ROYAL AIR FORCE

Air Power Review

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Royal Air Force Air Power Review

The Royal Air Force Air Power Review is produced under the auspices of the Director of Defence Studies (RAF). The publication aims to support the British armed forces in general and the Royal Air Force in particular by developing thinking about the application of air power. The intention is to provide a forum for high quality and academically credible articles on air and space power, with the objective of stimulating debate and promoting the evolution of air and space power thinking within the broader military and academic communities. Authors are, therefore, encouraged to challenge accepted norms and offer novel conclusions; consequently, the views expressed in this journal are not endorsed by either the Editor or the Royal Air Force and do not represent statements of official policy.

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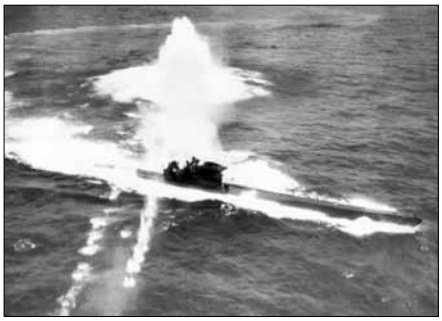
Images below of a successful U-boat attack by a Sunderland of Coastal Command on 27 July 1944.

Two splashes can be seen as depth charges enter the water close to the U-boat. Machine gun fire from the aircraft's rear turret can also be seen leading across the water to the submarine.



Critically damaged after a second Sunderland attack, the U-boat starts to sink stern first. The enemy submarine's crew can be seen crowding the conning tower as they prepare to abandon the stricken vessel.

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A Halifax of 58 Squadron, Coastal Command, caught this German U-boat, U-266, in the Bay of Biscay heading for the open seas in late May 1943.
This picture shows the explosion of one of the two depth charges dropped by the aircraft across the enemy submarine.

Foreword

The winter edition of APR begins with an article on Combat ISTAR written by Air Commodore Stu Evans, the Commandant of the Air Warfare Centre. The sharp eyed reader may recall an article from the summer edition, which had a similar theme and which was misattributed to Air Commodore Evans, for which we apologise. This article is entitled 'Combat ISTAR; a new philosophy on the battle for information in the future operating environment'. The article examines how our ability to maintain the significant contribution that air and space power make to the delivery of intelligence is under threat from the challenges inherent in the future operating environment and the likely fiscal constraints under which the Services must develop and operate joint combat capabilities. Meeting such challenges will require innovative thinking and new concepts that focus on the necessary future force structures, equipment and personnel that can deliver greater synchronicity in the delivery of intelligence and combat effect. Taking a platform agnostic approach, the article considers a range of options of how the development of Combat ISTAR may contribute to the part that air and space power play in supporting the joint force.

The second article is submitted by Dr Seb Ritchie of the Air Historical Branch and compares and contrasts the principal Allied and German airborne operations mounted in the European theatre in the Second World War, in an attempt to identify common factors in their success or failure. Pitched primarily at the operational level, the article considers their general features and outcomes, and the lessons that each bequeathed. It suggests that their results were primarily determined by five factors: lead time, command and control, relief for the airborne troops, intelligence, and airlift. Dr Ritchie explains that although, at the time, the key lessons were identified, it proved very difficult to exploit them effectively. The broader success of Germany's assault on France and the Low Countries in 1940 caused the most important airborne lessons to be neglected during the planning for the assault on Crete in 1941. Similarly, a mix of short-term operational imperatives and the more general Allied victories in Sicily and Normandy led to the neglect of vital airborne lessons from both campaigns before the launch of Operation Market Garden in September 1944. Ultimately, the Allies emerged from the war with robust airborne doctrine firmly rooted in wartime experience, but five years and a succession of major operations were required before they could arrive at this happy conclusion.

Staying with the historical theme to draw lessons for current operations, the next article, entitled 'Fair Stood the Wind for France? The Royal Air Force's experience in 1940 as a case study of the relationship between policy, strategy and doctrine' is penned by Group Captain Al Byford, a former Director of Defence Studies and now serving at the Development Concepts and Doctrine Centre. The article contends that the Royal Air Force's experience in 1940 illustrates a number of enduring lessons about strategy, and its relationship to policy and doctrine. First, strategy matters: it was the RAF's strategy to configure itself for independent action that largely explains why it was comprehensively defeated in France, yet within a matter of weeks was victorious in the Battle of Britain. Second, the construction of strategy is

easily misinterpreted. In the historiography, air strategy is erroneously regarded as a product of doctrine; but in reality, policy was the more important imperative. Consequently, the RAF's strategy is best understood as an entirely rational attempt to translate the interwar policy of 'limited liability' into military practice. Finally, strategy is a process, not an event. The Air Staff's failure to recognise this principle, and to continually adapt its strategy to reflect the changing policy context, is indicative of a culture that rejected critical reflexivity and did not promote intellectual agility. These institutional shortcomings are pervasive and, arguably, still resonate today as impediments to effective strategy-making.

Lieutenant Colonel Andrew Roe, a regular and welcome contributor provides the next piece, a fascinating and enjoyable article entitled "Good God, Sir, Are You Hurt?". The article explores the business of flying over India's troublesome North-West Frontier (now modern-day Pakistan) describing this hazardous undertaking, filled with ubiquitous dangers and hardships. Despite the maze of knife-edge hills, the oppressive furnace-like heat and the ice-cold winds, the constant strain and regular loss of life, this was an experience not to be missed and one to be proud of. This article homes in on the everyday realities and threats faced by aircrews posted to 'The Grim' – the name given to the untamed frontier by the army.

We are delighted to offer the next article, which is a guest article written by a colleague from the Indian Air Force (IAF), Air Commodore (Retd) Jasjit Singh, a former Director of Operations of the Indian Air Force and former Director of the Institute for Defence Studies and Analysis. The article, written from an Indian perspective, is a review of the part played by the Indian Air Force in conflicts across the sub-continent (mainly post-independence). The early history of the IAF started with its formation in 1932 and continued through to its contribution to the Second World War supporting Slim's 14th Army. On Indian independence the Air Force was restructured and supported land operations in the aftermath. Lack of an accurate intelligence picture preceding the Sino-Indian War of 1962 led to significant logistics problems for the Indian Army and subsequently to a large proportion of IAF effort being directed to air transport at the cost of the deployment of combat air power. The War for Kashmir 1965 saw the use of Mystere and Vampire aircraft in anti-armour and –infantry sorties, with air superiority being sought by dominating the skies rather than attacking airfields. India and Pakistan again went to war in 1971 with India initially operating to limited objectives set prior to the opening of hostilities. The IAF flew more combat sorties than their opponents but both air forces lost similar numbers of aircraft. In 1999, in Kashmir, the IAF provided high-altitude helicopter and tactical airlift logistics and communication support, with Canberra, Mig and Mirage aircraft providing recce and close air support. The article concludes by looking at the IAF plans for modernisation.

The next article, provided by a serving Intelligence Officer, Squadron Leader Mark Tobin, had its genesis as an Intermediate Command and Staff Course (Air) essay and is published here on its own merits as an interesting piece and to demonstrate what can be achieved on the RAF's command and staff courses. The article is an analysis of Operation Iraqi Freedom (OIF), which

began on 19 March 2003. Unlike the 1991 Gulf War, the 2003 air campaign was very different both in its execution and its implications for air power thought. This article first examines the OIF air campaign, looking at how its historical lineage and the military and political factors of the day shaped its development and execution. It then moves on to consider the effectiveness of the air campaign, in terms of both its military outcome for Coalition and Iraqi forces and importantly in today's media environment, in terms of whether or not the Coalition successfully translated military and technological superiority to information superiority amongst the public. The article concludes that the complexities of modern air campaigns are such that tactical military success can easily turn to strategic information failure if air power's capabilities are not clearly understood and matched to specific operational requirements. Furthermore, the contemporary operating environment is now too complex to characterise air campaigns as being a success or failure, raising questions as to whether previous absolute theories on the utility of air power are still relevant to complex non-linear campaigns in the twenty-first century.

The final article for this winter edition, written by Dr Richard Goette is entitled 'The British Joint Area Combined Headquarters Scheme and the Command and Control of Maritime Air Power'. The article looks at how the defeat of the German U-boat attack on Allied shipping during the Second World War required the close co-operation of the RN and RAF Coastal Command. It discusses how the constant debate over the command and control of maritime air resources overshadowed the operational relationship between the two British services and touched on some of the fundamentals of air power. The RN wanted to ensure that the RAF gave its trade protection role proper attention, and thus endeavoured to secure greater control over Coastal Command's operations. The RAF held true to the fundamental concept of the "indivisibility of air power," and was weary of losing command over its maritime air power forces. The key to the success of the joint trade defence task was operational effectiveness. Therefore, the RN and RAF developed a series of Area Combined Headquarters along Britain's coast in order to work together effectively in a joint construct and the RN was eventually granted operational control over Coastal Command. Though debates continued at higher levels, the author contends that efficient command and control arrangements at the operational level meant that sailors and airmen in the joint headquarters were eventually able to work out their differences and foster a positive and effective working relationship to ensure the proper prosecution of the trade defence mission.

To conclude the edition we are pleased to offer 2 book reviews, a review of Sir Sherard Cowper-Coles' 'Cables from Kabul: the Inside Story of the West's Afghanistan Campaign' by Wing Commander Greg Hammond, and a review of Stephen Bungays' 'The Art of Action: How Leaders Close the Gaps Between Plans, Actions and Results' submitted by Air Commodore Dolly Parton.

Notes on Contributors

Air Commodore Stuart Evans joined the Royal Air Force in 1983 directly from school, completing basic pilot training on the Jet Provost at Royal Air Force Linton on Ouse. After advanced fast-jet training on the Hawk, he was posted to the Central Flying School, training for and subsequently serving as a first-tourist qualified flying instructor. Following Tornado conversion training he joined 17(F) Squadron, Royal Air Force Brüggen in 1990 where he flew the Tornado GR1. Becoming a qualified weapons instructor, he flew the Tornado GR1A from both Royal Air Force Honington and Marham. He was selected to attend the Royal Australian Air Force Staff College, Canberra. Promoted to Wing Commander while on the course, he attained a Master of Defence Studies from the University of Canberra. Following a tour in MOD he took command of IX (Bomber) Squadron, Royal Air Force Marham, in January 2004. During this tour he took his total flying hours to over 4,000 with over 2,700 hours on the Tornado. In 2008 he was selected to fill an exchange appointment within the Chief of Staff of the United States Air Force Strategic Studies Group in the Pentagon. He returned to the United Kingdom in July 2010 on promotion to Air Commodore to take up an appointment at the Development, Concepts and Doctrine Centre. Air Commodore Evans has recently taken over as Commandant of the Air Warfare Centre.

Dr Sebastian Ritchie is an official historian at the Air Historical Branch (RAF) of the Ministry of Defence. He obtained his PhD from King's College, London, in 1994, and lectured for three years at the University of Manchester before joining the Air Historical Branch. He is the author of a number of official narratives covering RAF operations in Iraq and the Former Yugoslavia, and has also lectured and published widely on aspects of air power and air operations, as well as airborne operations, in the Second World War. He has published three books, including *Industry and Air Power*, and, in May 2011 *Arnhem: Myth and Reality*, as well as numerous articles on the history of air and airborne warfare.

Group Captain Alistair Byford has previously been the RAF's Director of Defence Studies and is currently serving in the Development Concepts and Doctrine Centre. A Tornado strike, attack and reconnaissance pilot, he has flown over 4,000 hours in an operational career that began with the first Gulf War and has included twelve operational detachments, command of No. 31 Squadron and, most recently, No. 904 Expeditionary Air Wing in Afghanistan. He has taken post-graduate degrees in International Relations at Cambridge as an RAF Tedder Fellow and in War Studies at Kings College London. He is the author of the current edition of AP3000 – British Air and Space Doctrine.

Lieutenant Colonel Andrew Roe YORKS, CO 2 YORKS, and previously Military Assistant to the Surgeon General, was commissioned into the Green Howards in 1992. He has held various command and staff positions in Northern Ireland, Germany, Bosnia, Afghanistan, the Falkland Islands and Iraq. He is a graduate of the U.S. Army Command and Staff College and the School

of Advanced Military Studies, Fort Leavenworth, Kansas. He has a PhD from King's College London and is the author of *Waging War in Waziristan: The British Struggle in the Land of Bin Laden, 1849-1947*.

Air Commodore (Retd) Jasjit Singh is a former Director of Operations of the Indian Air Force and former Director of the Institute for Defence Studies and Analyses (IDSA). He is one of the leading analysts of Indian military and strategic thought. He has published extensively and is the author and editor of more than two dozen books on strategic and security issues of South Asia, including - Air Power in Modern Warfare; Non-provocative Defence; Nuclear India; Kargil 1999: Pakistan's Fourth War for Kashmir; and India's Defence Spending: Assessing Future Needs. Dr Jasjit Singh is also a visiting lecturer at defence and war colleges in India and abroad. He was a member of the International Commission for a new Asia, consultant to the Standing Committee of Defence of the Parliament; Adviser and Member of National Security Advisory Board. Jasjit Singh was a 2006 recipient of the Padma Bhushan, a decoration established in 1954 by the president of India and given for distinguished service of high order in any field.

Squadron Leader Mark Tobin is an Intelligence Officer commissioned into the RAF in 1998. Much of his service to date has been in the ISTAR and rotary-wing Operational Intelligence fields with time at JARIC – The National Imagery Exploitation Centre, 28 (AC) Sqn and the Tactical Imagery-Intelligence Wing. Operational tours have taken him to Incirlik as SO3 J2 during Op NORTHERN WATCH followed by tours in ISTAR / Collections and rotary wing J2 on both Op TELIC and Op HERRICK. He is currently serving as SO2 Intelligence and Lessons Identified at HQ Joint Helicopter Command.

Dr Richard Goette is an aerospace academic and Canadian air force historian specializing in command and control, leadership, maritime air power and air defence issues. His 2009 Queen's University at Kingston (Canada) history doctoral dissertation examined Canadian-American command and control relationships regarding continental air defence from the Second World War until the formation of the North American Air Defence Command (NORAD). Richard is currently conducting research on strategic airlift, the Arctic, and professional writing on air power and doctrine by Royal Canadian Air Force (RCAF) officers. He also teaches history and defence studies for the Royal Military College of Canada and the Canadian Forces College. He has worked for the Canadian Forces Leadership Institute (CFLI) and is currently doing contract work for the Canadian Forces Aerospace Warfare Centre (CFAWC) as a contributor to the RCAF's forthcoming Forward Air Operating Concept (FAOC). Richard has published extensively in the fields of air force history, air power, naval history, leadership and command and control, and Canadian defence, and some of his work has also appeared in official Department of National Defence and Canadian Forces publications.

Combat-ISTAR; A New Philosophy on the Battle for Information in the Future Operating Environment

By Air Commodore Stuart Evans

This article is entitled 'Combat ISTAR; a new philosophy on the battle for information in the future operating environment'. The article examines how our ability to maintain the significant contribution that air and space power make to the delivery of intelligence is under threat from the challenges inherent in the future operating environment and the likely fiscal constraints under which the Services must develop and operate joint combat capabilities. Meeting such challenges will require innovative thinking and new concepts that focus on the necessary future force structures, equipment and personnel that can deliver greater synchronicity in the delivery of intelligence and combat effect. Taking a platform agnostic approach, the article considers a range of options of how the development of Combat ISTAR may contribute to the part that air and space power play in supporting the joint force.

Introduction

Studies by the Development, Concepts and Doctrine Centre (DCDC) into the future strategic environment identify important trends for the character of future conflict. The future battlespace will be increasingly *contested, congested, cluttered, connected and constrained* and the battle for information will become increasingly critical to operations.[1] Recent doctrine on the importance of intelligence and understanding to future national decision-making also highlights the need to dominate in the information arena. The UK must, therefore, be prepared to fight for information access and superiority in the battle for ideas and influence that will define tomorrow's operations.[2] This will present significant challenges given the difficulties we face today in meeting the demand for information, even in the relatively permissive environment in which many of our current capabilities and expectations have evolved.

Extensive studies by the MOD Air Staff in support of RAF Strategy development underpinned the DCDC futures work. The studies identified that the more complex future operating environment might necessitate a shift in emphasis, in terms of weight of effort and investment, between the 4 air power roles: Control of the Air and Space; Air Mobility; Intelligence and Situational Awareness (ISA); and Attack.[3] They confirmed the enduring necessity for Control of the Air as an essential pre-requisite for all operations, but highlighted the increasingly critical inter-dependencies between the ISA role and the other air power roles, and the potential for an expansion of doctrinal thinking on space power. The studies also reflected that fiscal constraints and rising technology costs will potentially see a reduction in the number of air platforms available and in the ability to address growing challenges to space access.

Together these issues pointed to a pressing need for a new approach to the delivery of air and space power. This approach must seek a more holistic view on how to integrate and synchronise the contribution that all air and space capabilities make to the ISA role and how to **exploit** more effectively the vital intelligence they provide. Initial consideration of how to proceed focused on adoption of a more platform-agnostic philosophy that looks beyond traditional tenets such as fast jet, dual-role or multi-role aircraft and seeks more innovative solutions spanning the physical and virtual domains. It also reflected the shift away from a predominantly counter force mentality and kinetic targeting towards operations more reliant on greater shared situational awareness and the achievement of decisive effects. In a number of keynote speeches ahead of the Strategic Defence and Security Review (SDSR) the Chief of the Air Staff outlined how the RAF would take forward this new approach under the banner of *Combat-ISTAR*.

