

SEA CHANGE

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ABSTRACT

Britain's Strategic Defence Review of 1998 and its subsequent amendments identified the operation of strike aircraft from aircraft carriers at sea as a cornerstone of the nation's defensive capability. In consequence, the Royal Navy is transforming itself from a primarily anti-submarine force into a maritime strike fleet, resuming a role it gave up nearly thirty years ago. The Author looks in depth at the changes that are taking place and assesses the new partnership with the RAF and its progress.

South Atlantic Lesson

Air dominance is critical to any military operation on land or at sea. The narrow margin by which the British managed to win it in the South Atlantic War of 1982 led to changes in Government policy. Until then, successive Governments had focused on a NATO led land war in Europe as the focal point of defence planning. On the margins of this 'central front myopia', Britain had available two small carriers, *Hermes* and *Invincible* which operated 28 of the Navy's 32 available SEA HARRIERS. They were to be of fundamental importance in winning victory over Argentina. In addition to the ships' normally allocated squadrons, both carriers operated 'tailored' air groups made up with additional anti-submarine and assault helicopters plus RAF HARRIERS deployed south after the war's start. A third carrier, *Illustrious*, which arrived just after the end of hostilities, had the first two AEW helicopters embarked.

The immediate lesson was learnt, the sale of *Invincible* to Australia, agreed in 1981, was retracted, the SEA HARRIER force expanded slightly and more credence was given to amphibious operations. The ability of RAF HARRIER and helicopter units to embark was noted, as was the ability of carrier air groups to change flexibly between aircraft types. The three ships of the INVINCIBLE class began to operate with modifications to the basic air group allowing significant role changes. Strike operations were back on the agenda as something that could be discussed for the future.

A Weapons System

Another catalyst for change came with the series of expeditionary operations that followed the end of the Cold War. Politicians 're-discovered' that aircraft carriers were not merely an expensive runway but a mobile 'sovereign base' that took maintenance facilities, weapons and spare part stores together with Command, Control, Communication, Computer and Intelligence (C⁴I) facilities to the scene of the action. They proved secure against terrorist or, to date, any other form of attack. No British carrier has been successfully attacked since 1945 despite facing numerous opponents who would have liked to do so. With their own stocks of fuel and ammunition they can be self sufficient for days on end. The stores ships that replenish them at sea would still have been required, with the escorts to defend them against asymmetric attack, to support squadrons based on land within range of the enemy. In the mid 1990s, the British Government insisted that the RN maintain a carrier in the Adriatic to support its troops in the former republic of Yugoslavia.

Aircraft carriers provide a base in areas where no other base might exist. They also allow a strike force to travel to the scene of the action quickly and without

having to ask any third party nation's permission. They arrive with a full operational support package ready to be effective on Day 1 of an expeditionary campaign.

The Strategic Defence Review

Given the intensity of post Cold War operations by aircraft carriers and the re-discovery of their utility by Politicians, it came as no surprise when the Review identified a new generation of large carriers as the 'cornerstone of future British Defence Policy'. The RN had, for some years, been evaluating a class of three 30,000 ton ships to replace the INVINCIBLE class which were expected to come to the end of their hull lives after the first decade of the twenty-first century. The INVINCIBLES were designed as helicopter carriers with a limited fixed wing capability and have always been cramped for the variety of other missions they have been called upon to perform. In the South Atlantic, the larger *Hermes* was a much more versatile ship and so increased volume was seen as a wise precaution. When the evidence collected for the Review was analysed, however, the MoD opted to procure two larger ships of 'about 60,000 tons'. These are potentially the largest warships ever built for the Royal Navy and are usually referred to as the 'Future Carriers' or CVF. They have been given the names *Queen Elizabeth* and *Prince of Wales*.

The concept is to keep one of these ships at high alert with the second at lower alert, training or in refit. The simple way forward would have been to procure a dedicated air group as a 'force package' on much the same lines as the USN or French carrier air wings. The MOD chose instead to operate these ships as 'Deployed Operating Bases' (DOB) capable of operating Tailored Air Groups (TAG) created for specific missions. The aircraft will be drawn from Joint Forces sited at Main Operating Bases (MOB) in the UK but the 'baseline' capability is to be the operation of the F 35 Joint Strike Fighter (JSF) which is known within the MoD as the Joint Combat Aircraft (JCA). This strategy is unique to the UK and contains many ideas that are transforming the British armed forces' concepts of warfare. It is also eerily reminiscent of some of the concepts put forward in the carrier debates of 1961-66.

