 knots, which makes it a serious threat to drug runners.

Riverine Combat Element (Elemento de Combate Fluvial)

These boats will replace the piragna boats in the near future. Cotecmar is currently engaged in development of the four concepts that have been identified as promising during concept exploration.



Heavy Riverine Support Patrol Unit (Patrullera de Apoyo Fluvial Pesada – PAF-P)



Light Riverine Support Patrol Unit (Patrullera de Apoyo Fluvial Liviana – PAF-L)



River Patrol Launch (Lancha Patrullera de Río – LPR)

THE MARITIME COMBAT FLEET

Offshore Patrol Vessel – OPV (Patrullero de Alta Mar)

This ship has 800 hours of coastal cruising capability under circumstances of variable risk, with a crew capacity of 30.

The first OPV was classified by Germanischer Lloyd, which has certified its high standards of quality for crew members, guaranteeing superior capabilities in all kinds of operations, such as interdiction, peacekeeping, humanitarian aid and environmental protection missions.

The Offshore Patrol Vessel (OPV) boasts superior deployment, capacity, resistance and support capabilities, making it essential whether in times of peace or crisis.

Coast Patrol Vessel – CPV (Patrullero de Costas)

The Coastal Patrol Vessel has been designed as a platform for maritime interdiction, sea patrol, maritime surveillance of jurisdictional areas, and support to border control operations for detecting, intercepting, stopping, boarding, and inspecting vessels.

The CPV is also designed for developing SAR missions and environmental control.

Due to its equipment, it is a perfect platform to asymmetric threat scenarios. The CPV is equipped with a multifunctional boat to be launched from the stern.

Logistic & Cabotage Support Vessel (Buque de Apoyo Logístico y de Cabotaje – BALC)

The BALC was designed under the concept of a landing craft to develop military missions to aid the civilian population located in riverine and coastal areas of Colombia. The bow ramp allows access to zones without the proper port infrastructure for conventional ships. Also, its high load capacity (200 tons) and the capability to navigate with a draft of only 1.5 metres helps in carrying out logistical-support missions such as transporting troops, vehicles, liquids, containers and/or unitized cargo to naval bases.

Also, considering the need to develop natural-disaster relief operations, the vessel is equipped with high-tech communication-

support systems, playing an additional role as an emergency control centre.

High-Speed Bay Interceptor – HSBI

This 40-foot Bay Interceptor is a high-speed boat that can reach 50 knots of velocity, and which is suited for surveillance and countermeasures against drug runners in bays and shallow waters.

The HSBI's endurance – 300 nautical miles at a cruising speed of 35 knots – and its two-day autonomous capability gives this boat the ability to patrol the coastline near shore and intercept any “go-fast” boat detected. The HSBI is equipped with two machine guns and personal assault weapons, and has a fully sea-land-aerial communication capacity to operate jointly with patrol planes and surveillance platforms, such as the Offshore Patrol Vessel – OPV.

Its four-man crew is protected by shock-mitigation jockey seats for patrol operations in rough seas and a strong canvas bimini combined with a cuddy cabin for station surveillance.



Heavy Riverine Support Patrol Unit (Patrullera de Apoyo Fluvial Pesada – PAF-P)

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Projecting military power

Robert Fox outlines how the Royal Navy remains as relevant as ever, and is still more than capable of projecting power where needed at a time of the government's choosing, best emphasised by recent events in Libya

The Royal Navy in 2011 more than proved its ability to be a global maritime player – with operations and deployments in half-a-dozen vital theatres around the world. It has done so against a background of growing foreboding about the global economy, highlighted by the protracted crisis of the euro, and the programme of public expenditure cuts being driven through by the coalition government at Westminster.

The Navy itself has received its fair share of cuts, and these were implemented through 2011 and will continue to 2014 under the policy lines laid out in

the Strategic Defence and Security Review of October 2010. Its achievements in 2011, however, give a clear indication that the Navy is managing these changes effectively and will emerge from the reform process as a maritime force of global impact.

Throughout the year, the Navy has mounted a complex, medium-scale, war-like operation in Operation ELLAMY in Libya. It took a crucial and leading role in the NATO campaign to enforce UN Security Council Resolution 1973 to protect the Libyan people against the aggression of the dictatorial regime of Muammar Gaddafi.

HMS OCEAN arrives at Malta's port of Valletta for maintenance during Operation ELLAMY



A clear pointer to the future is how the Royal Navy, as well as Army and RAF units, worked alongside European allies in Libya

"In cameo, we saw what the Navy is capable of doing, and will do in the future," explains Admiral Lord Boyce, the former First Sea Lord and Chief of Defence Staff. "It showed itself more than capable in highly complex tasks, which it could discharge alone, and with close allies France and the United States," he added.

At the same time, ships and units of the Navy and Royal Marines were involved in major reassurance and security operations in the Gulf, anti-piracy operations in the Indian Ocean off Somalia, and forming the core of the UK's Task Force Helmand in Afghanistan from March to October.

Under Brigadier Ed Davies, Royal Marines, 3 Commando Brigade succeeded, among other things, in blunting any serious attempt by the Taliban to mount a major summer offensive across the central fertile belt of Helmand – as they had done in the three previous summers, and had threatened again in 2011.

In addition, the Navy kept a presence in the North Atlantic, and its regular patrols by surface ship and submarine across the South Atlantic.

Operations in Libya opened with a civilian evacuation in dangerous circumstances by the Type 22 frigate HMS CUMBERLAND, which was on passage to the UK before being decommissioned. At considerable risk, she had to go alongside in Benghazi several times in February to take off some 450 British and foreign nationals, and carry them to safety in Malta.

In March 2010, the UK joined the combined NATO mission Operation UNIFIED PROTECTOR, which culminated with the overthrow and death of Colonel Gaddafi the following October. In that time, the Navy's submarines and surface ships carried out a series of vital operations, some still shrouded in official secrecy. Most innovative perhaps was the deployment of a force of some five of the Army Air Corps' AH-64 Apache attack helicopters from the decks of the LPH carrier HMS OCEAN. They proved particularly effective in striking individual tactical targets, from mobile command and radar posts, to tanks and military convoys.

Less publicised was the use of underwater assets. Mine-clearing teams from HMS BANGOR and HMS BROCKLESBY carried out critical mine countermeasures tasks along the coast, most notably in the port of Misrata, just after Gaddafi's forces had placed underwater mines and charges to prevent any allied effort to bring food and medical relief to the beset civilians in their towns and cities.

A Royal Navy submarine launched more than 30 Tomahawk cruise missiles against carefully selected, strategic shore targets – out of a total of 640 vital ground targets struck by UK forces. The submarine also carried out a series of intelligence and surveillance operations, and support of specialist forces ashore – a key part of their role in future combat and security missions.

Operation ELLAMY provides a working model of how such littoral operations might work in the future, covering anything from disaster relief and rescue to combating guerrilla and pirate forces in coastal areas. A clear pointer to the future is how the Royal Navy, as well as Army and RAF units, worked alongside European allies during the Libyan mission, particularly the French and the Italians.

The launch of air strikes by Rafale aircraft from the deck of French carrier *Charles de Gaulle* indicates how the UK may deploy its new aircraft carriers when they are commissioned in 10 years' time. The Italians provided vital naval and air bases, and support in logistics and supplies, mostly well in advance of formal requests from NATO HQ.

THE ARABIAN GULF AND HORN OF AFRICA

In other areas, the Navy has maintained operations that are likely to continue, and be enhanced even, particularly the Gulf and the northern Arabian Sea. The Navy maintains a permanent presence of two frigates or destroyers, plus a range of smaller assets



Royal Navy personnel help to load humanitarian supplies from RFA WAVE RULER onto a boat for transfer to the Turks and Caicos Islands

There is every sign that personnel reduction can be achieved while still enabling the Navy to project force globally

at sea and ashore in Operation KIPION – the successor to the long-standing Armilla Patrol begun in 1971 in the Gulf. This is in addition to the continuing support to counter-piracy operations off the coast of Somalia – where naval units have scored notable successes in the past year, including the capture of a pirate command ship by HMS SOMERSET in October 2011.

As concern grows about asymmetric threats from unpredictable adversaries, such as Somali pirates and the Shabab militias, the emphasis is placed increasingly on a flexible maritime strategy based on fixed-base deployments and rapid-reaction forces.

A new set of risks and threats is being thrown up by the growth in the human population and climate change, manifested by surges in migration, and threats to energy and food supply routes.

In keeping with this flexible thinking, the Navy has had its Response Force Task Group (RFTG), described by a senior officer as “a plug-and-play task group”, which can be led by capital ships, such as the current flagship, HMS BULWARK, or by a lighter force, comprising minehunters and submarines. These forces can be moved rapidly to reinforce British units in hotspots like the Gulf, the Horn of Africa and the South Atlantic.

The Navy is set to see the number of personnel, including Royal Marines, reduced to around 30,000 within four years. There is every indication that this can be achieved while still enabling the Royal Navy to project force on a global scale.

“I think the government will want Britain to have this capability because it still has truly global ambition,” says Christian Le Mière, the maritime warfare research fellow at the International Institute for Strategic Studies. “This prime minister is no exception, and he sees the Navy as a very important part of Britain’s global role today.” ●

The naval strategy

Maintaining a credible and effective maritime capability requires a strategy with vision and flexibility. *Simon Mitchell* talks to Captain Mark Titcomb to unravel the complexities behind the development of current naval strategic planning

In October 2010, the new coalition government published its Strategic Defence and Security Review (SDSR). This examination of the global security situation, and accompanying proposals for the forces required to address it, complements a National Security Strategy (NSS) published at the same time. Both these documents highlight the fact that the world has changed irreversibly, with unpredictability becoming the only constant. To reinforce this fact, the National Security Strategy (NSS) is entitled *A Strong Britain in an Age of Uncertainty* and the SDSR bears the name *Securing Britain in an Age of Uncertainty*.

The NSS has two core aims: "(i) To ensure a secure and resilient UK by protecting our people, economy, infrastructure, territory and ways of life from all major risks that can affect us directly; and (ii) to shape a stable world, by acting to reduce the likelihood of risks affecting the UK or our interests overseas, and

applying our instruments of power and influence to shape the global environment, and tackle potential risks at source."

In the foreword to the SDSR, Prime Minister David Cameron and the Deputy Prime Minister, Nick Clegg, set forth their vision for Defence while stating that: "Our Armed Forces – admired across the world – have been overstretched, deployed too often without appropriate planning, with the wrong equipment, in the wrong numbers and without a clear strategy."

The SDSR, therefore, set in motion an examination of the security dilemma currently facing the UK, and proposed a transition from the existing force arrangements into a more coherent, integrated and mutually supporting military structure, known as Future Force 2020. It subsequently directed each of the armed forces to come up with their own proposals for how they will achieve this vision.



The method for delivering the Royal Navy's strategic direction is encompassed in the key documents: *Defence Strategic Direction, the Future Navy Vision* entitled *The Royal Navy Today, Tomorrow and Towards 2025* and the *Navy Command Plan* (NCP). Together, they set out what the Navy needs to deliver to the UK's overall defence capability and how it is going to do it.

In his foreword to *The Royal Navy Today, Tomorrow, and Towards 2025*, the First Sea Lord, Admiral Sir Mark Stanhope, states that the Navy: "Will protect Britain's interests, citizens, territory and trade by being ready to defeat our nation's enemies with a deployable maritime force; one able to conduct decisive combat operations at sea, from the sea, on land and in the air alongside our sister services. With our allies and partners we will promote international maritime security and deter threats to our peace, prosperity and way of life."

The accompanying NCP, according to Captain Mark Titcomb of the Royal Navy Strategy Office, was deliberately designed to be compliant with Ministry of Defence policy, and to align with the other services. Published in autumn 2011, "the principles contained within it should last at least five years through to the next SDSR. There are bound to be policy realignments and changes within that timescale, so there is a process of yearly updates for

specific items," Captain Titcomb explains. The NCP uses a number of strategic objectives against which the Royal Navy will be measured and which describe the way ahead for UK naval forces.

For example, while the Navy is required to continue to support ongoing current operations, including Afghanistan, it must also fulfil its standing maritime commitments, which include protecting the UK's overseas territories and trade routes, as well as providing the UK's Continuous At-Sea Nuclear Deterrent. In addition, the Navy is required to respond to emerging crises. The latter is a pivotal role for the Navy's Response Force Task Group, which played such a significant role in protecting Libyan civilians during Operation ELLAMY.

INTERNATIONAL ENGAGEMENT

There are also other important strands to the strategy. The Royal Navy is tasked with contributing to the process of promoting the 'UK's influence' and international engagement – an area of particular importance within the NSS. "For the Navy, this includes providing persistent presence overseas in order to promote regional stability, build trust and to engage with our partners," explains Captain Titcomb.

There are other key tasks, such as ensuring that the Navy has the right concepts and doctrine in place to guarantee that it will have the right navy in

While the Navy is required to support ongoing current operations, it must also fulfil its standing maritime commitments



The First Sea Lord, Admiral Stanhope, attends the decommissioning ceremony for HMS ARK ROYAL. Two new aircraft carriers are currently under construction



The Royal Fleet Auxiliary is an integral part of the Royal Navy's future strategy. RFA FORT ROSALIE (centre) replenishes HMS OCEAN (right) and HMS ALBION (left) in preparation for the Cypriot Lion exercise

the future; both in terms of the Future Force 2020 and with regards to the First Sea Lord's Future Navy Vision, which stretches out five years beyond, into 2025. "It is imperative that we are thinking and looking far enough ahead to introduce the right sort of capabilities and planning to match the predicted threats," says Captain Titcomb.

Naturally, all of the Fighting Arms of the Royal Navy are critical to delivering the NCP in a coherent and efficient manner. The Royal Fleet Auxiliary (RFA) is vital to ensuring the ability to operate at range from the UK, while the Fleet Air Arm and Royal Marines provide the specialist capability to act at sea or from the sea to intervene at a time and place of the government's choosing.

Further, one of the key objectives of the NCP is to deliver a sustainable naval service as a whole. That includes the RFA and the civilian personnel who work alongside the uniformed sailors, aviators and marines. Ultimately, and perhaps most importantly, the strategy demands that the right sort of people

Ultimately, the strategy demands that the right sort of people are recruited, trained and retained

are recruited, trained and retained to operate the ships, aircraft and submarines of the future.

All of the above represents a substantial challenge and, crucially, relies on continuing to win the compelling case for the enduring political utility of maritime power: "This is a real focus for everyone and requires persistent, continuous effort to ensure the message is clearly understood across Defence and beyond," insists Captain Titcomb. Only by doing this can the Royal Navy be sure that it meets the requirements of the NSS and SDSR 2010. ●

Safe and environmentally sound recycling of decommissioned Royal Navy vessels: the case for recycling in Turkey

► Turkey has been at the forefront of international developments for regulating ship recycling on a global scale with its active involvement in the negotiations at the International Maritime Organization (IMO), the International Labour Organization and the United Nations Basel Convention.

Turkey is a NATO ally, a party to the Basel Convention and the fifth country worldwide – only the third in Europe – to have signed the IMO Hong Kong Convention on the Safe and Environmentally Sound Recycling of Ships, in August 2010.

As an OECD country with a major ship-recycling industry, Turkey can lawfully import obsolete Royal Navy vessels for recycling under the provisions of the European Waste Shipment Regulation (EC) No 1013/2006, as transposed into UK law.

Turkey, being an OECD and EU accession country, employs Western-style standards and regulations for the safe and environmentally sound recycling of obsolete seagoing vessels. Specifically in relation to waste management, all the requirements and provisions of the Council Directive 91/689/EEC on hazardous waste have been introduced into the Turkish national legislation related to hazardous wastes (BL-HWC 2005/22387).

LEYAL Ship Recycling Ltd of Turkey has been awarded a number of ship-recycling contracts by the Royal Navy, and has completed the necessary formalities by obtaining the relevant permissions from the UK Environment Agency for the export to Turkey of a number of Royal Navy vessels for recycling, including:

- HMS *Invincible* in 2011
- HMS *Exeter*, HMS *Southampton* and HMS *Nottingham* in 2011
- RFA tanker *Oakleaf* in 2010
- HMS *Cardiff*, HMS *Newcastle* and HMS *Glasgow* in 2008 and 2009



Sisters' farewell: HMS *Invincible* face-to-face with HMS *Ark Royal* just before departing for Turkey

PHOTO: LEYAL

LEYAL Ship Recycling Ltd also has a long and successful track record for the recycling of regular commercial vessels. The company, along with its affiliate/fellow recycling yards, has been involved in the decontamination, dismantling and recycling of more than 600 obsolete seagoing vessels and platforms since the early 1980s, ranging from bulkers, tankers, reefers, passenger ships, container ships, and RoRo vessels to FPSOs, navy ships and submarines, LPG carriers, dredgers and others up to sizes of 200,000 tons displacement.

In 2006, LEYAL Ship Recycling Ltd was awarded with the ISO 9001, ISO 14001 and OHSAS 18001 integrated management system certification by NQA, a leading British assessment, verification and certification body accredited by UKAS.

In 2011, LEYAL Ship Recycling Ltd was awarded its highest-profile contract to date when the Disposal Services Agency of the UK Ministry of Defence announced its decision to recycle the aircraft carrier HMS *Invincible* at LEYAL. The vessel was

towed to Turkey in March 2011 and, at the time of writing, was on schedule to be recycled by the end of 2011.

LEYAL Ship Recycling Ltd is also the main industrial partner to the first European Commission-funded R&D project under EC Funding Program 6, dedicated to ship recycling, with the acronym ShipDismantl.

For more information, please visit www.leyal.com.tr or contact us at environment@leyal.com.tr

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* en-route under tow to LEYAL

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HMS Invincible departing from HMNB Portsmouth ...



...arriving at LEYAL in April 2011

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A Royal Marine from 40 Commando secures an objective during Exercise Cypriot Lion

Response Force Task Group

The Response Force Task Group is the nation's high-readiness maritime reaction force. *Alan Dron* reveals how it was commanded in order to come to the immediate aid of the Libyan civilians threatened by Colonel Gaddafi's military

The value and utility of naval forces were brought into sharp focus again in 2011, as the Royal Navy's major overseas training exercise evolved into a live operation. Elements of the Navy's Response Force Task Group (RFTG) embarked on the Cougar 11 training mission, switching mode from training to actual combat by aiding operations against the Gaddafi regime in Libya.

Apache attack helicopters flew off HMS OCEAN to engage Libyan government forces that were opposing advancing rebel troops, while Type 23 frigate HMS SUTHERLAND was deployed to protect both HMS OCEAN and the fleet flagship, HMS ALBION, as well as to assist in the blockade of the Libyan coast.

The potential requirement for the Royal Navy to become involved in the latest manifestation of the Arab Spring had been foreseen even as Cougar 11 was about to get under way. Although the deployment was not linked to the situation in Libya, HMS ALBION and HMS SUTHERLAND sailed three weeks earlier than planned, in early April – forcing the cancellation of Easter leave for thousands of sailors and shore support staff – as the conditions in the North African nation deteriorated.

As part of the Response Force Task Group deployment, HMS SUTHERLAND transits the Suez Canal for exercises in the Indian Ocean



HMS ALBION conducts a replenishment at sea with RFA FORT ROSALIE on Operation COUGAR

Before 2011's political unrest in North Africa had developed, Cougar 11 had been designed to allow the RFTG to conduct a series of pre-planned exercises in the Mediterranean and Middle East with the naval forces of a number of friendly nations, as part of the Royal Navy's regional stability mission.

The Mediterranean transit included amphibious exercises and live firing off the southern coast of Cyprus in Exercise Cypriot Lion – the first major exercises between the UK and Albania since the latter country joined NATO in 2009. This was followed by intensive anti-piracy training with units of the Royal Saudi Armed Forces in the Red Sea. This activity goes to the heart of one of the Royal Navy's key efforts within a wider mission to contain the spread of pirate attacks, which have increased in number and voracity in the waters around the Horn of Africa and Somalia.

STRENGTHENING LINKS WITH ALLIES

The United Kingdom's relations with both Oman and the United Arab Emirates were once again strengthened as the Task Group went on to conduct exercises with their navies, highlighting how the Royal Navy plays a vital role in maintaining valuable links with the UK's allies across the globe.

With these exercises in mind, elements of 3 Commando Brigade Headquarters, 40 Commando Royal Marines and support units were on board assault ship HMS ALBION and helicopter carrier HMS OCEAN. RFA MOUNTS BAY brought an additional infantry capability with her embarked force of Royal Netherlands Marines, which have had a long-standing relationship with their UK counterparts and the Royal Navy.

The men of 40 Commando were refreshing the Corps' traditional amphibious role of inserting troops from the sea onto the land after being deployed on operations in the heat and dust of Afghanistan's Sangin district. In fact, as 40 Commando were honing their beach assault skills, the remainder of 3 Commando Brigade had returned for yet another deployment in the landlocked Asian nation.

With so much effort being focused on Afghanistan, it is vital to keep the Royals' waterborne skills up to scratch, so that they are consistently able to deliver a landing force ashore at a time and place of their own choosing, while being supported from the sea with little reliance on ports, airfields or host-nation support.

At one point during Cougar 11, no fewer than 11 ships, 12 helicopters, and more than 3,000 sailors and Royal Marines were involved across the Mediterranean and Red Sea, the Indian Ocean and the Gulf. Two months into the deployment, the Task Group split, with one group, led by HMS ALBION, passing through the Suez Canal to conduct strategic engagements with allies and partners in the Middle

East. The second group, led by HMS OCEAN, remained in the Mediterranean, in order to support Operation ELLAMY – the UK’s effort off Libya in support of UN Resolution 1973.

The creation of the RFTG was announced in 2010’s Strategic Defence and Security Review and represents the UK’s response to an increasingly uncertain world. It is a maritime force, held at very high readiness, that has the flexibility to undertake a wide range of missions.

Ships involved in Cougar 11 can remain deployed for up to six months. No fewer than six of the vessels involved were from the Royal Fleet Auxiliary (RFA), which kept the major warships supplied while at sea. Replenishment vessel RFA FORT ROSALIE was also carrying two Sea King Mk 7 Airborne Surveillance and Control (ASaC) helicopters, which operate in the airborne information and surveillance role with their Searchwater radar.

The strategy behind the RFTG is to deploy a group of ships, led by a helicopter carrier or amphibious assault ship. This group will train, form up and deploy a group of ships to an area of significance to the national interest. En route to its destination, the RFTG will undertake a series of exercises with allies and friends and perform other tasks that contribute to the promotion of British interests. This, for example, covers a range of activities from helping other nations with their maritime training, supporting export sales drives or engaging with influential representatives of states that hold a strategic defence or economic interest to the UK.

In the words of the Commander in Chief Fleet, Admiral Sir Trevor Soar: “Should world events conspire to threaten UK interests abroad, then the RFTG is on hand to respond; able, for example, to offer a range of strike options, a demonstration of national intent, the provision of humanitarian aid, or the evacuation of our citizens.”

With August 2011 marking the end of the Cougar deployment, the ships began to head home. However, some of the RFTG vessels remained off Libya, ready to intervene if required. HMS ALBION’s Commanding Officer, Captain James Morley summed up the deployment’s accomplishments as follows: “The Cougar 11 deployment has ended successfully, but HMS ALBION remains at very high readiness throughout the summer and into the autumn; on call to respond to the demands of an interconnected and unpredictable world.”

The importance of the work that was conducted in the Middle East during Cougar 11 cannot be underestimated, Captain Morley states: “The region contains some of the world’s busiest and most important shipping routes, linking Europe and North America with China and the Far East. Security and stability here is absolutely critical to the prosperity and well-being of the UK.” ●

The RFTG is held at very high readiness, with the flexibility to undertake a range of missions

Charlie Company, 40 Commando, move ashore from RFA MOUNTS BAY to Sazanbit island off Albania





For those in peril

For 24 hours a day, every day of the year, Royal Navy Search and Rescue (SAR) helicopters maintain a constant readiness to pluck people in danger from the sea. *Martin Temperley* describes the extensive and life-saving work undertaken by the Naval Air Squadrons based in South Ayrshire and Cornwall

(Above) An injured trawlerman is rushed to hospital after getting his hand caught in a chain winching gear

Gale force winds and heavy seas were battering the yacht, *Andriette*, 110 miles off the Scilly Isles, on 7 July 2011. Damaged, unable to steer, and drifting beam to wind, the 36-foot yacht was struggling desperately, and so the two Dutch crew members raised a distress beacon call just before nightfall. A Royal Navy Sea King, call sign Rescue 193, found the damaged yacht in the pitch black. The *Andriette* was pitching violently, the mast whipping wildly back and forth with its tip close to the helicopter cockpit windows. These conditions made it impossible to hover over the yacht and winch the men directly off the deck.

The Sea King crew, comprising first pilot Lieutenant Commander (Lt Cdr) Mike Luscombe,

second pilot Captain Martyn Roskilly, observer Lieutenant (Lt) Jason Sawyer, and winchman Sergeant (Sgt) Tony Russell – all Royal Marines – were forced, therefore, to attempt the rescue from the yacht's life raft, rather than from the yacht itself. After the yachtsmen had managed to struggle into the inflatable raft, Sgt Russell descended to make the rescue. One sailor was secured and then hauled into the Sea King with relative ease, but then, suddenly, the life raft capsized and the second survivor became trapped beneath it.

Sgt Russell was lowered alongside the upturned boat before diving under it to locate the survivor, who was trapped in an air pocket. In panic, the survivor seized the winchman, endangering both

their lives as he did so, but Sgt Russell was eventually able to get the winch strop over the yachtsman. Thankfully, after nearly 30 minutes in the sea, both were winched to the safety of the helicopter.

Despite the obvious high risks and the fear for his own life, Sgt Russell says that he found the rescue exhilarating: "The job was up there as 'grade one'. It is a strange thing to say, but I enjoyed it, although there were times when I thought my time was up."

This dramatic rescue was just one of 206 call-outs made by 771 Naval Air Squadron (NAS) between January and October 2011.

SAR STATISTICS

There are 12 air search and rescue (SAR) bases around the coast of Britain, two of which are operated by the Royal Navy. At one end of the country, in Cornwall, is the Royal Naval Air Station Culdrose – known as HMS SEAHAWK – home to 771 NAS. Equipped with eight Westland Sea King HAR 5 helicopters, 771's operational area is the rugged Cornish coastline, extending 220 miles offshore. In 2010, 771 NAS responded 260 times, making it one of the busiest air search and rescue organisations in the UK during that year.

At the other end of the UK, Prestwick International Airport in Scotland is home to HMS GANNET Search and Rescue Flight, commanded by Lieutenant Commander Debdash Bhattacharya. With its own hangar and facilities, equipped with three Sea Kings, it covers the coast of western Scotland, north to Ben Nevis, south to the Lake District and over Northern Ireland.

GANNET SAR Flight claims the record number of call-outs – 447 during 2009 – and two of its aircrew,

observer Lt Cdr Martin Ford and aircrewman Petty Officer Marcus Wigfull have logged more than 600 and 700 call-outs, respectively.

SAR crews work 24-hour shifts. During duty periods, they are on 15 minutes' notice to launch during daytime and 45 minutes at night. All pilots and observers are officers, with the aircrewmen drawn from branches of the Royal Navy and Royal Marines. All observers and aircrewmen are qualified to ambulance technician level, with a number having achieved NHS paramedic status, able to administer advanced pre-hospital care in a hostile environment.

The distinctive grey-and-red Sea King HAR 5s are far from new, the latest aircraft dating from 1982, and all are conversions from anti-submarine warfare aircraft. Despite its age, the Sea King is still rated as one of the most effective air rescue instruments ever devised. The radar from its former role as submarine-hunter allows the crew to operate in cloud and the thickest of fog, while the autopilot assists the pilots in maintaining a steady hover in poor weather at night. A video camera and infra-red pod are capable of picking up the smallest of temperature changes, making it easy to pick out people. All crew members are also trained in the use of night-vision goggles.

All HAR5s are equipped as ambulances, with onboard medical and rescue equipment. Importantly, the aircraft has a powerful, 250-foot hydraulic winch – a system not fitted to any civilian air ambulances.

With crew, all of its equipment and a full tank of fuel, the maximum permitted all-up weight of the Sea King HAR 5 is just under nine-and-a-half tons, which is enough for 13 passengers or two stretcher casualties to be carried. However, some judicious adjustments of the fuel state and offloading of

During duty periods, crew are on 15 minutes' notice to launch during daytime and 45 minutes at night



A Royal Navy SAR helicopter crew practises winching to and from a cliff in north Cornwall



(Top) A SAR helicopter during mountain rescue training

(Above) The crew that conducted the Andriette rescue – (from left to right) Lt Jason Sawyer, Sgt Tony Russell, Capt Martyn Roskilly and Lt Cdr Mike Luscombe

some non-essential equipment has allowed more to be carried on several occasions. The 771 aircraft frequently refuel on the Scilly Isles to provide greater reach out into the Atlantic.