This article intends to expose further the thinking behind this new approach to the wider air and space power audience, and the joint community. It examines some of the conceptual ideas being considered in an effort to stimulate debate and challenge perceptions on Combat-ISTAR ahead of the next iteration of the Future Air and Space Operational Concept (FASOC) and

to inform emerging space doctrine.

Air and Space Power – A Vital Contribution to Assured Intelligence

The advantages of being able to **secure, dominate** and **exploit** the high ground has been understood since the dawn of warfare and the elevated vantage point afforded by the advent of air and space power offers a unique ability in this regard. The resulting view *over the hill* and across the electro-magnetic spectrum supports the delivery of intelligence at all command levels. This intelligence acts as a force multiplier, allowing more effective decision-making and the ability to gain the initiative, including at the strategic and operational levels. Examples from history include the contribution made by airborne assets to locating the German V-weapons production and launch facilities during World War II, and the satellite and airborne imagery critical to resolution of the Cuban Missile Crisis. Exploiting the inherent characteristics of air and space power enables rapid sensor coverage of a wide area and, to a certain extent, without the access problems experienced in the surface environments. Air and space sensors can provide concentrated, detailed, multi-band coverage of an area of particular interest, with airborne sensors also able to reposition rapidly from one area of the battlespace to another. British Air Power Doctrine describes how wide-area sensors, such as airborne stand-off radar, can cue higher resolution sensors with narrower fields of view, such as electro-optic reconnaissance pods and even fast jet targeting pods, on to the point of interest; the analogy is *floodlight* to *searchlight to spotlight*.[4]

Traditionally, air and space capabilities support the intelligence process in 2 mission areas; surveillance and reconnaissance.[5] Surveillance is the *continuing and systematic* observation of air, space, surface or sub-surface areas, places, persons or things, by visual, aural, electronic, photographic or other means. Reconnaissance complements surveillance by using visual or other detection methods to obtain *specific information* about the activities and resources of an enemy or potential enemy; it may also secure data concerning the meteorological, hydrographical or geographic characteristics of a particular area. More recent adoption of the term ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) reflects the prominent role that air and space sensors also play in 4 of the 6 steps of the targeting process: *detection; location; identification; decision; execution;* and assessment.[6] ISTAR is defined as:

> *The coordinated acquisition, processing and dissemination of timely, accurate, relevant and assured information and Intelligence which supports the planning and conduct of operations, targeting and the integration of effects…throughout the Spectrum of Conflict.*[7]

Regardless of the sensor or platform involved, the provision of intelligence is the vital contribution to reducing uncertainty in decision-making processes at all levels of command.[8] The increasingly critical nature of air and space ISTAR capabilities to modern operations has once again been highlighted by UK involvement in operations over Libya. But the intelligence gathering conducted during the early stages of the conflict was very different to such activity

in Afghanistan. The latter benefits from a mature ground disposition that allows the fielding of fixed surface intelligence architecture such as masts, aerostats and unmanned ground sensors, allied to a relatively uncontested air environment enabling the forward basing and operation of relatively vulnerable air platforms with line-of-sight data-transfer. In contrast, early operations over Libya required long-range ISTAR platforms capable of operating near or within contested airspace. The Coalition's relative paucity of such assets resulted in a lack of accurate intelligence on Libyan force dispositions, with operational decision-making taking place in a vacuum of situational awareness. As the operation evolved, the UK was one of the few coalition partners able to employ much-needed, wide-area ISTAR capability including E-3D Sentry, Sentinel R1, Nimrod R1 and RAPTOR-equipped Tornado GR4s. Undoubtedly, had the UK retained a Maritime Patrol Aircraft capability or had a contingent Unmanned Air System to provide persistent surveillance, these capabilities would also have been used. Nevertheless, to overcome ISTAR shortfalls in Coalition inventories and provide sufficient weight of effort for intelligence gathering the Coalition was forced to place heavy reliance on US platforms. Given the demand on such US assets and Secretary Gates' recent comments on NATO this reliance could carry increasing risk, particularly given the UK Strategic Defence and Security Review (SDSR) decision to reduce, gap or remove some ISTAR capabilities, with other European NATO partners potentially following suit. This will require radical new thought to address the lessons arising from Libya and to maintain the ability to conduct and support expeditionary operations in the future operating environment. However, it remains to be seen whether innovative thought and concepts such as Combat-ISTAR can gain sufficient traction to influence the difficult decisions that will need to be taken concerning existing procurement plans.

A New Approach: Combat- ISTAR

The need to redefine current thinking on the future delivery of the ISA role is seen as an essential part of an innovative approach to the delivery of effective air and space power effects to the joint force. The increasingly complex nature of warfare and the growing ability of our opponents to contest our ability to **secure** access and **dominate** in the high ground of the air and space will challenge our ability to develop the necessary situational understanding to support joint operations. In the battle for ideas and influence that may mark future operations, information itself will be seen as an emerging area of *combat* in light of adversary challenges to information dominance.[9] The fight for information may itself become the driving rationale for control of the air and potentially space, rather than the ability to secure such control for other offensive activity. Furthermore, the ability to source information in cyberspace will increasingly pervade modern operations and augment other collection methods, placing increasing importance on our ability to **secure, dominate** and **exploit** in this new environment. And we must also recognise and where possible mitigate the vulnerabilities inherent in our dependence on space.

The adoption by the RAF of the Combat-ISTAR approach aims to provide a springboard for such innovation, building on complementary efforts across a number of the MOD's sub-strategies,

including development of the Single Intelligence Environment:

> *Combat ISTAR is the provision of assured Intelligence and Situational Awareness derived from the synergistic employment of networked **air, space** and **cyber** systems in complex and often **contested** operating environments **in tandem with responsive influence effects**.*

Combat-ISTAR is, therefore, seen as a composite effect that aims to provide ISA through the achievement of battle-space dominance across the physical, information and virtual domains, within defined geographical bounds. Air and space power support to joint action will normally be achieved through the simultaneous execution of the ISA role with one or more of the other core air and space power roles synchronised, where necessary, with activities in the other environments. The adoption of a platform-agnostic approach to delivery of the ISA role intends to place precedence on every air and space platform contributing towards delivery of combat effect in the information domain. It also recognises that the ability to deliver effective ISA using air and space capabilities will demand greater emphasis on the rapid processing, fusion and exploitation of information from a wider variety of available sensors, together with an ability to deliver immediate effects.

Combat ISTAR – From Intelligence to Influence

The military aircraft inventory is under increasing financial pressure, an issue compounded by the growing cost of platforms and technology in general. New concepts must, therefore, consider how a smaller number of existing and future platforms will contribute across the spectrum of the air and space power roles. The currently understood limits of materials and engineering techniques suggest that any one platform is unlikely to be able successfully to conduct all 4 of these roles. Combat-ISTAR should, therefore, seek to focus capability development so that **all** air and space platforms can contribute to combat in the information arena while providing other offensive or enabling capabilities. This approach will seek to exploit emerging technological solutions to some of the traditional limitations inherent in air and space sensors.

For air breathing platforms, this approach builds on the continual innovation evident since the advent of aircraft, which began with reconnaissance and then armed reconnaissance platforms. As fighter aircraft developed to counter this threat, further evolutions differentiated between fighter and bomber aircraft, which developed independently in response to their payload, manoeuvrability and range. Later evolutions, particularly in the era of jet-powered aircraft, saw an increasing design focus on multi-role capabilities, combining the roles of fighter, bomber and reconnaissance aircraft wherever possible. More recently, the addition of role-specific equipment to existing platforms has seen a further expansion of their capabilities and roles. This trend is apparent today in the multiple capabilities offered by the Tornado and the Typhoon over Afghanistan and Libya.

It is important to recognise, however, that the trend towards greater role diversity was not

solely the preserve of bomber and fighter aircraft. Larger platforms, including maritime and transport aircraft also made a considerable contribution to offensive and reconnaissance capabilities. Aircraft such as the Shorts Sunderland operating in the maritime environment outside of the short-range fighter threat were not so reliant on securing control of the air; they were therefore able to combine a long range and persistent reconnaissance capability with the ability to carry weapons effective against the U-boat threat in the Atlantic. The utility of long-range Maritime Patrol Aircraft was again demonstrated during the Falklands campaign, where persistent surveillance by Nimrod aircraft deterred the Argentines from using their maritime assets after the sinking of the *Belgrano*. Modern day equivalents include the installation of a range of offensive weaponry on the Hercules C-130 Gunship variants, the addition of a variety of sensors such as WESCAM cameras on the King Air and SIGINT packages and data-link rebroadcast capabilities on tanker and transport aircraft. This role diversity and the increasing trend towards all platforms contributing to the ISA role is the driving factor behind the platform-agnostic approach within the Combat-ISTAR philosophy.

In addition to a focus on the ISA role, Combat-ISTAR will seek to exploit the increasing interdependence between the air power roles in terms of rapid and agile offensive action against fleeting adversaries. As an important element of Joint Fires, air assets operating in the ISA, Attack and Control of the Air roles can operate seamlessly across all elements of the targeting process, **exploiting** the intelligence they gather through the *execution* and *assessment* functions. The synchronicity offered by a single platform conducting all of these discrete functions reduces the friction inherent in handing off tasks between separate assets and offers more effective prosecution of time-sensitive targets. This will be particularly relevant to the *congested* urban and littoral environments of the future where likely targets will be difficult to find, opportunities for prosecution will be fleeting and the risk of collateral damage high. It will also be critical if the future operating environment is being *contested* and platforms must fight to gain and **secure** access to the information required. Such aspirations are already becoming reality, with platforms such as Typhoon offering capabilities in the required 3 air power roles; further exploitation of the synergies offered by this platform is under consideration. Looking to the future, the integrated suite of highly capable sensors on the F35 Lightning II, Joint Combat Aircraft (JCA) and its ability to fuse and distribute information suggests that its introduction to service will offer a physical manifestation of the Combat-ISTAR principles.

However, while future capabilities such as JCA represent the embodiment of Combat-ISTAR, it is important to stress that in a holistic approach to delivery of air power they are not the sole answer to the assured delivery of intelligence or engagement of fleeting targets. Priority must be given to the need for seamless interconnectivity between all other 'sensors' and 'shooters' to enable rapid engagement of any target during the *execution* phase, including joint fires assets operating in the other domains. Indeed, one vision of the future suggests merit in delivering an *effects cloud* that represents the full range of joint fires assets available to a commander. This could potentially allow commanders to select assets, from all environments, including cyber,

resident on the network with the required information, capacity and capability to engage the identified target. As the foundation of the Combat-ISTAR approach, an *every platform a sensor* approach could be compared to a further evolution of the USAF's catchy *every sensor a shooter* strap-line that extends beyond a historic focus on fast-jet platforms. It also serves to refocus efforts on effective delivery of the required outputs; intelligence and influence.

In space too, continuing evolution in orbital delivery systems and satellite capabilities has led to greater exploitation by an increasing number of states and commercial operators. Greater competition in space, together with the resulting increase in *congestion* and *clutter* serves to limit traditional western dominance of this environment. Space is also increasingly being *contested,* as indicated by recent demonstrations of credible anti-satellite capabilities, activity in the cyber domain and through jamming of the electro-magnetic spectrum. The potential for the future weaponisation of space could also have a significant impact on our joint dependence on space capabilities, particularly the ability to **exploit** the high ground for ISA.[10] This aspect should drive a joint requirement for improved space situational awareness, including novel solutions such as the use of small satellites to monitor and even protect more valuable assets. Further, the advent of a new range of hybrid platforms – so called space planes and hyper-velocity glide vehicles - that operate in near space and the air represent a blurring of the boundaries between these environments. They will therefore complicate traditional notions of sovereign airspace and the global common of space. These and other issues will likely feature in the developing National Space Security Policy, which will influence emerging concepts and doctrine, including a proposed Joint Doctrine Note on *Space Support to the Joint Warfighter*.

A Focus on the Product – The Intelligence Cycle Revisited

Combat-ISTAR intends to move beyond the contributions made by individual platforms and sensors to the ISA role and take a more holistic approach to more effective exploitation of the full DIRECT-COLLECT-PROCESS-DISTRIBUTE intelligence cycle.[11] The emerging concept must therefore look to exploit technological developments in areas such as cyber capabilities, computer processing and network connectivity. Returning to the analogy from Air Power Doctrine, the future inventory might therefore see fewer floodlights and even searchlights but a potentially greater number of flashlights. This places even greater priority on the ability to piece together all of these discrete, multi-spectral flashlight elements and to focus greater effort on the DIRECT-PROCESS-DISTRIBUTE elements of the intelligence cycle, rather than a platform-centric approach to the COLLECT function.

One suggested solution to overcoming the limitations inherent in having fewer dedicated ISTAR assets is to use a *mosaic* or *jigsaw* approach to deliver intelligence across the entire area of operations. The future battlespace will likely contain an increasing range of sensors able to deliver discrete information elements, including airborne radars, self-defence electronic surveillance equipment, electro-optical devices and even blue-force tracking systems. Contributors will additionally include air and space assets from other nations and commercial

operators, placing high priority on interoperability with such partners, together with assets operating in other domains, including cyberspace. The so-called Combat-Oriented Mosaic-Built Intelligence (COMBI) approach aims to deliver the ability to cross-cue or task directly and then harvest information from every air and space sensor available in the battlespace. Subsequent piecing together of each small element of information in the same way as a mosaic or jigsaw allows construction of a more comprehensive *picture* of the battlespace to support delivery of assured intelligence.[12]

The COMBI approach will clearly demand highly effective computing and communications capabilities, together with interactive networks that support high rates of data transfer and fusion. This may predicate placing greater investment in research and development into future computing and software evolution, building on expected future advances in computer chip capacity and cloud computing. Software areas such as data-mining, pattern-recognition and prediction algorithms also offer encouraging signs of potential, as do commercial advances in multi-purpose, multi-function and multi-layered information and volume distillation development. Furthermore, trends in miniaturisation could offer increasing utility from the intelligent use of airborne platforms of all types, including in space, to enhance the range and utility of deployable and flexible networks by providing airborne relay stations and mobile processing. This could assist the movement of information around the battle-space, particularly in environments that do not support the placement of suitable ground facilities.

Such innovative approaches to the DIRECT-PROCESS-DISTRIBUTE elements should also drive a fresh examination of COLLECT capability requirements. Developments in on-board sensor capabilities offering greater information feeds from individual platforms provide one area worthy of consideration; current attempts by the US to develop its GORGON STARE concept provides a useful example.[13] Other interesting developments include the US Army's Manned-Unmanned System Integration Capability (MUSIC), which will be trialled in late 2011.[14] The system aims to combine manned and unmanned operations to form a cohesive intelligence, surveillance and reconnaissance unit that collects and disseminates critical battlefield information, accessing all the information collectively and simultaneously; the principle is *what one can see, all can see*. The capability will introduce a universal ground station for a variety of unmanned systems and a 3-sensor payload dubbed *Triclops*. The latter innovation aims to provide external operators – either soldiers on the ground or crews of manned platforms – the ability to control directly part of the sensor payload without the need for voice communications with the operator.

Combat-ISTAR might also usefully seek to exploit emerging platform technologies that could offer complementary utility in this regard. Novel platforms such as airships or hybrid air vehicles might offer interesting opportunities in the future and unmanned systems will doubtless offer increasing versatility and utility beyond their current armed ISA capabilities, to include Unmanned Combat Air Systems that can operate at less risk in non-permissive environments. Such platforms may offer significant advantages in terms of persistence

and even a modular approach to capability delivery. However, they do not yet obviate the personnel burden inherent in operating complex air systems. One of the reasons for the adoption into doctrine of the term Remotely Piloted Air Systems (RPAS), as an alternative to Unmanned Aircraft Systems (UAS), is to reflect the essential role of the crew operating the system and emphasises that the system as a whole is not unmanned.[15] Moreover, persistent surveillance, either manned or unmanned, requires a large number of personnel to both generate and maintain the activity and to manage the significant amount of data it generates.

The capability areas mentioned provide only a highlight of some of the areas that might be considered under the Combat-ISTAR approach. One other important consideration, however, is the impact that any significant shift in how air and space power contributes to the ISA role will have on how we attract and cultivate the right personnel to deliver the required product. Early work under the Combat-ISTAR approach should, therefore, investigate what new skills may be required for such an approach, the command and control arrangements and systems necessary for the tasking of more interdependent air and space operations, and the agile force structures required to deliver assured intelligence to the end user, at whatever level of command. It must also identify how the continuing increase in volumes of information delivered by modern air and space sensors, and increasingly from cyberspace, will impact on the capacity required within the analysis and processing areas. This area could potentially become a bottleneck in the intelligence cycle if insufficient resources, both personnel and technological solutions to information management and processing, are allocated to these critical functions. Fortunately, the RAF's long association with technological innovation and its highly skilled workforce make it particularly well placed to take the necessary leap of faith to deliver such outcomes for the joint force.