Transformation

The new concepts are radical and are taking time to mature. In 1998 the RAF, Fleet Air Arm and the Army Air Corps were commanded, trained and controlled on Single-Service lines although, increasingly, they could be used jointly in action. The Review created Joint Forces which each drew together flying elements from more than one service. First to form, in 1999, was the Joint Helicopter Force (JHF) which brought together all battlefield helicopters including the Navy's SEA KING HC 4s. It also contains an infantry brigade and has a 'two-star' headquarters at Wilton near Salisbury. In 2000 the Navy's three SEA HARRIER squadrons and the RAF's four HARRIER squadrons were brought together to form Joint Force Harrier (JFH). This was administered by Strike Command, initially forming part of 3 Group but it moved to 1 Group in 2003. The remaining naval assets, the MERLIN, non-commando SEA KING and LYNX helicopter fleets are administered by a 'one star' Commodore on the staff of C-in-C Fleet at Portsmouth. Significantly, the budgets for the joint types migrated with them to the new joint forces.

Change did not end there. There is only 20% commonality between the SEA HARRIER F/A 2 and the HARRIER GR 7. They have been maintained using different systems by technicians with different training and career paths. They use different weapons. Hard decisions had to be taken to 'melt down' this mixture into a single force that can move onto the JSF when it becomes available in the

next decade. In 2002 it was announced that the SEA HARRIER would be withdrawn from service early in 2006 and the operational force would comprise four squadrons of HARRIER GR 7/9 aircraft. For planning purposes these are nominally to have nine aircraft each, but that number could be reduced or increased from the rest of the force for specific operations as necessary. The RAF will man two, 1 and 4 squadrons, and the other two, 800 and 801 squadrons will be commissioned in the Royal Navy. The MOB for all four is to be RAF *Cottesmore*.

A single training unit, 20(R) squadron at RAF *Wittering* is to provide air and ground crews for all four squadrons. Both the RN and RAF have changed their approach to air engineering with new training, fewer branches and a more joint approach that will, eventually, be adopted by all three services. JFH can be seen, then, as the 'cutting edge' of the change to joint operating techniques.

The Joint Force will operate with unparalleled flexibility and, whilst the naval squadrons will specialize in embarked strike operations, all four squadrons could operate at sea if necessary. They could, equally, all operate ashore if that offered the best strike package for a particular conflict. A joint upgrade and deep maintenance unit has formed at *Cottesmore* to ensure that the optimum number of HARRIER airframes is available for the operational units. It is a joint venture between BAE SYSTEMS and the Services and is expected to save money and decrease the number of aircraft out of service since they will no longer have to be sent to *St. Athan* or *Warton* for upgrades or repair. Although *Cottesmore* and *Wittering* will remain RAF Stations, a percentage of the billets in the air, air traffic, meteorological and administrative departments will be filled by naval personnel. They will, thus have a unique 'feel' unlike any other air base in the UK although it is likely that the JHF will adopt similar ideas when the planned new battlefield helicopters come into service.

The transformation of the squadrons is so radical that it has had to be phased over a number of years. 800 Naval Air Squadron (NAS) decommissioned in 2004 to free manpower for conversion training. 899 NAS decommissioned in 2005, ending the SEA HARRIER training task for both pilots and maintainers. 3 Squadron RAF is to disband in March 2006 (to reform ultimately as a TYPHOON unit) and 800 will commission shortly afterwards. 3 Squadron is effectively being used as a holding squadron for naval pilots and maintainers as they complete their GR 7 conversion. This gives the 'new boys' the chance to work alongside RAF personnel who are more experienced on the type before commissioning 800 NAS. 801 is likely not to decommission but to run down to a cadre in March 2006 before being re-dedicated as a HARRIER GR 9 unit in the following September. Only then will the Joint Force achieve the planned structure.