A SENSE OF PRIDE

The Commanding Officer of 771 NAS at Culdrose, Lt Cdr Chris Canning, is full of enthusiasm and pride for the job performed by his team: "I am very proud and privileged to be in command of such a distinctive and well-known squadron. The courage, commitment and tenacity of my team, supported by the air station, enable us to stand ready and respond at a moment's notice whatever the weather, day or night."

The majority of missions involve ships, boats and cliff rescues, and there are also a proportion of inland rescues, such as road accidents. The greater

Despite its age, the Sea King is still rated as one of the most effective air rescue instruments ever

number of GANNET SAR Flight's call-outs are into the mountain region of Scotland but they also provide vital medical evacuation of patients from remote Scottish locations to specialist care at hospitals in Glasgow and Edinburgh.

For 771 NAS, the Royal Cornwall Hospital at Treliske, the decompression chamber at Derriford hospital in Plymouth, Frenchay Hospital in Bristol and Cardiff's burns unit are familiar destinations. Its longest mission was on 11 September 2011, when a 56-year-old woman lung-transplant recipient was rushed from Cornwall to Newcastle-upon-Tyne, where donor organs were available.

Assisted via some smart routing by air traffic control and strong tailwinds generated by the remnants of Hurricane Katia, the Sea King carried the patient in a spectacular, non-stop dash over 324 miles in two hours and 40 minutes.

"It was like an ambulance with blue lights and sirens racing the whole length of England," said the observer on this call-out, Lt Cdr Andy Watts. ●

On 28 November 2011, the Department for Transport announced its intention to press ahead with a fully civilian Search and Rescue helicopter service at 10 UK bases. The Royal Navy and the Royal Air Force will continue to deliver SAR until the new service is established in the middle of the decade.

Keeping the Gulf open

The Royal Navy's Fleet Air Arm, the Royal Fleet Auxiliary, frigates, destroyers and mine countermeasure vessels (MCMVs) all face a daily struggle to ensure that the world's most critically important waters are kept free for global maritime trade to transit. *Denise Hammick* reviews how this vital task is achieved

(Above) HMS ST ALBANS (left) patrols the Gulf as part of the region's Combined Maritime Forces based in Bahrain

The Gulf is a crucial waterway for oil and gas supplies and for the industries engaged in exploitation activities. It is also a vital sea lane for all manner of goods and materials flowing to and from Europe, the Far East and the United States. This makes it one of the world's busiest shipping routes, with in excess of 23,000 movements each year, on top of 17,000 local movements.

The Royal Navy's presence in the Gulf and Indian Ocean directly supports its core roles. First and foremost, it ensures the international engagement. Together with its coalition partners, the Navy works to build confidence between nations and to reassure the region that the UK is committed to stability in this part of the world.

In this strategically important area of some 2.5 million square miles, shipping movements are potentially vulnerable to interference. It is in the narrow waterways of this region where the danger from those with criminal intent is most likely to present itself. To keep this maritime area secure, a massive international effort is constantly under way. The Navy plays a key role within a 25-nation coalition, called the Combined Maritime Forces (CMF), which carries out counter-terrorism and counter-piracy patrols working alongside NATO and the European Union.

CMF is US-led, but the UK provides a Deputy Coalition Commander, currently Commodore Simon Ancona, to that force, which plays a key role by



providing command oversight and executive orders directly to the CMF. This ensures the smooth running of day-to-day operations in this huge joint area of responsibility, which spans from the Suez Canal to Kenya, from Tanzania to the southern tip of India, and up to the Shatt Al-Arab River, which constitutes the border between Iraq and Iran.

Three Combined Task Forces (CTFs) deploy ships from the NATO Alliance (Belgium, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, Turkey, the UK and the US); the Middle East (Bahrain, Jordan, Kuwait, Saudi Arabia, UAE); and Asia/Australasia (Australia, Japan, New Zealand, Pakistan, Republic of Korea, Singapore, Thailand). These countries take turns in commanding the CTFs.

Operating in a two-million-square-mile stretch of water from the Indian Ocean through to the Gulf of Aden and the Red Sea, CTF 150's remit is to counter terrorist and illegal activity such as narcotics, arms and people trafficking. In 2011, it was once again under the command of the Royal Navy.

PREVENTING PIRACY

Deployed in the same waters as CTF 150 is CMF's counterpiracy task force, CTF 151. This was created in January 2001, and now works closely not just with the wider NATO community, but increasingly with the EU's own anti-piracy mission, the EU Naval Force (NAVFOR) Operation ATALANTA, as well as other nations – such as China, India and Russia – which have unilaterally deployed warships to the region. To ensure that everyone is working together as effectively as possible the CMF, NATO and EU co-chair the SHADE (Shared Awareness and De-confliction) meetings, which feed information to the 70-nation Contact Group for Piracy off the Coast of Somalia (CGPCS).

The Navy routinely has ships serving with CTF 152. This task force is currently being led by Kuwait, and has responsibility for the international waters of the Gulf, from the Strait of Hormuz in the south, to the territorial waters of Iraq in the north. It was deployed in 2004, primarily to prevent terrorists using these waters as a venue for attack and a means to transport personnel and weaponry. In addition to serving ships, two Navy officers act as mentors and advisors to the regional commander and his team; a crucial capacity-building role that is paying huge dividends.

In addition to his CMF responsibilities, Commodore Simon Ancona also oversees the maritime operational assets directly assigned to this area of responsibility by the Permanent Joint Headquarters (HQ), based at Northwood, in the UK. He is supported in this task by the UK Maritime Component Command (UKMCC) HQ, which not only provides oversight of Navy vessels, but also covers the engineering, logistics and maintenance





(Above) An Omani Super Lynx helicopter lands on HMS ST ALBANS during her six-month deployment to the Gulf

(Left) Commodore Tim Fraser (pictured left) hands over the Combined Maritime Forces Deputy Commander post to Commodore Simon Ancona

personnel deployed in the port and airport. This unique arrangement helps to deliver impressive operational availability to vessels more used to operating in the freezing cold of the North Sea than the searing heat of the Gulf.

SHARING KNOWLEDGE AND EXPERTISE

This constant activity and the Deputy Commander role provides the Navy with significant leadership responsibilities in the coalition. It has much operational and expeditionary expertise to pass on, and will mentor, teach and offer assistance where possible. But such a position cannot be upheld without the cooperation of all 25 partner nations, and the particular expertise of regional navies.

“Key regional maritime players in the region understand the locality, which brings different knowledge and skill sets,” says outgoing UKMCC Chief of Staff Captain Richard Thomas. They also help each new rotation of Navy crews posted to

duty in Bahrain to understand what is “usual” activity from fishing boats and vessels while on maritime security operations.

Naval Support Activity Bahrain provides the hub for this massive cooperative effort. This American base is home to the US Naval Central Command (NAVCENT), the US 5th Fleet, UKMCC and the CMF. It was originally a pre-Second World War UK base – HMS JUFAIR – until 1971, when it transferred to the US military. Consequently, the Navy has been at this base since 1935 and “it’s that longevity,” says Captain Thomas, “which shows the UK’s commitment to the region.”

The Navy has much expertise to pass on, mentoring, teaching and offering assistance where possible

However, the most recent Navy involvement in the region can be traced back to the so-called ‘Tanker War’ of the 1980s, when the Armilla Patrol was formed to defend British-flagged vessels caught in the crossfire of the Iran-Iraq War. The Royal Navy subsequently remained in the region through the 1991 Gulf War, and a large Navy task force was present in the region following the terrorist attacks of 11 September 2001. The UKMCC was formed when the HQ was transferred ashore a year later.

The Navy performs duties in the Gulf by leading the Mine Countermeasures (MCM) task group to assist Gulf-state governments in training and mentoring their MCM vessels in the challenging warm-water environment of the Gulf. The activity of the MCMVs in the Gulf is dual, according to Captain Thomas. It demonstrates – through exercises and training – the “credibility” of the Navy.

Operating in such testing conditions is a challenge to the MCMV crews, making the Gulf an ideal location to maintain warm-water capabilities and develop the expertise necessary to deliver the full range of activities that make up an MCM group. Training in the Gulf also tests the Navy’s supply lines.

Moreover, the enduring presence of the Royal Navy – through the persistent deployment of vessels patrolling seas worldwide and the preservation of good relations with the local community – is key, according to Captain Thomas. “It shows support and awareness and is reassuring to both international shipping and local maritime traffic,” he says. Crucially, it shows the Navy is committed – both as a coalition partner and independently – to maintaining a secure maritime environment in the Gulf. ●



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Safeguarding our Overseas Territories

The Royal Navy is constantly assessing the most efficient way of safeguarding British Overseas Territories. *Iain Ballantyne* surveys the scope of missions likely to be faced by ships deployed on such duties as Hurricane Watch in the Caribbean, sovereignty patrols in the Falklands and also expeditions to Antarctica

It was autumn 2011 and the Royal Fleet Auxiliary (RFA) WAVE RULER proved once again that there are still corners of the globe where the sight of a British naval vessel sailing over the horizon is a guarantee that help is at hand. With Royal Navy warships heavily committed elsewhere, not least in safeguarding other British Overseas Territories (BOTs), the flexible WAVE RULER, primarily a fast fleet tanker, proved there is never an idle moment for the UK's maritime forces.

Hurricane Irene had blown through, lashing the Turks and Caicos Islands with 90mph winds. The usually tranquil, brilliant blue, flat calm of the

Caribbean had been turned into an angry tumult; the heavens ripped open by lightning, torrential rain hammering down. Roofs were blown off and there was damage to Grand Turk port, while Providenciales International Airport – the islands' main link to the outside world – was shut down, preparing people for the worst. In some areas the power supply was cut and there was flooding. The television station also went off the air.

When WAVE RULER sailed into Grand Turk, she was carrying, among other things, almost 6,000 sheets of corrugated iron to construct temporary shelters and more than a dozen

HMS CLYDE, the Falkland Islands patrol vessel, leaves Portsmouth en route for the South Atlantic



containers of essential supplies. The ship's embarked Lynx helicopter from 815 Naval Air Squadron acted as a damage survey platform for the islands' deputy governor, flying over remote settlements and outlying islands. Some 40 specialist vehicles that would assist with the clear-up operation were also conveyed aboard the RFA vessel, along with a Royal Navy Humanitarian Aid and Disaster Relief (HADR) team.

The ability of the ship to carry 380 cubic metres of fresh water and 500 tonnes of dry cargo meant that food and drink to sustain survivors of any disaster would be available, should it be needed.

WIDESPREAD DEVASTATION

In the end, while there was destruction and a certain amount of chaos, the Turks and Caicos escaped fairly lightly. Elsewhere, Hurricane Irene claimed 56 lives and caused \$18 billion worth of damage in a swathe of destruction all the way up along the eastern seaboard of North America. It was, however, just the midway point in a hurricane season that began in June and did not end until late November, so the UK maritime forces would continue to mount the 'Hurricane Watch'.

The Commanding Officer of WAVE RULER, Captain Steve Norris, promised: "The ship and her crew will continue to monitor hurricanes during the season and be ready to provide assistance to the UK Overseas Territories whenever we are tasked."

As WAVE RULER awaited the call to action in the wake of another hurricane, she also embarked on other missions under the banner of Atlantic Patrol Task (North) ship. The tanker provided fuel on the move to naval vessels of allied nations, some of which she has worked with on counternarcotics operations. Such operations are vital, not only to

The Royal Navy has commitments to defend and render assistance to 14 British Overseas Territories, which have a combined land area of nearly 700,000 square miles



A bird's eye view of HMS PROTECTOR, showing her helicopter landing spot and crane

underpin law and order in the Caribbean, but also to prevent drugs from reaching British streets.

The Royal Navy has major commitments to defend and render assistance to 14 BOTs, which have a combined land area of nearly 700,000 square miles and a total population of 260,000. Aside from the potential for natural disasters, there are ongoing challenges to British sovereignty, not forgetting threats of social disorder and criminality caused by drug smuggling and piracy.

Despite these risks, the Overseas Territories offer the UK trade benefits, banking advantages, the prospect of exploration of natural resources, plus key facilities for playing a major role in national and international defence.

SAFEGUARDING THE FALKLAND ISLANDS

The UK has primary responsibility for defence and foreign policy on the BOTs, and nowhere is this more acute than 8,000 miles from Britain, in the South



HMS PROTECTOR works up prior to heading for the Antarctic as a replacement for HMS ENDURANCE

Atlantic. A Royal Navy guard ship is on constant patrol around the Falklands, often supported by a destroyer, frigate, fleet auxiliary or deployed nuclear-powered attack submarine.

The long-distance commitment of such units embodies a determination to provide enduring protection for the Falklands and outlying dependencies, working closely with the other branches of the UK's armed forces.

HMS CLYDE is the only Batch 2 River-class patrol ship in the fleet, and is the sole Royal Navy vessel permanently forward-deployed to the region. The major differences between herself and sister ships in Batch 1 is a large flight deck, as well as aviation refuelling facilities. HMS CLYDE can act as a platform for search-and-rescue operations, carry out insertion of troops, and even has an airspace monitoring capability.

Despite cuts to the fleet under the Strategic Defence and Security Review, the Royal Navy will

continue to offer protection and a helping hand to all of the citizens of the UK's overseas territories as not only a basic duty, but also as a reminder of their continued importance to the nation.

Finally, the survey ship HMS PROTECTOR, a converted former Norwegian icebreaker, is a replacement for HMS ENDURANCE, which was saved from sinking in December 2008 thanks to the skill of sailors who were able to limit the damage she incurred in these most testing of waters. Like her predecessor, HMS PROTECTOR will play a vital role in assisting scientific research in Antarctica, helping to assess the impact of global warming on glaciers, among other issues.

The ship departed Portsmouth for her maiden deployment to Antarctica at the end of 2011. Her inaugural Royal Navy mission will cover the five-month austral summer, and will include the staging of a commemoration of the ill-fated attempt to reach the South Pole by Captain Robert Falcon Scott. ●

Combating piracy

With acts of piracy surging in 2011, it is clear that concerted and determined countermeasures are still a necessity.

Iain Ballantyne considers the ever-present deterrent effect of UK maritime units

According to the UK-based, maritime-industry, anti-piracy lobbying group, Save Our Seafarers, there are currently hundreds of seafarers “being held hostage by armed gangs of Somali pirates, in appalling conditions, subject to physical and psychological abuse”. Furthermore, adds Save Our Seafarers, they are under threat of death if multimillion-dollar ransoms are not paid.

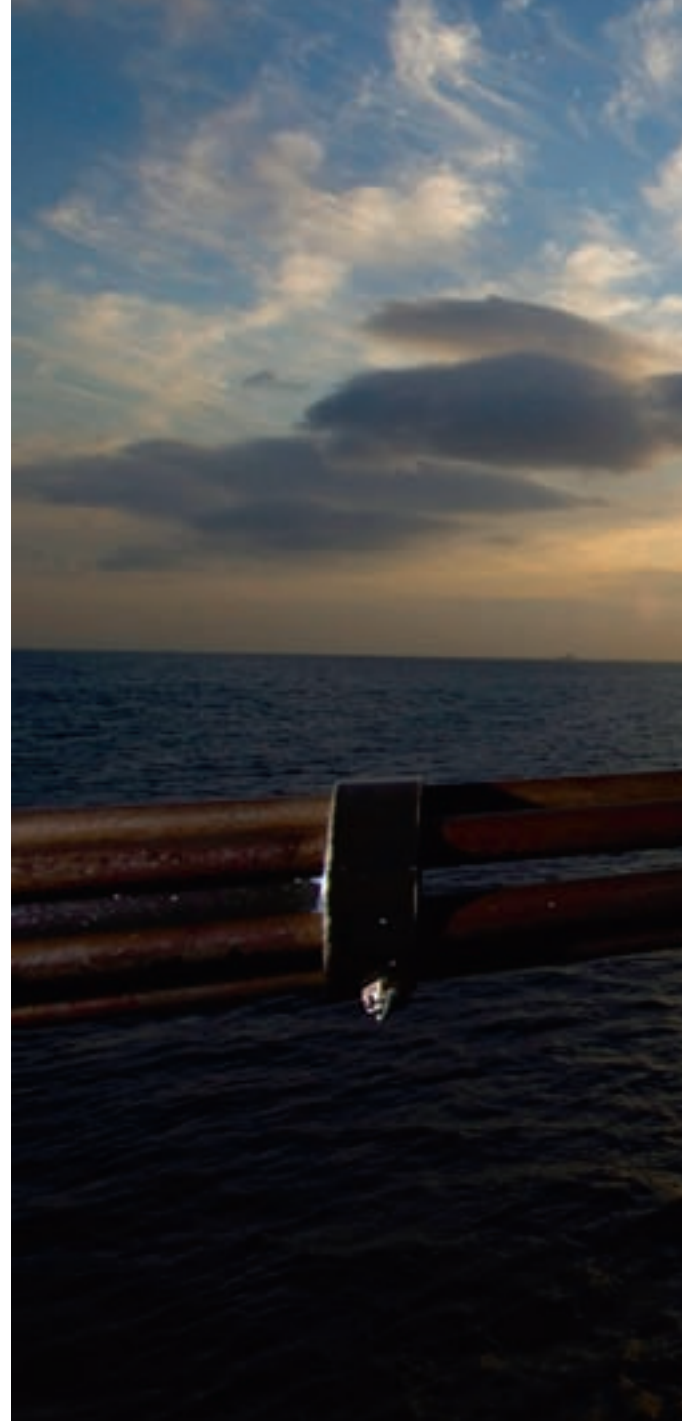
With 90 percent of the world’s trade carried by sea – including food, fuel, manufactured goods and raw materials for industry – shipping lanes could slowly grind to a halt without action against pirates. Piracy, not only in the Red Sea and Gulf of Aden, but also further afield, already costs the global economy between \$7 billion and \$12 billion per year, adds the group. Energetic young men and women who are well trained and brave enough to confront the pirates are a necessity, as are warships with the ability to project the threat of force.

In summer 2011, the 60,000-tonne MV *Caravos Horizon*, sailing under the Maltese flag but registered in Greece, found salvation in the shape of the Duke Class (Type 23) frigate, HMS MONMOUTH, on her second six-month Red Sea patrol inside 18 months. The bulk carrier was heading south in the Red Sea when boarded by six armed men who had come alongside in a skiff. Her 24 Filipino crew retreated into a specially reinforced citadel. The merchant vessel then put out a distress call.

A DARING RESCUE

Picking it up, HMS MONMOUTH immediately piled on the knots in a bid to cover the 90-mile gap as quickly as possible. While still some 60 miles away, the frigate deployed her Lynx helicopter to put eyes over the *Caravos Horizon*. Meanwhile, a Seahawk helicopter was launched from the US Navy assault carrier USS *Bataan*. Both were soon circling the merchant vessel, their high-powered cameras capturing video and photo stills to help decide on subsequent tactics. They spotted a long ladder

Energetic young men and women who are well trained and brave enough to confront the pirates are a necessity



dangling over the side, but there was no sign of any miscreants. It was uncertain whether or not the citadel had been breached, or what level of threat a boarding team might face.

Confined to the citadel, the master of the *Caravos Horizon* could provide no intelligence. Day was fading swiftly into night and nobody wanted to instigate boarding in the dark. As the frigate sailed into view, it was decided that the MONMOUTH’s Royal Marine and Royal Navy boarding teams would be deployed, using both the Lynx and small boats. Lieutenant Harry Lane, the officer in charge of MONMOUTH’s embarked Marines, explained: “At the very minimum, we needed to get on board and into the superstructure of the merchant vessel before last light.”

A systematic search of the ship was mounted, confirming that the pirates had fled. Liberated from the citadel, the crew of the *Caravos Horizon* were very grateful to the British boarding teams for



handing back control of their ship. MONMOUTH's commanding officer, Commander Dean Bassett, felt it was a good result: "Although in this instance the assailants had fled while we approached, our robust response will act as a deterrent to others from committing such crimes and provide reassurance to the maritime community that we are here to safeguard the high seas."

MONMOUTH was deployed under the aegis of Combined Maritime Forces (CMF), the coalition command authority based within the US Navy 5th Fleet Headquarters (HQ) in the Gulf, but Britain also plays a leading role in the European Union Naval Forces (EU NAVFOR) Somalia.

At the time of writing, EUNAVFOR Somalia was commanded by Rear Admiral Duncan Potts, with its HQ at Northwood in the UK, while Commodore Tim Fraser was the British deputy CMF commander, a role traditionally performed by a Royal Navy officer. In 2011, EU NAVFOR Somalia was primarily

responsible for escorting UN World Food Programme and African Union Mission in Somalia (AMISOM) aid ships into ports in East Africa, ensuring millions of starving people can receive life-saving sustenance.

INCREASING THREAT

Meanwhile, NATO also mounts counterpiracy patrols via its Operation OCEAN SHIELD, while other nations make a contribution to the effort under sovereign control. According to the International Maritime Bureau (IMB), there were 266 pirate attacks globally in the first six months of 2011, an increase of 70 on the corresponding period in the previous year. More than 60 percent of the incidents were attributable to Somalia-based pirates.

By September 2011, this had risen to 346 attacks globally, with 35 ships hijacked, 24 of them by Somalia-based pirates who held 277 hostages and 15 vessels. Fifteen people were killed in the incidents. Such troubling statistics provoked IMB

A sailor from HMS MONMOUTH's force protection team manning an upper-deck machine gun as the ship sails for counterpiracy duties east of Suez

director Pottengal Mukundan to observe: “In the past six months, Somali pirates attacked more vessels than ever before and they’re taking higher risks. For the first time, pirates fired on ships in rough seas in the Indian Ocean during the monsoon season in June 2011. In the past, they would have stayed away in such difficult conditions.”

There was a glimmer of hope, however, for while the Somali pirates were more active, they had, according to an IMB report, managed to “hijack fewer ships, just 21 in the first half of 2011, compared with 27 in the same period last year”. This was due to better countermeasures aboard merchant ships, but navies played their part, too. The report stated: “It is vital that this naval presence be sustained or increased.”

The Royal Navy has been actively combating piracy since the middle of the 18th century. In fact it was a Royal Navy officer, Commodore Augustus Keppel, who landed in Algiers to try and put a stop to the pirate threat emanating from that region.

The presence and leadership of the Royal Navy remains vital to this enduring task. Recent history

The Royal Navy has been actively combating piracy since the middle of the 18th century and remains vital to this enduring task

has highlighted the fact that putting Western military boots on the ground in places such as Somalia to take on pirates on land arguably only leads to more misery, with certain factions ashore using it as a rallying call to turn a campaign against pirates into another bloody counterinsurgency. After Iraq and Afghanistan, and with the Libyan campaign proving that local people are better off being assisted to provide local solutions, the betting is that the Royal Navy will continue to work alongside its allies in holding the line at sea. ●

A Merlin helicopter disembarks members of HMS MONMOUTH's boarding team in preparation for counterpiracy duties



Counternarcotics operations



Attempting to eliminate the availability of illegal narcotics on British streets poses a significant and ongoing challenge to society. *Martin Temperley* reveals how the Royal Navy continues to play an integral part in the international effort to prevent these harmful drugs from ever reaching our shores

(Above) The surprise interception of a Caribbean fishing vessel by HMS MANCHESTER, which uncovered 240kg of cocaine worth £16.8 million

The Royal Navy maintains a warship or Royal Fleet Auxiliary (RFA) on patrol in the Caribbean to protect British interests in the region. Fulfilling this deployment also has a significant impact at street level back in Britain. For while the ship stands poised to fulfil the noble cause of disaster relief, it also takes on the tough task of counternarcotics operations – intercepting illegal drugs that are often destined for the UK

On this deployment, dubbed Atlantic Patrol Task (North), a ship performs counternarcotics duties, while available to handle humanitarian relief work as and when it is required. In recent times, the warship has been a Type 23 frigate, such as HMS IRON DUKE, or an RFA Wave-class fast fleet tanker, such as WAVE KNIGHT or WAVE RULER, with a Royal Navy detachment aboard.

The Type 45 Daring-class air defence destroyers are beginning to be added to the Navy fleet, replacing the regularly deployed Type 42 destroyers, which are being phased out.

“Warships primarily designed for anti-submarine warfare or air defence, and tankers intended for

refuelling warships at sea are also well-suited to counterdrugs operations,” explains Lieutenant Commander (Lt Cdr) Tim Housom, a special operations officer at Northwood Headquarters. They bring to bear powerful radars that can see over the horizon, comprehensive communications equipment, helicopters and, sometimes, firepower.

It is not just in the Atlantic where Royal Navy warships on global deployment may encounter drug smuggling. It can be anywhere, such as the sea lanes in the Indian Ocean. That is why Royal Navy warships are at work on the ‘Hashish Highway’ – a sea lane in the western Indian Ocean, off the Pakistani coast. Counternarcotics is now a key mission of the Royal Navy in the post-Cold War era.

INTELLIGENCE-LED OPERATIONS

While the conclusion to a successful action can be the boarding of a drugs runner after a spectacular high-speed chase, the chain of intelligence that launches the interception remains unseen. This could originate from an undercover police operation in the United States, a US Drugs Enforcement

OPERATING AROUND THE GLOBE TODAY: CORE DUTIES

Agency investigation in a South American country, or information from the Serious Organised Crime Agency (SOCA) in the UK, for instance.

In Caribbean operations, intelligence and coordination comes from the US Joint Interagency Task Force (JIATF) South, a Florida-based command centre at the US Navy Key West Naval Air Station that is home to US Coast Guard units and also representatives of the Federal Bureau of Investigation (FBI), and several other 'three-letter' agencies tasked with counternarcotics responsibilities.

Royal Navy and RFA ships work closely with JIATF, and in particular, US Coast Guard District 7, which has deployed armed Regional Tactical Law Enforcement Team personnel on Royal Navy and Dutch ships, with the ability to make arrests. RFA WAVE RULER even embarked a US Coast Guard HH-5 Dolphin helicopter during such an operation.

"Royal Navy personnel, like the rest of the British Armed Forces, have no powers of arrest," explains Deputy Assistant Chief of Operations Captain Paul Abraham at Northwood headquarters. Therefore, law-enforcement officers are regularly embarked on British warships to bring what it described as a "legal finish" to the operations.

EUROPEAN COOPERATION

In Portugal, another intelligence and coordination organisation, the Maritime Analysis and Operations Centre – Narcotics (MAOC-N) has been active in Lisbon since 2007. Three British police officers from the Serious Organised Crime Agency (SOCA) are based there. Besides the UK, participating nations in MAOC-N are France, Ireland, Italy, the Netherlands,

Portugal and Spain. With such an array of nations, it is able to cover the eastern side of the Atlantic from southern Africa to the Norwegian Sea. This shows how intelligence gathering and interceptions have now become truly multinational in scope.

RECENT SUCCESSES

At-sea operations can be exciting after weeks of routine and false alerts, and not without danger. Guided by intelligence, the warship or RFA may shadow a suspect vessel at ranges of up to 30 nautical miles using its surveillance radar. A warning transmitted on VHF radio to the suspect vessel and a request to stop and submit to a search usually follows. This does not always have the required result, however.

If the suspect boat is a 'go-fast', typically a sharp-hulled light craft, massively overpowered by a bank of outboards, it may be equipped to easily outrun a frigate. However, it will not outrun the frigate's Lynx helicopter, which is capable of speeds of 160mph and can carry a Navy sniping team prepared to shoot out the motors if necessary.

When a stop is achieved, two rigid-hulled inflatable boats (RHIBs) deploy from the warship, carrying an armed team of 14, trained in search and fast-rope techniques to examine the suspect vessel. While the physical arrest of suspects is the job of law-enforcement officers, the Royal Navy can sink abandoned drug-running boats.

In an operation in August 2010, a suspected drug runner was intercepted in the mid Atlantic by HMS GLOUCESTER, which had been en route to the Falkland Islands before being diverted. The destroyer



Looking down on cocaine hidden under concrete on the smugglers' vessel

A suspect boat may be equipped to easily outrun a frigate – but it will not outrun the frigate's Lynx helicopter



The record capture by HMS IRON DUKE of 212 bales of cocaine

quickly embarked a party of law-enforcement officials from Cape Verde, off the west coast of Africa. Next, the Florida-registered suspect yacht, that they were targeting was apprehended and taken to Cape Verde for inspection.