Conclusion

Combat-ISTAR intends to drive a new approach to the integrated employment of air, space and cyber systems to deliver assured intelligence and situational awareness, in conjunction with agile offensive action against potentially fleeting adversaries. Underpinning this approach is the need to maximise the advantages of being able to **secure**, **dominate** and **exploit** the high ground to deliver effective intelligence, a critical element of developing the necessary understanding to support decision-making at all levels. However, our ability to maintain the significant contribution that air and space power make to the delivery of intelligence is under threat from the challenges inherent in the future operating environment and the likely fiscal constraints under which the Services must develop and operate joint combat capabilities.

Meeting such challenges will require innovative thinking and new concepts that focus on the necessary future force structures, equipment and personnel that can deliver greater synchronicity in the delivery of intelligence and combat effect. Such thinking must overcome legacy, platform-centric approaches and move to consideration of how to more effectively harvest, process, manage and exchange information collected by a wider variety of sensors. It must also consider how to meet the requirement for coincident support to joint action,

including fires against fleeting targets in difficult environments.

Early thoughts are considering the increasing inter-dependencies between the 4 air and space power roles, with an increasing focus on the centrality of the ISA role. This work recognises the growing importance of being able to challenge for dominance in the information arena within congested and contested environments. Initial consideration is being given to enhancing the utility that combat capabilities operating in the Control of the Air and Attack roles may offer to the ISA role, but the aspiration is for all platforms, including those operating in roles not traditionally considered as combat functions to contribute to the holistic delivery of information and intelligence. This platform-agnostic approach to the air and space contribution to the intelligence cycle brings with it a new paradigm for the command and control of a wider variety of other information contributors. It will also build on existing proposals seeking to enhance our abilities to process and share information across common networks and with our future coalition partners. The Combat-ISTAR approach will therefore have a marked influence on the future development of air and space power to support the joint force.

Notes

[1] DCDC: Future Character of Conflict Paper.
[2] Joint Doctrine Publication 04: Understanding.
[3] AP3000 British Air and Space Power Doctrine – Fourth Edition, Chapter 3.
[4] *Ibid* p47
[5] *Ibid*, p46.
[6] The term F3EA (Find, Fix, Finish, Exploit and Analyse) is also gaining popularity.
[7] JDP 0-01.1. United Kingdom Glossary of Joint and Multinational Terms and Definitions, (7th Edition).
[8] Intelligence is the product from the collection, processing, integration, analysis, evaluation and interpretation of available information.
Described in the Intelligence process (DCPD - Direct, Collect, Process, Distribute).
[9] OED, Combat: to fight or contend against; oppose vigorously; a fight, struggle or controversy, including between ideas.
[10] It is estimated that up to 90% of our current military capabilities are in some way reliant on space; FASOC 09, p1-2.
[11] JDP 02- Intelligence Support to Operations, Chapter 3.
[12] Advanced air platforms such as JSF offer the ability to fuse sensor data on-board the aircraft.
[13] GORGON STARE is a podded system fitted to REAPER with multiple cameras; the concept is attempting to provide coverage of a number of individual targets or synchronised output to provide mosaic wide area coverage.
[14] *Jane's Defence Weekly*, 18 May 2011, The Americas: MUSIC to sync manned aircraft and UAVs, page 8.
[15] UK Ministry of Defence News Brief, 21 Jul 2010, Adoption of new terminology for the RAF: Remotely Piloted Air Systems.

Learning the Hard Way: A Comparative Perspective on Airborne Operations in the Second World War

By Dr Sebastian Ritchie

This article compares and contrasts the principal Allied and German airborne operations mounted in the European theatre in the Second World War, in an attempt to identify common factors in their success or failure. Pitched primarily at the operational level, it considers their general features and outcomes, and the lessons that each bequeathed. It suggests that their results were primarily determined by five factors: these were lead time, command and control, relief for the airborne troops, intelligence, and the airlift. However, although, at the time, the key lessons were soon identified, it proved very difficult to exploit them effectively. The broader success of Germany's assault on France and the Low Countries in 1940 caused the most important airborne lessons to be neglected during the planning for the assault on Crete in 1941. Similarly, a mix of short-term operational imperatives and the more general Allied victories in Sicily and Normandy led to the neglect of vital airborne lessons from both campaigns before the launch of Operation Market Garden in September 1944. Ultimately, the Allies emerged from the war with robust airborne doctrine firmly rooted in wartime experience, but five years and a succession of major operations were required before they could arrive at this happy conclusion.

Introduction

The aim of this article is to compare and contrast the principal Allied and German airborne operations mounted in the European theatre in the Second World War, in an attempt to identify common factors in their success or failure. So much has been written about airborne warfare in this period that there might at first seem to be little need for another investigation of the subject. Yet the perspective adopted in the following pages has not, to the author's knowledge, been employed before, and our grasp of some of the most fundamental airborne issues has unquestionably suffered as a result. The simple truth is that too many histories have tended to consider individual airborne operations in isolation, and have failed to set them in their correct historical context. There is little examination of recurring themes spanning more than two operations, and the majority of authors typically seek to explain the outcome of airborne missions purely by reference to the tactical-level planning and execution of the mission itself.[1]

This approach neglects the fact that past experience is one of the key determinants of human action. Attempts to explain the course of military undertakings without reference to earlier, comparable operations, and to such lessons as might reasonably have been drawn from them, must therefore result in the presentation of a very partial and misleading account of events. Moreover, on the rare occasions that a degree of historical context has been introduced, it has been confined to tactical issues, while the operational level has been neglected. Yet there is of course a very close connection between the two. Indeed, operational-level factors create the framework within which tactical-level decision making takes place, thus profoundly influencing the tactical planning process and the courses of action ultimately adopted. For both these reasons, the preparation of an objective comparative analysis pitched primarily at the operational level appeared not merely worthwhile, but long overdue. Instead of addressing the operations of the later wartime years in isolation from earlier airborne ventures, there is a strong case for seeking to identify the characteristics that they shared, for considering the lessons drawn from them, and for assessing the extent to which they were successfully applied.

At the beginning of the Second World War, airborne warfare was an entirely new and revolutionary concept. However, as in so many areas of pre-war rearmament, the Germans got a head start. They began examining the airborne concept in 1936, established a parachute training school in the spring of 1937 and first incorporated airborne troops into exercises in the autumn. In May 1938, they decided to form 7 Air Division and to train air transport units for airborne operations; at the end of the year, it was agreed that 22 Infantry Division should also be trained and equipped for air-landing tasks. Large-scale airborne exercises were staged in both 1938 and 1939. This meant that by 1940 the Germans had addressed over an extended period a range of fundamental issues. They possessed a substantial air transport fleet, and they had formulated coherent airborne doctrine based partly on the use of airborne troops to capture key tactical objectives such as bridges, and partly on their employment to seize air heads through which reinforcements could be airlifted. Techniques, tactics, recruitment and

training were all well developed.[2]

The Western Allies did not initiate action under any of these headings until 1940, and very little was achieved in concrete terms until the second half of 1941.[3] Within their armed forces there was a chronic lack of expertise at all levels – especially, of course, at the top; there was no doctrine, virtually no airlift, and no training infrastructure. All of this had to be generated out of nothing at very short notice, and this was never likely to be easy. As one senior RAF officer put it:

> We are trying to do what we have never been able to do hitherto, namely to introduce a completely new arm into the Service at about five minutes' notice, and with totally inadequate resources and personnel. Little, if any, practical experience is possessed in England of any of these problems and it will be necessary to cover in six months what the Germans have covered in six years.[4]

The German airborne contributed on a limited scale to the Norwegian campaign in April 1940, but their first large-scale operations took place in the Low Countries in May. A force consisting of 7 Air Division and elements of 22 Infantry Division was tasked in an enabling role for the German ground offensive, involving the capture of a series of bridges across major waterways. In Holland this also required the capture of Waalhaven airfield, to act as an air head. The bulk of 22 Infantry Division was given a more strategic role involving a direct strike against The Hague, which was identified as Holland's principal centre of gravity. There they were to capture the Dutch Royal Family, the government and the high command. Their mission required the preliminary seizure of three air heads – the airfields at Ypenburg, Valkenburg, and Ockenburg.

The German airborne experience in the Low Countries ranged from triumphant victory to partial success, through to abject failure. The capture of fortress Eben Emael and the Albert Canal bridges ranks among the most brilliant and audacious feats of airborne assault, while the airborne also helped German ground forces to penetrate very quickly as far west as Rotterdam. Of the factors subsequently viewed as critical to the success of the operation, the first was lead time. Planning began as early as November 1939, and this provided ample scope for extensive preparations, exercises and mission-specific rehearsals. There was time to gather very detailed intelligence, deliberate over plans, identify potential problem areas and produce practical solutions.[5]

A second key factor was command and control. The German airborne operation plans were very closely integrated into their more general planning, both on the ground and in the air, so that senior commanders never lost visibility of vital airborne issues. Indeed, soon after taking up his appointment, the responsible air commander, Field Marshal Albert Kesselring, realised that the airborne enjoyed exceptionally high-level patronage, both Hitler and Goering taking a strong personal interest in their fortunes. Their chief, General Kurt Student, found himself in 'a certain privileged position which he seized with both hands.'[6]

With this in mind, Kesselring was evidently perturbed to learn of the depth of the missions assigned to 7 Air Division and 22 Infantry Division. He therefore visited his army counterpart, General Von Bock, and insisted 'that on the third day of the offensive the Panzer forces would have to join up with Student's air-landing parties in or near Rotterdam.'

> Von Bock was not by any means sure that he could keep to the Rotterdam time-table, but when I made no bones about it that the fate of the air-landing group, and indeed of the Army Group's operation, hung on the punctual arrival of the mechanised army units, he assured me that he would do everything humanly possible. I made it easier for him to give me this promise by guaranteeing him the fullest air support.[7]

One of Kesselring's *fliegerkorps* was also specifically earmarked for the airborne forces, both to provide them with direct air support and to impede Dutch troop movements and counter-attacks.[8]

Kesselring's actions lay behind the third factor in the success of German operations east of Rotterdam: the airborne troops were very rapidly relieved by ground forces arriving from the frontier, not only at Eben Emael but also in western Holland, where lead elements of 9 Panzer Division made contact with the airborne in a period of about two days. Moreover, before the panzers arrived, reinforcements and supplies were brought in by air via the Waalhaven air head, and landings along the Moerdijk-Dordrecht road. Fourth, staged in daylight, the parachute drops and glider landings were for the most part both accurate and concentrated, and the airborne troops were able to form up very quickly.[9] Fifth, in the Eben Emael and Albert Canal operations, the Germans were confronted by what might be termed compliant adversaries. This does not mean that the Belgians capitulated without a fight, but that German predictions about the nature of their response were reasonably accurate. They were largely unable to offer effective resistance.[10]

However, where the Dutch were concerned, the reverse was true. Alerted by events in Norway to the threat posed by the German airborne, the Dutch responded with a series of counter-measures aimed particularly at strengthening airfield defence. The result was far tougher resistance than the Germans expected. They ultimately secured their objectives between Moerdijk and Rotterdam, but 22 Infantry Division's mission around The Hague had to be abandoned. The Dutch were alerted by German troop movements on the frontier. The daylight airlift, advantageous elsewhere, became a liability in the absence of tactical surprise. None of the air heads were captured, and only a minority of air-landing troops were actually landed. Dutch opposition in Rotterdam prevented the arrival of relief forces over land, or any link up with 7 Air Division.[11] Personnel and aircraft losses were very heavy. Of those actually delivered to the three air heads, the casualty rate was 40 per cent among the officers and 28 per cent among the other ranks.[12] But the worst losses were sustained by the Luftwaffe's air transport fleet: during the course of the airborne attacks on both the Albert Canal and western Holland, as many as 280 JU 52s may have been destroyed, and many others were damaged.[13]

German operations in the Low Countries demonstrated simultaneously the tremendous potential of airborne assault and the considerable risks involved. The next major German venture would do the same, and the mix of success and failure is once more very informative. Operation Mercury, the capture of Crete in 1941, was of course a very different type of operation – an independent airborne assault on an island. Essentially, Mercury was a Pyrrhic victory – the island was captured but in excess of 50 per cent casualties were incurred by 7 Air Division, along with further heavy aircraft losses. The high cost of the operation undermined Hitler's confidence in the airborne, and raised serious questions about German airborne tactical doctrine.[14]

What went wrong? The German reports inevitably dwelt on the far shorter lead time for Mercury, compared with the time that had been available for planning and preparation before the assault on the Low Countries. The attack on Crete was launched at only a few weeks' notice, with the final plan being completed at the very last moment; there were no opportunities for the exercises and rehearsals that had proved so valuable the previous year.[15]

But the key factor was that the German airborne found themselves confronted by an initially non-compliant adversary in possession of vastly superior intelligence. Poor intelligence – especially a serious underestimate of the number of Allied troops in Crete – led directly to Student's decision to employ the so-called 'oil spots' approach, which dispersed 7 Air Division too widely across the island. Two of the four main force elements were cut off for days without relief, and with minimal resupply. The Germans also contributed to the Allied advantage by employing eminently predictable tactics: they targeted airfields, just as they had in Norway and Holland. The British identified their main objectives months before the Germans even began planning the assault, and long before they started receiving so-called 'Ultra' high-grade signals intelligence on Mercury.[16]

The German airlift also went badly wrong. It was inaccurate, due partly to the low average quality of the air transport crews, partly to the short lead time (which reduced the standard of pre-briefing) and partly to the selection of a number of drop zones (DZs) that either lacked distinctive features or else were too close to the sea.[17] The second lift took far longer to stage than expected and became severely disorganised. Tactical surprise was lost; the Allied troops at Rethymnon and Heraklion were placed on the alert by the first lift to Maleme and were literally waiting for the German airborne to arrive.[18]

How, then, did the Germans snatch victory from the jaws of defeat? As an independent airborne operation, Mercury did not raise the command and control issues that tended to accompany complex combined and joint operations. But close integration between the airborne and the Luftwaffe at the top level was nevertheless very important. Crete was effectively isolated, so that few supplies and reinforcements reached the defenders after the fighting had started, and the Luftwaffe provided direct support to the landing forces in both offensive and defensive actions.[19]

Secondly, the Germans' adversaries became more compliant after the initial landing phase of the operation. Allied troops voluntarily yielded key terrain; counter-attacks were repeatedly delayed.[20] The effect was magnified by the ability of the Germans to secure a clear intelligence advantage within the first 24 hours or so. The vital factor here was the establishment of functional communications between the airborne in Crete and Student's headquarters on the Greek mainland. This allowed him to change his plans in accordance with information received about the tactical situation on the island – hence his decision to fly 5 Mountain Division into Maleme airfield. It also meant that he could provide some direction to the Luftwaffe on how best to exploit their crushing air superiority. By contrast, Allied commanders quickly lost control of the battle and found themselves unable to obtain an accurate and up-to-date picture of tactical developments.[21]

Third, the air-landing operation that delivered 5 Mountain Division to Maleme was far more successful than the airlifts mounted for 7 Air Division on the first day of Mercury, even though the cost in terms of destroyed and damaged aircraft was very much higher. This meant that, by the end of the second day, the Germans were benefiting from far more in terms of airborne reinforcement and resupply than their opponents were obtaining over land or sea.[22]

After Mercury, the Germans did not attempt another large-scale airborne assault against the Allies. Paradoxically, however, the operation convinced both Britain and the United States that it was essential to generate large-scale airborne assault capabilities.[23] Both now began the process of creating multi-division airborne forces, using the German airborne as a model, although they opted to invest far more heavily in assault gliders than the Germans. By the time of Operation Market Garden, in September 1944, British airborne operations were primarily glider rather than parachute operations. Partly as a result, the Allied airborne emerged far more heavily equipped than their German counterparts.[24]

How were the Allied airborne to be used? Where would they fit into Allied strategy? This remained unclear for some time. For the British, the issues were particularly challenging because of their very small air transport infrastructure. There was consequently something of a divergence of opinion between those that advocated a limited, tactical, role for the airborne, and those promoting their broader and more ambitious employment.[25] The Americans were in a better position to think big: although they also lacked transport aircraft in the early war years, they did possess the industrial capacity to put troop carriers into large-scale production. Yet their focus was initially on assigning the airborne troops to quite limited tactical tasks.[26] Nevertheless, by mid-1942 it was broadly assumed by both countries that the airborne would in some way spearhead the re-entry of Allied forces into German-occupied Europe. As the Chief of the Imperial General Staff (CIGS) put it:

> We are all agreed that for the defeat of Germany it will sooner or later be necessary for our armies to invade the Continent. To do this we shall first be confronted with the attack of strongly defended beaches. The employment of the Airborne Division in the rear may

offer the only means of obtaining a footing on these beaches.[27]

Having said that, the first British missions would today seem to have much in common with Special Forces operations, taking the form of small-scale raids against targets of strategic significance – the Pugliese aqueduct in Italy, objective of Operation Colossus, or the German radar at Bruneval. Yet both actually raised issues of longer-term importance, particularly with regard to lead time, command and control, intelligence and (most of all) air planning. This was despite the fact that the airlifts were at least sufficiently accurate to enable key missions to be executed broadly according to plan. With hindsight, then, we can identify some recurring airborne themes even in these early and limited initiatives.[28] Yet the prevailing lack of experience made it difficult to draw meaningful lessons at the time.