The changes to the carriers themselves have been almost as radical. New briefing rooms, sortie planning facilities, access to intelligence information and photographic interpretation to assist debriefs have been built into new structure under the extended flight deck forward of the island. Workshops have been made capable of taking in equipment to support three at any one time out of the six different aircraft types that could form the TAG. These are the SEA HARRIER (until March 2006), HARRIER, SEA KING, MERLIN, CHINOOK and APACHE. The small weapon stowage spaces in the INVINCIBLE class were always a weakness of the design and even the ability to use the former SEA DART magazine space when the missile system was removed has not completely solved the problem. In the strike role, the ships will have to Replenish At Sea (RAS) more often as a consequence, a factor the planning staff will have to take into account. In the same way that the airfields ashore will take on a joint flavour, the carriers are becoming joint with RAF personnel appointed to the ship's company for a variety of tasks such as strike planning, air engineering and administration.

Invincible, despite being modified to a limited TAG/strike capability, has come to the end of her planned operational life and was reduced to an unmaintained reserve status in August 2005. While the MoD says that she is to be retained to provide spare components for her two sister ships if necessary, rumours abound that, if the right offer were made, she would be sold to a foreign navy. *Illustrious* has completed a major upgrade in Rosyth to equip her to act as a strike/TAG carrier and became fleet flagship in July 2005. *Ark Royal* is to be brought up to the same standard as *Illustrious* and is due to return to service in late 2007. Between them, they are expected to maintain one carrier at high alert in the strike role and one at lower alert in the assault helicopter (LPH) role until *Queen Elizabeth* and *Prince of Wales* join the fleet.

MARSTRIKE 05

The transitional changes described above are now sufficiently far advanced to take stock of how best to operate the new capability. *Invincible* sailed to the Middle East earlier this year with three SEA KING ASaC 7 helicopters of 849B Flight and a single SEA KING HAS 6 of 771 NAS embarked for the whole time away. Seven SEA HARRIERS of 801 NAS and eight HARRIERS of 4 Squadron joined the ship, with their maintenance personnel, off Salalah in early February when *Invincible* arrived off Oman.

The group was commanded by REAR ADMIRAL Charles STYLE, the Commander UK Maritime Force, who spoke on its return of how the deployment had been planned around the need for JFH and the carrier to explore strike operations. The results will be of particular interest to the team that is in the final stages of designing the CVF. In addition to gathering intelligence information to generate strike sorties, the SEA KINGS searched vast areas of ocean monitoring shipping. The Admiral said that,

“They saw everything and I do mean everything that moved.”

By understanding what is normal, the intelligence gatherers will be able to spot what is abnormal and do something about it. This is something the navy has not been able to do since the big carriers with their GANNET AEW aircraft were withdrawn thirty years ago.

The high point of MARSTRIKE was participation in Exercise MAGIC CARPET, during which the fast jets flew 196 sorties between 19 February and 2 March. HARRIERS carried out a number of live weapon drops including PAVEWAY 2 precision guided bombs. The first time these had been dropped by embarked aircraft. Six 540lb bombs were dropped by SEA HARRIERS and a total of forty 1,000lb bombs were dropped by both squadrons. In addition to the embarked flying, 4 Squadron practised a ‘step ashore’ to operate from a forward arming and re-fuelling point. This allowed the use of CRV 7 rocket pods and PAVEWAY 3 2,000lb precision guided bombs which are not yet cleared for carrier operations. 849 NAS contributed 108 sorties to the Exercise and provided organic intelligence, surveillance, target acquisition and reconnaissance. They also controlled the inbound strike packages. *Invincible*’s programming was written around the need to support the fast jets both on board and ashore. On completion of the exercise, the fast-jets flew back to the UK from Oman, via Cyprus. The ‘plus side’ of this is that the squadrons were able to carry on training on ranges in the UK to avoid ‘skill fade’. The ‘minus side’ is that the squadrons were not on board during the passage home to prevent ‘skill fade’ in the flight deck and air operations teams. The need to balance assets in order to stay sharp is not the least of the transitional solutions the strike force needs to perfect.