As anticipated, but only after an exhaustive inspection, cocaine was eventually found aboard the boat – ingeniously stashed in the rudder. In this case, the intelligence had originated in France with the Justice Department's ORCTIS countertrafficking organisation, and this was communicated through MAOC-N in Lisbon. It was the first time a Royal Navy warship implemented a MAOC-N operation.

In the Caribbean, operations are often against go-fasts or fishing vessels in waters closer to the coast, which are sometimes aiming to tranship their loads to an ocean-crosser. The biggest find of recent times was made by HMS IRON DUKE and RFA FORT GEORGE in a joint operation with US units off Colombia in 2009, when £240 million of cocaine was found in a fishing vessel.

In UK home waters, a seizure of £4 million worth of cocaine was made by HMS ARGYLL in 2008 and

In 2008, a seizure of £4 million worth of cocaine was made by HMS ARGYLL in UK home waters

drugs thrown down from large ships for transhipment have been intercepted closer to home. But, perhaps most notably, the RFA LARGS BAY, a landing ship which performed distinguished disaster relief work in Haiti following the earthquake in 2010, was credited with seizing over a tonne of cocaine in the Caribbean two years ago.

It goes without saying that such a quantity of cocaine would wreak havoc were it ever reach the streets of Britain, which reinforces the vital work undertaken by the Royal Navy. By intervening in concert with its international allies, thousands of miles from British shores, the Navy continues to serve an indispensable domestic duty. ●



40 Commando Royal Marines in Sangin

In April 2010, nearly 1,000 personnel from the 40 Commando Battlegroup deployed to the Sangin district of Afghanistan. Six months later, they handed the district over to their US Marine Corps allies. *Tim Ripley* highlights how this tour made a tangible difference to the lives of Afghan civilians living in the area

(Above) A Royal Marine undergoing training ahead of deployment to Afghanistan

When the history of Britain's most recent engagement in Afghanistan comes to be written, the heroism and bravery of those troops who fought in the small town of Sangin will more than likely be unsurpassed.

More than a third of all UK military fatalities – up to 2010 – occurred in the small town and the neighbouring countryside. Not surprisingly, Sangin gained a reputation as the “hottest” hotspot in

Helmand province. Throughout the four years from the summer of 2006, it was routine for almost every British patrol that ventured out of Forward Operating Base (FOB) Jackson on the edge of the town to be engaged in small-arms fire or to be struck by a buried improvised explosive device (IED).

Situated in the north of Helmand province, on the banks of the Helmand River, the town of Sangin outwardly appears little different from other small

market towns in southern Afghanistan. Yet it was at the nexus of the province's drugs trade, a centre of Taliban resistance, and boasted intense hostility to outsiders. When British Paratroopers first deployed to Sangin in 2006 they met fierce resistance and only hourly air strikes prevented the Taliban overrunning the small British base.

Over the next four years, a succession of British units worked tirelessly in a bid to drive the Taliban from the town, to allow a return to normality that would effectively pave the way for the Afghan government to restore its rule.

THE ROYAL MARINES' LAST TOUR OF SANGIN

Arriving in Sangin in April 2010, 40 Commando Royal Marines replaced the 3 Rifles Battlegroup, which had suffered 30 deaths and nearly 100 wounded over the previous six months. The next six months would be very different, with the 'Royals' of 40 Commando focused on building up local Afghan forces, improving the lives of local people and preparing to hand the town over to the control of the US Marine Corps.

As 40 Commando took control of Sangin, the policy of "courageous restraint" established by the then International Security Assistance Force (ISAF) Commander, US Army General Stanley McChrystal, was in full force. This emphasised protecting the local population against the insurgents, rather than the use of kinetic effects or firepower to kill enemy fighters, even in the face of a constant stream of casualties from the Taliban's relentless IED campaign.

While in Sangin, 40 Commando's time there was characterised by what was termed "population-centric, counterinsurgency operations". Success was measured not by the body count of Taliban fighters, but by the level of commerce in Sangin's bazaar, the number of children going to school, and the ability of government officials to work freely. Royal Marines in Sangin in 2010 talked about counterinsurgency operations being "a big game of cat and mouse". One described it as being like the video game Tetris, constantly being flipped upside down and pulled inside out.

At the heart of 40 Commando operations in Sangin was a network of small patrol bases around the district to give the 'Royals' a real feel for how the local people were living, and the crucial issues that were impacting on their lives. During the tour, just over 1,000 foot and vehicle patrols were mounted across the district to establish daily contact with local people, as well as local tribal elders.

Although this put the Royal Marines at great risk of IED strikes, it was seen as the only way to provide a show of strength across Sangin to convince the

A network of small patrol bases gave the 'Royals' a real feel for how the local people were living



A routine patrol is conducted around the bazaar in Sangin



The handover of Kajaki from Major Paul Lynch OC Delta Company, 40 Commando Royal Marines (left), to Captain Richard Stinnett OC India Battery, 3rd Battalion, 12th Marines USMC, on 18 June 2010

local population that ISAF, the Afghan security forces and 40 Commando were actively trying to protect them from the Taliban.

Hand in hand with its overt military operations, 40 Commando's 38-strong, tri-service Military Stabilisation Support Team (MSST) worked to build up a portfolio of projects aimed at improving the lives of Sangin's impoverished population, ranging from refurbishing mosques, to road improvements and re-establishing water supplies.

HANDING OVER TO THE US MARINE CORPS

As 40 Commando's deployment drew to its conclusion, the handover of Sangin to the US Marine Corps started to rise up the agenda. This was part of a major re-orientation of UK forces to allow Task Force Helmand to concentrate its resources in the south of the province, in the region known as the 'Green Zone'.

In preparation for the handover, 40 Commando's Bravo and Delta companies, along with a large force of Afghan troops, formed a Mobile Operations Group (MOG) to stage a major operation to disrupt insurgent supply routes in the desert to the east of Sangin. Using armoured vehicles, the MOG patrolled for the desert for nine days, providing cover for the

arrival of the US Marines in Sangin to begin the process of transferring responsibility for the town.

On 20 September, Lieutenant Colonel Paul James formally handed over FOB Jackson to his American counterpart, Lieutenant Colonel Clay Tipton. Sadly, during its six months in Sangin, the 40 Commando Battlegroup suffered some serious injuries and lost 21 killed in action, including 14 Royal Marines.

"It's been a hard fight for 40 Commando Royal Marines in Sangin," Lt Col James wrote in the Royal Marines journal, *The Globe and Laurel*, at the end of the tour. "We have sought to protect the local people and have worked hard with the Afghan National Security Forces. Our partners in the Afghan National Army and Afghan National Police have improved tremendously. They have provided the security for the district governor to spread the influence of the Afghan government.

"The bazaar itself, central to the economy of the area, is thriving and a much more bustling place than when we arrived, with new shops opening all the time. There is still work to do and we are confident that our American partners will build on what we have achieved. We have lost brave Marines, but we will do them proud and return home with our heads held high." ●



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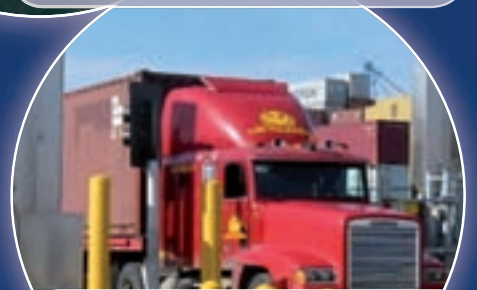
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3 Commando Brigade – Task Force Helmand

In April 2011, Headquarters 3 Commando Brigade Royal Marines took command of UK operations in Afghanistan under the code name Operation HERRICK 14. *Tim Ripley* reports on this important mission in Helmand province

For the Royal Marines of 3 Commando Brigade, Afghanistan has been the main focus of their operations over the past decade. However, the operational environment and tactical conditions experienced by Royal Marines have changed dramatically since the first Marines landed at Bagram airfield in November 2001 to open an airhead for international forces. The first major foray into Afghanistan by 3 Commando Brigade in the spring of 2002 resulted in little fighting, and the brigade returned home from Operation JACANA without firing a shot in anger.

Things were very different in both 2006 and 2008, when 3 Commando Brigade found itself fighting to defend a series of Forward Operating Bases (FOBs) across the length and breadth of war-torn Helmand province from sustained Taliban attack.

HERRICK 14 – CONCENTRATED ON THE GREEN ZONE

For six months during 2011, 3 Commando Brigade found itself conducting a very different type of operation. Unlike its previous deployments into Helmand province, the brigade was concentrated into a significantly smaller area of responsibility

in the centre of the province's 'Green Zone', where the majority of its population live and work.

The size of the UK contingent in Helmand had also been dramatically increased, and for its 2011 deployment, 3 Commando Brigade took command of just under 6,000 British Army and Royal Air Force personnel, as well as several allied contingents. Royal Marines provided the core of the task force headquarters, two Commando battlegroups, an information exploitation battlegroup and a logistic regiment. The Royal Navy also provided several hundred personnel in staff and administrative posts, as well as helicopter crews for Westland Lynx AH 9A utility helicopters, Sea King Mk 4 support helicopters and Sea King Mk 7 ASaC (Airborne Surveillance and Control) helicopters.

In total, some 9,500 UK personnel were assigned to HERRICK during the summer of 2011. The result was that, for the first



Royal Marines from 42 Commando man the weapon systems (GPMG and 0.5 Heavy Machine Gun) in a WMK Land Rover

In Helmand, 30 Commando was credited with major successes against Taliban bomb-makers who had previously taken many British lives

time since UK forces deployed to Helmand, they were able to mass their resources in the key towns and villages of the province. This coincided with a switch to a population-centric counterinsurgency strategy by the International Security Assistance Force (ISAF).

The Royal Marines of 42 and 45 Commandos, like the brigade's other army infantry battalions, spent their six months in command of tactical areas of responsibilities to the west of the provincial capital, Lashkar Gah. During their deployments, they worked to secure several designated 'protected communities' from insurgent influence and attack. In partnership with Afghan security forces, they established check points and patrol bases to drive out the Taliban from the heart of Helmand province.

Significantly, they mounted more than 5,000 night-time patrols in one of 45 Commando's areas of responsibility alone, preventing insurgents from intimidating local village leaders and other civilians who showed an allegiance to the Kabul government and the district governor.

INFORMATION EXPLOITATION GROUP

Operating outside the populated areas of the Green Zone, 3 Commando Brigade's specialist reconnaissance and intelligence-gathering unit, 30 Commando Information Exploitation Group, was deployed to conduct an aggressive campaign to interdict insurgent supply lines and prevent the Taliban massing for direct attacks on the protected communities. Its unique organisation allowed 30 Commando to bring together Unmanned Aerial Vehicles (UAVs), signals and communications intelligence-gathering capabilities, the fast-moving Brigade Reconnaissance Force mounted in Jackal vehicles and the strike power of the Warthog group, equipped with armoured all-terrain vehicles. This enabled 30 Commando to push far into the Helmand desert and then strike rapidly once Taliban fighters were detected.

During its tour, 30 Commando was credited with major successes against Taliban bomb-makers who

had previously taken such a heavy toll on British troops, seizing 177 pressure plates for improvised explosive devices (IEDs) and over five-and-a-half tonnes of home-made explosives. But the intelligence that generated these successes often had to be fought for, with more than 42 per cent of 30 Commando's patrols coming into direct contact with armed insurgents.

The deployment of the bulk of 3 Commando Brigade's resources to directly protect the population and undertake offensive operations had a dramatic effect throughout Task Force Helmand's area of responsibility. For example, 45 Commando reported an 86 per cent fall in violence, compared to 2010. The result of this was senior 3 Commando Brigade officers being able to report that "there was no summer fighting season" in Helmand, which in previous years has seen a huge upsurge in insurgent operations and even direct Taliban attacks on UK bases and forces. In the summer of 2011, the Taliban were firmly on the back foot. Thankfully, this was reflected in the brigade's much-reduced casualties, which were running at a rate of nearly a third of those suffered in 2010.

Brigadier Ed Davis, 3 Commando Brigade's commander, said his formation's tour during 2011 had seen significant developments in the capabilities and confidence of Afghan partners. "We have concentrated on strengthening our relations with our Afghan partners in the army, police and Helmand provincial government" he said.

"They have worked hard to build up their capacity to provide security and protect the people from insurgents, as seen by the transition of security authority for Lashkar Gah to the Afghan National Police in July. We have worked closely with the Provincial Reconstruction Team to continue to stabilise and develop insecure areas. The men and women of 3 Commando Brigade – some of whom have made the ultimate sacrifice – and their families can be immensely proud of what they have achieved in keeping our country safe by improving the lives of the Afghan people." ●

Royal Marines from 42 Commando disembark an RAF Chinook on their way to Forward Operating Base Price to start patrolling the district of Gereshk





Saving lives – Joint Force Medical Group

Jill Taylor talks to Surgeon Captain Stuart Millar, Deputy Assistant Chief of Staff of Medical Operational Capability with Navy Headquarters, to find out how the Royal Navy's command of the Joint Force Medical Group is helping to save lives not just in Afghanistan, but also back in the United Kingdom as well

(Above) Estonian and German medics take part in a pre-deployment exercise with the Joint Force Medical Group, prior to deploying to Afghanistan in 2011

The Royal Navy took on a special task during 3 Commando Brigade Royal Marines' recent six-month deployment in Afghanistan. The Navy already provides the Brigade's long-term medical support, and this responsibility extends to command of the Joint Force Medical Group that is deployed alongside coalition forces in Helmand province. The Navy has led the Medical Group on two previous occasions, in 2006 and 2009, to coincide with earlier 3 Commando Brigade tours.

While 3 Commando Brigade is in Afghanistan, the Navy provides command of the hospital at Camp Bastion, as well as the Close Support Medical Regiment, in a joint effort that includes the Army

and the RAF. "We could not do it on our own. It is a joint effort the whole time, only the staff proportions change," says Surgeon Captain Stuart Millar. During this period of command, Navy personnel made up the majority of the command positions and accounted for more than half of the 600 medical staff. "It is an opportunity for us to contribute to operations, to develop individual staff skills, and to build confidence and trust on all sides," he remarks.

The Navy benefits in particular when the skills and experiences picked up in Afghanistan are brought back to the maritime environment. "Sending out our medics, doctors, nurses and healthcare professionals gives them extremely useful skills

they can practise on board the ships and submarines where they usually work. For example, we have two surgical teams deployed in ships at the moment. HMS OCEAN has just finished supporting operations off the coast of Libya, while another is helping with counterpiracy operations. Many team members have deployed to Afghanistan at some stage and will have brought lessons back."

TRAINING THE GROUP

The Joint Force Medical Group delivers two distinct areas of medical services. The hospital at Camp Bastion includes 100 medical staff and treats approximately 2,000 casualties a year. The surgeons, anaesthetists and clinicians are drawn from all three services and provide core hospital treatment, including intensive care, CT and X-ray imaging.

Responsibility for force generation for the hospital rests with the Army and training follows a well-trodden path at the Army Medical Training Services Centre in York. A mock-up of Camp Bastion hospital is used to train, assess and validate medical staff using common processes. It also enables individuals to meet and experience working as a team within the hospital before they deploy.

Since the hospital at Camp Bastion was set up in 2003, survival rates have seen steady improvement, especially for severe casualties. Some of this is down to improvements in body armour and hardware, but advances in emergency medicine also play a part.

The second medical service area is provided by the Close Support Medical Regiment (CSMR), of which the majority are naval personnel. The CSMR goes out on patrol with the Royal Marines and soldiers on the ground. The regiment is spread out in small numbers over Helmand province in isolated areas, alongside their infantry colleagues. They carry equipment packs that weigh up to 36kg, comprising essential supplies, in addition to body armour, rifle and ammunition. They deliver medical care out on patrol, and GP-type primary care within the small patrol bases and small operating bases.

While this activity is routine for a formed army medical regiment, the Navy has to train up teams to prepare them for the different environment. Capt Millar says that the Navy has taken the experience gained from the previous two occasions to develop an effective programme that begins six months ahead of deployment. "It is easy to forget that about 90 per cent of the workload for the Close Support Medical Regiment is primary care. This is the kind of treatment that a GP would provide, for example, for rashes and stomach upsets. This is still very important for the well-being of the platoon. Only 10 per cent is emergency and trauma."

The medical group also administers care to coalition forces, including Afghan troops, and to civilian casualties. Afghan military care will eventually fall to the national army as Afghanistan



develops its own security and peacekeeping capability. "If we are looking both militarily and medically to lessen our commitment from 2015, we need to make sure they have the soldiers that can fight, the police and security forces, and also we need to ensure they have supporting elements, such as military medical care," adds Capt Millar.

PROVIDING INITIAL TREATMENT

Medical Assistants form the backbone of the Navy's medical service and deliver treatment on board ships, submarines and in support of the Royal Marines. They are trained with their Army and RAF colleagues at the Defence Medical Services Training Group at Surrey's Keogh Barracks, before consolidating their skills in naval vessels. Those selected for the CSMR also attend a two-week weapons training course and a three-day advanced battlefield trauma course. Further practical skills are acquired during sessions at the Stanant Training Area (STANTA) in Norfolk, a bespoke training facility modelled around an Afghan village to replicate situations that the troops are likely to encounter

Since the hospital at Camp Bastion was set up in 2003, survival rates have seen steady improvement, especially for severe casualties



A simulated casualty is treated by members of the UK Joint Force Medical Group during a training exercise

in Helmand. The programme culminates in two weeks' training at the Royal Marine Base in Chivenor, North Devon, where medics engage in exercises with the 3 Commando Brigade and are validated for CSMR duties. Long days spent on patrol and the harsh climate demands a high level of fitness among the troops, above and beyond that usually required by the Navy. The latest CSMR recruits take a higher basic fitness test for deployment overseas.

The Navy has drawn important clinical lessons from earlier operations with 3 Commando Brigade. All three services are converging on common medical equipment for light surgical capabilities, irrespective of the location. As a result, personnel can access familiar equipment when in the field without extra training. The aim is to deliver care using the same kit – anaesthetic machines and monitors – and the same procedures across all services.

INFLUENCING CIVILIAN TREATMENT

Many of the experiences acquired by the CSMR feed into the National Health Service (NHS) back home. One example is the addition of tourniquets to the equipment carried by paramedics and ambulances. The practice had fallen from favour, but has recently been re-introduced as a result of its impact on survival rates on the battlefield.

Similarly, the use of blood-stemming agents in cases of severe injury has helped to raise survival rates while on patrol. Gauze that contains a blood-stemming agent derived from crushed shellfish can be applied to an open wound to rapidly stop severe bleeding. These first-aid techniques are being shared with the NHS to improve civilian care.

All injured service personnel are brought back to Queen Elizabeth hospital in the UK, part of the Birmingham NHS Foundation Trust, where they are assessed for further treatment. Severe injuries are treated at Queen Elizabeth and, in some cases, are transferred to the Defence Medical Rehabilitation Centre at Headley Court. More than 90 beds are available for serious cases suffering from limb loss, brain and spinal injuries at Headley Court. The centre also delivers resident rehabilitation courses for muscle, bone and joint injuries. Headley Court aims to return patients to independence and, where possible, to active military duty.

The NHS is responsible for all patient treatment in the UK, including the Ministry of Defence District Hospital Units (MDHU) co-located with hospitals at Aldershot, Cambridge, Northallerton, Plymouth and Portsmouth. These facilities serve the large concentration of military staff stationed nearby and provide special occupational skills. The military clinicians working at these units are completely integrated into the NHS, sharing best practice and ensuring skills learned at home and abroad continue to benefit patients everywhere. ●



Medical staff prepare for deployment to Afghanistan during training in York



Helicopters on the front line

Royal Navy helicopters have been heavily involved in combat operations in Libya and Afghanistan. *Thomas Withington* talks to Commander Pat Douglas of the Fleet Air Arm, who looked at the deployment of the Sea King ASaC in 2011 to demonstrate the versatility of the Navy's flying division

For the Royal Navy, 2011's combat operations in Libya served as a valuable illustration of the force's capabilities. While much of the media coverage focused on the important contribution of the Senior Service's ships in enforcing the arms embargo that prevented Colonel Muammar Gaddafi from replenishing his materiel stocks, the Navy's helicopter force has played a major part in support of NATO's Operation UNIFIED PROTECTOR, both at sea and over land.

As part of this support operation, the Royal Navy deployed 857 Naval Air Squadron (NAS) operating AgustaWestland Sea King SKASaC – military shorthand for 'Sea King Airborne Surveillance and Control' – helicopters, which are based at Royal Naval Air Station Culdrose in Cornwall.

ESSENTIAL RADAR CAPABILITY

These aircraft are fitted with the powerful Searchwater radar that provides the Fleet with several important capabilities, according to Commander Pat Douglas, Royal Navy Maritime Sea King Helicopter Force Commander, who states that the SKASaC helicopters were "initially designed to operate from ships protecting the Fleet from

On 7 April 2011, three different Naval Air Squadrons conducted operations in Helmand province in Afghanistan: (left to right) Lynx Mk 9A (847 NAS), Sea King Mk 4 (845 NAS) and Sea King Mk 7 (854 NAS)

incoming aircraft and missiles". Using the Searchwater radar, these helicopters are "able to track contacts at sea, in the air or on the land. Within minutes of getting airborne, the Searchwater radar can detect vehicles, aircraft, missiles or ships over a huge area and send this information back to those who require it". The overall SKASaC force comprises 10 frontline helicopters, all of which are based at Culdrose. These aircraft are split across the 849, 854 and 857 Naval Air Squadrons.

According to Cdr Douglas, their role during Operation ELLAMY, the codename for the UK's involvement in NATO's Libya campaign, was to "monitor the seas around UK and coalition warships, provide surveillance information to aid wider situational awareness for NATO and national assets, and to assist the Army's Apache attack helicopters as they operated from the helicopter carrier HMS OCEAN". This necessitated the force flying 99 operational sorties before returning to its home base.

OPERATION HERRICK

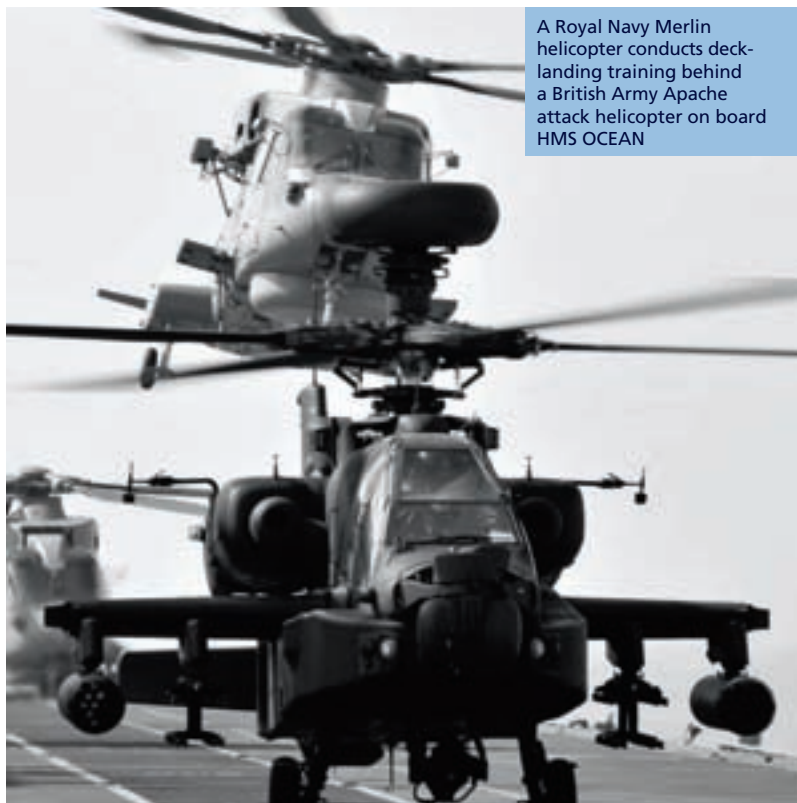
Despite Afghanistan being a landlocked country, Royal Navy helicopters have proven to be especially useful there. The Commando Helicopter Force has operated throughout the Afghanistan campaign with a mix of Lynx Mk 9s and Sea King Mk 4s in support of land forces, and in 2009, a squadron of Sea King ASaCs deployed to provide a different sort of support operation in this troubled country. Although the Searchwater radar was ostensibly designed for at-sea surveillance and airborne early

Despite Afghanistan being landlocked, Royal Navy helicopters have proven to be especially useful in this troubled country

warning, it also has a good capability for detecting targets on land. Cdr Douglas observes that: "Many miles from the sea and what might be considered its 'normal' operating areas, the SKASaC is a highly reactive asset, able to get airborne very swiftly and start monitoring the vast swathes of desert and countryside of southern Afghanistan. The helicopter passes acquired information to those who require it on the ground, thus assisting in the stabilisation operations by suppressing and strangling the supply routes of the insurgents".

Cdr Douglas adds: "Since 2009, the SKASaC force in Afghanistan has had a clear effect on the ground: this helicopter has proved to be an almost unique asset in ISAF, operating closely with the

A Royal Navy Merlin helicopter conducts deck-landing training behind a British Army Apache attack helicopter on board HMS OCEAN



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troops who are put in harm's way and so able to truly understand their requirements. Ultimately, we are part of a larger effort, seeking to make Afghanistan a safer place for both the Afghan people and the coalition forces serving there."

REPLACING THE SEA KINGS

Despite the impressive service of the SKASaC helicopters, they are not getting any younger, having entered service in the early 1980s. The Navy is now turning its attention to replacing these highly versatile aircraft. To this end, the Crowsnest programme has been launched to procure a similarly capable system that can outfit all of the AgustaWestland Merlin Mk 2 helicopters operated by the Navy. These aircraft will play an essential part in supporting the Navy's two new Queen Elizabeth-class aircraft carriers, which will enter service later this decade.

Cdr Douglas says: "A number of Merlins will be deployed aboard the new aircraft carriers, and these helicopters can be optimised to meet the threat in the most effective manner. This provides great flexibility to maritime commanders, as they will have at their disposal helicopters able to operate in their 'standard' Anti-Submarine Warfare (ASW) or Anti Surface Warfare (ASuW) role and, when required, change the role of the Merlin swiftly to that of Airborne Surveillance and Control." The Navy expects the Crowsnest capability to become available to the Merlin Force in the second half of the decade, once the SKASaC aircraft begin to leave service.

The introduction of Crowsnest will occur against a backdrop of some major changes to the Navy's

Despite impressive service, the SKASaC helicopters are not getting any younger. The Navy is turning its attention to replacing these highly versatile aircraft

helicopter force. The AgustaWestland Lynx and Sea King helicopters, which have enjoyed a long career with the Senior Service, are being put out to pasture and replaced by the Merlin family.

As noted above, the Merlin Mk 2 aircraft will perform the airborne warning and control mission, alongside its ASW and ASuW roles, while the Royal Navy's Merlin Mk 4 aircraft (upgraded RAF Merlin Mk 3s) will replace the Sea Kings that are used for the Commando Helicopter Force. Moreover, the existing Lynx fleet will be replaced by AgustaWestland's AW159 Wildcat, of which the force will acquire 28 aircraft.

Despite all of these changes, Cdr Douglas insists that some things will remain constant: "All aircrew and maintainers within the Fleet Air Arm are maritime men and women; they have trained and regularly operate over the sea and from the sea over land. Inculcated into them is that ability to operate in the most unforgiving of environments." ●

Royal Navy Sea King Mk 7 ASaC helicopters helped to find covert entry into Libya for British Army Apaches during the conflict



Iraq: the final chapter

Captain Mike Beardall, the last UK Commander on Iraq's ABOT oil platform, talks to *Simon Michell* about the Royal Navy's remarkable achievements in helping to rebuild the Iraqi Navy and Marines

Members of HMS SOMERSET's ship's company embark on the Al Basrah Oil Terminal (ABOT) to conduct a fire exercise

After Royal Navy Lynx helicopters, armed with Sea Skua anti-ship missiles, helped to destroy the Iraqi Navy during the fighting in the 1991 Gulf War, Iraqi maritime forces ceased to function as an effective fighting organisation. Although this naval victory was initially acknowledged as an overwhelming military success, its repercussions would have significant implications more than a decade later.

Realising that the embargo placed on Iraq following the invasion of Kuwait meant that it would be impossible to rebuild his navy, Saddam Hussein transferred his remaining naval officers into the army, where they were to stay until the second Gulf War of 2003. When this conflict ended in total defeat for Iraqi Forces, the coalition nations were legally obliged to take over the safeguarding of Iraqi waters in the Gulf and, in particular, the precious oil platforms that are the vital outlets for Iraq's oil exports.