The Allies first employed airborne troops on battalion scale in North Africa late in 1942. There was very strong high-level pressure to test the airborne in combat, although there were many question marks over their readiness, especially where airlift was concerned. Only a single battalion was employed on the same day as the Torch landings, and not in a direct supporting role. This mission – against an airfield at Oran – failed because the airlift failed; the airlift failed because it involved the assignment of a 1,100 mile overnight flight from the UK to wholly inexperienced and poorly briefed USAAF crews. The whole concept was thrown together at excessively short notice, and was completely at odds with the advice supplied by Eisenhower's senior air force officer. The outcome was further influenced by non-compliant adversaries in the form of the Vichy French air and ground forces. Although launched in the expectation that French forces at Oran would not offer resistance, the troop carriers that finally found their way to the objective came under attack from French aircraft and anti-aircraft batteries, and a number of the airborne elements ultimately landed were taken prisoner by French ground troops.[29]

Airborne forces were otherwise used to support the subsequent advance towards Tunis. Airfields were consistently chosen as tactical objectives (mimicking German practice) though not as air heads, as the Allies had no means of airlifting troops en masse. Effectively, the airborne were to be employed in a reconnaissance role, ahead of the main ground offensive. Three of these four missions broadly achieved their goals, but they did not provide much insight into the challenges of mounting airborne assaults in more complex joint environments. Two (at Youks les Bains and Souk el Arba) encountered non-compliant adversaries in the best possible sense – French troops who offered no resistance – and a third (Bône) was unopposed.[30] So the only genuine airborne assault was 2 PARA's mission to Oudna and Depienne, which ended in a disaster that had five basic causes. The first was the absence of integrated command and control, there being no airborne representation or expertise at the headquarters of First (British) Army,[31] while the second was the absence of lead time: the operation was launched at such short notice that many paratroops did not even know where they were going to drop. The third was poor intelligence about the objectives and about the likely enemy response, the fourth was the cancellation of First Army's offensive, which

would otherwise have brought relief to 2 PARA (who were dropped 50 miles behind the front line) and the fifth was the misdirection of the airlift to Depienne when Oudna was in fact the principal target.[32]

Given the novelty of airborne operations at this time, it was inevitable that there should have been a good deal of trial and error in North Africa. The greater problem again lay in identifying lessons from the experience, which might then have influenced the Allies' approach during Operation Husky, the landings on Sicily, in the following year. Major General (later Lieutenant General) F.A.M. 'Boy' Browning, who was then commander of 1st Airborne Division, argued correctly that there was a critical need to secure airborne representation at higher command levels, but this proved easier said than done. Otherwise, it was unfortunate that the North African operations offered only a limited insight into what was destined to become perhaps the greatest operational airborne challenge – namely the planning and execution of accurate and concentrated airlifts. After the initial mission to Oran, all the lifts were staged in daylight, and they were thus accurate judged by the standards of later night missions over Sicily and the American sector in Normandy.

In Husky, the Allied airborne were to be employed far more in accordance with the role originally envisaged for them: they were to form the vanguard of an amphibious assault on the coast of mainland Europe. But translating this general scenario into practicable brigade-scale airborne assault plans, including the first mass glider landings, proved extremely challenging. Despite Browning's warnings, airborne planning was not properly incorporated into the more general Allied command and control machinery, which was in any case chaotically dispersed across multiple headquarters.[33] Hence the airborne plan did not retain sufficient visibility at higher command levels. Second, given the far greater scale and complexity of the airborne operations on Sicily, insufficient time was allowed for planning and preparation – especially where the glider assault was concerned. Both the glider and the glider tug pilots were inexperienced, and were especially unfamiliar with night formation flying, night navigation and (where the glider pilots were concerned) night landing. There had been literally no training in remote glider release by night, without a flare path for guidance. Furthermore, the British glider pilots and air-landing troops had not previously used the American Waco gliders they were predominantly to employ in the operation, as few British Horsas were as yet available.

Glider training for the operation progressed very slowly because of the delayed arrival of Wacos and Horsas in North Africa. Ultimately, it was not until June that the glider pilots began training with the USAAF's 51st Wing on even a limited scale. When the training period ended, the British glider pilots had received an average of only 4.5 hours flying on the Waco, including an average of just 1.2 hours night flying. As one British observer remarked, 'Practically none of our glider pilots have sufficient training, and it is too late to rectify this omission now.' Where parachute training was concerned, the situation was not much better.[34] A later report on airborne training before Husky recorded: 'Neither the parachute nor the glider exercises simulated the conditions of the coming operations closely enough to give any very definite

indication of their probable results.'[35]

The aircrew training issue was linked inextricably to a third, broader problem, which was that the challenges involved in executing the airlifts were vastly underestimated. Routing posed enormous problems, and the routes devised could not ultimately protect the troop carrier formations from both friendly and enemy anti-aircraft artillery (AAA).[36] However, beyond this, the various operations would only have succeeded if the Allies had possessed large numbers of experienced aircrew who had been intensively trained to execute tactical air transport and glider assault operations at night, in imperfect weather, over long distances and in combat conditions. Very few aircrew in the RAF, the Glider Pilot Regiment, the USAAF or indeed the Luftwaffe boasted these qualifications in July 1943.[37]

Thus it is hard to avoid the conclusion that the Sicilian operations were conceptually flawed. Some members of the Allied airborne community, especially from within the RAF and the Glider Pilot Regiment, argued this point strongly before Husky was launched, but to no avail.[38] And so it was that only a small minority of airborne personnel were delivered accurately to their objectives. The landings were otherwise widely dispersed, and many gliders came down in the sea. The airborne missions on Sicily played an important part in deepening the Allied beachhead. But rapid relief and fire support from the beaches were also crucial to such success as was achieved, and the airborne at first encountered only weak Italian opposition.[39] The airborne experience hinted at what might be possible in more favourable circumstances, but the true significance of Husky lay elsewhere. Far more important was the fact that the Sicilian operations offered some perspective; the key problems involved in planning and executing airborne missions started to become more apparent. It was now easier to record lessons and make recommendations. Husky was thus followed by a veritable outpouring of lessons identified and doctrine papers, which formally recognized many of the issues we have already considered.[40]

On integrated command and control, it was stated that airborne plans must be kept visible to the most senior commanders throughout the planning process, and not delegated to the extent that the high command lost sight of airborne considerations. The US War Department decreed:

> Airborne and troop carrier units are theatre of operations forces. Plans for their combined employment must be prepared by the agency having authority to direct the necessary co-ordinated action of all land, and air forces in the areas involved. This responsibility should not be delegated to lower headquarters since positive co-ordination can be ensured only by the one agency in control of all elements.[41]

The main British inquest into the fiasco, conducted jointly by the War Office and the Air Ministry, emphasised the critical importance of lead time: 'Airborne operations must be planned sufficiently far in advance to allow for the necessary training and rehearsals.' No less

essential was rapid relief or reinforcement of the airborne by ground forces. As their supplies of food and ammunition would inevitably be limited, airborne troops 'should not … normally be used in a role requiring their separation from the main force except for a short period.'[42]

Air issues had to be addressed with far greater care, with much more influence being given to theatre air commanders. It had to be recognized that successful lifts and landings were weather dependent; the higher command had therefore to rule on whether airborne missions were essential to the success of broader ventures, such as amphibious operations. If essential, these other operations might have to be delayed until weather conditions were suitable for the airlift.[43] Aircrew training, especially in night navigation, required far greater attention. The joint War Office and Air Ministry report pointed out that airborne operations were highly complex.

> Aircraft crews participating must therefore be trained to an operational standard. In particular, pilots require intensive training in low flying, navigation over sea, and in judging distances by moonlight. All the aircraft crews must have some preliminary operational experience and be able to drop human bodies as accurately as bomber crews drop their loads.[44]

American doctrine similarly stressed the critical importance of accurate troop carrier navigation and its dependence upon thorough training. 'Troop carrier units must be qualified for both day and night operations. This in turn dictates a high order of training requirements.'[45]

The post-Husky post mortem was thus very thorough: the clearest and most concise Allied airborne lessons and doctrine papers of the Second World War all appeared in the months after the capture of Sicily. The only surprising omission from both the British and American reports was the issue of intelligence, and there is no obvious explanation for this. Its importance may have been overshadowed by other matters after Husky, but it had certainly given the airborne some serious food for thought in North Africa. It was nevertheless recognised that the response of Axis forces had to be more seriously considered during the planning of future operations: 'Ground opposition was less determined than it is likely to be in other theatres of war.'[46]

It was one thing to write lessons and doctrine papers; but implementing key findings and recommendations was never likely to be so straightforward. The various papers prepared in late 1943 and early 1944 were of course written with the Normandy landings in mind, in an attempt to increase the chances of success and ensure that mistakes were not repeated. To what extent was this goal achieved?

First, steps were taken to ensure that the airborne plan was more effectively integrated into broader land, maritime and air planning, and it remained reasonably visible to the most senior commanders in the months before June 1944. The basic airborne concept of mounting one

operation at the base of the Cotentin Peninsula and another in the Caen area was included in the initial joint plan for the Normandy landings and evolved from then on. The Allied Army Group and Army commanders, Montgomery, Dempsey, and Bradley, were kept fully appraised of airborne developments, and the various airborne and air formations involved were regularly represented at a so-called Airborne Air Planning Committee, through which their activities were co-ordinated.[47] Second, a high priority was attached to achieving a rapid link-up between the airborne and the troops from the beaches. This was, for example, part of the rationale for prioritising the capture of Pegasus Bridge.[48] Third, the long lead time, spanning more than six months, was hugely beneficial where planning and preparation were concerned. As with the German airborne operations of 1940, lead time provided the basis for evaluating plans, collecting intelligence, and training personnel.

Yet even in this respect we have to add an important caveat, for the American airborne plans were substantially altered at a very late stage because of a revised intelligence appraisal concerning the strength of enemy defences in their sector. The objectives assigned to 82nd Airborne Division were only finalised a week before D-Day, and mission-specific preparations conducted before that time were thus rendered null and void. As an illustration, the air plan drawn up for the main airborne command rehearsal, Exercise Eagle (11-12 May 1944), was designed 'to be, so far as practicable, exactly similar to that for the operation, i.e., the same pathfinder procedure, the same number of aircraft, the same length of flight, the same landing times and relative position of dropping zones etc., to be adopted.' But the late alteration of the airborne plan necessitated corresponding last-minute changes to both the air routing and DZ locations of 82nd Airborne, so that at least half the final USAAF lift plan for D-Day diverged very considerably from the arrangements prepared for the exercise.[49]

In other ways, too, it would prove difficult to act on the post-Husky recommendations. Responsibility for the airlifts to Normandy was nominally placed under the Allied air commander-in-chief, Air Chief Marshal Sir Trafford Leigh-Mallory. But his task was essentially to execute the lifts so as to meet the requirements of the senior land commanders; they alone determined how, when and where the airborne would be employed. For a variety of reasons, Leigh-Mallory was never happy with their initial concept for the two American divisions. He believed airborne troops would be landing so close to enemy forces that they were likely to come under attack before they had formed up, that troop carriers would have to be routed over defended areas to reach their assigned DZs, and that some of the DZs chosen might well be obscured by fires, lights and smoke produced by naval or air bombardments. There was some basis for all of these objections and they were supported by several Allied doctrine papers.[50] Nevertheless he accepted the plan because of the importance that the generals attached to the capture of particular locations.

Then – at the end of May – he was confronted by the various late changes in the US sector. He feared they would leave the troop carriers and gliders even more vulnerable, and argued

very strongly against revising 82nd Airborne's mission. The result was a major top-level disagreement. The land view eventually prevailed, but Leigh-Mallory instigated changes in the lift plan designed to reduce aircraft exposure to German AAA.[51]

The Allies expended a considerable effort on raising the standard of air navigation. The Pathfinder system was introduced to aid the location of landing areas at night.[52] But the task of improving aircrew performance was massively complicated by the immense scale of the operation, which involved the deployment of the bulk of three divisions. This necessitated an extremely rapid short-notice expansion of the air fleet – transport aircraft and gliders – and thus the dramatic acceleration of aircrew training. The inevitable result was that many undertrained and inexperienced personnel were committed to battle.[53] In addition, some of the DZs selected were not very distinctive from the air – particularly in the US sector. Moreover, the bocage terrain in this sector was unsuited to assault glider landings, especially at night. In recognition of this fact, the initial American glider operations were scaled down and a follow-up lift was instead scheduled for the evening of D-Day, before nightfall.[54] However, this approach meant that the gliders might potentially have to land in daylight in the middle of a hotly contested battleground.

Then finally there was the weather issue. The Allied high command might ostensibly have accepted that the airborne lift was weather-dependent, but Eisenhower's concerns lay elsewhere during the approach to D-Day. His ultimate decision to launch the operation was based overwhelmingly on maritime rather than air considerations.[55] The wind was too high for parachute drops, and visibility conditions over the American sector in Normandy were also unfavourable.[56]

The Normandy airborne operations achieved partial mission success, a higher proportion of objectives being secured in the British rather than the American sector because of the greater accuracy of the British airlift. The British achievement was of course capped by the brilliantly executed coup-de-main seizure of Pegasus Bridge – another illustration of the value of ample lead time, which allowed the mission to be intensively rehearsed over several months.[57] The main airlift was accurate enough to ensure effective defence of the Ranville area and the subsequent expansion of the bridgehead up to the so-called Ranville Heights;[58] the larger glider lifts were extremely accurate – especially on the evening of D-Day.[59] Fire support and reinforcements were soon available from the beaches.[60]

Yet this still left the bridgehead substantially smaller than expected. This was partly due to the fact that the airlifts to the more outlying landing areas were far less accurate than the lifts to Ranville.[61] But it was primarily because German actions did not comply with British expectations. British planning was based on the assumption that the Germans would accept the establishment of the eastern flank on the Dives River, whereas Rommel was in fact determined to hold the Ranville Heights – between the Orne and the Dives, and the Germans also fought very hard to maintain their control of the coast.[62]

In the American sector, the degree of mission success was more limited. The key factors here were the same, but with the more general inaccuracy of the airlift being decisive. Only a minority of paratroops landed on their DZs, and both glider operations also went badly wrong, partly because of the terrain, partly because of navigation and visibility factors, and partly because gliders came under attack while landing.[63] German resistance was certainly strong – in some areas far stronger than expected – but the effect was magnified by the wide dispersal of the airborne troops. Of the two American divisions, 101st Airborne secured a higher proportion of their tactical objectives primarily because they lay closer to the coast,so that the paratroops were more quickly relieved by units arriving from Utah Beach.[64] Part of the 82nd Airborne became cut off to the west of the River Merderet – beyond the reach of friendly forces; predictably they incurred very heavy casualties, as did the units tasked to rescue them.[65]

This is not to deny that the effect of the American landings was considerable. German command and control was thrown into confusion, and the US airborne played an important part in protecting the Utah beachhead during the first day of the campaign. Nevertheless, after what had happened in Sicily, a number of senior American commanders inevitably drew very negative conclusions from the Normandy operation. Indeed, Bradley appears to have lost confidence in the airborne medium completely. This reaction was unnecessarily extreme. The problems encountered by the Americans in Normandy had less to do with airborne warfare per se than with their inability to exploit past experience. Although they had accurately identified the most important airborne lessons of the Sicilian debacle, it had proved extremely difficult to apply them. Normandy did not imply the abandonment of the airborne concept, but it did suggest that the Allies needed to think far more carefully about how the airborne were to be employed.

The primary airborne lesson drawn by the Allies from the Normandy campaign emerged more from the planning of the operation than from its execution. Eisenhower decided to create a single Allied airborne headquarters responsible both for the airborne forces and their supporting air transport. This was duly established, and was named Headquarters, First Allied Airborne Army.[66] It was disliked by the British airborne community and the British Army, who saw it as a US-dominated institution.

As far as the execution of the Normandy airborne missions was concerned, the American troop carrier commanders afterwards decided that there should be no further night operations.[68] This new departure was also favoured by the airborne forces themselves, not only on grounds of accuracy, but also because night assembly in Normandy had proved to be extremely difficult, even where the airlifts had been reasonably accurate.[69] The other major recommendation came from the commander of 101st Airborne, and concerned the all-important link-up between the airborne and the conventional ground forces. Major General Taylor wrote that 'the previous conception that an Airborne Division can maintain itself independently for two or three days should be revised downward for action in "FORTRESS EUROPE".'[70]

After Normandy, the Allies had to alter their expectations of how the airborne would be used. As we have seen, it had previously been envisaged that they would operate in support of amphibious landings to open new fronts on mainland Europe. This had now been achieved so the question arose, what should they do next? The view gained currency that they should be committed to multiple successive operations to maintain the momentum of the advance into Germany.[71] According to this scenario, after the breakout from Normandy, Allied forces might run into a German block – perhaps a river line or some other kind of defensive position. Airborne troops would then be deployed into the German rear to help unhinge their defences and get the advance moving again. Superficially, this approach sounds eminently sensible. However, past experience had of course emphasised the immense value of lead time in the planning and execution of airborne operations, whereas the new concept implied that they might have to be launched at virtually no notice. This contradiction, which appears very obvious in retrospect, is not addressed in the surviving documents. It brings us to Operation Market Garden.

