

“Through Adversity to the Stars”



The VC-10 fleet provides both military air transport and flight refuelling. It is seen here refuelling two Tornado aircraft.

The Royal Air Force lives its Motto

Richard Gardner reports on the challenges facing Britain’s Royal Air Force, in which the Indian Air Force shares more than a common early history.

The Indian Air Force and the Royal Air Force can trace their shared histories directly to decisions taken before the First World War to create a military air service, to give commanders access to the new third dimension of the air, as well as on land and at sea. This was the birth of a new

age, where air power was to become a key component in defeating enemies and protecting the homeland from external attack. In the Second World War, India became a bastion of air power, a crucial pillar in the Allied fortress that was to prevent Japanese forces advancing further into the Indian sub-continent. Today,

much of the ethos, training, infrastructure and capability of the IAF continues to build on the sound foundations that were laid when the RAF flew from air bases it had constructed all over the sub-continent and where comrades-in-arms served proudly side-by-side against a common enemy. Over many decades, the

British and Indian aircraft industries have worked closely together, sharing the production and support of many outstanding military aircraft including the Hunter, Canberra, Gnat, Jaguar and Hawk, as well as transport aircraft and helicopters. Many of the air bases built in India have grown into thriving centres of operational activity and the shared tradition of excellence has seen



Early days...a Royal Aircraft Factory BE-2 was one of the earliest British military aircraft to enter production.



The BAE Systems Mantis is a new generation autonomous armed unmanned air system that may replace the current Predator/Reaper UAVs in service in Afghanistan.

the IAF transform successfully into a powerful global air power, and regional peacekeeper. So, if Indian air power is in safe hands, and expanding its capabilities to meet the new threats of the 21st Century, how is the Royal Air Force facing up to its own challenges?

In just eight years time, the Royal Air Force is due to celebrate its centenary, having been established as the world's first fully independent air force on 1 April 1918, with its own Service Chiefs and separate command structures, existing alongside the Army and Royal Navy. This new Service merged aviation elements that had previously been shared between the Army's Royal Flying Corps and the Royal Naval Air Service, and was a revolutionary development, brought about by the realisation that air power is a strategic military asset that requires its own decision-making and support structure. In recent times there has been speculation that the RAF might be split into its original army and navy elements to save on the administrative costs of maintaining a separate Service. But British Ministers have since underlined their commitment to retaining all three

British Services. Today's RAF is already highly integrated, with many of its operational units operating on a Joint Force basis, especially abroad, sharing bases and support facilities with army and navy units depending on the military needs of the deployment. However, the drain on UK defence funding caused by a combination of massive equipment

replacement programmes and expensive enduring operations overseas, has led to a crisis where the planned new programmes add up in cost to more than can be provided without a huge increase in planned spending. The new political climate, following a change of government in the UK last May, has brought the issue to the top of the agenda.



The RAF Hawk Advanced Jet Trainer T2 is similar to the IAF's latest Hawks.

A detailed analysis of all new programmes, known as the Strategic Defence and Security Review (SDSR), is nearing completion, and is expected to be made public in late October. It is attempting to put right the £35 billion “black hole” in funding that has risen over several years of over-spending. Now, the UK government is taking a long, cold, look at what it thinks it will need to defend against, and what it will need to do the job effectively, making the most of new technology and prepared to think in terms of new concepts. In other words, the defence study can be a springboard for new opportunities rather than preparation for doom, as some may regard it. The RAF’s current doctrine, enshrined in a guide known as AP3000,

flexible, multi-role capability, while continuing to provide the global reach that has become its hallmark role over the last thirty years. Some front line squadrons, especially those involved in tactical air transport, air-to-air tanking, close air support and helicopter operations, have been involved in continuous operations for over ten years. No other NATO country, other than the United States, has been prepared to undertake such large-scale air operations over such an extended period. Concentration on what has become a full-blown counter insurgency war in Afghanistan has “hollowed out” much front-line RAF capacity. Aircraft fleets that should have had lives of up to 30-40 years in service are being worn out early. As a result, they have to be expensively

carry four times the payload of a Hercules and accommodate bulky loads such as complete medium-size helicopters or part-dismantled Tornado combat aircraft.

The RAF today maintains a strong homeland air defence capability, equipped with Tornado F3 and Typhoon fighters. In an emergency Hawks can also be armed. Quick Reaction Alert fighters are kept on stand-by 24 hours a day, seven days a week, and are based to intercept suspect aircraft in cooperation with highly integrated ground-based and airborne radar assets. Supporting the UK air defence squadrons are RAF Search and Rescue Sea King helicopters and a fleet of VC-10 and TriStar air-refuelling tankers, E-3D Sentry AWACs command and control air platforms and Nimrod



The A400M will offer a major increase in airlift capacity as it carries twice the payload of the C-130K that it will replace.

spells out key capabilities: control of the air, air mobility and lift, intelligence and situational awareness and attack. Though the priorities may evolve into a different bias compared to today, these basic capabilities are regarded as necessary to maintain a balanced force that can “thin” and “bulge” over time, with the ability to protect the re-generation of “thin” capabilities at a later stage.