Initially, this was carried out under the banner of the Combined Task Force (CTF)/Combined Task Group (CTG) 158, before being renamed CTF Iraqi Maritime in 2008. Captain Mike Beardall explains the situation: "CTF-158 was based out of Bahrain with the US 5th Fleet, whereas the Task Group was commanded from a warship in the Gulf." He continues: "It soon became apparent, however, that a more cost-effective solution would be for the CTG to command from one of the oil platforms."

Accordingly, a barge with a naval operations (ops) room was moored at KAAOT (Khawr Al Amaya Oil Terminal), which is located in relatively shallow waters, close to the Iranian sea border. The ops room was later transferred onto the platform itself and the barge removed. Command transferred to a bigger ops room built on the larger oil platform, ABOT (Al Basrah Oil Terminal), with a link to KAAOT. This enabled Command and Control to be joined, with each platform linked and able to see what was happening on both the radar and sensor imaging systems on the other.

The vulnerability of these two platforms from terrorist attack was tragically highlighted on 24 April 2004 when boats manned by suicide bombers made a coordinated series of attacks that resulted in the loss of coalition lives and damage to one of the platforms. Since then, a more robust, layered defence system has been put in place within a 3,000m exclusion zone around both platforms. "The outer layer of the defence is patrolled by coalition destroyers, frigates and patrol craft, along with US Coast Guard patrol boats – and, more recently, Iraqi Navy patrol boats. There is also a system of alerts and trip wires to deliver early warning. Point defence is undertaken by Marines," explains Captain Beardall. Should an attacking force evade the patrol boats, the abundant defences on the platforms kick in.

REBUILDING THE IRAQI NAVY AND MARINES

Protecting the platforms requires ships to patrol the waters around ABOT and KAAOT, marines for defending the platforms, as well as a coordinated command-and-control setup – in short, a navy. A naval force, however, also requires a defended home base. Consequently, ever since 2003, the Royal Navy has been working with the US Navy, US Marines Corps and US Coast Guard to reconstitute the Iraqi Navy and Marines and rebuild their naval headquarters at Umm Qasr.

To do this, a relatively small group of about 200 sailors and marines (roughly 80 from Britain and about 120 from the US) set up a training establishment at Umm Qasr, just south of Basra. They are known as the ITAM-N (UQ) Team – Iraqi Training and Advisory



The Al Basra Oil Terminal counts towards 90 per cent of Iraq's income and is vital to the stability of the country's economy

US and UK Marines have put the Iraqi Marines through some of the most rigorous training available

Mission – Navy (Umm Qasr). It is this joint US-UK group that has masterminded the rapid reformation of a credible Iraqi maritime force. They provide training and mentoring on the full range of naval skills that will enable the Iraqis to take over the protection of their waters and the associated oil infrastructure. The Iraqi recruits are schooled in navigation, gunnery, seamanship, communications, future planning and command and control skills.

At the same time, US and UK Marines have put the Iraqi Marines through some of the most rigorous training available, so that they can take over the defence of the oil platforms and the perimeter security of the Umm Qasr naval base. However, in order make this possible, the ITAM-N first had to plan out a programme for the reconstruction of Umm Qasr and the commissioning of new boats.

While the base was being rebuilt and new boats were being ordered under the US Foreign Military Sales scheme, the painstaking work to bring the Iraqi sailors and marines up to scratch began. As of May 2011, some 1,800 personnel had already passed through the numerous courses (up to 50 in all). Moreover, the new boats have started arriving from Italy and the US, and are being worked up and commissioned into service. "When the new boats arrive, the Iraqi crew and CO [commanding officer] walk on board. They have already been trained in

advance, to the point whereby they would pass their basic operational sea training (BOST), so there is rapid progress to being able to deploy on operations in support of the CTG," explains Captain Beardall.

Progress has been speedy and remarkable; from the early days where the Iraqis took control of a small coastal strip of water, they have now taken over full responsibility for the KAAOT platform and some 80 per cent of their territorial waters. The first Iraqi patrol around the ABOT platform was successfully launched in January 2011, with an Iraqi Commander in charge of one of the brand-new swift patrol boats. At the time of writing, it was expected that the Iraqis would assume responsibility for the ABOT platform and the remaining 20 per cent of their territorial waters imminently.

ENTERING THE END GAME

On 22 May 2011, the UK-Iraq Training and Maritime Support Agreement came to an end, and with it, Operation TELIC, the UK's contribution to the second Gulf War. Although US forces will remain in Iraq to finish what is left of the job, the sailors and marines of the Royal Navy leave behind a 'first-division' Gulf navy that ranks as one of the most professional and capable in the region. They are able to maintain a presence at sea for four or five days at a time; this may not sound much in terms of NATO navies, but very few maritime forces in the region sustain patrols at sea for longer than overnight.

Captain Mike Beardall, the last British officer to command the CTF IM unit on the ABOT platform, was glad to leave behind the harsh conditions – summer temperatures of 45°C with almost total humidity and, at times, choking crude-oil fumes. He sums it up succinctly: "The men and women of the Royal Navy and Royal Marines have done an absolutely first-rate job here. Acting, for the most part, as the lead nation, supported by our US partners, we have managed to rebuild the Iraqi Navy and Marines almost from scratch. It is an amazing achievement: one of which everybody involved – Americans, British and Iraqis – should be terrifically proud." ●



Commander-in-Chief Fleet, Admiral Sir Trevor Soar (left), on a visit to Al Basrah Oil Terminal

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Frontline perspectives

Commodore John Kingwell, head of the Response Force Task Group, talks to *Simon Michell* about the important and indispensable contribution that the Royal Navy made to Operation UNIFIED PROTECTOR and the liberation of Libya

In February 2011, the Royal Navy tasked one of its Type 22 frigates, HMS CUMBERLAND, to rescue stranded civilians who had massed in Benghazi, Libya. On her way back from a deployment in the Gulf, she slipped quietly into the port and whisked away some 454 people, including 129 British nationals. Later, the Type 42 destroyer, HMS YORK, diverted from her planned South Atlantic deployment to pick up a further 43 personnel and delivered medical and food supplies to aid agencies in Benghazi. This was the beginning of the Royal Navy's efforts to prevent civilian casualties, while Libyan irregular forces set about toppling one of the world's most notorious dictators – Muammar Gaddafi.

The UK's contribution to UNIFIED PROTECTOR – the UN-mandated mission to protect Libyan civilians – was delivered through Operation ELLAMY. The plan was to contribute to the NATO effort by helping to impose a maritime embargo to prevent

explains Cdre Kingwell. Therefore, some three weeks before he was due to leave, he departed on board HMS ALBION, taking with him a simple order given to him by Admiral Soar, Commander in Chief – Fleet. That order was to sail from the United Kingdom and “deliver options in the Mediterranean and Middle East to Her Majesty's Government”.

PREPARING FOR ACTION

Straight away, Cdre Kingwell set about devising a plan to maintain a pre-planned set of exercises and engagement activities with important allies, while also placing ships in areas in which they would be able to deliver those 'options', should the need arise. By the end of May, that need had taken on a very real sense of urgency when Cdre Kingwell was ordered to take a maritime strike capability, based around Army Air Corps Apache attack helicopters, and position it off Libya so that it would be able to strike at designated targets, as they became known.

This then proved the scalability aspect of the RFTG. In order to carry out his new orders, he split the RFTG in two. An amphibious assault flotilla with 22 of Cdre Kingwell's staff undertook the preset exercises with HMS ALBION as flagship. The other element, led by HMS OCEAN (with Kingwell and eight of his remaining staff having transferred from ALBION), joined Operation ELLAMY, and overall command of the RFTG was transferred to the Chief of Joint Operations, Air Marshall Sir Stuart Peach of the Royal Air Force.

The RFTG showed how adaptable it was, in undertaking joint operations with its UK sister services, as well as operating as part of a combined NATO force. Cdre Kingwell had to integrate with a chain of command coordinated by NATO Air Component Command under the United States Air Force Lieutenant General (Lt Gen) Ralph Jodice, who reported to the NATO Joint Commander of Operation UNIFIED PROTECTOR in Naples, Lt Gen Charles Bouchard, from Canada's armed forces.

Added complexity was introduced to proceedings through the decision to run the helicopter strike operations in consort

Almost as soon as it was established, the Task Group saw real-life action

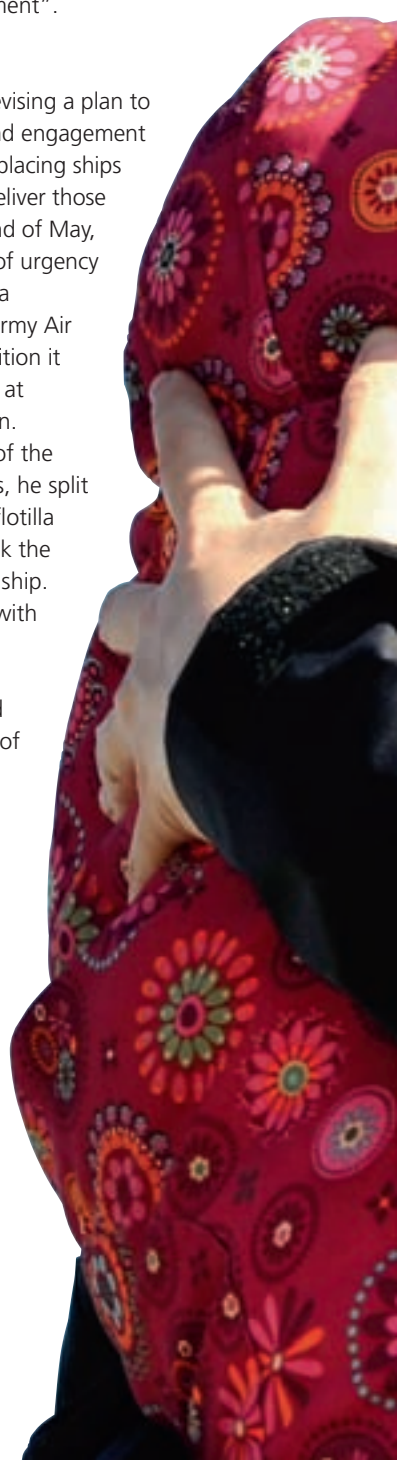
military supplies and mercenaries reaching Gaddafi's forces. At the same time, the UK was to participate in the enforcement of a no-fly zone over Libya so that Libyan planes and helicopters could not shoot or bomb civilians. In addition, the Royal Navy would assist with the effort to maintain access to Libya from the sea.

A NEW ERA FOR ROYAL NAVY OPERATIONS

The Libyan campaign coincided with a master plan for how the Royal Navy intends to deliver 'contingency' – the term used for reacting to unexpected events – through combining its maritime strike and amphibious assault expertise around a single concept – the Response Force Task Group (RFTG). This was established on 1 February 2011, along with the unit that supervises it, the Command United Kingdom Task Group (COMUKTG).

In the words of Commodore (Cdre) John Kingwell, the officer who commands the Task Group: “RFTG is scalable, adaptable and flexible.” In essence, it can either sail as one fleet or split up to carry out separate tasks simultaneously. It can also carry out a range of tasks and be put to sea at a moment's notice.

Almost as soon as the task group had been established, Cdre Kingwell saw it operate under real-life conditions. “The RFTG showed its flexibility right from the start. The Arab Spring dictated that the RFTG should begin the Cougar deployment early in March, in the run-up to the traditional Easter leave period,”





A five-month-old baby is evacuated from the Port of Benghazi in Libya on board HMS CUMBERLAND



An aerial photograph of HMS OCEAN shows an array of helicopters used in Operation ELLAMY to protect Libyan civilians

with the French Navy, which was flying Gazelles off *Tonnerre* and, later, *Mistral*.

As the chain of command evolved, it was imperative to stay on top of what was happening at all times. “To make sure that I remained fully aware of what was required of me, and that my new bosses and allies understood what I was planning, I put liaison officers from COMUKTG into the French ships, into Naples, into the Air Component Command and into my NATO opposite number,” says Cdre Kingwell.

HMS OCEAN then began receiving not just the situational awareness intelligence from its own ships, submarines and Sea King Mk 7 AsaC surveillance helicopters, but also from NATO air ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) assets.

Over the next two months, the Royal Navy became an integral part of the air campaign, as well as the maritime mission. Significantly, this was the first time that British Army Apaches had flown strike missions off Royal Navy ships scoring some significant successes. An example of the value

they and the RFTG brought to the air operation was demonstrated when a Libyan government artillery battery was spotted shelling civilians in Misrata. One of the Royal Navy submarines reported that, every night, a couple of small boats were seen scooting up and down the coast to Misrata in order to supply the battery.

“So I sent my Mk 7 surveillance helicopters from OCEAN to investigate,” revealed Cdre Kingwell. “They located and identified the small craft, which were subsequently destroyed by Apache helicopters flying from OCEAN. This was just one example; the Apaches also targeted tanks and command nodes, as well as some of the checkpoints that were harassing civilians,” he added.

A CRUCIAL CONTRIBUTION

Looking at the bigger picture, the Royal Navy’s role was undoubtedly critical to the eventual success of the operation. During the very early stages, Royal Navy submarine HMS TRIUMPH launched cruise missile attacks on air defence targets to pave the way for the air campaign. HMS LIVERPOOL not only fired her gun onto shore targets, but also spent 280 hours directing air operations over Libya.

The Royal Navy mine-hunters, HMS BANGOR and HMS BROCKELSBY, detected and neutralised mines that had been seeded by Gaddafi’s forces, as well as some ordnance left over from the Second World War. The Royal Fleet Auxiliary ships FORT ROSALIE, ORANGELEAF and WAVE KNIGHT sustained British and NATO ships at sea and delivered Apache helicopters to HMS OCEAN.

“Overall, it was an impressive contribution. It also proved the concept of the RFTG and COMUKTG and proved another key capability to UK Defence – attack helicopter strike from the sea,” summarises Cdre Kingwell in conclusion. ●

Campaign statistics

Naval Gun Fire: Most extensive use of naval gunfire since the Falklands campaign – 254 shells fired (134 high-explosive and 120 illumination rounds)

TLAM launches: HMS TRIUMPH

Apache strikes: 50 sorties (95 Hellfire missiles, 16 CVR-7 rockets, 4,085 cannon rounds)

Civilian extractions: 497 people evacuated during Operation DEFERENCE (454 on HMS CUMBERLAND, 43 on HMS YORK)

Fleet replenishment: 35 replenishments at sea (RAS), nine helicopter replenishments (Vertrep), 2,638 pallets transferred

Merchant shipping boardings: HMS LIVERPOOL and HMS SUTHERLAND

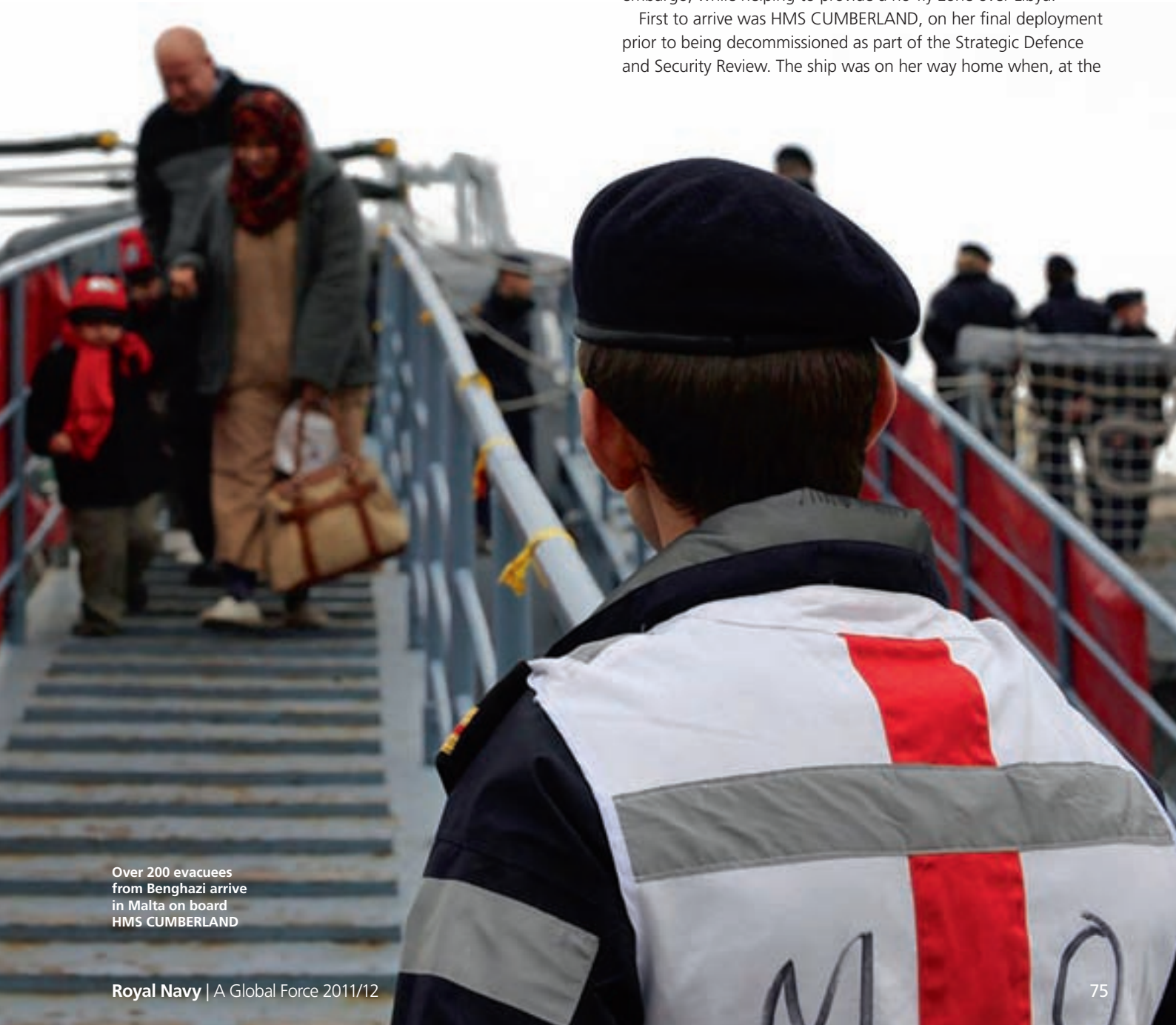
Benghazi rescue

As the Arab Spring took hold across North Africa, the Libyan regime fought back, resulting in a surge of refugees fleeing the country. *Julian Moxon* reveals the contribution that HM Ships CUMBERLAND, WESTMINSTER and YORK made in saving the lives of British and other nationals

The Royal Navy has many roles, and one of its most important, if seldom used, capabilities is the rapid evacuation of civilians in areas where the local situation threatens lives. In February 2011, three ships – Type 22 frigate HMS CUMBERLAND, Type 23 frigate HMS WESTMINSTER and Type 42 destroyer HMS YORK – found themselves off the Libyan coast, mounting the first major UK humanitarian evacuation since 2006, when the Navy rescued some 4,000 British citizens from Lebanon; an event in which HMS YORK was at the forefront.

In the spring of 2011, the situation in Benghazi had become extremely dangerous as troops loyal to Colonel Gaddafi homed in on the city. A huge international operation was mounted to rescue nationals from the besieged city, and the Royal Navy was on hand, not only to evacuate, but also to impose an arms embargo, while helping to provide a no-fly zone over Libya.

First to arrive was HMS CUMBERLAND, on her final deployment prior to being decommissioned as part of the Strategic Defence and Security Review. The ship was on her way home when, at the



Over 200 evacuees from Benghazi arrive in Malta on board HMS CUMBERLAND



In all, HMS CUMBERLAND evacuated 454 people from Benghazi, over three separate trips

Even with large portions of the ship's quarters given up to evacuees, the majority of the ship's crew continued with their main jobs

last minute, she was ordered to remain in the eastern Mediterranean to carry out the evacuation. "We had literally just popped out of the north end of the Suez Canal when we got the call," explains Lieutenant Commander James Farrant. "There had been some fairly harrowing tales of violence during the last couple of days, and certainly there was great relief to see the safety of a Royal Navy warship arriving in Benghazi," he added.

LOGISTICAL HEADACHES

HMS CUMBERLAND evacuated a total of 454 personnel from Benghazi on three separate trips: 207 on the first, then 217, and 30 on the final mission. The vast majority of those rescued were families, including, on the first trip, children and babies. This begged the question how to accommodate so many civilians on a fighting ship with limited space. "Most were housed on the mess decks and dining halls," recalls HMS CUMBERLAND's Commanding Officer, Captain Steve Dainton. "Families were obviously kept together and all were provided with blankets, food and drink."

On the first trip, one last ordeal awaited the passengers; the weather. The 360-nautical-mile voyage to Malta took place in extremely rough seas, placing major restrictions on where the evacuees could go. "A significant number suffered from chronic seasickness and several required intense

medical attention, including intravenous hydration, from my medical team," says Captain Dainton.

The initial intention had been to sail at around 20 knots, resulting in an 18-hour journey. "However, the weather and resultant sea state during this first trip precluded such speeds, as there would almost certainly have been serious injuries to the evacuees," Dainton reveals. "So we slowed down to around six knots, then increased our speed as the weather improved. In the end, the first journey took 36 hours to complete," Captain Dainton continues.

Even with large portions of the ship's quarters given up to accommodate the evacuees, the bulk of the ship's crew continued with their main jobs and were closed up in defence watches or action stations during the voyage. "As such, we were able to maintain full operational status, keep all weapons and sensors manned, and use any spare capacity to look after our guests," Captain Dainton is proud to confirm. In the event of a sudden operational requirement, he adds that HMS CUMBERLAND would have been in a position to respond, although this would have been subject to the limitations imposed by having more than 200 civilians aboard.

The main problem in embarking civilians in a warship, according to Captain Dainton, is their unfamiliarity with the environment aboard. There are myriad items of war-fighting, damage-control and fire-fighting equipment on board, much of

which represents trip or snag hazards, as well as other more potentially dangerous risks. There are also numerous hatches and doorways that need to be negotiated simply to move along the main deck, as well as the steep ladders between decks. All in all, there is considerable scope for injury.

Additionally, for a warship such as CUMBERLAND, a large number of unexpected people on board places a major strain on the 'hotel' services, such as the galley, toilets, showers and so on. The ship's Marine Engineering Officer also had to work out the mathematics surrounding the stability issues related to the extra weight that the vessel had taken on.

CUMBERLAND's final deployment turned out to be one of her proudest. Captain Dainton explains: "We undertook a huge range of missions and it's a fine example of the flexibility and agility of naval forces. It is fitting that a ship that has served her country so well for over 20 years has bowed out in such style. Of course, it is her crew that makes CUMBERLAND what she is. They performed exceptionally well throughout the deployment, but especially when called upon to assist with the evacuation of personnel from Benghazi."

RESPONDING TO CHANGE

HMS WESTMINSTER's role – initially to support non-combatant evacuation and humanitarian operations – was changed to one of surveillance after the UN resolution authorising military

intervention in Libya was agreed. "We switched in very short order from official ceremonies in London to operational circumstances in Libya," says the ship's Commanding Officer, Commander Tim Green. "We were ready for combat, embargo or humanitarian operations at immediate notice. This is what the Royal Navy does, and my ship and its people stepped up to the mark brilliantly."

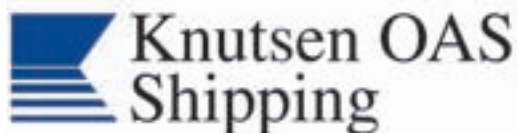
A further element of Royal Navy operations was the delivery of vital medical supplies, intended to be distributed to Libyan civilians. On 2 March, HMS YORK sailed into Benghazi with tonnes of medical aid aboard, leaving a few days later with around 60 civilians, including 10 British evacuees.

Medical supplies were donated by the Swedish government, but had to be transferred from Malta at short notice after Benghazi airport was closed. The armed forces of Malta assisted the operation, shortening the time needed to get the supplies to where they were needed.

"There has been a real international flavour to this mission, with the Maltese Armed Forces transporting the Swedish medical supplies so that the UK could deliver them to Libyans in need," recounts HMS YORK's Commanding Officer, Commander Simon Stanley. "I'm exceptionally proud of both my ship and my people. The ship's company has responded well, proving we are resilient. We have shown what the Navy is all about." ●

Stores and humanitarian aid was transferred from RFA ARGUS off the Libyan coast by HMS WESTMINSTER's Merlin helicopter





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At present, Knutsen OAS Shipping operates in the tanker segment in the following areas:

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- Chemicals
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Knutsen OAS Shipping aims to be a frontrunner in tanker operations. Therefore, the company has stringent requirements with respect to quality, safety and the environment. In order to fulfil these ambitions and meet charterers' requirements for advanced shipping services, a focus on technology has been given high priority.

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KVOC® is a cost-efficient method to limit VOC emissions during loading and transport

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Helping to enforce the no-fly zone

The sophisticated air-defence technology installed in the Royal Navy's destroyers played a key role in enforcing the no-fly zone in Libya. *Julian Moxon* looks at how HMS LIVERPOOL's fighter controllers supervised bombing, surveillance and air refuelling missions

The international agreement announced on 25 March 2011, to give NATO control of enforcing a no-fly zone over Libya, resulted in immediate action under the Operation UNIFIED PROTECTOR banner. The Royal Navy was a key contributor to establishing and maintaining the no-fly zone, conducting surveillance and identification of all aircraft within radar range of its ships. One of the principal participants was Type 42 destroyer HMS LIVERPOOL, which brought advanced surveillance technology to the table, controlling coalition aircraft tasked with preventing Libyan aircraft from entering the no-fly zone.

Weapons engineers carry out checks on HMS LIVERPOOL's 4.5-inch gun as she sails off the coast of Libya



Her fighter controllers worked in the joint operating area with Royal Air Force E3-D Sentry aircraft to establish the air picture using voice reporting and data networking. They regularly controlled NATO aircraft tasked with enforcing the zone and protecting high-value air assets.

When the E3-D was not available, HMS LIVERPOOL took control of all air assets enforcing the no-fly zone in the Battle Management Area, including air-to-air refuelling operations. “An informal, but extensive, working relationship was built up with the Sentry detachment to ensure that both parties were fully aware of each other’s abilities and able to support each other throughout the operation,” says Deputy Fleet Operations Officer, Lieutenant Commander Nick Unwin.

UNDER ATTACK

HMS LIVERPOOL’s capabilities were put to the test when the French ship, *Montcalm*, reported that she was under attack from a shore-mounted BM21 multiple rocket launcher. HMS LIVERPOOL turned towards the threat, penetrating the 62-nautical mile ‘line of death’ declared by Gaddafi in the 1970s. Two decks down, in the Operations Room – the tactical nerve centre of the ship – a team monitored HMS LIVERPOOL’s Type 1022 air-search radar (with a range of 250 miles), and Type 996 surveillance radar (faster, with a shorter beam width), tracking and identifying air and surface ‘contacts’.

HMS LIVERPOOL was also under surveillance by Libyan coastal radar, but she could not locate the firing site and thus called in a couple of RAF Tornados to do what was necessary. The operation was a classic example of the kind of flexibility and international cooperation that characterised Operation UNIFIED PROTECTOR.

TRACKING AIRCRAFT

On several occasions, HMS LIVERPOOL detected possible helicopter flights thought to be operated by pro-Gaddafi forces over Misrata. The information was passed to the on-station Sentry crew, who vectored aircraft to investigate. Later on, after humanitarian flights had begun, HMS LIVERPOOL was tasked to ensure coalition forces were aware of these aircraft. “She also had to establish they were what they said they were and not pro-Gaddafi forces posing as humanitarian flights,” says Unwin.

Policing the no-fly zone requires “persistent surveillance”, he continues. “This operation has done much to illustrate the joint, cooperative nature of modern military operations, not only between the Navy and the RAF, but also between the different coalition nations involved. The argument that one component, whether a ship or an aircraft, can function in isolation is false. The reality is that one requires the support of the other.”

The maritime component of Operation UNIFIED PROTECTOR was made up of ships from Canada,



HMS LIVERPOOL’s Lynx crew watch as the helicopter is prepared for action



HMS LIVERPOOL attracted many positive comments for her skill in Battle Management Areas

France, Greece, Italy, the Netherlands, Spain, Turkey, the UK and the US. "At one stage, ships from Belgium and Poland were also present," says Unwin.

COUNTERACTING THE THREAT

Was there any real threat from Gaddafi's forces? "Absolutely. Yes," declares Unwin. "HMS LIVERPOOL and other ships in the Task Group were engaged a number of times by pro-Gaddafi artillery and un-guided rockets." Fortunately, despite accurate targeting, no Royal Navy ships were hit. There was also a threat from on-shore and ship-launched anti-ship missiles, and finally, although they were observed flying, the Libyan Air Force posed a credible threat to all ships operating close to Libyan international waters.