MARSTRIKE has demonstrated that the Royal Navy has regained a strike capability, albeit on a modest scale. It has created the template into which the CVF and JSF

will fit and must now make it work. The carriers and JFH must also work hard to provide a pool of trained manpower to man the new ships and squadrons when they become operational, for apart from the sheer scale of the concept, they will be among the most complex weapons systems in the world's armed forces.

The CVF

Under original plans announced after SDR, orders for the two new carriers were to have been placed in 2004 with the first metal being cut in 2005. Significant orders for machinery, known as 'long lead items', should have been placed in 2004. This has not happened because the MoD extended the period of study underpinning the design to get the largest ship for the least money. At the time of closing for press, a 'Main Gate' decision to proceed is expected to be taken some time late in 2005 or early 2006. Original plans, based on cutting metal in 2005, anticipated launch (or more realistically 'float out' of a dry dock) in 2009 and entry into service in 2012. That date is now extremely unlikely and 2015 is more realistic for the first ship. Any later and the spectre of having to retire *Illustrious* and *Ark Royal* through old age before *Queen Elizabeth* is operational has to be taken into account.

The ship is one 'pillar' of the weapons system, the others being the F 35 JSF and the Maritime Airborne Surveillance and Control (MASC) aircraft of a type not yet decided. The MoD has signified the LOCKHEED MARTIN F 35B, STOVL variant of the JSF as the preferred variant at this stage but has insisted that the CVF could be built, if necessary, with catapults and arrestor wires to operate the F 35C 'tailhook' version being developed for the USN. The variant decision was a close one, influenced by the fact that the new Electro-Magnetic catapult (EM-cat) being developed in the USA for CVN 21 would not be ready until 2014, two years after the planned completion of *Queen Elizabeth*. The naval staff rejected steam catapults because they required the ship to have steam generation machinery, which it would not otherwise have had, built into the design. If the EM-cat is ready in time for *Queen Elizabeth*, however, there seems less merit in selecting the STOVL F 35B when the F 35C is undoubtedly the better strike aircraft and has the advantage of commonality with USN deck operations. The latter's selection becomes more of a possibility as shortcomings and problems with the STOVL variant emerge. Whichever version is selected, the type is so technically complex that the first two RN squadrons will form up and train using facilities that will only exist in the USA before becoming operational. MOBs for the JSF have not yet been identified in the UK and the extent of the training 'package' that will need to be 'imported' is still far from clear.

The third 'pillar' of the new strike capability is the Maritime Surveillance and Control (MASC) aircraft. There is no doubt that the ASaC community would prefer the NORTHROP GRUMMAN E 2D (formerly the E 2C 2000) but this would be difficult to operate if the CVF is built with a ski-jump for the F 35B. Baseline funding for the project assumes a version of the MERLIN helicopter fitted with the 'CERBERUS' system from the SEA KING ASaC 7.

Detailed planning for the CVF is driven by the need to generate JSF sorties. It assumes 108 launches on Day 1 of an operation, reducing to 72 a day for the next ten days and 36 for twenty days after that. The latest plan is a ship of 65,000 tons that will be 918 feet (280 metres) long and 226 feet (69 metres wide). The hangar would be 534 feet (163 metres) long by 95 feet (29 metres) wide with a height of 23 feet (7 metres), rising to 29 feet (9 metres) in two 'high hat' areas to allow helicopter rotor heads to be removed. It could accommodate 20 JSF or 45 SEA KING sized helicopters. The two side lifts on the port side could take two JSF or a single CHINOOK with rotors spread.

A strike TAG is expected to comprise 30 JCA, up to 6 MERLIN helicopters and 4 MASC aircraft. 36 JCA, the equivalent of the whole JFH, could be operated for short periods. Perhaps not surprisingly, this is identical to the air group proposed for the cancelled CVA 01 'Joint Carrier' of 1966 which was also to have been named *Queen Elizabeth*. The number of 'souls on board' is far lower, however, and a target figure of 1,400 including the TAG, is said to be made possible by the extensive use of automation. To give just one example of what is required, the weapons supply system will need to provide over 500 weapons to meet the 108 potential sorties on Day 1 of a conflict. Without large numbers of sailors, each will have to be identified, extracted from the relevant bomb room and moved to the right 'pit stop' on the flight deck by automated systems. A similar but reversed process will be needed to strike down weapons and stores after replenishment at sea.