There can be little doubt that in the short-term the SDSR will see some current capabilities downgraded in priority, as funding for essential re-equipment has to be safeguarded. But the arguments are now raging behind the scenes as to how best the RAF can continue to retain an affordable,

refurbished and updated more frequently than was planned for. Examples can be seen with the older Nimrods, Hercules and VC-10 fleets, where high airframe hour aircraft are being withdrawn early where it is no longer economic to attempt yet another life extension programme. Replacing these aircraft on a one-for-one basis with more modern production aircraft is proving to be very expensive, so orders tend to be for reduced numbers. On the positive side, new aircraft can bring greater productivity, requiring less down-time for maintenance, and can carry more payload with greater mission capability (more on-station endurance and greater range). The C-17 transports can

R1 electronic intelligence aircraft. For offensive operations the Tornado GR4A is the main combat attack and reconnaissance aircraft, equipped with the latest defensive aids, precision GPS and laser-guided missiles and bombs, and Raptor and Litening III imaging pods. The Tornado fleet has been upgraded with new avionics and communications systems as well as weapons such as the MBDA Dual Mode Brimstone and the Paveway IV precision guided bomb. The RAF has now retired its Jaguar attack squadrons, which served for over 35 years in the front line, and are due to be replaced by Typhoons, though the IAF continues to fly its own modernised and still very-capable Jaguars.



The RAF's C-130 Hercules fleet has been operating worldwide for over four decades, but now the newer C-130J provides most of the front line tactical air support.

The RAF Harrier Force comprises GR7 and GR9 Harriers, which are probably the best-equipped aircraft in the RAF fleet for close air support operations. They have provided the backbone of continuous RAF offensive ops in Afghanistan since NATO forces first arrived in the country, during which they performed over 22,000 flying hours, but have now been replaced by detachments of Tornado GR4As. The Harrier remains one of the world's most flexible military aircraft as it can fly off almost any airstrip, road or ship deck and is a true "go anywhere" platform carrying a heavy load of bombs, rockets and missiles. The RAF is scheduled to maintain its Harriers until 2018, when they are due to be replaced by the Lockheed Martin F-35 Joint Strike Fighter. The Short Take-Off/

Vertical landing F-35B Model is being jointly developed by L-M in the USA and BAE Systems in the UK, with Rolls-Royce contributing the lift-fan engine which provides the VSTOL technology. Until this arrives in service, the Harrier remains the world's only operational STOVL combat aircraft. The RAF is struggling to retain its procurement target of 138 F-35s, especially as the cost of this aircraft has arisen considerably in the last few years, and is also delayed by continuing technical difficulties. If the B Model fails to live up to its promise, the UK will face a very difficult choice in deciding how to replace its remaining Harriers. Complicating this issue is the fact the F-35 is intended as an aircraft that can operate from either land bases or the Royal Navy's new 65,000

ton aircraft carriers. Some observers have questioned whether the RAF really needs a large multi-role fleet of F-35s as well as Typhoons, which are now multi-role aircraft, and not just air superiority fighters. As an air defence fighter Typhoon is in a class of its own offering outstanding agility, Mach 2 performance, supersonic supercruise, a large weapons load and when equipped with the MBDA Meteor long range air-to-air missile, a stand-off air superiority performance to rival the F-22. Typhoon is destined to remain the RAF's main air combat platform for the next 20-30 years, and moves are already underway to upgrade its radar. The UK government is fully supporting efforts to sell the Typhoon to the IAF to meet its multi-role combat aircraft requirements.



The Spitfire, Lancaster and Hurricane were outstanding Second World War combat aircraft, and Spitfires and Hurricanes also served in Indian squadrons during its formative years. The RAF Battle of Britain Memorial Flight keeps these airworthy examples as a reminder of the bravery of thousands of wartime crews who gave their lives defending freedom. 7 September 2010 marked 70th Anniversary of this epic air battle.

Manned or unmanned future combat force?

A new factor has entered into the argument over future combat air platforms for the RAF. Apart from the need to cut the cost of defence spending, the prospect of providing enhanced operational capabilities through the use of unmanned air vehicle platforms has gained favour as the emerging generation of UCAVs requires a much smaller number of expensively trained pilots to fly the aircraft, while allowing continuous operations for periods of up to 24 hours or more. But it was operational need rather than a search for economies that led to the present increased use of large UCAVs by the RAF. Extra persistence, speedy mission response and a varied sensor payload were driving factors in reforming No.39 Squadron as a Predator B/Reaper unit, having previously been a Canberra unit since the 1960s. The RAF has been a major operator of the General Atomics MQ-9 Predator/Reaper UCAV in Afghanistan since 2007, which has shown the value of continuous surveillance, but as a single engine powered platform has its limitations and the RAF is anxious to operate a replacement that has the added “get you home” security of the extra engine. The UAVs are also simpler to maintain, requiring fewer ground crews than are needed for a conventional manned squadron. The Predator/Reaper investment was the result of a procurement process known in the UK as an Urgent Operational



Airbus A330 tanker transports will take over from the RAF's VC-10 and TriStar fleets.