Rigorous training was necessary before HMS LIVERPOOL could play such a key role in

enforcing the no-fly zone operation, including specific training in developing a Recognised Air Picture and being able to counter any threat to the Task Group. This included deployment to the east coast of the USA in 2010, in order to test the crew fully in a busy air traffic environment and develop techniques that would subsequently be used.

HMS LIVERPOOL's Commanding Officer, Commander Colin Williams, said: "I'm immensely proud of my ship's company for the way they have dealt with the challenges they have faced so far. HMS LIVERPOOL protected the civilian population of Libya through enforcement of the no-fly zone and the maritime embargo, showing the value of maritime forces and the skill of the Royal Navy."

BOWING OUT

The Libyan deployment was Falklands campaign and Gulf War veteran HMS LIVERPOOL's last, as she is due to be decommissioned in spring 2012. Her record of distinguished service continued during the recent crisis, with the ship and her crew attracting many positive comments from the RAF on the flexibility, willingness and speed at which she could take over a Battle Management Area whenever a Sentry was unavailable or not on station. Not bad for a veteran of 30 years' service. ●

**The crew of
HMS LIVERPOOL was
on station off the coast
of Libya for more
than seven months**



Enforcing the Libyan embargo

Implementing an embargo requires patience, experience and diplomacy. The Royal Navy employed all of these traits in support of United Nations Security Council resolution 1973, explains *Julian Moxon*

In March 2011, following the adoption of United Nations Security Council Resolution 1973, NATO allies began enforcing an arms embargo against Libya, in order to halt what NATO Secretary General Anders Fogh Rasmussen described as “intolerable violence against Libyan citizens”.

NATO ships and aircraft in the region were immediately activated under Operation UNIFIED PROTECTOR, the aim of which was to prevent not only arms, but also mercenaries, being supplied to the regime, as well as ensuring that humanitarian aid could be supplied to besieged cities, in particular, Misrata. But with a 600-mile-long coastline, the forces involved would have to be flexible and fast-acting if they were to stop Gaddafi’s surface ships from posing problems.

Potential embargo breakers had to be intercepted. At sea and in the air, tried-and-tested surveillance and intelligence techniques were put into action. The Royal Navy is no stranger to such an operation, says Lieutenant Commander Caroline Wyness of the Navy Fleet Operations Division: “Boarding suspect vessels is routine business. The Navy is constantly involved in counterpiracy operations in the Gulf of Aden and Indian Ocean, and has done so on many previous occasions, for example, when it helped enforce the embargoes against Iraq, and Serbia, during the Balkans conflict.”

ROYAL NAVY SHIPS IN THE VANGUARD

One of the principal Royal Navy warships involved was Type 42 destroyer HMS LIVERPOOL, which worked alongside other coalition ships identifying and clearing maritime traffic to and from Libyan ports. Although, by then, the fighting in Libya had resulted in the cessation of most maritime trade, there were still plenty of vessels that appeared to be heading for Libyan ports.

“They all needed to be checked and verified as not carrying guns to support the Gaddafi regime,” says Wyness. “The assigned ships were given specific areas at sea to police and they worked together; contacting, boarding and clearing or diverting maritime traffic as required.” Between them, HM Ships LIVERPOOL and SUTHERLAND conducted seven boardings of merchant vessels during the campaign.

The threat of attack from Gaddafi’s navy could not be discounted, says Wyness. “Although the operational status of many of his vessels was doubtful, we had information that he had two Koni-class coastal anti-submarine warfare ships, armed with Soviet-built Styx anti-ship missiles, along with numerous other armed patrol vessels. There was, therefore, a very real threat until they were either disarmed or confirmed to have arrived in opposition hands.”

NATO units enforcing the embargo initially assessed suspicious vessels electronically, using the

Automated Identification System, which gathers detailed information before the vessel has been boarded. They were then boarded, the information received by radio confirmed, and this, along with any further information, was relayed to NATO headquarters, which assessed the information and directed the warship to clear the vessel. If it turned out to be on a humanitarian mission, the vessel would be cleared to proceed. Otherwise, it would be told to submit to further checks, or allowed to continue to a non-Libyan port (if, for example, it was carrying ordinary cargo destined for Gaddafi that might have supported the regime). “All of the ships boarded were very welcoming,” says Wyness.

ROYAL MARINE BOARDING TEAMS

Royal Marines boarding teams were embarked on several ships. “We worked very closely with them in order to secure a ship, allowing us to search it safely and thoroughly,” says Petty Officer Jones, one of the Royal Navy team commanders. “Although, as always, there was a fair bit of banter between the Royal Navy sailors and Royal Marines boarding teams, we always work professionally together.”

Royal Navy ships and personnel are routinely trained in boarding and maritime interdiction operations, and the Libya campaign presented no particular problems. “Operations such as this can be

Boarding suspect ships requires tact and diplomacy – qualities that the Navy fosters

carried out with minimal training or none at all,” says Wyness. Boarding suspect ships does require a degree of tact and diplomacy, however – qualities that the Navy fosters without difficulty. Likewise, operations with foreign navies did not present any undue challenges. “We’re well used to working with ships of other nationalities. We’ve been doing a lot of it in the counterpiracy effort east of Suez,” adds Wyness. “We welcome every opportunity to work with our NATO and other partners.”

Besides HMS LIVERPOOL, UNIFIED PROTECTOR included Type 22 frigate HMS CUMBERLAND – which has subsequently been decommissioned as part of the Strategic Defence and Security Review – and HMS WESTMINISTER, a Type 23 frigate, which took part in early embargo operations. Two other Type 23 frigates, HMS SUTHERLAND and HMS IRON DUKE, covered for HMS LIVERPOOL while she was recalled for routine maintenance. Last, but not least, mine countermeasures vessels HM Ships BROCKLESBY and BANGOR were also put to work

Royal Marines from HMS SUTHERLAND board a merchant vessel as part of the UN-sanctioned embargo of Libya

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Helicopters, such as HMS IRON DUKE's Lynx, played a vital role in enforcing the embargo

seeking out and destroying a number of mines on the approaches to the major ports.

One of HMS LIVERPOOL's interceptions involved boarding the roll-on/roll-off ferry *Setubal Express*, sailing from Malta to the Libyan capital, Tripoli, with a cargo of vehicles. The suspicion was that these might be used by pro-Gaddafi forces. Consequently, a boarding team was deployed and they quickly discovered that the cargo record contained irregularities. The Task Force commander instructed the ship not to enter Libyan territorial waters and to redirect to Salerno, Italy.

HMS SUTHERLAND had her own story, when a combined Royal Marines and Royal Navy boarding team was deployed to search a merchant vessel in international waters close to Libya. Royal Marine Lieutenant Viggars, the officer commanding the ship's boarding team, said: "In a highly demanding sea state, my lads swiftly boarded the suspect vessel and conducted a thorough search. Once

we had satisfied ourselves that they were not in breach of the embargo, they disembarked as professionally as they had arrived."

One of the most vital assets available to the Navy was the Lynx Mk 8 helicopter, which was used to search huge areas of sea as quickly as possible to assess the activities of Libyan forces and search out suspect vessels. The much larger Merlin Mk 3 utility helicopter was also used extensively, both for surveillance and transport.

HMS CUMBERLAND's Captain, Steve Dainton, points to his ship as an example of the Royal Navy's ability to utilise its vessels as highly flexible assets, with the capability of effectively enforcing the will of the international community. "In a period of one month, we conducted three evacuation operations from Benghazi, carried out patrols off the coast and acted as an effective deterrent to Gaddafi's naval forces. I am extremely proud of the performance of our crew." ●



Keeping the seas free of mines

The Royal Navy continues to be a leading force in the effort to keep the world's sea lanes free of mines. *Alan Dron* reflects on recent mine countermeasure activities undertaken in the Mediterranean and the Gulf

Members of HMS BANGOR's mine-disposal crew in the ship's operations room

Much is spoken today about 'asymmetric warfare'. Many people forget that the concept has existed for centuries and one of its most frequently used forms over the past century has been in conjunction with mine warfare. Sea mines possess all of the qualities needed to deter a quantitatively or qualitatively superior adversary: they are cheap, do not require expensive delivery systems or extensive training, but are potentially lethal to the most sophisticated of warships.

Indeed, the mere threat that mines have been laid in an area can deter vessels from entering it, even if no weapons have actually been deployed. This is

particularly true in the case of merchant ships. The detection and destruction of mines is a slow, painstaking business. It also happens to be one in which the Royal Navy is regarded as a world leader.

DE-MINING MISRATA HARBOUR

The Service's skill in the mine countermeasures (MCM) field was called into play in 2011 when the besieged Libyan rebels in the port of Misrata learned that Colonel Gaddafi's forces may have laid mines in the approaches to the town's harbour, preventing delivery of humanitarian supplies, or the evacuation of refugees or wounded troops.

As part of Operation UNIFIED PROTECTOR – the allied deployment designed to enforce UN Resolution 1973 that decreed all possible help for rebelling Libyan citizens being suppressed by the Gaddafi regime – minehunters HM Ships BROCKLESBY and, later, BANGOR were tasked with ensuring that Libyan harbours were kept free of such threats.

BROCKLESBY, a Hunt-class minehunter, did indeed discover a mine, using its sophisticated Thales Type 2193 sonar to identify the lethal device on the seabed. Her Seafox remotely piloted mine-disposal system was then launched, with one of its vehicles locking on to the mine and destroying it with an explosive charge.

DISCOVERIES OFF TOBRUK

HMS BANGOR also chalked up successes off Libya. Having spent time off Misrata to help keep the port open, she was dispatched to eastern Libyan ports to carry out further surveys to ensure that they were also safe for merchant shipping. Off Tobruk, lurking in 475ft (145m) of water, she discovered a 2,000lb (900kg) mine on the seabed. It was also dispatched with a Seafox drone. For good measure, the Sandown-class ship then located a torpedo nearby and went on to dispose of it.

BANGOR's Commanding Officer Lieutenant Commander (Lt Cdr) Neil Marriott noted afterwards

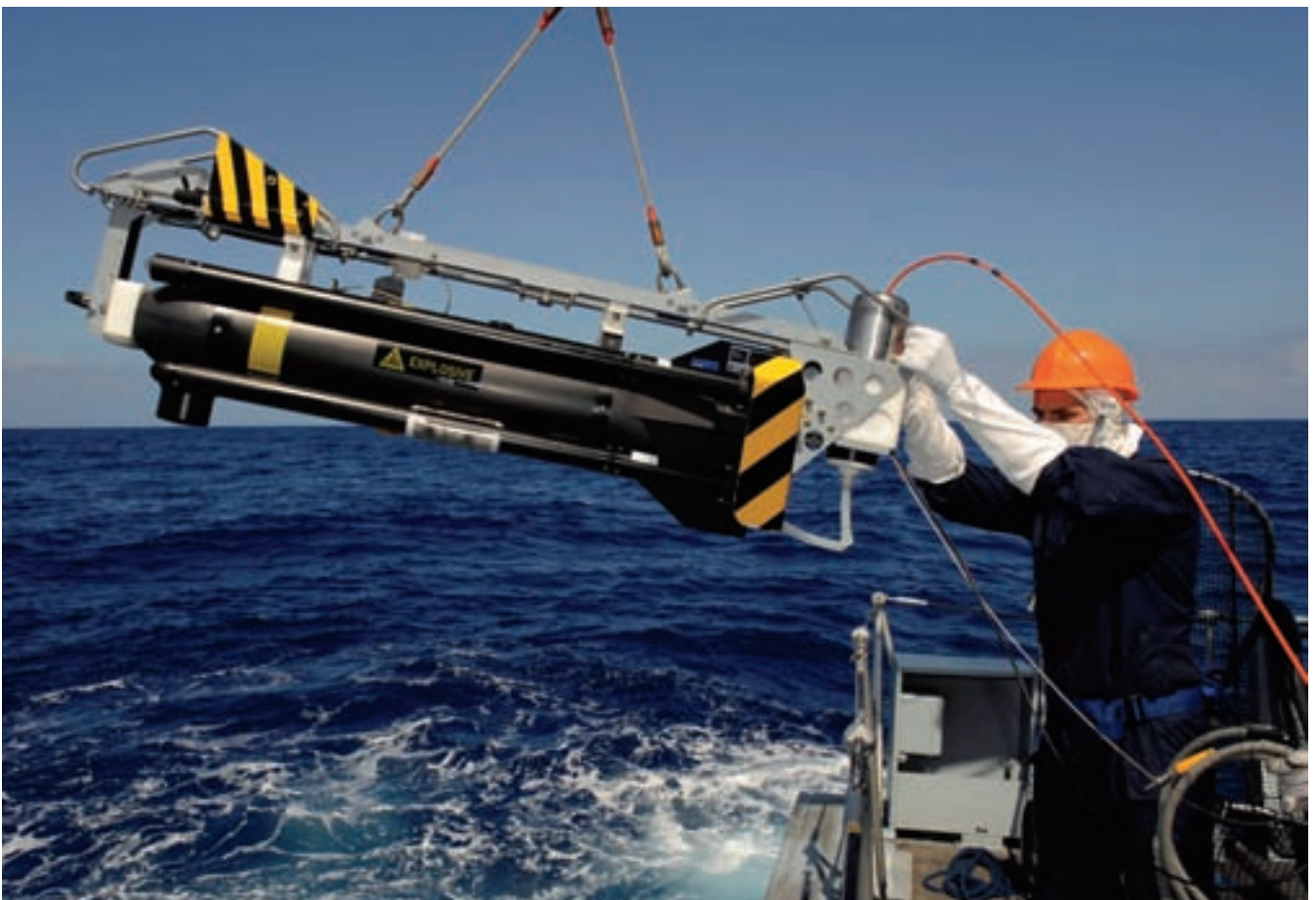
that both devices were almost certainly remnants of the Second World War: "Their detonation methods had corroded, but they could still have been set off accidentally, so it was correct to destroy them."

Sitting close offshore, the minehunters were a relatively exposed target for any Libyan government forces that attempted to disrupt their operations. For that reason, the vessels' main 30mm cannon were supplemented by multi-barrel 7.62mm miniguns, which, with a capability of firing 2,000 rounds per minute, can lay down a virtually solid curtain of bullets, especially in consort with general-purpose machine guns.

Those extra guns meant that, when they were not doing their 'day jobs' on the ship, the 38-strong crew had to take turns on the upper deck in full anti-flash gear, plus body armour and steel helmets – all this in temperatures that were approaching 100°F (39°C). Below decks, the minehunters'

The minehunters were a relatively exposed target for any Libyan government forces

The Royal Navy's Seafox underwater drone was used to destroy unexploded ordnance in the waters off the Libyan coast





Hunt-class minehunter HMS BROCKLESBY departs HMNB Clyde

darkened operations rooms were the hub of the search for underwater weaponry, with several crewmembers watching the sonar screens so as not to miss a potentially lethal mine.

ALWAYS ON ALERT

Libya was just one arena in which the Royal Navy was able to demonstrate its minehunting expertise over the past year. For several years now, four minehunters have been based in Bahrain as part of the Navy's contribution towards supporting the UK's national interests in the Arabian Gulf, as well as training and engagement with other friendly navies in the region. Indeed, the Royal Saudi Navy has three Sandown-class minehunters of its own.

Smaller warships are often stationed semi-permanently in the region, rather than using up significant amounts of time and fuel shuttling back

and forth to the UK between deployments. For example, HMS PEMBROKE, another Sandown-class vessel, has remained on standby in the Gulf for four years. The ship's company is rotated periodically, with new crews being flown out to the region.

The shallow waters of the Gulf pose specific tactical challenges for sonar operators, very different to those encountered in northern Europe. The Gulf is a seaway particularly at risk from mines, with some 80 per cent of Europe's oil supplies passing through the Strait of Hormuz.

A further reflection of the degree of importance placed by the UK on the waterway comes from the fact that the Royal Fleet Auxiliary has up to a third of its fleet in the region to support the minehunters and other warships undertaking duties there.

The Gulf's shallow waters pose specific challenges for sonar operators, very different to those in northern Europe

The Navy maintains a force of 16 minehunters, split equally between Hunt- and Sandown-class ships. The Hunts, at 750 tonnes, are the largest warships ever constructed from glass-reinforced plastic, and are based at Portsmouth, while the Sandowns are stationed in Faslane, on the west coast of Scotland, where they ensure safe passage for the Service's Vanguard-class ballistic missile submarines and the nuclear-powered hunter-killer boats, through the Firth of Clyde to open waters.

The vessels also contribute to Standing NATO Response Force Mine Countermeasures groups 1 and 2. The first of these groups normally consists of seven ships (including a dedicated command ship) that conduct an intensive programme of operations throughout Europe, from the Baltic to the Irish Sea. It has also been deployed to Iceland and North American waters. The second group, comprising eight minehunters and minehunters, plus a support ship, is permanently available for duties that may arise in the Mediterranean.

The detritus of the Second World War continues to provide steady 'trade' for the Royal Navy's minehunters. The amount of ordnance surrounding the UK – left by both sides – during that conflict means that mines are still discovered on a regular basis and have to be safely disposed of.

Meanwhile, the MCM ships remain ready to respond to any further unforeseen occurrences, such as the summer spent off Libya. ●



Rebalancing manpower

Reducing the size of the Royal Navy by 5,000 personnel has to be carried out in a careful, compassionate and coherent way. *Simon Michell* looks at why it is necessary and how this painful process is being managed

(Above) The crew of HMS MANCHESTER marches through the streets of Liverpool

In October 2010, the UK Government published its Strategic Defence and Security Review (SDSR), entitled *Securing Britain in an Age of Uncertainty*. As well as a raft of equipment withdrawals – tanks, aircraft, ships and artillery – the review also tasked the armed forces with achieving a reduction of 17,000 personnel by 2015. The cuts are to be shared by all three services, with the British Army accounting for 7,000, the Royal Air Force 5,000 and the Royal Navy a further 5,000.

The UK Government has been open about the need to downsize. The armed forces minister, Nick Harvey, even went on record as saying that: “We would, of course, prefer not to make any of our personnel redundant, but unfortunately, we inherited a huge deficit in the defence budget from our predecessors in government.”

Therein lies the rub. The extent to which the economic crisis has depleted national financial reserves, and the alarming magnitude of the budget deficit, has left the planners with very few options but to reduce the size of the UK’s military forces.



The ship's company of HMS EDINBURGH are thanked for their efforts by Rear Admiral David Steel, Chief of Staff (Personnel) and Naval Secretary, shortly before being reunited with their families and friends

It may come as little comfort, but the UK is not alone in this regard. Europe, as a whole, is engaged in similar deficit-reduction programmes, while President Barack Obama has outlined \$400 billion in cuts to be made in the US Department of Defense budget between 2013 and 2023.

According to the Second Sea Lord, Vice Admiral Charles Montgomery, the 5,000 personnel who will leave the Service will include approximately 3,500 frontline personnel, largely as a result of the ship-decommissioning programme. The remaining 1,500 will be lost as part of a reduction in non-frontline staff. In order to manage this process as compassionately as possible, a Compulsory Redundancy Programme has been launched.

On 4 April 2011, the Royal Navy announced details of its long-anticipated programme to its sailors and marines. The first tranche of redundancies, announced on 30 September 2011, resulted in the loss of some 1,020 personnel across a range of the Naval Service's specialisations and branches. It included both ratings and officers up to the rank of captain. Some 670 of the 1,020 applied for redundancy, while a further 350 non-applicants were made compulsorily redundant.

However, although the first tranche of redundancies has proceeded according to the initial plan, the rest of the process has had to be postponed. Admiral Montgomery released a statement in August 2011 explaining that the

announcement of the second tranche of the redundancy process, which was also to be published on 30 September, had been delayed for all three armed services. Moreover, this delay would almost certainly have a knock-on effect for all subsequent tranches. The reason for the postponement is to allow planners to take a closer look at the services' future skills requirements, to ensure that the cuts do not adversely affect these numbers.

This announcement highlights the difficulties that such a large-scale force reorganisation introduces. It may seem counterintuitive, but at the same time as bringing down the overall number of sailors and marines, the Navy also has to ensure that it continues to recruit in order to maintain adequate coverage across all the branches, trades and specialist skills. There have regularly been areas in which attracting both the sufficient number and calibre of recruits has proven to be a challenge. Submariners, engineers and pilots, in particular, have all been difficult to recruit.

GETTING THE RIGHT PEOPLE FOR THE JOB

Although recent innovations, such as mobile-phone recruiting apps, have redressed the balance – to the extent that at the end of 2010, the Navy had achieved what it refers to as 'manning balance' – the pressure to attract the right sort of people to man the Navy's extremely technologically advanced ships, aircraft and weapon systems remains.

Added to this regular day-to-day challenge is the peculiarity that the Navy has to train and field the seed corn of a fast-jet carrier community to man the new Queen Elizabeth-class carriers that are due to enter service at the end of the decade. As the Royal

The Navy has put in place support structures, while naval charities have stepped in to help

Navy no longer possesses any fast-jet carriers, this is going to require the cooperation of two of the UK's strongest allies, France and the United States.

Being the only remaining nations that can routinely operate fast jets off carriers, they have agreed to embed pilots, engineers, controllers – in fact, the full array of skills that are required for this complex task – within their own ranks. The practice of servicemen and women serving with other nations' forces is not new, but this is definitely taking the concept a considerable step further.

When the redundancy process is completed in 2015, the Royal Navy will have a full complement of 29,000 men and women. The Naval Service

recognises that this is going to be difficult, but is confident that the rebalancing can be achieved.

The Royal Navy has put in place support structures and communication channels to assist with the process, while naval charities have also stepped ably into the breach. The Royal Naval Association, for example, is keen to promote its 400 branches as a ready-made network that can be utilised to help with the resettlement process.

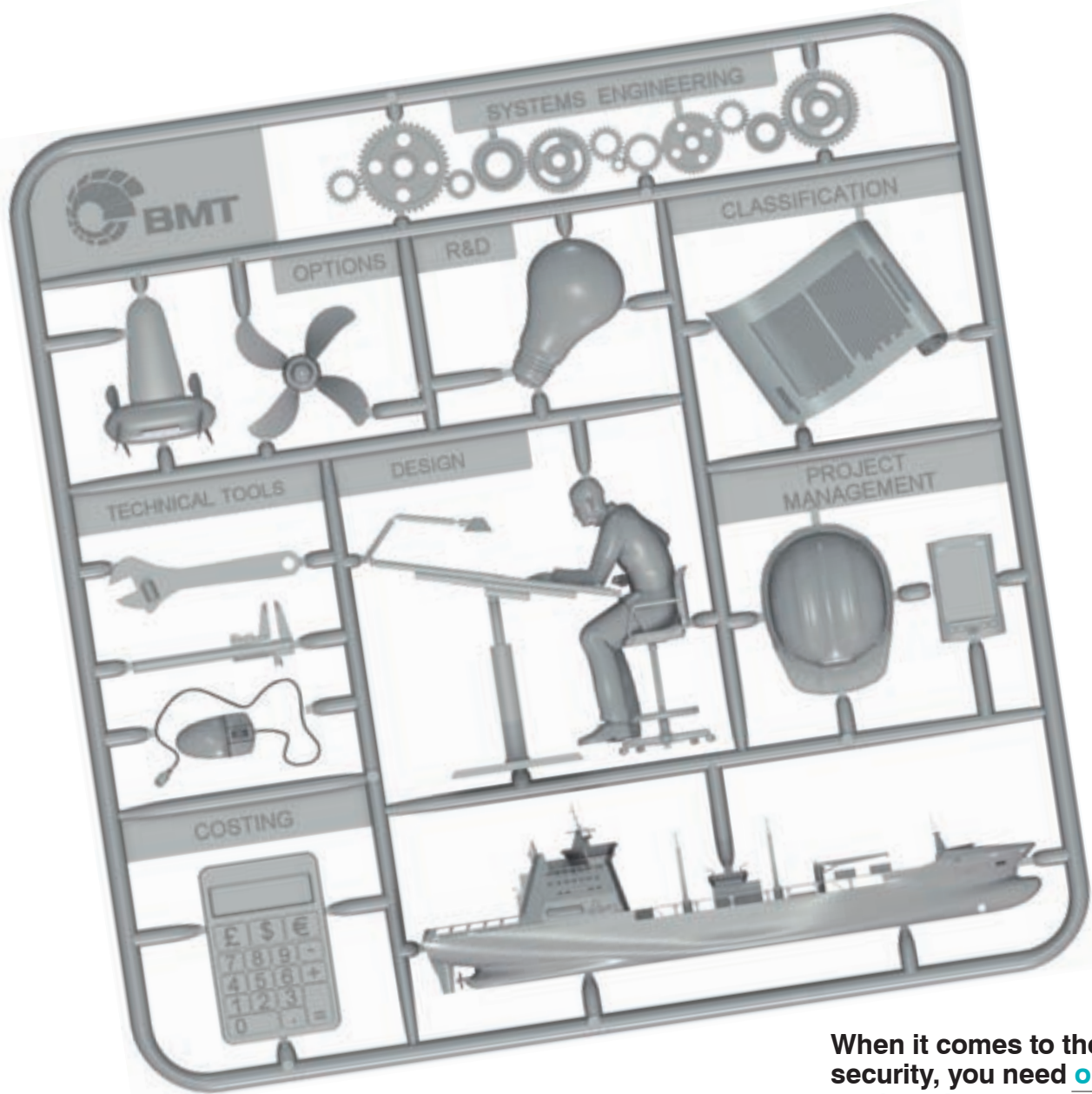
There is no easy way of achieving these personnel reductions, and, inevitably, some people will be affected more than others. However, the Second Sea Lord has stressed: "We must treat all of these people with the respect and understanding they deserve, and do all we can to ensure their transition to the civilian workplace." ●

The Royal Fleet Auxiliary



RFA LARGS BAY loads maize and other food supplies destined for Haiti in support of the World Food Programme

For the Royal Fleet Auxiliary (RFA), the Strategic Defence and Security Review (SDSR) means a reduction of 400 personnel, leaving the service a variety of options. This figure does not directly reflect the loss of crews from the three ships that have been listed for decommissioning under the Review – BAYLEAF, FORT GEORGE and LARGS BAY. It is more an evaluation of what the RFA will need in terms of crews to ensure its ships can be manned at the readiness rates required by the SDSR. On top of these staff reductions, the RFA has also been tasked with implementing an efficiency drive that will see a further 10 per cent reduction in numbers.



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A “convoy” of charities

As the so-called ‘Age of Austerity’ exerts a firm grip on society, charitable donations are set to become an even more valuable resource for all those who have served in the United Kingdom’s Naval Service. *Ian Gould* talks to Robert Robson, chief executive of the Royal Navy & Royal Marines Charity

(Above) “Life Outside Work” day enables clubs and associations on HMNB Clyde to show both service and civilian personnel what is on offer to help them keep fit and make the most of their leisure time

Former sailors and marines find a new home in a dedicated dementia facility in Surrey. Living in desperate straits in Zimbabwe, the octogenarian widow of a Royal Navy Volunteer Reserve officer receives financial assistance. Royal Marines from 45 Commando hold an event to reassure families before the soldiers deploy to Afghanistan. A new climbing wall is completed at HMS SULTAN. The Royal Navy sailing team takes part in the 2011 Fastnet Race.

All of these scenarios have been made possible by financial support emanating from myriad organisations, but a common theme is the support

they have received from the Royal Navy & Royal Marines Charity (RNRMC).

The RNRMC and its federation of subsidiary charities include six ‘benevolent charities’ that support beneficiaries throughout their lives, and six ‘quality-of-life’ charities, focused on providing funds for those who wear the uniform today.

The RNRMC’s main area of focus is to support Britain’s entire naval family, by helping those in need or suffering hardship, assisting with children’s education, and boosting the morale and well-being of serving personnel. The grant-making charity filters donated financial gifts into the charities it supports.



PLYMOUTH
CYCLE SCENE

ROYAL NAVY

ROYAL NAVY &
ROYAL MARINES
CHARITY

ROYAL NAVY &
ROYAL MARINES
CHARITY

ROYAL NAVY &
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RNRM

RNRM

ROYAL NAVY &
ROYAL MARINES
CHARITY



HMS VIGILANT
CYCLING 600 MILES
from Devonport to Faslane

The RNRMC supports the naval family by giving grants to the charities that provide care to those in need, throughout their lives

These donations and gifts fall into five core areas: benevolence, amenities, dependents, sports, and prizes. The RNRMC, therefore, works closely with the independent charities, whose mission is to provide direct support to those individuals in need. "We use the 'brands' of the RNRMC and our constituent charities to attract more funds, thus enabling us to give more money to more beneficiaries," says chief executive Robert Robson, who served for six years as a General List Seaman Officer, before embarking on a 20-year banking career.