A new Command Structure

The new maritime strike partnership is demonstrating that Britain has the will to deploy forces that will be available and effective on Day 1 of a conflict. This, in turn has ensured a seat at the planning table before any future US led coalition operation. Both the RN and RAF have shown a willingness to think differently in order to move into the new era of precision warfare against asymmetric, stateless terror groups.

For the Navy, this means thinking in a much wider context as operations will involve interaction of ships, aircraft and forces on land to project power into 'the opponents own backyard'. The need for knowledge, surveillance and, potentially, targeting information is vast as is the requirement for secure communications to transmit and receive it. Maritime commanders will find themselves playing a key role in the land, air and logistic support battles rather than fighting another navy 'somewhere at sea'. This realization is leading to changes in the command structure of the strike force. As in MARSTRIKE 05, it is intended to get maximum value for the whole fleet out of the carrier's time at sea. It will, therefore, always operate with a tailored task force of anti-air warfare destroyers, anti-submarine frigates and supply ships so that they all gain in operational knowledge working together.

It is anticipated that, for normal operations, the carrier strike group will be commanded by a 'one star' Commodore RN who may be a Fleet Air Arm pilot or a specialist in other naval warfare disciplines. The fast-jet assets, when embarked, will have a 'fixed-wing commander' usually a Captain RN or Group Captain RAF tasked with using the aircraft to the best advantage. He will liaise between the strike group commander and the 'owner' of the assets, JFH for the next ten years. There is also a proposal to have a dedicated helicopter commander freeing the Commander 'Air' who has traditionally been the senior aviator in British carriers, to concentrate on safety, flight deck and hangar issues. If an APACHE unit is embarked, the helicopter commander could be an Army colonel.

Operational Sea Training (OST) scenarios and Joint Maritime Courses (JMC) are being re-written to reflect the emerging strike role. Every opportunity will be taken to deploy the ships and their tailored task forces to 'learn the patch' in the Mediterranean, the coast of Africa, the Middle and Far East and the USA. CAPTAIN David JAMES, C-in-C Fleet's Staff Officer responsible for carrier strike operations sees the latter as being of particular importance and is anxious to use every opportunity of operating jointly with USN carrier air wings in exercises. To keep the fighter 'art' alive until the JSF is available, in the absence of the SEA HARRIER, the RN has a number of pilots embedded in USN and USMC fighter squadrons. RN focus is on strike operations with the emphasis on maximum sortie generation. This will need the weapons supply parties to make maximum use of

the small, legacy, bomb rooms. Various ways of launching strike aircraft and fighters to cover them are being evaluated. JMCs and future deployments are being planned around the aircraft not the ship so that pilots can maintain peak operational efficiency by day and night. CAPTAIN JAMES recently said,

“If there is little to be gained, then there will be no point in sending a TAG and probably no point in sending the carrier either”.

For the same reason, a TAG may not embark all its potential aircraft or personnel, they can always be flown on to reinforce the group later if necessary as happened in the South Atlantic War and, indeed, with BUCCANEERS in the last generation of strike carriers.

The next ten years

Invincible has faded from the scene but a lot of work is planned for *Illustrious* and *Ark Royal* to keep them operational for another ten years. Both are to be fitted with Precision Approach Radar (PAR) and TACAN to recover HARRIERS in bad weather. The step has been made necessary because SEA HARRIERS used Microwave Aircraft Digital Guidance Equipment (MADGE), a dated system which is not fitted in the HARRIER GR 7/9. Both ships are to be fitted with new flight deck lighting compatible with night vision goggles. It is expected that the ships will be operated in the manner anticipated for the CVF with one at immediate notice in the strike role and one at lower notice in the commando assault (LPH) role.

The transformation has already brought both the RN and RAF a long way from the concept of operations they held before 1998. The partnership is still evolving and learning new ideas but it has created a viable maritime strike force that is a template for the introduction of the JSF and CVF. Given the amount of money that any British Government is likely to want to spend on defence, the present force structure is, perhaps, the only way that the maritime strike capability that the nation needs can be produced. It will be interesting to see if other nations adopt similar ideas or if the British strategy remains unique.