Much has been written on the ultimate failure of Market Garden, with the main focus again being on tactical planning issues. Yet it is once more important to consider the operational level too, and the manner in which operational factors shaped lower-level decision making. Equally, no satisfactory explanation of the Allied defeat can be constructed without reference to earlier airborne experience. To begin with, despite the progress made before the Normandy landings, Market Garden again suffered from a lack of integrated command and control: Montgomery obtained Eisenhower's authorisation for his already detailed and restrictive operational concept before it was presented to First Allied Airborne Army. This was done to prevent the American airborne and troop carrier commanders raising objections.[72] However, past experience suggested that senior land, airborne and air commanders should have been brought together into a properly joint planning process at the earliest possible stage, i.e., when the Market Garden concept was being developed, and *before* the plan was placed before the Supreme Allied Commander.

The lack of integrated command and control led directly to the Allies' failure to achieve optimal employment of the contributing force elements – particularly the RAF and the USAAF. Montgomery did not seek the advice of a single senior air force officer about what the airlift could – or could not – be expected to achieve. There is no documented discussion of air interdiction measures to isolate the Market Garden battle area, nor of the more general role of air support. Equally, because of his initial failure to consult key stake-holders, the basic airborne concept was founded on a number of flawed assumptions, such as the notion that 101st Airborne Division could reasonably be dispersed over a 50-mile area serviced by seven different DZs.[73] Their subsequent opposition to this scheme led to a key change of plan, which very sensibly concentrated the division within a smaller area but which, in the process, removed any airborne threat to German forces south of Eindhoven.[74] Resistance in this area would halt the British ground advance for much of the day on 18 September, thus playing an important part in the failure of the entire operation.[75]

Second, once again, the airborne found themselves confronted by a non-compliant adversary. Indeed, Market Garden was an intelligence disaster in terms of both collection and interpretation. A succession of references suggesting the potential presence of German armour in the Arnhem area did not give rise to any systematic or concerted efforts to find out more, and the combat power and response times of enemy units around Arnhem and Nijmegen were seriously underestimated.[76] Of the key German formation, II SS Panzer Corps, Montgomery would later record, 'Its battle state was far beyond our expectations.'[77] Responsibility for both of these failures must be assigned to the main British headquarters on the continent, on which the airborne forces were heavily dependent for the supply of intelligence. The staff at both 21st Army Group and Second Army headquarters inevitably lacked airborne expertise and did not understand the particular importance of good intelligence to the successful prosecution of airborne warfare.

Third, there was the familiar issue of the link-up between the airborne and the ground forces. The simple truth is that 1st Airborne Division's objectives lay too far behind the front line. The route north to Arnhem was both narrow and vulnerable; it was intersected by a series of major water obstacles and by two substantial conurbations. In these circumstances, there was always a danger that 1st Airborne might become cut off. However, it is not clear that the risks were fully appreciated. Browning's famous pledge that they could hold out at Arnhem independently for four days was at odds with virtually all past airborne experience – Allied and German – and with specific lessons identified in earlier operations.

But it is the issue of lead time that sets Market Garden apart from other Second World War airborne operations. As it was launched at only a few days' notice, there was minimal scope for planning and preparatory activity, and preliminary exercises or rehearsals were out of the question. The commander of First Allied Airborne Army believed that the UK air transport bases were too far from the airborne objectives, but there was insufficient time for his forces to be deployed to continental airfields.[78] Equally, there was no opportunity to discuss, debate or test any of Market Garden's other potential weaknesses. Decisions had simply to be taken and implemented.

This was especially true where the airlift was concerned. Ostensibly, this might appear to have been one of the more successful features of Market Garden. Executed in daylight, the various lifts achieved far greater levels of accuracy and concentration (approximately 90 per cent for 1st and 101st Airborne on the first day of the operation) and the task of assembly on the ground was also much easier. The vast majority of airborne troops were formed up and ready for action within an hour of landing.[79] And yet the assumptions that underpinned the airlift plan were again seriously mistaken. The Allies possessed very large numbers of transport aircraft by September 1944, but not nearly enough to convey in a single lift three whole airborne divisions with substantial headquarters and support elements and immense quantities of equipment and stores. For this reason, when the Market Garden concept was being hatched, it was accepted that ventures of this scale would require multiple consecutive

airlifts, along lines already established for two earlier operations (Operation Linnet and Operation Comet), which had ultimately been cancelled.[80]

Yet to attempt a long-distance multiple-lift operation against deep and defended objectives near the German frontier was fraught with risk. The Germans would inevitably begin mobilising as soon as the first airborne landings began, while many airborne troops would have to be wastefully tied to the defence of DZs, instead of being sent directly to their objectives. By the time the second lift arrived, the tactical situation would be completely transformed, and the original Allied plan would no longer be worth the paper it was printed on.

Had more time been available, the obvious disadvantages of the multiple lift approach might have been more clearly identified, alternative approaches might have been considered, and it might not have been necessary to recycle the Linnet and Comet lift plans on an inflexible 'one size fits all' basis.[81] Different arrangements might potentially have involved a single airlift carrying the maximum possible number of combat troops. For a relatively small sacrifice in terms of support elements and supplies, two full combat brigades could easily have been landed simultaneously at Arnhem on 17 September 1944 and, without any need to defend the landing area pending follow-up lifts, they could both have been despatched to their objectives immediately.[82] As it was, in the rush to finalise their plans, the Allies confused their priorities in Market Garden. There was too much focus on the problem of completing a full-scale airlift, and not enough on the key challenge, which was to deploy as many combat troops as possible, as rapidly as possible, around the key airborne objectives.

It is hardly surprising to learn that the chief lessons identified after Market Garden's failure were meticulously applied by the Allies during the preparations for Operation Varsity – the Rhine crossing – in March 1945.[83] A lead time of several months provided ample scope for every aspect of the plan to be subjected to detailed scrutiny and deliberation. Command and control was properly integrated, with senior land, airborne and air commanders being intimately involved from the very beginning. Among other things, this allowed air power to be far more effectively exploited in support of the operation. The airborne plan was a lot less ambitious than the Arnhem plan: the objectives lay only a short distance across the Rhine, and the landings did not in any case commence until the first river crossings had been successfully completed by British ground forces. The bulk of the Allied air transport fleet was deployed forward to bases on the continent and the scale of the airborne operation was deliberately restricted so that the participating airborne divisions could be delivered in a single daytime lift.

A highly detailed and accurate intelligence picture was constructed in the weeks before the operation, and the Germans were compliant; indeed, their capability was if anything overestimated.[84] This was crucial to the rapid achievement of airborne tactical objectives and it was important in other respects because, while the parachute drops were reasonably accurate in Varsity, the glider landings went badly wrong. The selected landing zones were so

close to the Rhine that they were obscured by the Allied smoke screen, and by smoke from the land battle. Considerable quantities of glider-born equipment was destroyed or damaged or landed too far from the LZs to be quickly recovered and deployed.[85] Luckily, it wasn't needed to overcome German resistance.

Conclusions

This article set out to identify the key influences upon the success or failure of airborne operations in the European theatre in the Second World War. It is appreciated that, analysed in detail, there were many important differences between the various operations considered here; theoretical frameworks and models should never be applied too rigidly to explain the course of successive historical events, which may be shaped by a multiplicity of disparate factors. Nevertheless, surveying the airborne experience over an extended period, it is impossible not to be struck by the extent to which outcomes were determined by five basic themes, which were also regularly identified and commented on by Allied and German reports at the time. These should by now be very familiar to the reader, but they can be summarised as follows.

1) ***Lead time***. Lead time was an important factor in the more successful operations. Over time, preliminary airborne operation plans could be scrutinised and discussed, increasing the likelihood that potential weaknesses would be identified and rectified. Time also created scope for intelligence gathering, and for training, exercises and rehearsals. Lead time was demonstrably crucial to the Germans in the Low Countries, to the British in Normandy, and to both Western Allies in Operation Varsity. Equally, the Germans blamed their problems in Crete, at least in part, on the fact that the operation was launched at short notice, and lack of lead time was likewise viewed by the Allies as a major cause of the failure of the airlifts in Operation Husky and of the overall failure of Market Garden.

2) ***Integrated command and control***. If the airborne operation was part of a broader venture involving land, air and perhaps maritime forces, integrated command and control was essential and had to be exercised from the earliest stage of planning, i.e., the conceptual stage. Subsequently, it was vital to keep the airborne plan and especially the *airlift* plan visible at higher command levels throughout the various preparatory phases. Any loss of visibility could result in critical decisions being taken without their implications for the airborne being properly considered or appreciated.

3) ***Relief, reinforcement or re-supply***. Airborne forces could only operate independently for limited periods. Assuming they were not to be evacuated, plans had therefore to provide for their reinforcement or re-supply at a rate comparable to or exceeding that of their adversaries. This would normally involve actual relief via a rapid link-up between the airborne and conventional ground forces, and anything with the potential to prevent that link-up could seriously jeopardise the outcome of the entire undertaking. Particular care was required in this respect if the airborne troops were to be landed in deep locations or on the wrong side of major obstacles, such as rivers.

4) ***Intelligence***. Airborne troops were normally conveyed by large, slow and vulnerable aircraft; they usually lacked much in the way of heavy weaponry and mechanised transport, and their supplies were of course limited. Against more numerous ground forces equipped with heavy weapons, and enjoying the benefits of mechanisation and overland supply, the airborne often found themselves at a considerable disadvantage. For this reason, airborne operations had to be preceded by careful intelligence preparation, so that the nature and scale of the enemy's response could be predicted with reasonable accuracy.

5) ***The airlift***. To stand a reasonable chance of success, the airborne forces had to be conveyed to their objectives accurately and en masse. The effectiveness of airlifts was influenced by a wide range of variables and represented one of the most challenging aspects of airborne warfare for both Germany and the Allies between 1939 and 1945. Aircrew training was a critical factor, and airlift planning required exceptional care and attention to detail, and the closest possible collaboration between the air forces and their airborne passengers at every stage in the planning process.

Finally, it is impossible not to be struck by one broader point that emerges from this study – the extreme difficulty of translating past lessons into easily applicable doctrine to guide future airborne planning. Politics, personality issues, inter-service arguments and short-term operational pressures all influenced the extent to which past experience could be drawn upon. The Germans proved unable to learn appropriate lessons from the failure of their operations around The Hague in 1940, which might potentially have led them to employ very different tactics in Crete in 1941. Equally, for the Allies, it was hard to learn from German experience in the Low Countries, for there was little intelligence on what the airborne had achieved, or on how they had achieved it. The same was not true of Operation Mercury; indeed, during the fighting in Crete, the Allies obtained a wealth of information on the German airborne, which was very closely scrutinised by the British War Office and RAF intelligence.[86] Yet it is unclear how, or even whether, this influenced early Allied airborne plans. Moreover, as we have seen, the Allies' first attempts to use airborne troops at battalion scale in North Africa offered few obvious lessons for the larger operations in Sicily in 1943.

Sicily *did* produce innumerable lessons, which the Allies realised would be directly applicable to Normandy, but they were only partially exploited; further dispersed and inaccurate airlifts were the main consequence. Effective steps were then taken to ensure that the Market Garden airlifts were by far the most accurate that the Allies staged during the war, but Market Garden was to the Allies in most other respects what Crete had been to the Germans – a retrograde step. In recognition of this fact, Varsity at last involved the scrupulous application of airborne lessons identified, both from Market Garden and earlier ventures. The Allies emerged from the Second World War with practical and robust airborne doctrine firmly rooted in wartime experience, but five years and a succession of major operations were required before they could arrive at this happy conclusion.[87]

Notes

[1] In the author's view, despite their age, the most useful comparative works on Allied airborne operations remain four official studies, Air Publication (AP) 3231, *The Second World War 1939-1945, Royal Air Force, Airborne Forces* (Air Ministry official monograph, 1951), Lieutenant Colonel T.B.H. Otway, *Airborne Forces* (War Office official monograph, 1951), John C. Warren, *Airborne Missions in the Mediterranean 1942-1945* (USAF Historical Division Research Studies Institute, Air University, 1955) and, by the same author, *Airborne Operations in World War II, European Theatre* (USAF Historical Division, Research Studies Institute, Air University, 1956).
[2] AP 3231, pp. 225-228.
[3] Otway, *Airborne Forces*, p. 25.
[4] Ibid, p. 23.
[5] Lieutenant Colonel E.H. Brongers, *The Battle for the Hague*, 1940 (Aspekt, Soesterberg, 2004), pp. 29-32; I.H. Lyall Grant, 'The German Airborne Attack on Belgium in May 1940', *Journal of the Royal United Services Institution*, Vol. CIII, February 1958, pp. 94-102; *Airborne Operations: A German Appraisal*, Office of the Chief of Military History, Department of the Army, 1950 (AOGA), p. 14; W. Speidel, *The German Air Force in France and the Low Countries* (US Air Force Historical Research Agency study 152), Vol. 2, Part 1, p. 131.
[6] Field Marshal Albert Kesselring, *The Memoirs of Field Marshal Kesselring* (William Kimber, London, 1953), p. 55.
[7] Ibid, p. 53.
[8] Ibid, pp. 53-54.
[9] Jean Paul Pallud, *Blitzkrieg in the West Then and Now* (After The Battle, London, 1991), pp. 121-122, 125, 128, 130.
[10] Lyall Grant, 'The German Airborne Attack on Belgium in May 1940', pp. 100-102.
[11] Jean Paul Pallud, *Blitzkrieg in the West Then and Now*, pp. 113, 118, 128; Maurice Tugwell, *Airborne to Battle: A History of Airborne Warfare* (William Kimber, London, 1971), pp. 48, 50, 59-61.
[12] Tugwell, *Airborne to Battle*, pp. 48, 50, 59-61.
[13] Brongers, p. 269.
[14] Shelford Bidwell, 'Operation Mercury – The Invasion of Crete', in Ste. Croix (ed.), *Airborne Operations*, p. 61; Anthony Beevor, *Crete: The Battle and the Resistance* (Penguin, London, 1991), pp. 154-155; 229-230; some sources record a figure of 170 lost transport aircraft.
[15] D.W. Pissin, *The Battle of Crete* (USAF Historical Study 162, 1956), **http://afhra.maxwell.af.mil.**, pp. 8, 64; AOGA, pp. 13, 14, 21.
[16] Tugwell, *Airborne to Battle*, pp. 84-87; Beevor, *Crete*, pp. 72,88, 111-112, 132-133, 136-137, 152-153.
[17] Pissin, pp. 118, 127, 130, 137; AOGA pp. 80-81.
[18] Beevor, *Crete*, pp. 130-132; report by Luftflotte 4, The Invasion of Crete, 28 November 1941; AOGA, pp. 12, 13.
[19] Report by Luftflotte 4, The Invasion of Crete, 28 November 1941, pp. 1, 16, 22, 25.
[20] Beevor, *Crete*, pp. 87-94.
[21] Tugwell, *Airborne to Battle*, pp. 102-103.
[22] Beevor, *Crete*, pp. 153-155, 166

[23] Tugwell, *Airborne to Battle*, p. 122.
[24] Otway, pp. 21, 37-39, 45-48, 94-95; Tugwell, *Airborne to Battle*, pp. 233-234. According to Otway, the glider-borne air-landing troops were the most heavily armed infantry in the British Army.
[25] Otway, *Airborne Forces*, p. 51.
[26] G.L. Rottman, US Airborne Units in the Mediterranean Theatre, 1942-44 (Osprey, Oxford, 2006), p. 24.
[27] Air Publication (AP) 3231, p. 48.
[28] Ibid, pp. 28-29, 57-58. For example, the principal lessons report on Colossus concerned intelligence, aspects of the airlift, lead time and the need for unified command and control.
[29] Warren, *Airborne Missions in the Mediterranean*, 1942-1945, pp. 5-13.
[30] Ibid, pp. 14-17.
[31] Otway, *Airborne Forces*, p. 81.
[32] Ibid, pp. 78-81; Major-General John Frost, *A Drop Too Many* (Cassell, London, 1980), pp. 74-100.
[33] Otway, *Airborne Forces*, p. 118. Headquarters nodes with at least some influence over airborne matters included Allied Forces Headquarters, 15th Army Group, Eighth Army, Seventh Army, Mediterranean Air Command, 12th US Troop Carrier Command, Browning and his staff, and the airborne divisional headquarters.
[34] Warren, *Airborne Missions in the Mediterranean*, pp. 22, 26-28.
[35] 38 Wing RAF Report on Training and Operations in North Africa and Sicily, May/July 1943 (AHB copy).
[36] Warren, *Airborne Missions in the Mediterranean*, pp. 2, 40-41, 51-52; Ste. Croix (ed.), *Airborne Operations*, pp. 85-86.
[37] Warren, *Airborne Missions in the Mediterranean*, pp. 26-28; 38 Wing RAF Report on Training and Operations in North Africa and Sicily, May/July 1943.
[38] Warren, *Airborne Missions in the Mediterranean*, p. 23. 'In vain did the British Airborne Forces adviser, Group Capt. T.B. Cooper, RAF, protest that a glider assault on a dark night with inexperienced crews was not practicable. The decision stood.' See also AP 3231, p. 95; Chatterton, *Wings of Pegasus*, p. 42.
[39] Otway, Airborne Forces, p. 120; Warren, *Airborne Missions in the Mediterranean*, pp. 33-36; Tugwell, *Airborne to Battle*, pp. 165-166.
[40] These papers included Joint War Office/Air Ministry Report on the Employment of Airborne Forces, Appendix D to Appendix V/19, Wing Commander W.D. Macpherson to SASO, 27 November 1943, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices (AHB copy), U.S. War Department Training Circular 113, un-numbered SHAEF memorandum dated 19 January 1944, and Combined Chiefs of Staff Paper 496. See also US Army Air Forces Board Project (T) 27, Long Range Study of Airborne Operations, 29 April 1944 (AHB copy).
[41] US War Department Training Circular 113, 9 October 1943.
[42] Extract from Joint War Office/Air Ministry Report on the Employment of Airborne Forces, Part A, Lessons of Airborne Operations in Sicily, Appendix D to Appendix V/19, Wing Commander