"The Service has many historic tribe- or rank-oriented funds," notes Robson, explaining that the establishment of the RNRMC has "finally enabled the sector to overcome a historic reluctance to come together". The sector's "splintered nature" failed to provide a single message that appealed to everyone wishing to support the Navy and Marines, according to Robson. It became increasingly clear that the old structure of naval charity had no future in "a world of increased regulation, diminishing resources and increased risk".

PROVIDING A NEW STRUCTURE

The compelling argument for change was not so much an absence of support for beneficiaries, as the potential financial, procedural and structural synergies made available through combining expertise and resources. The RNRMC, therefore, put in place a new structure and identity, in order to focus the sector's strengths through alliances, cooperation and a united approach.

It is a federation – Robson describes it as a "convoy" – within which charities enjoy varying levels of autonomy, from a centralised model to an arms-length relationship with separate management. One recent example of change has been the RNRMC's appointment to distribute financial support from Greenwich Hospital within the military charity sector.

The RNRMC's focus means it is not constrained by rank, specialisation or tribe. Accordingly, its beneficiaries include everyone serving, or who has served in: the Royal Navy, Royal Marines, Queen Alexandra's Royal Naval Nursing Service (QARNNS), the Maritime Reserve, the former Women's Royal Naval Service, and the Royal Fleet Auxiliary.

The RNRMC supports the naval family by giving grants to the charities that provide care to those in need, throughout their lives. Grants to individuals are subsequently made through, among others: the Royal Navy Officers' Charity, the Royal Marines Charitable Trust Fund, QARNNS Trust, the Royal Naval Benevolent Trust, the Royal Navy and Royal Marines Children's Fund, and the Women's Royal Naval Service Benevolent Trust.

It also exists to help serving personnel and their families, providing funds for a huge variety of projects and opportunities, which would be

unaffordable without the help of those in the Naval Service, former members and the general public.

For example, in the event of death in service, immediate relief is provided via a £12,000 grant to dependants within 48 hours. The RNRMC supports serving personnel in various ways: twice a year, all operational units receive a grant for the Commanding Officer's discretionary use for their welfare. Substantial grants are awarded for equipment, facilities, family days and other team-building events. The RNRMC's sports charity funds around 40 sporting associations and enables Olympic and Paralympic athletes to receive the sort of world-class coaching that may well result in winning medals at London 2012. The RNRMC also recognises professional excellence and achievement through the 'prizes and awards' funds made available to Commanding Officers.

There are an estimated 750,000 potential beneficiaries of naval charity in the UK, a number that will change over the next 20 years as those who served their country in the Second World War and though national service pass away. However, Robson points out that: "Increasing age and associated health- and dementia-related problems, less governmental support and a greater emphasis on the emerging concept of the 'big society', will all contribute to an increased requirement for charitable services and funds in the future."

FUTURE CHALLENGES

Combining higher demand with fewer primary supporters, as the Naval Service becomes smaller, is one of several challenges facing the RNRMC, which is positioned to support those who assist the injured, damaged or affected in today's conflicts long after their immediate needs have been met, says Robson.

In 2007, the RNRMC said that success would be measured against the progress that the organisation made against three factors, which have been retained in the current five-year plan to:

- increase the money available for beneficiaries;
- increase the money available for benevolence; and
- complete the creation of a single focus for naval charity.

Having amalgamated the majority of the in-service charities and funds, and being well on the way to achieving its single focus, the RNRMC has now been recognised as the Navy Board's preferred fundraising charity. "We are proud of this endorsement and recognise the value that flows from the Service's leadership, active backing and support," concludes the RNRMC chief executive. ●



Cyclists from HMS VIGILANT made a gruelling 600-mile trip from Devonport to Faslane to raise funds for and increase awareness of the RNRMC

Redesigning Navy warfare training

Giles Ebbutt reveals how the revolutionary Maritime Composite Training System (MCTS) is helping to create realistic and demanding training scenarios for the personnel preparing to man the Royal Navy's new ships

The Royal Navy's Operational Sea Training (OST) is internationally renowned for the demands it places on ships and their companies, as well as its effectiveness in bringing crews to a high state of readiness. For the Royal Navy, however, it is actually the culmination of a meticulous training process. This method is being revolutionised for the Navy's warfare personnel who man the ships' Operations (Ops) rooms by the introduction of the Maritime Composite Training System (MCTS), which was formally declared ready for use in August 2011.

As new equipment and platforms have been introduced into the Royal Navy, notably the Type 45 Daring-class destroyers, the existing training facilities were becoming obsolete, particularly the simulator suites in the Cook complex at the now-decommissioned HMS DRYAD, which were modelled on ships and equipment that are rapidly going out of service. MCTS has, therefore, been developed in response to the need to modernise Royal Navy warfare training and reflect equipment now in service with the fleet.

MCTS – A TOTAL TRAINING SOLUTION

Developed by BAE Systems Mission Systems, MCTS is "the most radical change in maritime training for over 40 years", according to Jeremy Tuck, the BAE Systems Team Leader. "It is not just about providing some training equipment. It is a total training solution and a complete redesign of how the Royal Navy delivers its warfare training."

MCTS provides individual career training across all warfare disciplines and continuation training, both for individuals and for ship warfare teams, with training at the appropriate levels and a heavy emphasis on computer-aided instruction, computer-based training (CBT) and simulation.



To design the system, some 4,000 training objectives were analysed and distilled into 60 training statements, which led to the design of 85 different courses. From this and 300 other identified requirements, 30,000 requirements were established, leading to the development of facilities, equipment and training packages.

Individual training starts with basic theories and principles, moving through basic practices and the development of generic skills, to teaching and developing equipment-specific knowledge and expertise, before ending with platform-specific training. This enables individuals to receive training more closely aligned to the appointments that they will fulfil when joining the fleet.

MCTS facilities, which are in the newly constructed Anson Building at HMS COLLINGWOOD near Portsmouth and the Discovery Building at HM Naval Base (HMNB) Devonport, include Electronic Classroom Trainers (ECTs), Warfare Team Trainers (WTT) and debriefing facilities. There are eight ECTs at COLLINGWOOD and one at Devonport. The ECT complex is physically flexible enough to allow for varying class sizes, with a COTS (commercial



The Maritime Composite Training System (MCTS) represents the most radical transformation in naval training in 40 years

MCTS enables far more demanding training that cannot easily be replicated in live conditions

off-the-shelf) computer architecture and the ability to create a classified computer domain.

The ECT provides facilities for CBT with some specific equipment training, including Tactical Data Link management and different in-service command systems. It also includes the Classroom-Based Skills Trainer (CBST), which supports training in generic tactical and voice procedures. The CBST software is an amended version of a similar package developed for the Royal Canadian Navy.

The WTTs provide flexible facilities for both individual skills and continuation training via three systems at COLLINGWOOD and two at Devonport. These can provide a reconfigurable simulated physical Ops room environment for specific training covering all the Navy's current major ships, and with the flexibility to include future ships, such as the Type 26 Global Combat Ship, as well.

Each WTT has a reconfigurable architecture with 42 operator consoles and four user desks. These consoles, known colloquially as 'Martians', have three display screens with adjustable mountings. Other controls, apart from keyboard and joystick, are shown as photo-realistic panels on touch screens

that can be repositioned or folded away, according to the type of console being emulated, allowing any workstation to be reconfigured rapidly to represent not only different equipment types, but also different user roles. The consoles can be physically arranged in the configuration required to represent the Ops room of a particular platform.

The WTTs are supported by the Common Synthetic Environment Control (CSEC), which generates scenarios and provides data preparation and control functions. A number of different threats can be created in a range of environmental and geographical environments. Commander Bill Evans, Commanding Officer of the Warfare Training Group (WTG) at the Maritime Warfare School at HMS COLLINGWOOD, observes that: "MCTS enables me to conduct far more demanding training and pose difficult questions for trainees, which cannot easily be replicated in live conditions."

Exercises are supported by a number of experienced role-players provided by VT Flagship Training. These can represent various other platforms that might be involved in an operation, such as helicopters, submarines or maritime patrol aircraft



(Above) The crew of HMS DIAMOND sharpen their skills on the BAE Systems MCTS

(Right) The MCTS facilities are in a newly constructed Anson building at HMS COLLINGWOOD



when full team-training is taking place, or can act as other members of an Ops room team when individual or sub-team training is in progress. Many of them are retired naval personnel. In the past, these role-players would have been drawn from the rest of the Navy, to the detriment of their parent ships and with mixed effectiveness.

Evans notes that “role-players reduce the demands on a shrinking fleet for augmentee manpower, provide a well-practised service, allow me to concentrate on the trainees, who are my principal output, and give me greater programming flexibility. The role-players and the reconfigurable WTTs also enable me to replicate almost any Task Force configuration, which also opens up the possibility of mission rehearsal prior to deployment.”

RESOLVING RESOURCE ISSUES

As well as the instructional facilities, MCTS provides a complete warfare training and resources-management capability. Career and continuation training requires more than 40,000 50-minute periods per year, plus 66 platform weeks for the fleet. To solve the resource allocation equation, involving rooms and systems, role-players and instructors, BAE Systems had to develop its

own timetabling tool, called the Courses and Resources Rationalisation Tool (CARRaT).

The Devonport facility is particularly used by ships undertaking operational sea training to get up to scratch before embarking on the live serials at sea. It enables Ops room teams to revise their entire range of skills and conduct their own training, putting themselves under pressure and ironing out problems before they come under the OST microscope. It also enables OST staff to conduct much more intensive, and targeted, training and testing of the teams than is possible in the live training environment, where the level, intensity and realism of threat is limited by resources. According to Evans, “the Daring class, with Samson radar, is so good it’s hard to stretch them. With MCTS we can really make them sweat.”

The two facilities at HMS COLLINGWOOD and Devonport are linked by the high-speed Joint Multinational Interoperability Assurance Network (JMNIAN), provided by the Ministry of Defence’s Equipment and Support (DE&S) organisation, which enables those using the WTT in the two locations to work together. Future plans include linking ships alongside – and, eventually, at sea – into the system.

There is also the possibility of training with coalition partner navies, as has already been achieved with the US Navy. “We want to play with the French and Germans, as well as the US,” says Evans, “but there are some technical security issues to be worked through first.”

MCTS has had a warm reception from the instructors of the WTG. “I’ve been very impressed,” says Evans, “and more importantly, I haven’t had a single concern from my team.” Commodore Tim Lowe, who commands the MWS, believes: “It is a revolution in the way we conduct individual and collective naval warfare training, and the start of an exciting journey in how we can move forward to conduct mission rehearsal and beyond.” ●

MCTS is a revolution in the way the Royal Navy conducts its individual and collective training



Technology comes to life

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Learning to fight together

The Joint Warrior naval exercise has been occurring so often and for so long that the locals have modified the lambing season so that sheep are not born amid low-flying aircraft and noisy gunfire. *Christina Mackenzie* speaks to Captain Phillip Titterton, Director of Joint Tactical Exercise Planning Staff

Joint Warrior is a twice-yearly exercise, which takes place every spring and autumn and began after the Second World War, when it was decided that the UK Air Command and Navy had to train alongside each other to enhance the way they fought together. For the autumn 2011 version (11-2), the British Army provided staff from 16 Air Assault Brigade for the two-week exercise, which ended on 17 October.

Generally, between 10 and 20 nations from NATO, the European Union and, occasionally, further afield take part in Joint Warrior. NATO also participates as a separate entity, with ships it has been allocated by the member states. In October, there were 25 ships overall, including Royal Fleet Auxiliary (RFA) ARGUS, which was required to provide deck room for helicopter landing exercises.

Captain Phillip Titterton, Director of Joint Tactical Exercise Planning Staff (JTEPS), says ARGUS's key roles are as a hospital and flying training ship, but, for this exercise, helicopter landing spots were needed. The RFA was unable to provide a replenishment tanker because there are only six, with four being deployed in the Gulf, in the Falklands, in the Caribbean and in Plymouth, while the other two were preparing to relieve the ships on these tasks. However, a tanker was made available from the US Navy.

As Captain Titterton explains: "Due to our navies being completely interoperable, it is very easy for a

In 2011, recent experience gleaned from both Libya and Afghanistan was fed into the exercise planning process

US tanker to come over and provide the necessary logistical support for all ships taking part in the exercise, and all of the ships in the exercise take their logistics from that ship." The United States invariably supplies at least one ship to the exercise, and because of this close US involvement, there is a US officer on the Planning Staff.

Guided-missile destroyer USS *Forrest Sherman*, guided-missile frigate USS *Samuel B Roberts* and fleet-replenishment oiler USNS *Big Horn* – together known as Destroyer Squadron 24 – took part in the April 2011 (11-1) exercise. Captain Aaron 'Jake' Jacobs USN, commander of Destroyer Squadron 24 says that: "Joint Warrior is always a challenging exercise. It prepares not only the US Navy, but our partnering nations, for real-world operations."

To date, there have never been fewer than two British frigates taking part in the exercises, but rarely more. "As ships are becoming busier, it can be difficult for fleet HQ to allocate ships to me, but as Joint Warrior provides such valuable training opportunities, fleet is always keen for UK vessels to join in," says Captain Titterton. The 11-2 exercise included the amphibious ship HMS BULWARK, in her role as the nation's flagship.

JTEPS is responsible for designing the exercises. "We get our objectives from headquarters, which has received training requirements from all three Services, and we knit together an exercise," explains Captain Titterton. "Every country tells me what they want and I try and fit this in as well. I haven't had an objective yet that I couldn't meet in one way or another."

LEARNING FROM RECENT LESSONS

The exercise also represents an opportunity to modify training and tactics in light of recent lessons learned, so in 2011, for example, it was the experience gleaned from the conflicts in both Libya and Afghanistan that fed into the exercise planning. "Naval gunfire was used in Libya, and the procedures for using that weapons system were modified for operational reasons. We are already reflecting these procedures within the Joint Warrior training package for the ships that are about to deploy," Captain Titterton confirms.

Fortunately, in terms of scale, the Sea of Hebrides – where a large part of the exercise takes place – is representative of many regions in the world where tensions exist. "So we use this space to train in mine warfare," he explains. In 11-1, the disposal of ordnance did not even have to be simulated after the mine countermeasures force, comprising minehunters from the UK, the Netherlands and Norway, encountered two pieces of unexploded ordnance from the Second World War on the seabed around Loch Ewe: one was a US Mark 12 mine, the other, a German mine. They were dealt with in the framework of the exercise.

Joint Warrior encompasses all of the North Sea, the entire west coast of Scotland, and Kielder Forest, Cumbria – which is the largest man-made woodland in Europe and surrounds the Kielder Water reservoir. Apart from the lambing season being modified to take exercises into account, the Planning Staff also liaise with environmentalists, air traffic controllers and fishermen. The latter have to be closely involved so that they do not find themselves caught in the middle of a sea battle, although no actual torpedoes are ever used, even in their exercise form.

Asymmetric warfare scenarios were played out in the past two exercises with civilian contractors employed to role-play, notably with media teams, boats, civilian aircraft and Hawk fast jets – generally flown by ex-Royal Air Force pilots.

(Opposite) French Marines deploy from HMS BULWARK during a Joint Warrior exercise, taking British ration packs with them



Joint Warrior is unrivalled in using multinational assets in an efficient, cheap and highly flexible exercise

(Top) As Exercise Joint Warrior draws to a close, French Marines take last-minute souvenir shots of HMS BULWARK

(Above) Joint Warrior enables a raft of skills to be practised. Here, lorries are placed ashore by landing craft

The exercises are also an opportunity for companies to test equipment “providing it doesn’t hamper my training objectives,” stresses Captain Titterton. It’s a win-win situation; the companies do not have to pay to get their equipment tested and the Joint Warrior participants receive exposure to the latest technology. During Joint Warrior 11-2, GPS jamming was tested. “This required a huge amount of up-front legal work because of air traffic control issues,” explains Captain Titterton.

CONSIDERATION FOR THE COMMUNITY

It is impossible to jam a GPS signal in just a limited geographical area, so when the signal is jammed over a significant part of north-west Scotland, it is likely that a number of hill walkers and fishermen could find themselves unable to use the satellite

navigation devices on which they rely. The staff who plan Joint Warrior go to significant lengths to notify the local community of this and other training that may impact upon them, welcoming engagement with the community so that conflicts are avoided, and Captain Titterton is very grateful for the support they have shown.

Over the 60 years that Joint Warrior has been taking place, it has proved itself unrivalled in collecting multinational assets and using them in an efficient, cheap and highly flexible exercise, so that it can adapt to lessons learned from ongoing conflicts. As Commander Luis E Sanchez Jr, USS *Forrest Sherman's* captain, says: “Joint Warrior provides us with a unique opportunity to work alongside other NATO units in a highly complex warfare environment that we don’t get anywhere else.” ●

Ships' HVAC systems – energy reduction

► The energy needs of modern warships are significant and one of the main consumers is the ship's air conditioning and ventilation system. Current demand – including design for extreme ambient conditions, rising fresh air requirements and internal heat loads, and improved crew comfort – poses further challenges to HVAC systems for warships.

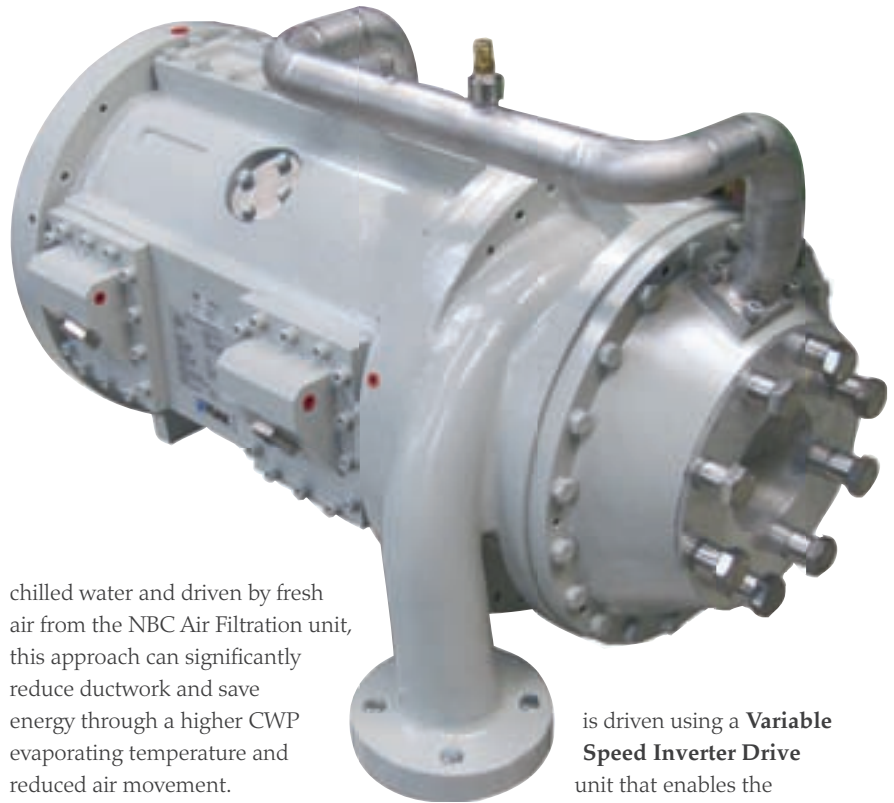
To date, naval vessels' HVAC design has used a simple, constant-flow chilled water and air volume system, sized on worst-case parameters: an approach capable of delivering very limited energy savings at part load. This is due to conventional Chilled Water Plant designs using fixed RMP motors, therefore only delivering a small energy saving when the plant capacity is reduced.

Variable Air Volume systems, widespread in the commercial ship sector, enable the air flow to suit the actual

With more than 125 years' experience in the HVAC field, Johnson Controls has the knowledge and technology to meet the requirements of modern navy environments

demand rather than constantly meeting a theoretical design condition, significantly reducing energy consumption. By applying suitable controls to ensure naval vessel HVAC system performance requirements – such as CO₂ levels, system over pressure in NBC closed-ship mode, along with temperature and occupancy demands – are met, this approach can offer significant energy reductions even if only used in certain independent areas of the vessel.

The use of **Active Chilled Beams** is another proven technology from land applications that is suitable for naval environments. Using higher-temperature



chilled water and driven by fresh air from the NBC Air Filtration unit, this approach can significantly reduce ductwork and save energy through a higher CWP evaporating temperature and reduced air movement.

The **Chilled Water Loop** is another aspect of the system that can deliver energy savings by switching from fixed to variable volume flow. Using two-way valves, rather than the usual three-way, decreases demand for chilled water at reduced loads, and this can be sensed to reduce pump flow. At 80 percent flow, the pump only consumes close to half of the full flow power.

With more than 125 years' experience in the HVAC field and with significant experience in energy-saving solutions in both land and commercial ship applications, Johnson Controls has the knowledge and technology necessary to meet the energy-saving requirements of modern navy environments.

A prime example is the Johnson Controls oil-free compressor, which has been in service for more than 10 years. The use of **Active Magnetic Bearings** to support the compressor/motor shaft allows the chilled water plant to run completely oil-free, avoiding all the typical problems this usually brings about. The motor

is driven using a **Variable Speed Inverter Drive** unit that enables the

compressor impeller to run at optimum speed to maximise both efficiency and performance.

The ability to operate oil-free has numerous advantages: in addition to a less complex system design, reduced maintenance and increased system reliability (up to 60,000 hours), there is also no necessity to maintain an artificial condensing pressure to drive oil around the system.

The system can, thus, operate at the 'real' seawater condition and, at low load, this can result in savings of up to 80 percent, compared to conventional systems.

For more information, please contact: carl.bookless@jci.com

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Lean and mean: training the Royal Marines

Giles Ebbutt reviews the constantly evolving process of Royal Marine training. The teaching concepts may have changed over the years, but the underlying rigour remains as robust as it was during the Second World War

Field Marshall Sir William Slim once observed that a fighting force is like an inverted pyramid, with a broad brass base at the top and the whole structure balanced on a single fine point – the will, skill and discipline of the individual. In the Royal Marines, these qualities are instilled from the moment that an individual joins, and it is the task of those who train them to ensure that this process is as comprehensive and successful as possible.

The Commando Training Centre Royal Marines (CTCRM) at Lympstone, situated on the banks of the River Exe estuary in Devon, has been described as “the crossroads of the Corps as, throughout their careers, marines will return at regular intervals, either to undertake further specialist or command training, or to serve on the staff. The effect of this is a constant renewal of standards, as well as the “reinvigoration of the Royal Marine mindset”, as the centre’s Commandant, Brigadier Ged Salzano MBE, remarks.

The training at CTCRM falls into three areas:

- Basic training for recruits and Young Officers (YOs): the Royal Marines are unique among the British Armed Forces in training officers and recruits alongside each other, albeit on separate, bespoke programmes;
- Command training for all non-commissioned officers: ranging from the Junior Command Course, which trains Marines to become Corporals, through to the Regimental Sergeant Majors’ Course;
- Specialist training: which includes training for infantry-support weapons, command information systems, reconnaissance and intelligence, physical training, and the armoured support company, equipped with the Viking all-terrain vehicle (protected).

CTCRM trains 400-700 recruits and 30-40 YOs per annum, depending on the requirement, but with command and specialist training it will have around 1,200 students training at any time across the complete range of courses. This includes pre-deployment training for naval personnel about to deploy on land, such as those supporting operations in Afghanistan, which at present amounts to around 900 per annum.

Today, with fewer people, fewer resources, increasingly varied military tasks and an expanding range of equipment, it is impossible to provide in-depth training for all eventualities. Training must, therefore, be generic enough to prepare the Marine or YO for whatever they may encounter, with an emphasis on core infantry skills while developing the flexibility of intellect to adapt easily to different conditions, environments and equipment.

TOUGH TRAINING

Recruit training lasts 32 weeks, teaching weapon and tactical skills, and developing physical fitness in increasingly arduous conditions with lengthy periods spent deployed on exercise. The course culminates in the six-week Commando Course and the Commando Tests. These – the nine-mile Speed March, the Tarzan Assault Course, the Endurance Course and the 30-mile march on Dartmoor – must all be completed within a time limit, and they have changed very little since they were originally devised for commando training in the Second World War.

YO training is 15 months long, with the Commando Tests coming at the halfway point. YOs must complete the same tests as recruits, but with tougher time limits. Subsequent elements of the course are designed to develop them as junior leaders and so include increased tactical training.

Training must be generic enough to prepare the individual for whatever they may encounter



(Opposite) Royal Marine Commando Young Officers are put through some of the most gruelling training available, at Devon’s Woodbury Common, near Lympstone

(Left) A Royal Marines Commando instructs members of HMS BULWARK’s crew in how to rig a capsized rigid inflatable boat



A passing out parade of 103 Troop Kings Squad held at the Commando Training Centre Royal Marines, Lympstone, Devon

“Basic training is our most important primary output and is about turning a civilian into a Royal Marine,” says Director of Training, Colonel Toby Middleton. Both he and the Commandant observe that changes in society mean that the today’s recruit enters the service with different values than those of 20 years ago. “There is less understanding of collective responsibility,” notes Salzano, “but this is a more highly educated and technologically aware generation.” Some 40 per cent of recruits are educationally qualified to be officers, with a significant number of graduates.

TEACH, COACH, MENTOR

There have been subtle adjustments to the training regime to take this into account, with a training ethos of ‘teach, coach, mentor’ adopted. “You don’t get the best out of people by creating an atmosphere of fear, but our training standards have not been lowered and are as robust as ever. We still have to make sure our people are familiar with demanding, challenging conditions, so that when they go from CTCRM straight to a commando unit on operations they are not found wanting. The tests haven’t changed; it’s how we get people to pass them that has,” explains Middleton.

The approach is reaping rewards in reducing the recruit training failure rate; pass rates are now close to a historically high level of 60 per cent. Contributing to this is CTCRM’s attention to rehabilitation. Those who are injured in training have the benefit of

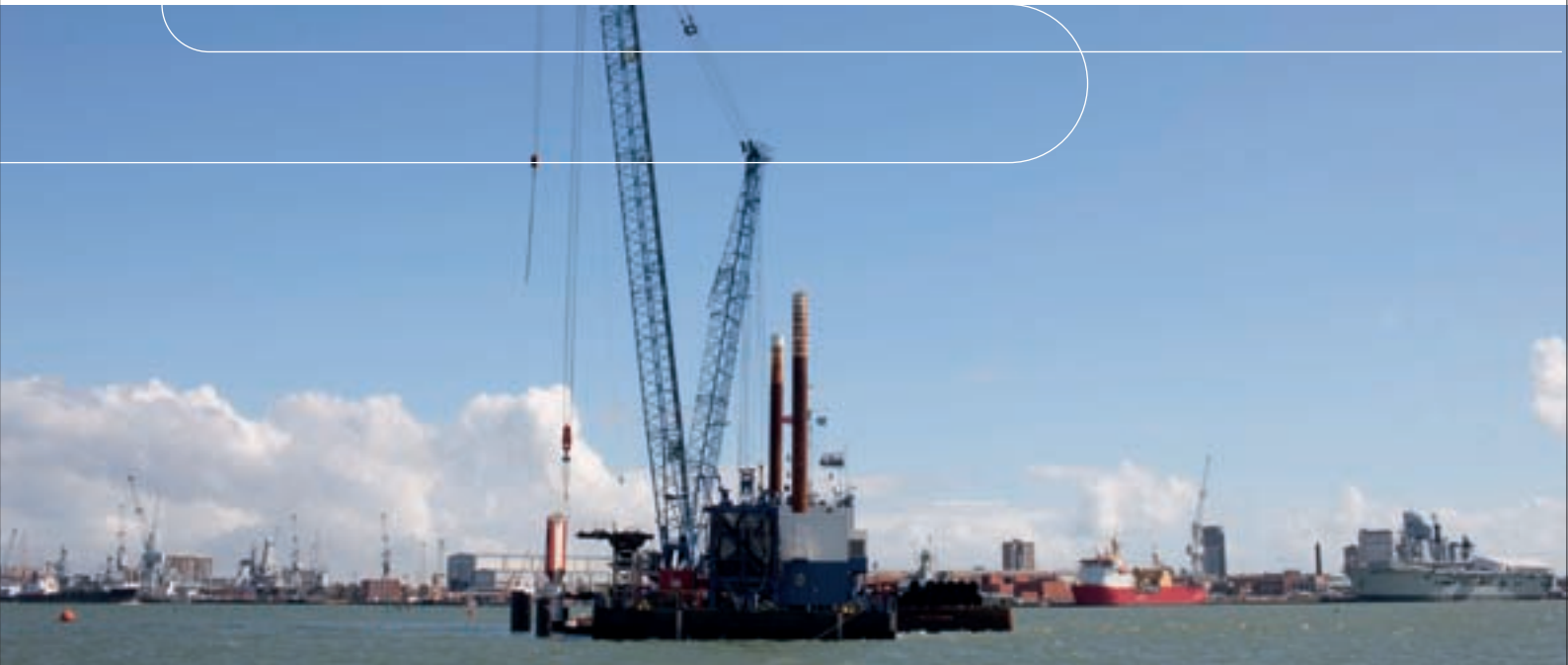
outstanding specialist medical rehabilitation facilities, while for those who are having difficulties with particular aspects of training the emphasis is on getting them up to the necessary standard, rather than rejecting them.