Requirement. Designed to meet short-term needs the UOR is not intended as an alternative to conventional procurement, but has been forced upon the British MOD as a result of so many intensive conflicts being undertaken in rapid succession over the last decade or so. Because these UOR orders are not addressing the longer term needs of the UK Services, and do not allow for export benefits, BAE Systems has developed a family of Unmanned

Air Systems covering all the major size categories from the simple, lightweight Herti, and its armed Fury variant, to the large twin engine Mantis, intended for extended-duration surveillance and armed response. Also being developed as a technology demonstrator is the stealthy high-speed Taranis, which could in productionised form be a partial replacement for the Tornado GR4 fleet, alongside the F-35 and Typhoon.



Typhoon landing.

Contractor services

One area where a different policy direction may arise concerns the future of the many private/public partnership agreements that have become such a feature of UK defence policy in the last decade. Because the conventional procurement pattern for defence contracts was becoming so difficult to fund “up-front” with capital costs requiring major financial outgoings at the start of a new programme, the UK Ministry of Defence became attracted to the more innovative partnership option. This saw a government/industry package being set up to procure new equipment and support services, on behalf of MOD, but involving military control with private management. In some cases, the entire military support service was re-packaged into a joint scheme which, in the short-term, required no MOD cash investment but involved a long-term contract in which all the costs of provision, plus profits, were charged back to the government. Over the full life cycle of the programme this is clearly a more expensive way of providing the solution, but it has the advantage of allowing the RAF to obtain new equipment in a quicker timescale. This, for example allowed the RAF to acquire its first four Boeing C-17 strategic transport aircraft very quickly through a lease, but later, as their intensive use increased the demand for more aircraft, extra numbers were bought outright. Seven will be in service by the end of this year.

A sign that the commercial defence procurement package may be going out of favour is the recent decision to shelve a proposed scheme to replace all the UK military search and rescue helicopters with a private contract service. This contract was well advanced but has been postponed while the defence study is underway. Most of the RAF’s crew training is now carried out under such joint government/commercial partnership arrangements and is working successfully, and has delivered new aircraft and simulator centres that might have been unaffordable under the old in-house military arrangements. The RAF is very enthusiastic towards the concept of transferring non-operational tasks to more efficient commercial management, freeing up uniformed personnel for more operational tasks. The downside to this pattern is that the rolling payments to contractor partners gradually overtakes the



Red Arrows and Typhoons in formation.

cost of the in-house alternative. Decision-makers have to balance the advantages and disadvantages of the two alternatives, but the temptation is to always go for the solution that appears attractive in the short-term.

As it celebrates the 70th Anniversary of the Battle of Britain, the RAF is still one of the world’s most capable air forces. Its Tornado, Typhoon and Harrier aircraft are supported by air tankers and transports giving them global reach. The Service maintains a global network of transport flights supporting detached RAF squadrons and army units in Canada and the USA, Belize, Cyprus, East Africa, the Falkland Islands, the Gulf States and Afghanistan. In addition, tasking in support of humanitarian missions can take RAF transport aircraft carrying emergency relief supplies to almost anywhere in the world from the Asia Pacific region to South America and Africa. A new fleet of 22 A400Ms will replace the older C-130K Hercules fleet which has been in service since 1966. Another fleet of 24 newer C-

130J Hercules transports currently provide the main RAF operational in-theatre air mobility for UK and other forces along with large numbers of helicopters, including Merlins, Chinooks and Pumas. More specialist intelligence-gathering, surveillance and electronic warfare aircraft also operate in Afghanistan, including Nimrods, Sentinel, Shadow and Islander platforms, equipped with special sensors, air-to-ground radars and advanced infrared and electro-optics pods. For short-haul and VIP transport the RAF continues to fly BAE 146 and 125 jets.

The Royal Air Force has had to make big changes to the way it operates at many stages in its illustrious history, such as after the two World Wars, during the Cold War period, and more recently in wars in the Falklands, the Balkans, Iraq and Afghanistan. As it faces its next battle – how to adapt to new technologies and unknown future threats – it can be confident that it will continue to be a world class air force, where bravery and excellence in all things go hand in hand.



RAF Chinook helicopters are at the heart of support operations in Helmand, Afghanistan. The fleet strength is due to rise to 70 Chinooks.