W.D. Macpherson to SASO, 27 November 1943, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[43] Ibid.
[44] Ibid.
[45] US Army Air Forces Board Project (T) 27, Long Range Study of Airborne Operations, 29 April 1944, pp. 7, 10.
[46] Extract from Joint War Office/Air Ministry Report on the Employment of Airborne Forces, Part A, Lessons of Airborne Operations in Sicily, Appendix D to Appendix V/19, Wing Commander W.D. Macpherson to SASO, 27 November 1943, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[47] Warren, *Airborne Operations*, pp. 3, 6-9.
[48] Stephen Ambrose, *Pegasus Bridge, D-Day: The Daring British Airborne Raid* (Pocket Books, London, 2003), pp. 51-52.
[49] Minutes of the 9th Meeting of the Airborne Air Planning Committee, 28 April 1944, Appendix V/39; Bradley to Montgomery, 26 May 1944, Appendix V/43; Williams to Leigh-Mallory, 27 May 1944, Appendix V/44; notes of a conference held at SHAEF, 27 May 1944, Appendix V/45; all sources contained in Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[50] Memorandum on the Employment of Airborne Forces in Operation Overlord, April 1944, Appendix V/8, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[51] Notes of a conference held at SHAEF, 27 May 1944, Appendix V/45, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[52] AP 3231, pp. 96-97; Warren, *Airborne Operations*, p. 4; Otway, *Airborne Forces*, p. 131.
[53] Warren, *Airborne Operations*, pp. 7-9, 18-20, 23, 24; notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, by PS to Air C-in-C, AEAF (held at AHB), p. 310; AP 3231, p. 108.
[54] Warren, *Airborne Operations*, pp. 9-10, 22.
[55] Carlo D'Este, *Decision in Normandy* (Penguin, London, 2001), pp. 109-110.
[56] The wind was gusting at up to 30 mph; see AP 3231, p. 125.
[57] Ambrose, *Pegasus Bridge*, pp. 57-59.
[58] AP 3231, p. 132.
[59] Ibid, p. 134.
[60] Lloyd Clarke, *Orne Bridgehead* (Sutton Publishing, Stroud, 2004), pp. 88, 91.
[61] AP 3231, pp. 125-128.
[62] Otway, *Airborne Forces*, pp. 174-175; Clarke, *Orne Bridgehead*, p. 168.
[63] Warren, *Airborne Operations*, pp. 58, 61-69.
[64] Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, by PS to Air C-in-C, AEAF, p. 316.
[65] Warren, *Airborne Operations*, pp. 39, 42, 47-48, 52, 57-58.
[66] Ibid, p. 81.

[67] The Commanding General and the Chief of Staff was American, and Americans were placed in charge of personnel, intelligence, operations, planning and communications – in other words five of the six main divisions within the headquarters. See Otway, *Airborne Forces*, p. 204.
[68] Warren, *Airborne Operations*, p. 61.
[69] Otway, *Airborne Forces*, pp. 178-179.
[70] Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, by PS to Air C-in-C, AEAF, p. 316.
[71] AP 3231, *Airborne Forces*, p. 146.
[72] Hamilton, *Monty*, p. 451.
[73] TNA WO 219/4997, memorandum by Brereton, 11 September 1944. The employment of multiple small pinpoint drop zones directly contravened Allied tactical doctrine; see extract from Joint War Office/Air Ministry Report on the Employment of Airborne Forces, Part A, Lessons of Airborne Operations in Sicily, Appendix D to Appendix V/19, Wing Commander W.D. Macpherson to SASO, 27 November 1943, Notes on the Planning and Preparation of the Allied Expeditionary Air Force for the Invasion of North West France in June 1944, appendices.
[74] Warren, *Airborne Operations*, p. 89.
[75] Margry (ed.), *Market Garden Then and Now*, pp. 254-260; TNA WO 171/1256, War Diary, 2nd Irish Guards (Armoured Battalion), 18 September 1944.
[76] For the first reports of II SS Panzer Corps' move to Arnhem, see TNA DEFE 3/221, XL 9188, 5 September 1944; TNA DEFE 3/221, XL 9245, 6 September 1944.
[77] Field Marshal the Viscount Montgomery of Alamein, *Memoirs* (Collins, London, 1958), p. 297.
[78] TNA WO 219/2186, Brereton to Eisenhower, 1 September 1944; TNA WO 219/2121, memorandum by SHAEF planning staff, 4 September 1944.
[79] Warren, *Airborne Operations*, pp. 102, 112-114; TNA AIR 37/1217, Urquhart to Hollinghurst, 27 September 1944.
[80] Warren, *Airborne Operations*, p. 89; Report by First Allied Airborne Army, Operations in Holland, September-November 1944, 22 December 1944.
[81] On the basis of plans drawn up for Operation Linnet, it was thought that the vast majority of airborne troops committed to Market Garden could be conveyed by the first two lifts, leaving only a relatively small proportion of the force to be carried by the third lift. However, the Linnet plan depended on the use of 'double-tow' arrangements for the American airborne, i.e, two gliders being towed by each tug aircraft. This technique was practicable for the Linnet objectives, which lay on the Belgian-French border around Tournai, but not for the Market Garden objectives, which were considerably further from the UK. Consequently, half of the American gliders had to be transferred to the third lift, which thus became far more important to the successful execution of the Allied plan.
[82] Even with a large part of the initial glider lift committed to the carriage of headquarters, support and artillery elements, and to equipment and supplies, it was still possible to deploy almost the whole of 1 Air-Landing Brigade on 17 September (along with 1 Parachute Brigade). Only a single company remained in the UK pending the second lift on the 18th.
[83] No. 38 Group RAF Report on Operation 'Varsity', 20 May 1945 (AHB copy), para 110.
[84] All of these issues are covered in Warren, *Airborne Operations*, pp. 156-173.

[85] Otway, *Airborne Forces*, pp. 304-305, 318.
[86] HQ RAF ME Intelligence Branch, German Airborne Attack on Crete, 1 November 1941 (AHB Copy); War Office, Periodical Notes on the German Army No. 38, XI Air Corps and the Attack on Crete, 20 March 1942 (AHB Copy).
[87] See War Office, Army/Air Operations Pamphlet No. 4, *Airborne Air transported Operations*, 1945 (AHB Copy).

Fair Stood the Wind for France? The Royal Air Force's experience in 1940 as a case study of the relationship between policy, strategy and doctrine

By Group Captain Alistair Byford

The Royal Air Force's experience in 1940 illustrates a number of enduring lessons about strategy, and its relationship to policy and doctrine. First, strategy matters: it was the RAF's strategy to configure itself for independent action that largely explains why it was comprehensively defeated in France, yet within a matter of weeks was victorious in the Battle of Britain. Second, the construction of strategy is easily misinterpreted. In the historiography, air strategy is erroneously regarded as a product of doctrine; but in reality, policy was the more important imperative. Consequently, the RAF's strategy is best understood as an entirely rational attempt to translate the interwar policy of 'limited liability' into military practice. Finally, strategy is a process, not an event. The Air Staff's failure to recognise this principle, and to continually adapt its strategy to reflect the changing policy context, is indicative of a culture that rejected critical reflexivity and did not promote intellectual agility. These institutional shortcomings are pervasive and, arguably, still resonate today as impediments to effective strategy-making.

Introduction

Britain's ability to make strategy effectively has increasingly been called into question. The Public Administration Select Committee recently identified 'a strategic deficit across government',[1] while the last Chief of Defence Staff was explicit about the failure of the military to grow a cadre of senior leaders with an adequate understanding of how strategy is constituted and is shaped by – and shapes - the context within which it is developed.[2] However, the problematic nature of strategy-making is hardly novel; consequently, historical examples may yield valuable and enduring lessons, and this paper will suggest that an analysis of the RAF's experiences in 1940, where a catastrophic defeat in France was immediately followed by a decisive victory in the Battle of Britain, provides a particularly instructive illustration of the results of the interplay between policy, strategy and doctrine.

The dichotomy in outcomes in 1940 was primarily a result of the RAF's strategy to configure itself as a 'strategic' air force. This meant that it was optimised for independent, single-role air campaigns, intended to be conducted from a well-established structure of secure bases in the metropolitan homeland; conversely, it had very little capacity to provide multi-role, tactical support for joint forces deployed on expeditionary operations. In the historiography, this strategic choice is invariably attributed to what is portrayed as the Air Staff's irrational and doctrinaire predilection for long-range bombing, which, it is argued, led it to neglect other and more fruitful air power roles, a perspective usefully summarised by John Terraine: 'It may be said, without straining verity, that bombing was what the RAF was all about. It was chiefly for that reason…that co-operating with the army and the navy went right out of fashion between the wars'.[3] This account is ripe for revision, because it represents a fundamental misunderstanding of how strategy is constructed. It interprets its formulation wholly as a consequence of military doctrine and preference, thus disregarding the much greater influence of policy, which was the key driver in determining the allocation of priorities and apportionment of resources that led directly to both the successes and failures of British air power in 1940.

This paper consists of four sections. First, the development of air strategy is described within the framework set by policy, and shaped by single-service doctrine. Second, the RAF's failure to adapt its strategy to reflect the dynamic policy environment is analysed. Third, the consequences are assessed, as an essentially unmodified strategy was implemented in operational practice during the *blitzkrieg* in France. Finally, the RAF's institutional culture and behaviours will be considered as a context for strategy-making, highlighting lessons that may still be of contemporary relevance.

The Nexus of Policy, Strategy and Doctrine

The Policy Framework: Limited Liability

Policy is fundamentally a political activity: the executive direction given to the pursuit of national interests, which strategy is then designed to achieve.[4] This paper argues that throughout the interwar period, it was policy that dictated air strategy rather than the RAF's

own conceptual prejudices, although serendipitously enough for the Air Staff, political direction and the popular mood both tended to reinforce its own doctrinal preferences.

In 1923, the Salisbury Committee was established to coordinate national defence. It was constrained by the two political imperatives that would increasingly dominate interwar defence policy: first, the overriding requirement to avoid any repetition of the horror of the trenches and the mass casualties that appeared to be an inevitable consequence of modern land warfare; and second, a developing (if at this stage largely irrational) popular fear of aerial attack, with the apparent potential for a 'knock-out blow' to be delivered against centres of population and industry.[5] The 'never again' and 'bomber will always get through' schools of thought were powerful organising ideas that pointed to investment in the RAF at the expense of the other services, so that future wars could be fought from the air without the necessity to fund large field armies and as a deterrent against any prospective aerial attack on Great Britain. Consequently, the committee recommended the creation of a fifty-two squadron metropolitan air force 'to protect against air attack by the strongest Air Force within striking distance of this country'.[6] However, the means were not made available to translate this policy into an actionable strategy. In the generally benign geopolitical environment of the Locarno era, economic risks were more tangible than the potential threat of an attack by another state – France was the only credible opponent – so the 'ten-year rule' (mandating there would be no European war for at least a decade) was adopted to justify swingeing cuts in defence expenditure.

Having effectively opted out of national security based on sovereign capabilities, Britain put her faith in collective security provided by the League of Nations. However, this approach became increasingly untenable as autarky and militarism erupted in the wake of the global economic crisis of 1929. In 1933, Germany withdrew from both the Geneva Disarmament Conference and the League of Nations, and this prompted Britain to establish a Defence Requirements Committee to reconsider her military needs. The committee was dominated by the Permanent Under-Secretaries for the Foreign Office and the Treasury, while ironically, it was the service chiefs who initially hampered their efforts to establish realistic requirements, despite being encouraged to state what they needed and leave it to the committee to determine priorities. As Michael Howard comments, 'starved of resources for years, uncertain of their ability to recruit the necessary manpower and conscious of the lack of any armaments-base to make major expansion possible, [their] timidity, pathetic as it now appears, is understandable.'[7] The Chief of the Air Staff, Sir Edward Ellington, asked for just the fifty-two squadrons originally recommended by the Salisbury Committee, although this assumed an attack by France. Another twenty-five squadrons would be necessary to defend against an attack from Germany and 'he had no idea what that would cost.'[8]

Rearmament on a significant scale would require the ten-year rule to be rescinded, but Britain had recently been forced off the gold standard and the national debt was enormous, leaving the government with an extremely difficult choice between national security and a healthy

economy. This dilemma is enduring; while most administrations have accepted Adam Smith's dictum that their 'first duty is to protect society from the violence and invasion of other independent societies',[9] Britain's current coalition government has explicitly rejected this proposition, stating instead that 'its first priority is to reduce the deficit and restore economic growth'.[10] This is understandable, as despite a plethora of potential security risks, there is no objective, existential threat to the United Kingdom, while the national debt stands at over £900 billion with interest payments exceeding the annual defence budget. In 1934, the choice was more finely balanced, because although the financial situation was equally malignant, it was accompanied by a patent, external threat that could not be ignored.

Consequently, the government compromised. The ten-year rule was abandoned, but defence spending was capped, so although expenditure was increased by £5 million to £107 million in 1933, this only restored the budget to the 1931 level. Even as rearmament accelerated later in the thirties, fiscal constraints remained in place, prompting John Slessor (then Group Captain (Plans) in the Air Staff) to complain that 'the government seemed less interested in setting defences in order than having enough money to pay an indemnity to a victorious enemy when the war was lost'.[11] In fact the Chancellor, Neville Chamberlain, did acknowledge the need for rearmament - but not at any cost. He believed that Germany's experience of economic blockade in the Great War meant she would be extremely reluctant to contemplate another long war; accordingly, a sound economy as 'the fourth arm of defence' [12] would demonstrate Britain's capacity to stay the course in a protracted conflict, and Chamberlain hoped that this would act as a powerful deterrent to German aggression without the expense of expanding the Army, particularly if coupled to the creation of a long-range bomber force 'calculated to inspire respect in the mind of a possible enemy'.[13]

Chamberlain therefore recast the Defence Requirements Committee's proposals to give priority to the RAF, 'based on the belief that the next war would be an air war: a war that would be won or lost in the air.'[14] This formalised a policy that aimed to limit Britain's liability in a future war by avoiding any commitment of land forces to the continent, a decision that was not only based on economic considerations, but was also overtly political, because of the premise that a renewed continental commitment would be unacceptable to popular opinion because of the baleful legacy of the Great War. The results were profound: the RAF was to be expanded to eighty, rather than fifty-two, squadrons, while its budget jumped from £16 million in 1932 to £450 million in 1939, offset by a reduction in spending on the Army from £40 million to £19 million.[15] Unsurprisingly, this did not meet with the universal approval of the service chiefs, including even the Chief of the Air Staff, who was concerned that a hasty expansion would result in an unsustainable, 'shop window' air force without proper reserves. However, the cabinet unanimously endorsed the chancellor's proposals, Stanley Baldwin, the prime minister, noting that politically 'it was necessary to do something to satisfy the semi-panic conditions which now existed about the air'.[16] Limited liability was to remain an article of political faith for Chamberlain until 1939, initially as chancellor, and then as prime minister.

The policy framework that would shape the development of military strategy for the rest of the thirties had now been set in place. In a political atmosphere where 'almost no price was too high to pay to avoid another war',[17] it was fervently hoped that German militancy could be deterred by a two-pronged approach based on a prudent economic policy, demonstrating Britain's ability to fight a long war, and the threat posed by a capable metropolitan air force. Should deterrence fail, Britain would limit its liability through the implementation of an adapted air-maritime strategy where - in accordance with the 'British way of warfare' described by the influential Basil Liddel-Hart[18] - Britain's geographical isolation would be used as a platform for the support of her continental allies through a combination of air attack and naval blockade. This was pithily summarised by the Chief of the Imperial General Staff: 'Never again shall we even contemplate a Force for a foreign country. Our contribution is to be the Navy and the RAF'.[19]

Air Strategy: Optimized for Independent Action

A coherent strategy now had to be developed to put limited liability into practice. The Air Staff decided to meet the policy goal by building a strategic force organised and equipped to fight an independent air war against Germany from a secure base infrastructure in Great Britain, with a target date for readiness of spring 1939. The means to resource this strategy would be provided by Chamberlain's amendment of the Defence Requirements Committee's recommendations, which formed the basis for 'Expansion Scheme A'.[20] This was the first of seven lettered expansion schemes designed to reconcile political and military priorities as war approached, thus representing tangible manifestations of strategy in action. Because of the urgency of the requirement – Germany had been ceded a five-year head-start in rearmament by the time the expansion programme began to take effect - and the continuing fiscal constraints, sufficient means could not be generated in the time available to address all potential air roles, so it was determined that strategic air power would be resourced at the expense of more tactical capabilities, which were, in any case, not required within the policy framework set by limited liability. Consequently, the expansion schemes concentrated on long-range bombers, as a deterrent, and short-range interceptor fighters, for home defence, rather than dive-bombers, army cooperation and other tactical support aircraft.