“We take absolutely no joy in failing people,” explains Middleton. Brigadier Salzano is unequivocal about the bottom line, however: “Ultimately, there’s a cold, hard reality to life; if you can’t hack it, we have to move you on.”

As CTCRM’s Commandant, Salzano oversees the vast majority of Royal Marine individual and career training, and can therefore ensure a common and effective approach across the board. “Our size is ideal, in that we can react quickly and flexibly when changes are required,” he observes. He uses as a recent operational experience as an example of the need for urban warfare training to be updated to take account of modern conditions and recently developed tactics. The result was the rapid advancement of modernised urban combat modules and their introduction across all training streams.

“CTCRM is a unique place” he says. “Because everyone returns here during their career, we are able to reinvigorate and reinforce our standards, and ensure that they are maintained at every level, and in every specialisation. The Centre is a reassuringly fixed point for Royal Marines of all ranks in an increasingly busy operational environment. The value of the ‘Lympstone Effect’ on the Corps as a whole cannot be overestimated.” ●

“Basic training is our most important primary output and is about turning a civilian into a Royal Marine”



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VolkerStevin Marine has just started on site constructing a specialist marine facility for loading ammunition at Portsmouth Harbour for the

Defence Infrastructure Organisation (DIO). Other recent projects include bridge pier collision protection in Dundee, construction of an LNG Jetty at Isle of Grain and construction of the New Tyne Crossing using immersed tunnel techniques.

VolkerStevin Marine provides design and construct services across the marine sector in the UK, whilst VolkerConstruction International extends these services outside the UK as well.

The Royal Marines Bands

Ian Gould speaks to Lieutenant Colonel Nick Grace, the Royal Marines Principal Director of Music, to discover why the men and women of the Royal Marines Bands play such an important role, be it by keeping morale high, engaging with partners and allies, or rescuing the wounded from the battlefield

In November 2011, members of the Band Commando Training Centre Royal Marines (CTCRM) received medals after returning from deployment in Afghanistan. Aside from being professional musicians, the men and women of the Royal Marines Band Service (RMBS) are also available for operational duties. These soldiers had spent six months serving on Operation HERRICK 14's (Afghanistan) Ambulance Response Troop (ART), alongside other Royal Navy, British Army and Royal Air Force personnel, as part of the Joint Force Medical Group (JFMG) at Camp Bastion, Helmand province. Commanded by Band Sergeant Matt Weites, the ART won the Ambulance Society Institute Military Award for 2011.

ORIGINS OF MARITIME MARTIAL MUSIC

Historically, British military bands – whether part of a ship's company, corps, division, regiment, command, squadron or other unit – had two roles, notes John Ambler in his 2010 Royal Marines (RM) history *Per Mare, Per Terram*: firstly, to entertain officers and secondly, to play martial music as a means to move bodies of men between places at a regular pace. Today, the dual role is to provide music and to provide operational support in theatre.

For the past 100 years or so, the responsibility for training and providing Royal Navy bands has rested with the RM. To standardise ships' bands performance, formal training was introduced and bands assumed specialised military roles when becoming part of a ship's communication or, later, gunnery-control systems.

Ambler says that musical entertainment remained the primary role of the five bands of the Chatham, Portsmouth and Plymouth divisions of the RM Light Infantry, the RM Artillery division at Eastney, and the RM Depot Deal Band. In the mid 20th century, they amalgamated with the RM Bands of the Royal Navy School of Music to form the RMBS and the RM School of Music. That musical role remains and will continue as it is a vital means of communication, according to RM Principal Director of Music, Lieutenant Colonel (Lt Col) Nick Grace: "There will come a time in the operational tempo of war when gaining the confidence of the local population can be best achieved through the medium of music."

Deployed in two groups, serving three months each under Director of Music Capt Richard Harvey as adjutant, 40 members of RM Band CTCRM worked in Afghanistan as ambulance drivers and radio operators, coordinating JFMG transport. "They saw a lot of the trauma of the war and transported more than 2,500 casualties," reports Grace.

While RM Band CTCRM was able to provide music, including a Last Night of the Proms-style concert, Lt Col Grace also despatched a 15-piece show band from RM Band Portsmouth (under Director of Music Major Tony Smallwood) to entertain 3 Commando Brigade and other coalition troops. Their support included contemporary popular music at the main base areas, including Forward Operating Bases, according to Grace.

The show band comprised a rhythm section, two singers, and a host of instruments – the first performance being to patients and staff at the hospital in Helmand province's Camp Bastion. "Music always makes you feel good and it raises morale. It was excellent for everyone here in the hospital," says hospital commanding officer Commander Carol Betteridge of Queen Alexandra's Royal Naval Nursing Service. The band also performed to an International Security Assistance Force camp in the Afghan capital, Kabul, and at the Task Force Helmand headquarters in Lashkar Gah.

PREPARING FOR AFGHANISTAN

Before deployment, band members spent months undergoing intensive training. The time in Helmand provides a classic illustration of the RMBS's dual role. Band members helped to transfer casualties to hospital, as well as driving and commanding armoured ambulances in combat logistic patrols providing food, ammunition and medical supplies. This is a role that the bands have perfected over the decades. Ambler points out that recent years have seen RM Band musicians involved in Cyprus, the Falklands campaign, the first Gulf war and Kosovo.

Demonstrating its community spirit, the RMBS created a new march to recognise the respect shown by a Wiltshire town to those who have died on active duty. *Wootton Bassett*, named after the town through which repatriation convoys travelled until recently, premiered in Portsmouth in June 2010.

Royal Marines Band members have perfected their dual role over the decades, serving in Cyprus, the Falklands, Kosovo and the first Gulf war



The Royal Marines
Band Service performing
in their annual concert at
the Royal Albert Hall



The band of Her Majesty's Royal Marines, Portsmouth, in informal mode, perform for British forces in Helmand province, southern Afghanistan

Although RMBS deployments have been a frequent part of band members' lives over the past few years, the military operations role has not completely usurped the music, according to Lt Col Grace. Looking forward in *Per Mare, Per Terram*, he explains that uncertainty remains as to the eventual consequences of the 2010 Strategic Defence and Security Review for the bands.

However, he is quick to point out that, during his service, the RMBS has continued to adjust, develop and maintain both the relevance and value of military music to the defence sector.

FACING THE MUSIC

While Lt Col Grace expects operational demands to reduce, the pressure to justify military music and the roles played by the RM Bands will remain. Grace suggests that future arguments should focus on the excellent musical support and output provided by the RMBS. He is adamant that the requirement for musical support remains as high as ever: "The future vision for the Royal Navy and RM is looking ahead to 2025, by which time the size and shape of the

Naval Service may be vastly different, with even fewer sailors and marines than the 30,000 to be achieved by 2015." On whether musical-support requirements offset the pressure to justify bands, he sees demand "as pressing as ever", with RM bands performing more than 1,200 times a year. The structure of the RM Bands based around the country has served requirements extremely well.

Any further reduction in personnel will have a profound effect on the bands and their output for defence. He argues that the future will bring forth an even greater reliance on the positive impact that military music brings to defence. To provide influence, in a positive manner without the use of force, is an extremely efficient and effective use of a military asset. The RMBS will continue providing the visible manifestation of musical and ceremonial excellence that underpins the fabric of the nation.

He cannot resist a musical military metaphor in conclusion: "Music can cross cultural and language barriers like nothing else and without the use of force. It can be deployed like a precision-guided missile into key areas of influence." ●

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Striking a blow

The October 2010 Strategic Defence and Security Review (SDSR) reaffirmed existing plans to construct two new 65,000-tonne Queen Elizabeth-class aircraft carriers, but also announced important changes to the programme. *Richard Scott* explains how the new concept of Carrier-Enabled Power Projection (CEPP) will take shape



The new fast-jet carriers that will operate an air wing, comprising the F-35B Lightning II Short Take-Off/Vertical Landing (STOVL) variant of the Joint Strike Fighter (JSF), were intended to deliver a next-generation Carrier Strike capability from 2017.

However, in the Strategic Defence and Security Review (SDSR), the UK Government confirmed it would build both carriers, but maintain only one in frontline service, the other being held in extended readiness. It also dropped the STOVL F-35B in favour of the F-35C Carrier Variant (CV) of JSF, a decision that will require the redesign and conversion of one or both of the Queen Elizabeth-class ships to receive aircraft catapults and arrestor gear.

Furthermore, the SDSR judged that the UK's legacy carrier strike capability should be retired with immediate effect, on the grounds that it offered only a very limited coercive capability and did not represent "a cost-effective use of defence resources". As a result, the government has taken the difficult decision to 'gap' a fixed-wing carrier capability until the introduction of the first new carrier in the 2020 timeframe.

CARRIERS REMAIN INTEGRAL

It should be pointed out, however, that the SDSR very firmly endorsed the continued strategic requirement for carrier-based aviation. "A Queen Elizabeth-class carrier, operating the most modern combat jets, will give the UK the ability to project military power more than 700 nautical miles over land, as well as sea, from anywhere in the world", it noted. "Both the US and France, for example, have used this freedom of manoeuvre to deliver combat airpower in Afghanistan from secure carrier bases in the Arabian Gulf and Indian Ocean.

"This capability will give the UK long-term political flexibility to act without depending, at times of regional tension, on agreement from other countries to use of their bases for any mission we want to

undertake." The move also offers the UK an in-built military flexibility to adapt its approach over the 50 years of the carrier's working life. The SDSR articulated how it "provides options for a coercive response to crises, as a complement or alternative to ground engagements", adding: "It contributes to an overall force structure geared towards helping deter or contain threats from relatively well-equipped regional powers, as well as dealing with insurgencies and non-state actors in failing states".

In arguing that the UK needs to maintain only one aircraft carrier in operational condition, the SDSR observes that the UK "cannot now foresee circumstances in which the UK would require the scale of strike capability previously planned. We are unlikely to face adversaries in large-scale air combat. We are far more likely to engage in precision operations, which may need to overcome sophisticated air defence capabilities. The single carrier will therefore routinely have 12 fast jets embarked for operations, while retaining the capacity to deploy up to the 36 previously planned".

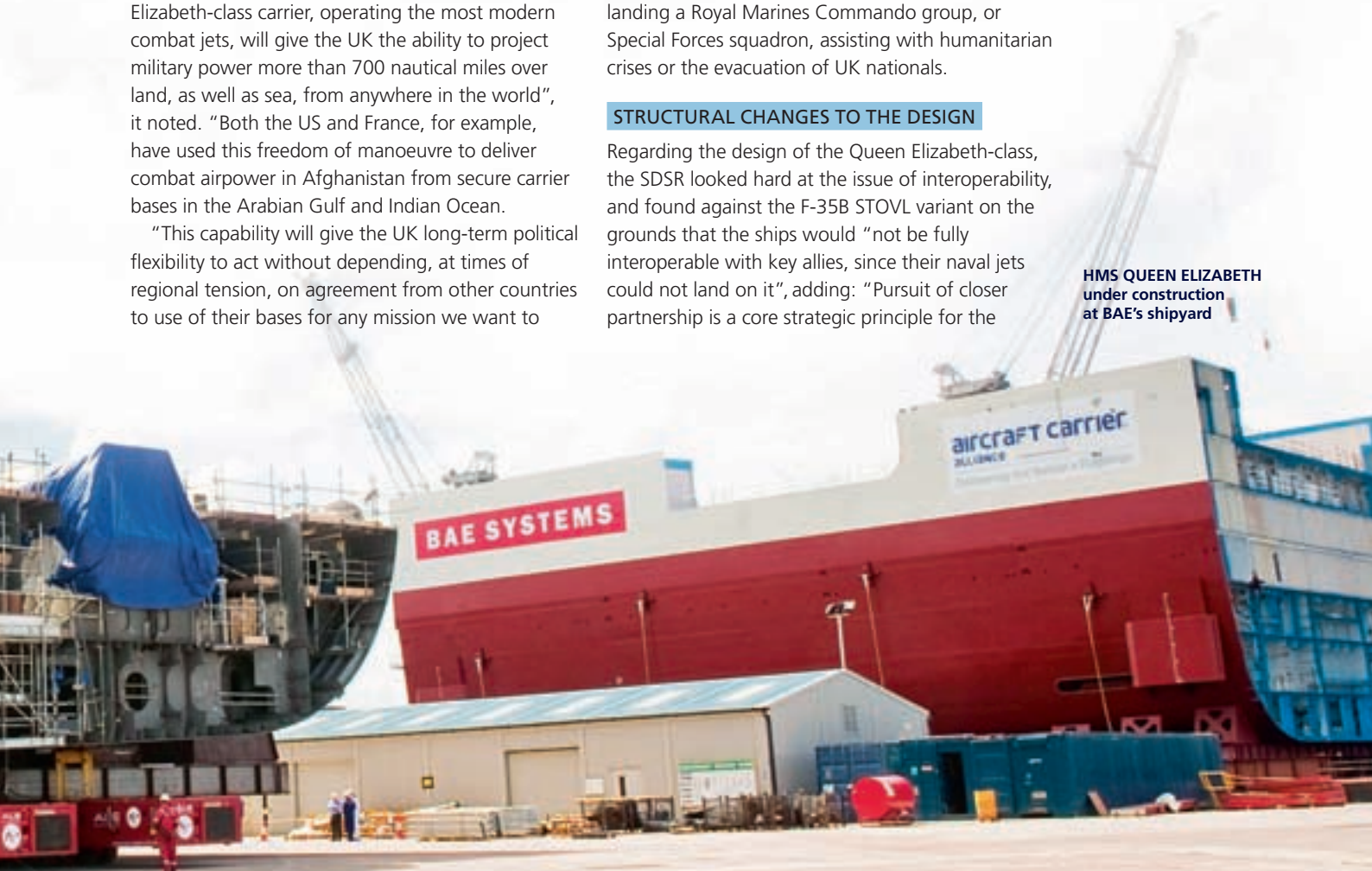
The carrier will also be able to accommodate a wide range of helicopters, including up to 12 Chinook or Merlin transport and eight Apache attack helicopters. Indeed, the emerging Carrier-Enabled Power Projection (CEPP) concept goes well beyond fast-jet carrier strike to additionally embrace support for a broad range of operations, including landing a Royal Marines Commando group, or Special Forces squadron, assisting with humanitarian crises or the evacuation of UK nationals.

STRUCTURAL CHANGES TO THE DESIGN

Regarding the design of the Queen Elizabeth-class, the SDSR looked hard at the issue of interoperability, and found against the F-35B STOVL variant on the grounds that the ships would "not be fully interoperable with key allies, since their naval jets could not land on it", adding: "Pursuit of closer partnership is a core strategic principle for the

A Queen Elizabeth-class carrier will give the ability to project military power more than 700 nautical miles over land, as well as sea

HMS QUEEN ELIZABETH under construction at BAE's shipyard





(Above) The US Navy completes a successful F-35C take-off using the EMALS (Electromagnetic Aircraft Launch System)

(Right) Computer image of the conventional take-off and landing version of the Queen Elizabeth-class aircraft carrier



[SDSR] because it is clear that the UK will, in most circumstances, act militarily as part of a wider coalition. We will therefore install catapult and arrestor gear”.

This conversion process is expected to delay the in-service date of the new carrier until around 2020, but it will allow greater interoperability with US and French carriers and naval jets. Furthermore, the F-35C boasts a longer range and greater payload than the F-35B.

Former Secretary of State for Defence Dr Liam Fox explained: “Converting one of the Queen Elizabeth-class aircraft carriers to operate the more capable and cost-effective Carrier Variant of the Joint Strike Fighter fast jet will maximise our military capability and enhance interoperability with our allies. Operating the more cost-effective [F-35C] Carrier Variant will also, over the longer-term, offset the conversion costs.”

The Ministry of Defence and the Aircraft Carrier Alliance (ACA) are now undertaking a Conversion Development Phase, lasting 18 months, to mature a detailed engineering plan, implementation strategy and cost model. To this end, in April 2011, the ACA

established a new engineering team to investigate the integration of catapults and arrestor gear and other CV-specific flight deck equipment, such as jet-blast deflectors, landing aids and deck lighting. The Conversion Demonstration Phase will run to the end of 2012 to investigate the design changes associated with the operation of the F-35C aircraft.

Initial work carried out by the ACA has shaped planning assumptions, as well as identifying a strategy outline. Given that block build work on QUEEN ELIZABETH is now well advanced, a decision to retrofit catapults and arrestor gear would inevitably cause major disruption to the programme. Instead, HMS PRINCE OF WALES – the second-of-class, for which manufacture activities began in May 2011 – will be configured for CV operations from the initial build stage.

Construction of HMS QUEEN ELIZABETH will continue in the meantime. This will maintain momentum on the programme, allowing the first-of-class to prove the platform, power and propulsion, and mission system; provide crew training; and achieve rotary-wing clearances. QUEEN ELIZABETH will then enter a state of extended readiness around 2019, when PRINCE OF WALES is accepted from build.

To support the conversion demonstration phase, the MoD and the US Navy have signed an agreement under which the US will provide the UK with engineering and technical assistance, in order to help define aircraft launch and recovery equipment requirements. The UK has decided to use the same EMALS (Electromagnetic Aircraft Launch System) that will equip the US Navy's next carrier, USS GERALD R. FORD (CVN-78). ●

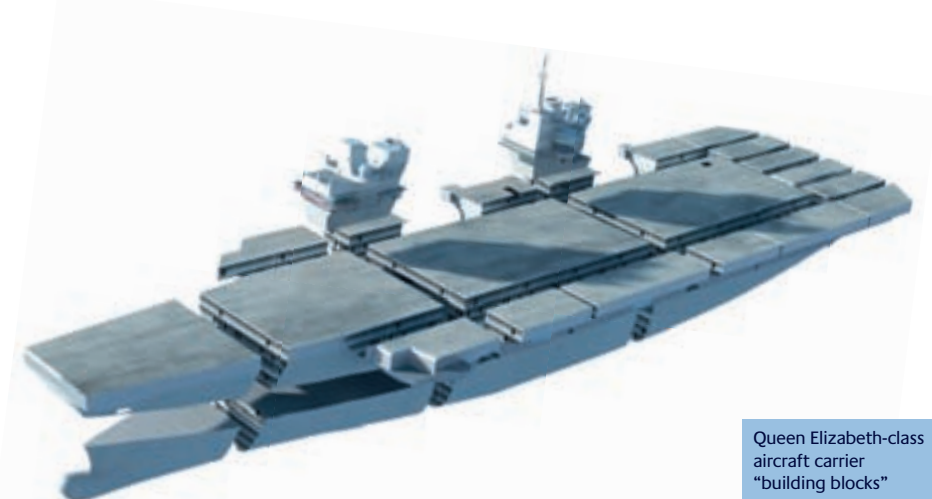
The conversion process will delay the in-service date until around 2020, but will allow greater cooperation with US and French carriers and naval jets

Modern warship design and build in the UK

Robert Lynch, senior naval architect at Avrotech Design International Ltd, explains how ship design has had to adapt to modern technologies and tight budgets



Robert Lynch



Queen Elizabeth-class aircraft carrier "building blocks"

Image by kind permission of The Aircraft Carrier Alliance

Having been involved in the design of various types of commercial and naval ships over the past 40 years, I have seen how the basic concepts of hull design have changed relatively little. However, changes in technology, financial and legal constraints have meant that the interior and detail design has altered dramatically.

The basic concept for any design requires the owners/operators to define clearly all the potential roles that they require their vessel/platform to undertake. This allows the naval architects and designers to produce an overall concept design that attempts to meet the client's aspirations.

Advances in computer technology, such as 3D CAD (Computer Assisted Design) modelling, allows for the client to be provided with a visual concept of the outline end product. As for the naval architects and designers, when the basic concept is agreed, only then can the in-depth detail of designing a ship begin, and, usually, a more complicated design emerges from the detail than from the early 3D visual concept.

To cope with the changing demands and an environment in which budgets are being squeezed, it is important that the platform can be readily refitted for differing roles in a cost-effective and timely manner during the vessel's service life. Consequently, the design team is required to produce a flexible platform that

embodies speed, endurance, hull signature, defined capability, modularisation, crew accommodation and protection of the environment.

As a result, modern warship design eventually ends up as a compromise between owners/operators, the ship designers/naval architects and the shipbuilders. This requires close cooperation between all partners, consultants and yard-based personnel to deliver the platform on time and within budget.

The methods used in modern ship construction ensure that assembling the main hull steelwork/hull envelope can be achieved with relative ease. However, the construction of the interior – which includes detailed design of the equipment, such as electronic installations, main propulsion, accommodation outfit, ventilation systems and general ship services – is much more complex.

Because of the long lead times involved with designing, procuring and, eventually, constructing a modern flexible warship, as well as the inevitable changes in specification due to advances in electronic installations and improvements in marine engine technology, the naval architects and designers face fresh challenges daily.

It is particularly evident at this time following the Strategic Defence and Security Review, which has seen the Queen Elizabeth-class carriers (now

under construction in various shipyards throughout the UK) requiring the platform to be drastically altered to suit the change in fast-jet choice – from the F-35B jump jet to the conventional take-off and landing F-35C. This requires an in-depth rethink of the design of some of the major installations on board the vessel.

Professional engineers, naval architects and designers will rise to meet these challenges, and the UK shipbuilding industry will deliver a quality product that we can rightly call the nation's flagships.

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Helicopter support onboard

INDAL Technologies, a business unit of Curtiss-Wright Flow Control Company, is a world leader in the design and development of shipborne helicopter handling systems, subsurface and surface cable-handling systems, specialised structures and other sophisticated systems for many of today's international navies.

INDAL has been contributing to successful surface combatant rotary aviation operations since the early 1970s. Early activities included the supply of telescopic hangars for naval and coastguard ships. To date, more than 170 sets of telescopic hangars and 400 sets of hangar doors have been supplied. INDAL's start in the shipboard helicopter handling arena came through its support of the Canadian Force's Sea King helicopter operations aboard the Navy's small frigates. The successful Canadian experience soon led to the INDAL RAST (Recovery Assist, Secure and Traverse) system becoming the shipboard helicopter handling solution for all US Navy LAMPS 3 capable surface combatants. The RAST technology was further exported to the navies of Japan, Australia, Spain and Taiwan.


INDAL introduced its ASIST (Aircraft Ship Integrated Secure and Traverse) system in the early 1990s to support the free deck landing/take-off operations adopted by many navies. The ASIST system enhances operational safety through the removal of personnel from the flight deck. It also simplifies shipboard installation and integration requirements through its modular design and reduced overall footprint.

The 2011 acquisition of the UK-based Douglas Equipment completes the portfolio of INDAL helicopter handling products, enabling the supply of an on-deck, free manoeuvring traverser to fill the gap between low sea state manual operations and high sea state integrated system operations supported by the ASIST and RAST systems.

The Royal Navy's (RN's) new Type 26/Global Combat Ship design represents the next iteration in state-of-the-art warship design. With the ability to adapt to varying mission requirements, it will provide the RN with the capability and flexibility to respond to a wide variety of in-theatre needs.

INDAL brings to the table 50-plus years of engineering experience and capabilities, and a broad product portfolio to support modern warship design and construction projects, such as the T26/GCS, from the concept stages through construction, introduction into service and through-life support. INDAL's ability to effectively model and evaluate the critical interface and interactions between the helicopter and flight deck ensures that operational risks are fully identified and mitigated early on in the programme, and enable the programme to proceed with a high degree of confidence.

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Jack of all trades: the versatile Type 26

Richard Scott highlights how the programme strategy for the Royal Navy's next-generation Type 26 Global Combat Ship has been set on a new course to take account of the UK Government's Strategic Defence and Security Review

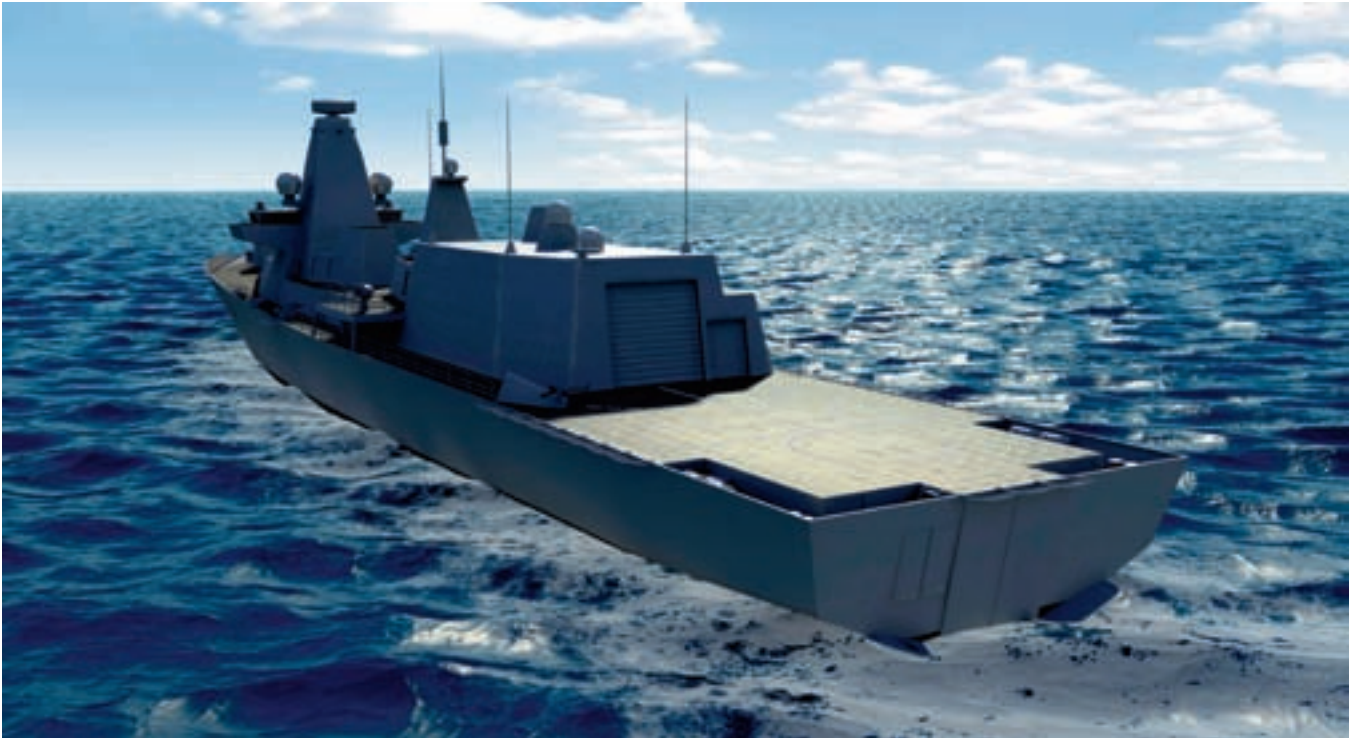
A solid commitment to the Type 26 programme was reaffirmed by the Strategic Defence and Security Review (SDSR), which stated an intention to bring the new class into service "as soon as possible after 2020". However, the capability requirement against which the class is being designed has undergone some measure of revision to reflect two key policy drivers: first, to realise the economies of scale, the Type 26 programme will now deliver a single, common, acoustically quiet hull design merging the two capability requirements (C1 and C2) previously set out in the Ministry of Defence's (MoD's) surface combatant roadmap; second, greater

emphasis is being placed on the design's exportability under the banner of the Global Combat Ship (GCS).

Described as a versatile anti-submarine warfare (ASW) combatant optimised for medium- and large-scale warfighting, the Type 26 is intended to form the backbone of the future Royal Navy surface fleet out to 2060. Entering service from 2021, the class will progressively replace the current Type 23 frigates as they reach the end of their lives. Current plans call for 13 vessels, comprising eight ASW versions and five general-purpose variants.

BAE Systems began a four-year Assessment Phase in March 2010 under a £127 million contract

(Above) A computer graphic of the Type 26 Global Combat Ship replacement for the Type 23 frigates



The Type 26 flight deck will be able to accommodate a range of helicopters, from Chinooks and Merlins to the Lynx Wildcat

awarded by the MoD. It is currently working with the MoD to finalise cost and capability trade-offs, this process culminating with a so-called Capability Decision Point. Subject to approval, the plan is to set in progress a two-year design phase in early 2012; a Main Gate (green light) submission is scheduled for 2013, with build work on the first of class to get under way in 2015.

For the Royal Navy, the goal is that the Type 26 programme should deliver a design that is capable, adaptable, sustainable, globally deployable and able to contribute to a broad span of warfare operations. And it must achieve these objectives while remaining affordable from a whole-life cost perspective, as well as being sustainable. It is equally important for the UK's maritime industrial enterprise; the Type 26 represents the UK's only complex warship programme for the next 20 years.

MODULAR THINKING

The current Type 26 reference design is a steel monohull, displacing around 5,500 tonnes. A range of 'modular' approaches is being applied to the design process, addressing physical, system, functional and whole-ship design aspects. As well as offering the flexibility to adapt and reconfigure the ship through its service life, embracing modularity is also seen to offer a cost-effective means to customise the design to meet export requirements.

One example of modular thinking is the mission bay area, designed as a multi-functional space able to accommodate and deploy a variety of boats and/or unmanned vehicles, and role-specific payloads housed in standard ISO containers. This will offer

an intrinsic capability for role adaptation and mission optimisation according to task.

Hangar facilities will provide for the support of a Merlin-size helicopter and up to two vertical take-off unmanned air vehicles. Moreover, the flight deck will be of a sufficient size to allow the massive CH-47 Chinook to land on it. Crewing is another area of potential innovation for the Type 26. The plan taking shape is for a relatively small core crew of about 130 personnel, but with berthing on board for up to 36 more. This would provide for augmentation with, for example, an enlarged boarding team, an embarked military force or a passive sonar team for ASW tasking.

A number of power and propulsion arrangements are being considered. The current baseline is a combined diesel-electric or gas (CODLOG) system. This hybrid machinery arrangement is envisaged as combining four high-speed diesel generators and two electric motors (to achieve diesel-electric cruise speeds up to 18 knots) and gas turbine direct drive (for a threshold sprint speed of 26 knots).

However, CODLOG is not the only option. Alternatives still under study include combined diesel and diesel, combined diesel electric and diesel, and integrated full electric propulsion. The intention is that the design would be sufficiently flexible to accommodate the different propulsion machinery arrangements of potential export partners.

Type 26 is also expected to be the 'greenest' warship ever built for the Royal Navy. An initial environmental appraisal against the reference design indicates that it conforms to a number of key legislation and policy requirements. This includes

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Queen Elizabeth carriers



Type 45 destroyers

After sea trials of the first Type 45 destroyer HMS Daring, BAE Systems wrote:

“The high standard of the ship’s overall design ... is a unique achievement for such a large, complex and powerful warship.”

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After recent work on HMS Protector, the Royal Navy Head of Fleet Time Engineering, Portsmouth, wrote:

“Your ability to respond quickly and deliver a quality product ... represents true Team Portsmouth spirit.”





The general-purpose version of the Type 26 frigate will launch boats from the stern instead of over the side

prevention of oil, sewage, garbage and air pollution, along with non-use of ozone-depleting substances and other environmentally hazardous materials. The Type 26 general arrangement, oil-outflow system, waste-management system, freshwater treatment systems and hull anti-fouling paint system will all comply with current and known forthcoming future international standards.

REDUCING PROGRAMME RISKS

To reduce programme risk, and in keeping with the principles of through-life capability management, there is a drive to maximise pull-through from the Queen Elizabeth-class aircraft carriers, Type 45 destroyers and ongoing Type 23 capability sustainment/upgrades, in an effort to both reduce risk and capitalise on previous investment, and/or existing system inventory. So while the Type 45 is characterised by approximately 80 per cent new-to-service equipment and 20 per cent reuse, these percentages will be effectively reversed for Type 26.

Migration paths for cross-decking equipment and/or capabilities are already being defined. For example, the new Type 997 Medium-Range Radar being procured for the Type 23 capability upgrade will be transferred to the Type 26; the existing Sonar 2087 low-frequency variable-depth sonar will similarly migrate; the combat management system

will be evolved from that of the current Outfit DNA(2)/CMS-1 combat system core; and the Future Local Area Air Defence System (Maritime), based on the new Common Anti-air Modular Missile, will be fitted first to Type 23, then to Type 26.

A medium-calibre gun will be fitted at the front of the ship for naval fire support (the importance of coastal suppression was reaffirmed by Operation ELLAMY, during which HMS LIVERPOOL fired over 200 rounds of 4.5-inch ammunition). The expectation is that the weapon selected for Type 26 will offer a capability to fire extended-range, precision-guided munitions. Long-range precision land-attack capability remains the subject of further study. However, the ambition remains for Type 26 to be outfitted from build with vertical launcher modules, conferring the flexibility to take a wide mix of suitably qualified strike weapons.

The development of the export-oriented GCS initiative reflects the UK Government's desire to increase the potential of the Type 26 in international markets. Rather than full-scale collaboration, the approach being taken by the MoD, BAE Systems and UK Trade & Investment is to partner with other nations that want to leverage the Type 26 ship architecture to meet their specific requirements, and access full technology of transfer so as to enable the build and integration of complex warships in-country. ●



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Clearing the air

With HM Ships DARING, DAUNTLESS and DIAMOND all scheduled to make their inaugural deployments during the next 12 months, *Richard Scott* outlines how the Royal Navy's latest Type 45 air-defence destroyers will demonstrate their ability worldwide

HMS DAUNTLESS, the second of the Royal Navy's Type 45 destroyers, sails under Dartmouth Bridge



Designed, built and integrated by BAE Systems Surface Ships, and billed as the world's most advanced anti-air warfare (AAW) warships, the six Type 45 Daring-class destroyers will provide the Navy with an unprecedented capability to protect Task Group elements against the threat of air attack. Indeed, while procured as replacements for the venerable Type 42 destroyers – equipped with the GWS30 Sea Dart missile system – the Type 45, in fact, heralds a step change in terms of both AAW situational awareness and defensive coverage.

Beyond this specific role, the destroyers are also extremely capable command-and-control platforms, and are key elements of the Royal Navy's wider task of engaging with the nation's partners and allies. In times of need, they can also contribute to emergency evacuation missions.

In terms of building the tactical picture, the Type 45 is very well served by its S1850M Long-Range Radar (LRR), developed jointly by BAE Systems and Thales. Rotating once every four seconds, the LRR can automatically detect and track up to 1,000 targets at any one time, creating a three-dimensional air picture extending out to a range of 400km. Tracks from the LRR are fed into the ship's CMS-1 combat management system, which compiles the tactical picture. It can share high-quality picture data with other platforms via the Link 16 Datalink system, enabling rapid and secure coordination across a Task Group.

However, the cornerstone of the Type 45's AAW capability is the Sea Viper guided-weapon system, developed by MBDA to defeat massed attacks by sea-skimming anti-ship missiles. A complex 'system of systems', Sea Viper is unique in that it offers the capability to provide self-defence, local-area defence and medium-range area defence. Furthermore, it has been designed from the outset to take on and beat the most potent anti-ship weapons, including supersonic high divers, and highly manoeuvrable subsonic and supersonic sea-skimming missiles that can execute 'high-G weaves' or 'dog-legs'.

NEW AIR-DEFENCE REQUIREMENTS

While Sea Dart has served the Royal Navy well, it was conceived in the 1960s, when the principal threat was assessed as high-flying strike aircraft operating over 'blue-water' expanses, mid-ocean. The 1982 Falklands campaign highlighted the limitations of the Navy's existing AAW capability, both in blue water and in the near-land environment now more generally referred to as the littoral, and gave rise to requirements for a fundamentally different sort of air-defence capability, which was conceptualised as the Support Defence Missile System (SDMS).

The logic underpinning SDMS reasoned that advances in the threat – particularly sea-skimming missiles – demanded a new type of capability that

could simultaneously engage multiple crossing targets by providing a quick-reaction, high-rate-of-fire defensive 'umbrella' above and around a task group or consorts. Its key components were an advanced multifunction radar (capable of multi-target tracking and surveillance, even in the presence of heavy jamming) and a fast and accurate missile, offering a very high probability of a kill.

REALISING THE VISION

Sea Viper translates that vision into an operational reality. By some margin the most sophisticated guided weapon system ever to equip an Royal Navy warship, it melds selected technology 'building blocks' developed under the Franco-Italian FSAF (Future Surface-to-Air Family) programme – notably, the exceptionally manoeuvrable Aster 15 and Aster 30 missiles – with BAE Systems' Sampson multifunction radar and a UK-customised command-and-control (C2) system.

Sampson is mounted inside a distinctive 'golf ball' radome atop the foremast, its elevation high above the waterline, maximising coverage. Virtually immune to jamming, it uses state-of-the-art active array technology and advanced adaptive beam-forming techniques to search, identify and track all types of air and surface targets. It also supports an uplink to Aster, allowing mid-course guidance

A Sea Viper (Aster 30) air-defence missile is fired successfully from HMS DAUNTLESS





(Above) The third Type 45 destroyer, HMS DIAMOND, en route to the Clyde

(Right) HMS DIAMOND's warfare department at work in the operations room during a war exercise



updates to be sent to multiple missiles in flight, guiding each to assigned targets. Simultaneous salvos of up to eight missiles can be supported.

Aster's world-beating performance is pivotal to Sea Viper's capability against the most challenging air threats. It has two key performance discriminators: first, its highly accurate active radar homing capability obviates the requirement for shipborne target illumination and maximises the probability of a 'hit-to-kill'. Second, the missile's aerodynamic design enables manoeuvres in excess of 50G, while a novel, lateral-thrust control system (acting upon the missile centre of gravity) provides for an additional 12G to minimise the miss distance in the terminal phase.

The short-range Aster 15 and medium-range Aster 30 munitions share a common terminal 'dart' – incorporating the seeker, electronics, proximity fuse, autopilot, warhead and uplink receiver – but are differentiated by their range (as a factor of first-stage rocket booster size): Aster 15 is

effective out to 30km, while Aster 30 extends its range out to more than 80km.

Finally, the Sea Viper C2 system is the means to synergise the radar and the missile. It is, in effect, a high-speed computer tasked to perform picture management, threat evaluation/weapon assignment, and engagement planning and control. It also provides the primary interface between Sea Viper and the Type 45 combat management system.

Qualification testing of Sea Viper was performed from the sea trials platform, LONGBOW, which was towed to the Mediterranean for a series of live firing tests at a missile range off the Ile de Levant. These culminated in June 2010 with a successful Aster 30 salvo firing that saw the system engage a low-altitude Mirach 100/5 target that was executing a high-G evasive manoeuvre.

The first Aster 30 scored a direct hit at a range in excess of 12km; the second Aster 30 fused on the target debris. This success was followed up in September 2010 when DAUNTLESS became the first Type 45 to fire Sea Viper, successfully intercepting a Mirach target at the Benbecula range. DARING achieved a similarly impressive result during her first high-seas firing in April 2011.

Although there is currently no stated requirement for the Type 45 destroyer and Sea Viper to provide a ballistic missile defence (BMD) capability, MBDA and BAE Systems have jointly studied an evolutionary roadmap that would leverage the existing investment in platform and weapon system.

MBDA is also currently engaged in applied maritime theatre BMD research, which is being carried out by the UK's Missile Defence Centre, in conjunction with other industry partners. ●

Aster's world-beating performance is pivotal to Sea Viper's capability against the most challenging air threats



Hunter-killer submarines

The Trafalgar-class hunter-killer submarines have found a new role as the masters of power projection. *Nick Childs* reviews this transformation and shows how their successors, the Astute-class boats, will be even more effective in fulfilling this role

The seventh and last of the Trafalgar-class hunter-killer submarines, HMS TRIUMPH

One of the most remarkable transformations in the Royal Navy fleet over recent years has been that of its flotilla of hunter-killer submarines (Ships Submersible Nuclear – SSNs). From archetypal Cold War warriors, focused almost exclusively on the Soviet threat, they have reinvented themselves as one of the most adaptable instruments of UK Defence, imbued with tactical flexibility, a potent strategic punch and almost limitless reach.

The arrival of the first of the new generation of Astute-class SSNs should take that transformation a dramatic stage further. The Astutes promise to be remarkably powerful and flexible tools of power projection – to observe, deter, coerce or defeat. Their value of these submarines is likely to increase as the strategic horizons change and

the requirement to carry out ever more complex and frequently clandestine missions grows.

The Royal Navy's SSNs remain a unique asset. In a world in which British government policy is still that the country remains a global player, the SSN's ability to deploy at great speed over huge distances without support, to remain on station for prolonged periods – covertly, if necessary – and to have at its disposal a powerful array of weapons and sensors that can reach far inland, has become more prized, if anything. As the rest of the Royal Navy has shrunk, and other navies have improved in quality and capability, the Service's SSNs continue to set it apart. Its number-one strategic priority continues to be supporting and protecting the country's deterrent force of ballistic-missile submarines.

The most significant new commitment that the hunter-killer force has taken on is that of providing a permanent presence east of Suez with a Tomahawk cruise missile land-attack capability. Here the boats support maritime security operations in the region, as well as undertaking strategic surveillance and intelligence-gathering activities. There is no doubt that they give the nation a significant and flexible military tool in a region of vital and growing strategic importance to the United Kingdom.

It is a tough task to fulfil with so few operational boats. Consequently, the Royal Navy has made a conscious decision to deploy the boats for longer periods. Hence, HMS TIRELESS returned to Plymouth in May from her stint east of Suez, having completed the longest submarine deployment in a decade – 307 days. During that period, she played escort to French aircraft carrier *Charles de Gaulle* in the Arabian Sea, giving tangible substance to the new Anglo-French defence relationship.

SUPPORTING THE LIBYAN MISSION

Her sister boat, HMS TRIUMPH, faced an equally gruelling time away. A salvo of her Tomahawk missiles helped Britain to play a part in the opening phase of the United Nations-mandated enforcement mission in Libya. In total, the number of UK Tomahawks that were launched was “in the high teens”. HM submarines TRIUMPH and TURBULENT also contributed to maritime security and surveillance operations, as well as being involved in the embargo mission against Libya.

HMS ASTUTE test fires a Tomahawk land-attack missile (TLAM) in the Gulf of Mexico



But valiant as the service of the ‘T’ boats has been and will continue to be for some time to come, the ‘A’ boats are the future. Notwithstanding the significant upgrades to the ‘T’ boats, ASTUTE and her sisters will bring a major new dimension to Royal Navy submarine operations.

The ‘A’ class is much more than just an improved version of the ‘T’ class. They will give the Royal Navy a quality and capability not duplicated anywhere else outside the US Navy. That their new Core-H reactors will allow them to serve without the need to refuel for their entire planned 25-year careers is a remarkable enough fact in itself. At nearly 7,500 tonnes submerged, the ‘A’ is half the size again of the ‘T’. But, despite her bulked-up appearance, the experience of ASTUTE on her sea trials so far has been that she is extremely agile underwater.

Trials of the boat’s systems are at an advance stage, including the successful firing of four Spearfish heavyweight torpedoes. During these tests, ASTUTE is proving to be extremely quiet, with a low noise signature that has exceeded expectations. Moreover, the greatly increased weapons payload – up from 24 weapons on the ‘T’ boats to 38 – provides a whole new level of flexibility for commanders. The choices between numbers of Tomahawks and Spearfish torpedoes, or increased Special Forces’ equipment, are much enhanced. The fitting of the Chalfont Special Forces delivery system will also allow covert, submerged deployment of Special Forces from the sea to land.

The new combat system, world-class sensors and improved intelligence-gathering and surveillance capabilities will all represent another step up in capability over even the upgrades to the ‘T’ boats. Access to high-data-rate communications will help to address a submarine Achilles heel of connectivity, and allow the Astutes to become a more integrated element of the ever more critical overall ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) picture for joint force commanders. At the time of writing, ASTUTE was preparing to cross the Atlantic for a more comprehensive set of systems’ trials, including a first Tomahawk firing.

SERVICE ENTRY IMMINENT

HMS ASTUTE first went to sea in November 2009, and was commissioned into the Royal Navy in August 2010. As the first of class, and the first new Royal Navy SSN in nearly two decades, her trials have not always been straightforward. Not unexpectedly, initial teething troubles have led to an extension in the trial period. This will stretch the operational lives of the ‘T’ boats. For example, HMS TURBULENT has had her planned decommissioning delayed by a few months. However, the hope is that ASTUTE should be operational by the end of 2012.

The second-of-class boat, HMS AMBUSH, should go to sea in early 2012. Meanwhile, construction of



As costs come under scrutiny, there is no doubt that the Astutes are a key pillar of the future Royal Navy

the third boat, ARTFUL, is largely complete, while all of the pressure hull units of the fourth boat, AUDACIOUS, are now in BAE Systems' Devonshire Dock Hall construction facility at Barrow-in-Furness. For budgetary reasons, the construction period has been stretched out. But the government's decision

to delay the Vanguard-class ballistic-missile submarine replacement programme has opened the way for it to confirm plans in the Strategic Defence and Security Review for a seventh Astute boat.

As the costs of remaining in the nuclear-powered submarine business come under regular scrutiny, there is no doubt that the Astutes are a key pillar of the future Royal Navy. The submarines will be extremely powerful and flexible assets in their own right. They will also be uniquely valuable enablers for a range of other maritime, joint and combined multinational forces across a wide spectrum of missions for decades to come. ●

Nick Childs is a BBC world affairs correspondent

The Royal Navy's second Astute-class submarine, HMS AMBUSH, is officially launched in December 2011 at the BAE System's shipyard in Barrow-in-Furness



The deterrent effect

Work is ongoing to prepare the Royal Navy's next generation of nuclear ballistic-missile submarines to maintain a continuous sea-based deterrence, as the Vanguard boats retire from service late in the next decade. *Peter Long* explains

(Above) Trident submarine HMS VANGUARD is escorted into HMNB Clyde



The past year has been incredibly busy for the ‘successor’ deterrent programme,” Commodore Mark Beverstock asserts. The work has enabled an agreement on the basic architecture of the successor submarine. Studies are also continuing on how to build the boats as efficiently as possible, to cut the cost of production and also maintenance under the Submarine Enterprise Performance Programme (SEPP).

The SEPP is a “hugely important programme for all of us within the MoD (Ministry of Defence) and industry”, Beverstock says. “We need to make the submarine enterprise as efficient as possible, but we need to do so in a way that will allow us to deliver these boats to the Navy on time and at cost.” MoD officials have been working closely with the three main contractors – BAE Systems, which will build the hull; Rolls-Royce, the nuclear propulsion; and Babcock, which will handle maintenance.

An Initial Gate report to Parliament in May 2011 updated the cost of the new boats to £25 billion, factoring in inflation, and based on the 2006-07 estimate of between £11 billion and £14 billion. Building the new boats is expected to take 17 years, hence the estimated inflation effect on the 2006-07 prices.

The £25 billion price tag assumes that four submarines will be built. However, the Main Gate decision, due in 2016, will decide whether there will be three or four boats in the new fleet. These are early days, but discussions with industry have identified ways of achieving around £100 million of the scheduled £900 million worth of savings within the first 10 years, under the SEPP. The larger savings are expected as MoD officials work with industry to slash costs and boost performance. Savings are anticipated to come from sharing expertise, common systems, and locating work on the most suitable industrial site.

MAKING SAVINGS

“We expect savings to come both from removing duplication in the submarine enterprise, and through developing new collaborative ways of working between MoD and industry,” Beverstock explains. A prime example of this would be the Joint Programme Function (JPF), established in May 2011, which connects the MoD with industry. “The JPF brings together expertise from all of the key players to make sure that we are working to a single integrated submarine programme and that



(Above left)
HMS VANGUARD test-fires a Trident II D5 nuclear missile

(Above right) HMS VICTORIOUS leaves her home port, HMNB Clyde



A significant source of savings should flow from an agreement with the US to share design, building and integration of a common missile compartment

we are managing risks much more coherently, particularly where they cross organisational/company boundaries,” Beverstock reveals.

A significant source of savings is expected to flow from an agreement to share the design, building and integration of a common missile compartment for the new boats with the US. The US Navy wants to replace its Ohio-class ballistic missile boats, and the agreement is seen as ensuring commonality of the Trident D5 weapon, which will be used for much of the life of the successor submarine.

The common missile compartment is expected to lead to large savings, both on the design and manufacture of the compartment, but also on the way we will support and maintain the compartment through its life. The missile compartment is located in the middle section, between the forward part, which includes the control room and crew quarters, and the nuclear propulsion system at the rear of the submarine. The design for the common missile compartment comprises 12 tube launchers, instead of the 16 on the Vanguard class, and studies are under way to include the reduced number of eight operational missiles on the future Royal Navy boats, which will carry up to 40 operational warheads.

Work on the new submarines includes the choice of a new propulsion system incorporating the Pressurised Water Reactor (PWR) 3, which utilises technology that was unavailable when the Astute nuclear-powered attack submarine (Ship Submersible Nuclear – SSN) was being developed. The Vanguard boats use the PWR2 system.

The overall design of the new submarine has been frozen. Naval architects have decided where the major elements, such as the control room, torpedo room and propulsion, will be situated. Further detailed work will focus on the system level.

“So far, we’ve finalised the broad layout of the submarine and chosen some of the key systems,” Beverstock confirms. “The next stage will be to work up the design to a much more detailed level, so that we can start to build the boats.”

The new submarines will be slightly larger than the Vanguard boats – VANGUARD, VICTORIOUS, VIGILANT and VENGEANCE – which are about 150 metres long. But the design engineers are trying to minimise the differences. A key reason for this is to ensure that the successor submarine can employ the same ship lifts, which are used to take the entire boat out of the waters of the River Clyde.

ASTUTE LESSONS

There is a strong “linkage” between the Astute attack boats currently being built and entering service and work on the future missile submarines. The lessons learnt on building the Astute class will feed into work on the ballistic-missile boats, avoiding the 10-year gap that occurred between the end of the last Vanguard class and the first Astute submarine. That break in continuity of design and production meant key competences were lost before work began on the Astute submarine.

Although missile boats are generally twice the size of attack submarines – the former ship’s missiles were more than 13 metres high – the new boats will use very similar systems to those in the Astute: control systems, sonars and the tactical torpedo weapon system. This similarity is intended to reduce the design and delivery of equipment costs, but also yield benefits in training crews and maintaining the gear. A crew trained for an Astute class would slot fairly easily into the new missile boat.

A small number of purchases have been made for test and manufacturing equipment as part of a tooling-up effort for the future boats. But the big purchasing decisions for long-lead items will be made as 2016 nears. That includes 2,000 tonnes of steel for the hull, while Rolls-Royce will need to order electrical gear for the nuclear reactor.

There is, however, some extra time available as October 2010’s Strategic Defence and Security Review extended the service life of the present Vanguard boats, with the delivery of the first of the replacement boats in 2028 instead of 2024. ●

A Lynx Mk 8 helicopter conducts winching operations from the deck of HMS MONMOUTH

The Royal Navy helicopter fleet

The brand-new Lynx Wildcat helicopters, which are set to join the existing Mk 1 Merlins, will replace a comparatively mixed, but also highly capable, group of helicopters. *Thomas Withington* talks to the Fleet Air Arm to reveal a transformation in the Royal Navy's helicopter inventory

Currently, the Royal Navy's helicopter order of battle comprises three Sea King variants: the Mk 4 (Jungly) transporter, the Mk 5 Search and Rescue (SAR) helicopter and the Mk 7 Airborne Surveillance and Area Control (ASaC) early-warning platform. This Sea King fleet is complemented by the maritime attack Lynx Mk 3 and Mk 8 helicopters, as well as the Mk 7 and Mk 9 Lynx land-attack machines.

The Lynx and Merlin fleets play an indispensable role in supporting Royal Navy Anti-Surface Warfare (ASuW) and Anti-Submarine Warfare (ASW) operations. Commodore (Cdre) Paul Chivers, the Commanding Officer of Royal Naval Air Station Yeovilton, says: "There's always a Lynx or a Merlin on the back of a destroyer or a frigate." At any one time, these helicopters can be working in a diverse



Helicopters from around the world celebrated Royal Naval Air Station Yeovilton's 70th anniversary, during the International Air Day in July 2011

number of locations, and are presently "supporting operations in Libya, and anti-piracy operations in the Gulf and the Horn of Africa, while also supporting anti-narcotics operations and disaster relief in the West Indies," adds Cdre Chivers.

Unsurprisingly, the Royal Navy's helicopter fleet has been in huge demand since the terrorist attacks in the United States on 11 September 2001, and the subsequent military campaigns involving British forces in Afghanistan and Iraq. The aircraft have brought an important capability to these efforts, namely, their ability to operate from a ship over both sea and land. The importance of helicopters to Royal Navy operations is reflected in the number of personnel who support these aircraft. Some 10 per cent of Royal Navy manpower is involved in delivering maritime aviation, with the support of civilian staff, all of whom play a fundamental part in delivering naval air power.

THE COMMANDO HELICOPTER FORCE

The Sea King Mk 4 and Lynx Mk 7 and 9 helicopters are grouped together in the Commando Helicopter Force (CHF): "We provide battlefield helicopters and aviation combat support under all environmental conditions, primarily in support of the 3 Commando Brigade Royal Marines," explains Lieutenant Colonel (Lt Col) Paul Morris Royal Marines, Chief of Staff (Commitments) CHF. It is a combined Royal Navy and Royal Marines force that flies Sea King and

Lynx helicopters and specialises in amphibious warfare – getting troops from ship to shore under combat conditions. The pilots and aircrew of CHF are among the most versatile and well trained in the rotary world. Once qualified, they can operate in the most extreme conditions possible, from sub-zero winter conditions north of the Arctic Circle to the tropical jungles and deserts around the world.

WILDCATS AND MERLINS

Commenting on future developments, Lt Col Morris reveals: "CHF is currently making preparations for the planned transfer of Royal Air Force (RAF) Merlin support helicopters to replace our Sea King helicopters, which are due to be withdrawn from service in 2016. The resultant Merlin Mk 4 will be derived from the Mk 3 airframes currently in service.

"A few Royal Navy aviators have already completed the Merlin Operational Conversion Course and are now instructing on the aircraft alongside their RAF counterparts. Plans are in place for them to be joined by 12 aviators and 35 aircraft engineers in the new year. We look forward to the challenges of transitioning to both Merlin and Wildcat, especially as 847 Squadron will be the first UK squadron to convert to the Wildcat in 2013. These are exciting times and we welcome the increased capability that these aircraft will bring."

As far as deliveries of the Wildcat are concerned, Commander (Cdr) Mike Ryan, in charge of the Royal

Navy's maritime Lynx helicopters at Yeovilton, says that the first Mk 1 Wildcat helicopter will be delivered to the service in January 2013, with a further 27 following over the next four years.

While the Royal Navy's 847 Naval Air Squadron will operate the Wildcat Mk 1 attack helicopter as part of the CHF, the Navy will primarily operate the Helicopter Maritime Attack (HMA) version that will be outfitted with the Future Anti-Surface Guided Weapon, and will carry Sting Ray torpedoes, Mk 11 depth charges and the M3M heavy machine gun.

Turning one's attention back to the Merlin helicopter, up to 30 of the 38 aircraft will undergo a Midlife Capability Sustainment Programme, which will take the aircraft to Mk 2 status, outfitting it with a new open-architecture mission system, and revised human-machine interfaces, according to Commander Kevin Dodd, who is in charge of the Royal Navy's Merlin fleet.

For added punch, these aircraft will receive an M3M 0.5-inch heavy machine gun. Intensive trials of the Merlin Mk 2 are expected to commence in September 2012, with a service entry mooted for 2013. Although the Merlin is optimised for ASW, Cdr Dodd is keen to emphasise that the aircraft can, and has, performed many other tasks, including counterpiracy and counternarcotics operations, as well as people-trafficking prevention activities.



(Above) The new AW159 Lynx Wildcat helicopters will enter service over the next few years

The upgrade of the Merlins and the introduction of the Wildcats underscores the major transition that the Royal Navy's helicopter fleet has set in motion regarding the aircraft types it will operate in the future. "It is a period of great change for the helicopter force," says Cdre Chivers. "Every air crew will have to change helicopter type in the next few years." However, he notes that the way the Royal Navy performs its helicopter operations is likely to remain constant. "I don't envisage a massive change in how we employ these helicopters. They swing from role to role with comparative ease." ●

(Below) A Merlin helicopter delivers supplies to RFA ARGUS from RFA FORT VICTORIA





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