Once this strategy was implemented, structural realities - it took two years to train a pilot, three years to train a technician and nearly five years to build a flying station – severely limited the extent to which it could be amended to reflect subsequent changes in policy, although political interventions could still alter the emphasis if not the overall thrust of air strategy. This was most apparent in the politico-military debate about the correct balance between offensive and defensive capabilities that ensued as a result of the sudden acceleration in aviation technology (from the mid-thirties onwards) which meant that aircraft were obsolescent almost as soon as they entered service. For example, the RAF's *Battle* and *Blenheim* bombers looked like world-beaters in 1937, as they were patently superior to the wood and fabric biplanes they were superseding, but they were completely outdated by 1940 and proved frighteningly vulnerable in combat.[21] Planners were now faced with the dilemma of too much too soon, or too little too late; once a design was put into production, an air force was committed to a force

structure that would be obsolete within a few years, yet any delay in re-equipment might prove fatal if war broke out earlier than anticipated.[22] This was critical, because in the air, even small technical advantages may be leveraged into an overwhelming superiority, as the *Luftwaffe* proved when it literally decimated the Soviet Air Force in 1941. France and the Soviet Union fell into the trap of modernising too early, while Britain left rearmament too late. As the aggressor, Germany held the advantage, because she could choose the moment to provoke a crisis.

New technology also led to the advent of the high-performance monoplane fighter just as the expansion programme was getting into its stride.[23] This suddenly put Baldwin's proposition that 'the bomber will always get through' into doubt, especially as the concurrent development of radio direction-finding provided early warning of attack and the basis for an economical method of command and control.[24] These innovations offered a realistic prospect that a knock-out blow – which remained an issue of enormous popular concern – could now be defeated. By itself, this would almost certainly have prompted a reappraisal of the balance of priorities in air strategy, but the imperative for change was reinforced by the difficulties that were being experienced in establishing a credible bomber arm. The delayed start to rearmament meant that during the Munich crisis the RAF's entire strategic potential was represented by a few squadrons of hopelessly obsolete *Virginia* and *Heyford* biplanes, demonstrably lacking both the range and bomb-load to threaten Germany.[25] Although development of the heavy bombers that would ultimately underwrite a genuine strategic capability had already been set in train, the practicalities of design, development and production meant that more interim types (notably *Battles* and *Blenheims*) would be necessary to bridge the gap, despite their impending obsolescence. Technique was deficient as well as equipment; whereas the Germans had developed the *Knickebein* blind-bombing device, R.V.Jones 'was astonished by the complacency that existed regarding our ability to navigate at night'.[26] In short, the RAF possessed little genuine strategic capability, bearing out Slessor's remark that 'our belief in the bomber, in fact, was intuitive – a matter of faith';[27] there was certainly no indication that the nascent British bomber force was constraining German foreign policy in any material sense.

The increasing concern about the impotency of the bomber force coupled with the development of the new technologies that were empowering air defences prompted Sir Thomas Inskip, the Minister for Defence Coordination, to conduct a formal review of air strategy. As a result, capabilities were reprioritised on the basis that the RAF's most important function was now air defence, not bombing.[28] This intervention was undoubtedly motivated as much by politics as by a real concern about the proper balance between offence and defence, as fighters were cheaper and quicker to build than bombers; an important consideration when there was mounting political pressure to attain numerical parity with Germany as quickly as possible. Nevertheless, Inskip's initiative capped the immediate expansion of the bomber force, effectively marking the end of the strategy to deter German militancy through the threat of air attack, while the commensurate increase in fighter numbers laid the foundations for the tiny margin of strength that ultimately helped to secure victory in the Battle of Britain.[29]

The mood in air rearmament now changed abruptly, as production planning was put on a wartime footing and the constraints imposed by the doctrine of economic stability were gradually relaxed.[30] The different design, development and production branches of the Air Ministry were amalgamated to plan and build an air force with a genuine war-fighting capability, and the RAF's share of the combined services' budget rose to forty percent from an interwar average of seventeen percent.[31] The extent of Britain's commitment to air power is indicated by annual aircraft production, which rose from 893 in 1935 to over 20,000 in 1941.[32]

Meanwhile, the RAF restructured itself into a configuration intended as a more appropriate way of implementing the strategic air force strategy. In 1936, the Air Defence of Great Britain organisation was replaced by four new, mono-functional, commands: Fighter, Bomber, Coastal and Training. The sharp distinction between roles was the antithesis of the *Luftwaffe's* structure, which consisted of geographically-based, self-contained, multi-function air forces or *Luftflotten*, reflecting the entirely different purpose and strategy of Germany's air arm. The RAF's system of functional commands eased the administration of the expansion programme and was to prove its worth as a way of commanding and controlling air power in independent, single-role campaigns conducted from the home base, such as the Battle of Britain and Bomber Command's offensive against mainland Europe. But it also had significant drawbacks, particularly through the loss of the training opportunities and shared experiences that would have been enjoyed in a unified command structure, and this was mainly to the detriment of Bomber Command. Whereas Fighter Command enjoyed the freedom to develop the sophisticated techniques and technologies of air defence, Bomber Command learned little about the vulnerability of its bombers to a radar-controlled, modern fighter force, and had few opportunities to practise the coordination of fighter escorts.[33]

The functional commands therefore translated the policy of limited liability into military strategy, and also reflected the tension between the two; whereas Bomber Command represented the Air Staff's strategic theories and aspirations, it had been initially resourced by government purely as part of the policy of deterrence, while Fighter Command was created almost entirely as a result of public pressure for the sole purpose of defending Great Britain.[34] A clear omission from the RAF's organisational structure was a command able to sustain itself on mobile, expeditionary operations, configured to gain and maintain air superiority overseas, and with the capability to provide reconnaissance and bomber support to an army in the field; so 'while the *Luftwaffe* was trained and equipped for mobile operations from improvised airstrips, the RAF had become deeply wedded to the concept of controlled operations from secure bases'.[35]

Air Doctrine: Strategic versus Tactical Employment?

The proposition that air strategy was driven by policy rather than the Air Staff's own conceptual preferences is supported by an analysis of its formal doctrine; indeed, the RAF's genesis as an air support element of the Army in 1918 – a powerful and relatively recent formative experience shared by all of its strategic decision-makers – would make it strange if it was not

predisposed to play a full part in air-land warfare. However, the development of air strategy has been clouded by the RAF's rhetorical emphasis on strategic bombing, which has fostered the impression that it was conceptually opposed to tactical air power in principle.[36] This was not the case, despite the RAF's well-documented espousal of strategic or 'morale' bombing, which it had adopted as the most likely guarantor of its continuing independence in the financial austerity of the post-war era. But this was 'sowing the seeds of later troubles',[37] as the Commandant of the RAF Staff College acknowledged when he observed that the other services were growing impatient that the air force would not focus on 'the common aim of attacking the enemy's armed forces', but was instead 'advocating a form of military action [morale bombing] that no government will put into effect'.[38]

However, in reality the RAF was not entirely focused on strategic air power; for example, while the most authoritative statement of doctrine, *AP1300*, devoted thirty-eight pages to bombing, it allocated fifty-five pages to army support.[39] Serious efforts were made to explore how air power could best be employed in modern land warfare, including the creation of a School of Army Air Cooperation with a particular aim of investigating tank-aircraft cooperation.[40] However, the dissolution of the Army's Experimental Mechanised Force in 1929 caused momentum to be lost, and the RAF turned to its practical successes in colonial air policing (in Somalia, Palestine and Iraq) as more powerful and current examples of air support than theoretical exercises conducted against a putative European enemy on Salisbury Plain. *AP1300* accepted that lessons drawn about the use of air power against such 'uncivilized opponents' would not be directly applicable in modern warfare, although its prediction that 'liberties could be taken'[41] if complete air superiority was achieved against an ill-organised opponent without an anti-aircraft capability was, ironically, exactly the situation that the *Luftwaffe* was able to exploit in 1940. This illustrates the essential soundness of the RAF's doctrinal thinking, if not its success in providing the wherewithal to implement it: 'Organisation and doctrine are useless without aircraft and aircrews, and in France in 1940 the Royal Air Force, relative to the Germans, had too few of either.'[42]

The RAF's formal doctrine – as opposed to its rhetorical position – therefore demonstrates its willingness to consider both tactical and strategic air power roles, indicating that it was a lack of resources rather than dogmatic prejudices that led it to prioritise independent air capabilities in its strategy - although this undoubtedly corresponded with the Air Staff's beliefs about how future wars ought to be fought. However, while this was a rational component of a coherent strategy, unfortunately the RAF failed to explain its thinking to the General Staff, so the Army saw the relative neglect of tactical air support as a cultural preference rather than a sensible apportionment of scarce resources. Consequently, the Chief of the Imperial General Staff professed himself to be 'disgusted with the way in which the RAF treat cooperation',[43] although this observation is hardly fair given the Army's equal lack of preparedness for air-land operations. The General Staff had not been a conspicuous advocate of air cooperation in the era before a continental commitment was envisaged and indicatively, its *Notes on Lessons of the Great War* (which were not published until 1934) contained only one sentence on air

support, commenting unenthusiastically that 'low flying assault fighters as maintained by some foreign countries may be worth consideration.' The Army, like the RAF, had taken the direction provided by limited liability as the basis for its own resource prioritisation, and this naturally led it away from serious preparations for modern air-land warfare, most clearly symbolised by the disbandment of the Experimental Mechanised Force.

The Failure of Adaption

Ends: the Continental Commitment

In March 1939, Germany annexed the rump of Czechoslovakia. This abruptly ended limited liability, as the government was forced to acknowledge that German revisionism could not be deterred or appeased, and reluctantly accepted the necessity of raising a substantial British Expeditionary Force (BEF) to support France. This *volte face* removed the central assumption of air strategy and had two major implications: first, already limited air resources would have to be stretched over a much wider commitment, as the RAF was faced with reconciling the competing demands of providing tactical air support for an Army in France - a task never previously envisaged - with the maintenance of a viable bomber force, to hold Germany at risk, and enough fighters to defend Britain, should deterrence fail; and second, a way would now have to be found to organise the squadrons that could be made available for the continent, given the RAF's configuration in functional commands that were 'exceedingly mobile and flexible in the air while [being] absolutely immobile and inflexible on the ground'.[45] The change in policy had changed the ends of air strategy; this naturally dictated that means would have to be rebalanced and new ways found to employ air power effectively. However, the Air Staff was to find it difficult to develop a coherent strategy capable of achieving this.

Means: Competing Requirements

The RAF was thus caught on the horns of a dilemma as it sought to meet its obligations to its French ally and the BEF without substantially weakening the air defence of Great Britain; Terraine notes that this put it 'in the uncomfortable posture of a man looking over both shoulders at once.'[46] The most contentious debate polarised around the allocation of fighter aircraft, as these were the guarantors of air superiority, the most critical factor in modern warfare. In the literature, Sir Hugh Dowding, the Commander-in-Chief of Fighter Command, is generally lauded as the only RAF leader to understand fully the strategic implications involved, and his famous letter and personal intervention on 14 May 1940 is invariably credited with prompting the cabinet's decision not to send additional fighters to France.[47] However, this is something of a myth. As the officer primarily responsible for the air defence of Great Britain, Dowding began to make the case against any reduction in his command's strength as soon as the scale of the continental commitment became clear in March 1939,[48] while Sir Cyril Newall, the Chief of the Air Staff, was equally aware of the potential drain on Fighter Command's resources. Newall also realised that Dowding's fighters would be far more effective in Britain (where they would benefit from a well-found infrastructure and a proper system of air defence)

than they would be in France,[49] but he understood that politically, the imperative to support the BEF and the French was not discretionary, while militarily, the problems of defending Great Britain would be compounded enormously if France fell. The secret was to achieve an appropriate balance of resources.

Consequently, he promised just four squadrons of fighters for France initially, but accepted that up to fourteen might be necessary eventually.[50] In the meantime, most of Fighter Command would be retained at home to hedge against failure in France, although this was clearly something of a self-fulfilling prophecy, as it naturally increased the chances of defeat on the continent. Nevertheless, as Sebastian Cox notes, the Chief of the Air Staff's strategic judgment was generally sound: 'Newall has received insufficient recognition from many historians over the correctness of his strategy. Rather, there has been a tendency to portray the reversal of policy [not to send additional fighters to France] as simply a result of the stoic and principled resistance of Lord Dowding to wrong-headedness in Whitehall'.[51] Dowding reportedly thanked God when he heard that France had asked for an armistice, because this would end any more external calls on his command's resources;[52] but believing that Britain would somehow benefit from the loss of her major continental ally, with the strategic vulnerability this entailed, demonstrates a narrowness of vision and, perhaps, a certain naivety.

In contrast, the Air Staff sought to reconcile the need to provide fighter support in France with an effective defence of Great Britain through a proposal for a common Anglo-French air defence structure running from Scapa Flow to the Mediterranean.[53] Slessor explained the rationale: 'Unless we can make some arrangements for operating fighters from French Bases, we might be faced with the spectacle of five or six hundred good short-range fighters sitting in England, unable to contribute at all to the issue of the struggle in the Low Countries – a struggle on which the fate of England might ultimately depend'. He went on to explain the strategic dilemma faced by the RAF: 'It was unfortunate that our proper obsession with a "knock-out blow" against England has forced us to concentrate on a type of fighter and static fighter organisation that make it very difficult to assist resistance against a different knock-out blow against France, which, if successful, would be the first stage of a knock-out blow against England'.[54]

Inevitably and understandably, Newall made the maintenance of an adequate fighter force in Britain - to defeat such a knock-out blow - his absolute priority. Given the existential stakes involved, it is difficult to argue that this was not the right strategic choice. However, rather than setting clear priorities and constraints, means were apportioned through an incremental series of *ad hoc* decisions, and the lack of definition meant that there was little consensus within the RAF's high command about the real extent of the commitment to the campaign in France. Slessor's proposal, for example, demonstrates the Air Staff's willingness to consider extending Fighter Command's liability, but only if its fighter could be employed within a proper system of command and control.[55] This proved to be impossible, as the RAF was not able to adapt its strategy, and find an effective way of deploying air power to the continent.

Ways: Organising Air Power

In the absence of an established tactical command, the RAF's deployment to France had to be extemporised. Initially, there were two elements, the Air Component of the BEF and the Advanced Air Striking Force (AASF). The Air Component was intended to provide dedicated support to the BEF, and consisted of fighter, army cooperation and reconnaissance squadrons. The AASF was essentially No.1 Group of Bomber Command, comprising ten squadrons of *Battle* light bombers. It was not intended to provide tactical support for the Allied armies, but was deployed as an outpost of Bomber Command, so that its short-range *Battles* could reach industrial targets in the Ruhr. However, this aspiration quickly fell by the wayside, as the *Battles* proved to be far too vulnerable to penetrate into Germany while the weakness of the French bomber arm (which only possessed twenty-five modern aircraft) meant that the AASF would be called on to conduct nearly all of the close air support tasks when the German offensive began.[56]

A British Air Forces France (BAFF) Headquarters was eventually formed to coordinate the two elements. Commanded by Arthur 'Ugly' Barratt, it demonstrated all of the weaknesses of *ad hoc* organisation. While the AASF came under BAFF's control, the Air Component answered directly to the BEF; furthermore, BAFF could only request, not order, support from the home-based elements of Bomber Command. Neither of the two RAF elements was a properly balanced, composite force, which meant the Air Component had to rely on the AASF for bombing support while the AASF had to request fighter escort from the French, when it could have been provided by the Air Component if the two elements had been integrated as a unified command. Events were to prove that these support arrangements were far too fragile to work reliably in practice. Moreover, the only working air-land interface was in Whitehall rather than in theatre, so Army officers had to telephone London with requests for air support, compromising timeliness and assurance, the twin pillars of effective air-land integration.[57]

The rest of Bomber Command was theoretically available to support the Allied armies, but there was still political concern that London was vulnerable to a massed air attack, especially if there was a protracted period of stalemate following a German occupation of the Low Countries. Consequently, there was pressure to preserve the sixteen squadrons of heavy bombers 'in being' as a deterrent force, particularly as there were grave doubts about their effectiveness in supporting a land battle. The commander-in-chief, Ludlow-Hewitt, pointed out that none of his squadrons were up to strength and all would require fighter escort. It was not clear how this could be provided, or how command and control would be exercised. His crews lacked any useable maps of the likely areas of operation and were not trained or equipped to engage targets of opportunity, such as armoured columns. Instead, he argued that they should be used to attack static targets in the rear, such as vehicle parks, marshalling yards and depots, where the prospects for success were greater.[58]

By the eve of the German attack, Bomber Command's resistance to being used in a tactical role was hardening. Sir Charles Portal was now in command. He wrote to the Chief of the Air Staff

on 8 May 1940 in the strongest possible terms, protesting that the planned use of his aircraft against German columns was fundamentally unsound, 'as the area will be literally swarming with enemy fighters, and we shall be lucky if we see again as many as half the aircraft we send out each time'; in these circumstances, there were serious doubts about 'whether the attacks of fifty *Blenheims* based on information necessarily some hours out of date are likely to make as much difference to the ultimate course of the war as to justify the losses that I expect them to sustain'.[59] The operational instructions jointly issued by BAFF and Bomber Command were sadly prescient, stating that 'Bomber aircraft have proved extremely useful in support of an advancing army, especially against weak anti-aircraft resistance, but it is not clear that a bomber force used against an advancing army, well supported by all forms of anti-aircraft defence and a large force of fighter aircraft, will be economically effective.'[60] This demonstrates that even before the battle, the RAF's leaders understood the likely outcome. In the absence of a coherent strategy providing overall direction, Bomber Command - *pace* Fighter Command - sought to limit its own liability, and fought with one eye on its future commitments, particularly in striving to conserve its heavy bomber force.

One factor, however, trumped any other considerations about the RAF's deployment, and this was the reality of what was logistically possible. Trenchard's vision for an independent air force had identified the flying squadron as its fundamental building block, and every possible effort was therefore made to maintain the integrity of squadrons as self-supporting units. But in the event of expeditionary operations, squadron establishments would have to be minimised to maintain mobility, so in 1927 it was determined that squadrons in the field would be relieved of all repair work and their supply holdings limited to three days. The necessary deep support would be provided by non-mobile air stores parks and depots in the rear, with advanced repair detachments closer to the frontline. Based on the successful system employed on the Western Front in 1918, this was sound practice; but because it would weaken the self-sufficiency of squadrons and mobility was, in any case, thought to be unnecessary in the era of limited liability, the RAF reverted back to a squadron-based logistics system deemed more appropriate for the static posture adopted under the functional command arrangement introduced in 1936.[61]

Consequently, the squadrons deploying to France were desperately short of vehicles, spares and repair and salvage capabilities, and only the four Air Component fighter squadrons were equipped to operate from austere airfields on a mobile basis. These deficiencies were belatedly recognised and steps were taken in late 1939 to provide dedicated forward repair and salvage units with extra mobile servicing wings, much as originally proposed. However, these could be neither manned nor equipped in the time available, and the lack of specialist vehicles meant they were quickly rendered immobile and ineffective. Less than a dozen aircraft were repaired in France and no engine repairs were completed at all because of a shortage of tools.[62] Similarly, although two extra mobile servicing wings were created (and an additional three planned), only one was functioning by May. This in itself would have limited the number of additional squadrons that could have been deployed, and in this sense the debate about

fighter reinforcements must be set in context, because there were no means to support them had they been dispatched.

The logistics problem was exacerbated by a grave shortage of even the most rudimentary airfields. This precluded the planned deployment of the *Blenheim* bombers of No.2 Group, although these could still operate over France from airfields in Britain. In contrast, the short-range *Battles* of the AASF had to be deployed forward, but the ten bases earmarked for them were still largely under the plough.[63] Fifty-nine new airfields were planned in a major Anglo-French construction programme, but the project was hampered by delays, not least because suitable grass was (apparently) only available from New Zealand. This meant there were few available alternatives when bases were bombed, or when Barratt had to move his squadrons to avoid being overrun, and the French could do little to help as they were also critically short of bases. Even when new operating strips could be found, the weakness of the RAF's logistics concept exacerbated the problem; the Air Component was mobile, but its ancillary units were not and the AASF had no mobile capability at all. It was easy enough to fly aircraft to a new base, but relocating ground-crews, fuel, armaments, spares and repair machinery proved impossible without adequate transport. Barratt had recognised the problem during the Phoney War, but the Air Ministry Establishment Committee refused his request to rectify the deficiency, stating with an impressive lack of foresight that 'owing to the position of the AASF behind a strong fortified line, the degree of mobility required for the unit is small.'[64] Barratt was not convinced, because his handwritten notation survives: 'East, yes, North???'[65] BAFF was still 600 vehicles short in May, a deficiency of twenty-five percent, and only a generous loan of 279 vehicles from the French Army was to provide any sort of mobility.

The squadron-based logistics system had been designed to enable a static air force strategy; it proved to be manifestly inadequate for fast-moving, mobile operations and was simply overwhelmed in practice. Of 452 *Hurricanes* originally sent to France, just sixty-six (fifteen percent) ultimately returned to Britain; only seventeen percent were lost in air combat, while an astonishing 178 aircraft (thirty-nine percent) were abandoned through lack of repair facilities.[66] Because the RAF was not an expeditionary force, its deployment and organisation in the field was makeshift, and it paid a correspondingly heavy price for its lack of logistical resilience.

Strategy in action: May-June 1940

The consequences of the failure to adapt air strategy became clear when the German *blitzkrieg* began on 10 May. Although Germany held a numerical advantage, with roughly 3,700 aircraft to oppose 2,600 British and French aircraft,[67] the key to success was the *Luftwaffe's* ability to gain and maintain control of the air by concentrating force where it was most needed in time and space. In the absence of an effective system of command and control, the Allies' response was piecemeal, reactive and rarely timely. The *Luftwaffe* seized the initiative at the outset by attacking nine of the AASF's ten airfields in the opening minutes of the campaign,[68] and it maintained a ruthless tempo that kept the Allies off-balance and disorientated subsequently. Although BAFF covered the initial movement of the BEF into Belgium, its *Battle* squadrons were

eviscerated in the process, losing sixty-three of their original complement of 135 aircraft within the first two days. This prompted Newall to instruct Barratt to husband his resources, but this was impossible as the climax of the battle was already approaching.[69]

In every campaign, there is a tipping point when irrevocably, one side begins to gain the advantage while their opponent starts to lose the physical capability and will to resist.[70] In 1940, the decisive act took place at Sedan, when Guderian's *panzerkorps* pierced France's 'continuous front' by forcing a crossing of the River Meuse.[71] The danger was clear and the RAF responded by mounting a maximum effort against the bridgehead. The result was what Alistair Horne memorably describes as a 'Valley of Death'.[72] Forty-four aircraft were lost from seventy-two bombers dispatched, the sixty-two percent casualty-rate representing the highest losses ever suffered by the RAF in an operation of comparable size; the uncoordinated and unescorted bombers were simply overwhelmed by 814 *Luftwaffe* fighter missions.[73]

After this catastrophe, six composite squadrons were formed from the remnants of the AASF, but few sorties could be flown as they were forced to withdraw to stay ahead of the German advance. The few survivors were eventually switched to night operations to reduce the prohibitive casualty-rate, although the effects achieved were negligible; the last aircraft were finally withdrawn on 15 June.[74] The Air Component's fate was similar. Following the Meuse crossing, the squadrons had to keep moving and were finally evacuated on 19 May after just nine days of combat. By this stage, the RAF had already lost 195 *Hurricanes*, or about a quarter of its total front-line fighter force.[75]

If Sedan was the RAF's Charge of the Light Brigade, *Operation Dynamo*, the Dunkirk evacuation, was arguably its Thin Red Line, although this would have been disputed by many of the soldiers and sailors involved; Admiral Ramsey, in overall command, expressed his disappointment at the 'puny efforts made to provide air protection during the height of this operation.'[76] However, this is not a fair assessment of the value of the 651 bomber and 2739 fighter sorties flown by the RAF over Dunkirk, and more objective analysis suggests a degree of effectiveness that provides a useful point of comparison with the earlier failures elsewhere.[77] This was acknowledged by the prime minister, when Churchill famously stated: 'There was a victory inside this deliverance. It was gained by the Royal Air Force.'[78]

The RAF was now operating from its permanent infrastructure in much the way envisaged by its original strategy, permitting sortie generation rates to be increased and, for the first time, combat power to be massed at a point of decision. Fighter Command was able to sustain over three hundred sorties a day over Dunkirk, and there was also a qualitative improvement as the more capable *Spitfire* squadrons of No.11 Group were committed to combat for the first time, providing an infusion of fresh blood at a time when the *Luftwaffe's* fighter units were suffering from the fatigue and attrition of three weeks of intense fighting and constant movement.[79] The net result was that *Operation Dynamo* marked the *Luftwaffe's* first significant reverse of the war.[80] The RAF was successful in contesting control of the air, with attacks on Allied shipping

being only significantly effective on two days - 27 May and 1 June - and even then, the *Luftwaffe* units involved suffered grievously. The more permissive air environment also allowed No.2 Group's *Blenheims* to operate more effectively and at greatly reduced cost.[81] The limited size of the bridgehead reduced their exposure in hostile airspace, while finding appropriate targets was easier, as operations around Dunkirk were essentially static, so the intricate coordination necessary to identify and strike fast-moving targets elsewhere was not required.

However, the organisation of air power was still inadequate. RAF bombing support was highly effective when available, but - as reported by the East Surrey Regiment - its arrival was considered 'miraculous'.[82] On one occasion, the Secretary for Air, Sir Harold Balfour, took a call in person in the Air Ministry from a corporal on the beach who was requesting urgent air support to destroy an artillery-spotting balloon. The soldier used a field-telephone which was routed through a naval telephone exchange to the Admiralty in Whitehall, then to Fighter Command at Uxbridge, and finally to Adastral House.[83] Balfour ordered Dowding to send some fighters to shoot down the balloon, but this was hardly an endorsement of the way that air strategy was being implemented in tactical practice. The next section will consider why the RAF found it so difficult to adapt its strategy to reflect changing circumstances.

Institutional Culture

This paper has suggested that the strategy that contributed to the RAF's defeat in France originated in an entirely rational response to the ends dictated by the policy of limited liability; and that throughout the thirties, the Air Staff's management of ways and means was generally sound, as it sought to reconcile competing demands through the sensible apportionment of inevitably limited resources and the development of an organisational structure appropriate for a home-based force intended for independent action. However, strategy is an inherently dynamic and iterative process, and it must be subject to continual review if it is to retain its relevance;[84] the RAF's sclerotic response to the changing policy context indicates that this was not well understood. The Air Staff failed singularly to take advantage of the fourteen months that were available between the end of limited liability, in March 1939, and the beginning of the *blitzkrieg*, in May 1940, to adapt its strategy to new circumstances. Although there were obstacles to change, notably the structural constraints on the expansion programme providing the means of air strategy, scant attention was paid to determining the most appropriate way of employing expeditionary air power; instead, the system of mono-functional commands was retained, indicating a lack of imagination or at least a degree of intellectual inflexibility.

One of the key requirements for effective strategy-making is a culture of 'collective reflexivity', institutionalising a discipline of rigorous analysis to provide an evidential basis for sound decision-making.[85] The military in general, and the RAF in particular, had no such tradition. It was not particularly disposed to introspection; culturally, as a highly technical service, it was more comfortable with an instinctive approach based on pragmatism and empiricism, and was deeply suspicious of what could be regarded as undue intellectualism.[86] This tendency

is most apparent in the haphazard approach that was adopted to post-battle analysis and the lack of rigour in learning and applying lessons. These weaknesses have proved to be enduring, indicating the strength and pervasive nature of powerful institutional cultures; the current Chief of the Air Staff, for example, has expressed his frustration at the RAF's failure to capture single-service, operational-level lessons from the campaigns in Afghanistan and Iraq in anything like a systematic manner.[87]

In 1940, the RAF's lacklustre attitude towards analysis may have reflected its institutional mind-set, but is perhaps more understandable given the context. After Dunkirk, the Army had the luxury of a period of respite and reflection while the RAF continued to be committed to intense combat operations, not least in the Battle of Britain. However, as the Army was convening a committee to report on the campaign, Balfour felt that politically, the RAF must also be seen to be capturing lessons.[88] Accordingly, he ordered a special committee to be established, an approach so alien to the RAF that the Chief of the Air Staff felt it necessary to reassure his senior commanders that 'it is not the intention to assemble a Soviet, but to make full use of those who have had recent experience for the benefit of all concerned as quickly as possible'.[89] Air Marshal Brooke-Popham chaired the committee, interviewing fifty-two RAF personnel of all ranks, including non-commissioned officers and airmen. This was in striking contrast to the Army's committee, where only ten of thirty-seven witnesses were below general officer rank. This indicates that despite the stated aim of informing future policy, the RAF felt that it had little to learn at the strategic level and was content to confine its analysis to tactical practice. As would be expected, given the rank range of interviewees, the resulting recommendations covered everything from fighting tactics and operational organisation down to minutiae such as 'the bad type of sock issued to airmen', the number of gum-boots held by squadrons and the correct size of mudguards for bomb trailers.[90] One aspect that did stand out, however, was the singular failure of the logistics arrangements.

While Balfour felt the report was useful, he had second thoughts about its potential consequences. He pencilled in the margin that 'in my view we should say that it is confidential to our own service' as although the report was intended to be constructive as well as critical, 'it must present an appearance to any Army officer or Civilian reading it, of being an indictment of ourselves by ourselves.' A signal sent by the Air Ministry to the Air Headquarters indicates the sensitivity that the RAF felt about any process of critical analysis, stating that the report 'contains valuable lessons to be circulated at senior level...it should not repeat not be distributed to Military or Naval Officers or to civilians'.[91] This unease was reflected in the Air Council, which acknowledged the report's utility, but felt 'the exercise should not be repeated except in exceptional circumstances'[92] - although it is hard to imagine what could be considered more exceptional than the loss of the nation's most significant ally and the concomitant unravelling of twenty years of strategic assumptions.

The Army's report was produced by General Bartholomew, a retired officer 'notorious for his undisguised animosity to the RAF'.[93] It concluded that the Army's organisation and doctrine

had been sound, and it was a mixture of new German tactics, the role of air power and the failure of the RAF that had been decisive. This somewhat myopic analysis illustrates the degree of institutional distrust between the services that set the tone for joint operations in 1940.[94] Bartholomew's central recommendation was that air support should be provided by a tactical air force subordinate to army command, sub-allocated to divisional and corps commanders. Although intended to emulate the *Luftwaffe* model, it represents a fundamental misunderstanding of German technique, where air power was never controlled directly by the *Wehrmacht* but was always retained under centralised control and only allocated for specific missions as part of an integrated air-land battle plan. Unsurprisingly, the Air Staff considered that the Army had failed to recognise an approach to war where dislocation was more important than wholesale physical destruction, and indirect support (attacks on depots, headquarters and choke-points) had been more effective than direct support (dive-bombing deployed units in the field) in influencing ground operations. It believed that air superiority was the most important prerequisite for cooperation, arguing that if this could be achieved, then the whole of available air power could then be used to meet Army needs, negating the requirement for specialist cooperation aircraft and dive-bombers.

All of these conclusions were to be vindicated by subsequent experience later in the war, but the RAF's performance in its next overseas campaigns, in Greece and then Malaya, demonstrate the limitations in its own strategic thinking; it is clear that the real reasons for the successes and failures of 1940 had not been identified, and it was assumed that the victory of the Battle of Britain could be replicated abroad in the absence of many of the factors that had led to success. In particular, sufficient control of the air could not be achieved, because inadequate numbers of less-capable fighters (*Hurricanes*, *Buffaloes* or biplane *Gladiators*) were deployed rather than the more formidable *Spitfires*, and without either an effective system of radar-based air command and control, or the support of a functioning mobile logistics organisation and infrastructure.[95]

Following the Bartholomew Report, the War Office proposed the creation of an Army Cooperation Command to facilitate air support. The Air Staff was concerned that this might be a first step towards the creation of an organic Army air force, and considered its response in a secret memorandum. It reiterated its belief that the proper purpose of an air force was to gain air superiority first, and only then to apply its resources in support of land operations; but it was conscious that this view was not shared by the Army.[96] Therefore, although it did not support the concept, the Air Staff reluctantly concluded that an Army Cooperation Command - with a degree of separation from both the War Office and the Air Ministry - might be a way of demonstrating the goodwill necessary to head off any further calls for a separate Army air arm. It directed that this compromise be adopted 'with the best possible grace' and decreed that the command must be given sufficient resources to avoid the impression of the RAF 'appearing to want sincerity.'[97]

Despite acknowledging the political necessity for Army Cooperation Command, the RAF's

practical support was to prove lukewarm. By the time the command was established in December 1940, air support was no longer a critical task, because the danger of invasion had receded and there was no immediate prospect of the Army engaging the enemy by land in Europe. In effect, the strategic situation envisaged under limited liability had come to pass, and in determining the allocation of resources, the Air Staff made exactly the same choices, for much the same reasons, as it had done before 1939. As it had insufficient assets to cover all potential eventualities, it prioritised the most important; and from 1941 to 1944, provisioning the real air war that was actually being fought by the frontline commands was a more pressing requirement than building up Army Cooperation Command for a putative continental campaign.

Meanwhile, some progress had been made in resolving the practicalities of tactical air support through joint trials leading to the 'Wann-Woodall Report'. This developed mobile communication links and the concept of a joint RAF/Army control centre for unified planning. However, the RAF's institutional distrust of theoretical models meant that these recommendations were never codified as doctrine, so a method of air support had to be developed from first principles when the RAF was next required to support the Army, in the North African campaign. Here, the air commander, Sir Arthur Tedder, created a functioning system of air support through trial and error, eventually establishing the Western Desert Air Force as the RAF's first genuinely multi-role formation.[98] Its success validated the 'whole air force' approach to the provision of tactical air power, and contrasted favourably with the limitations of the single-role command model for this purpose. Accordingly, when a return to air-land operations in Europe was imminent, Army Cooperation Command was unceremoniously disbanded and replaced by 2nd Tactical Air Force - a multi-role, deployable formation - as the primary mechanism for air support.

The lack of intellectual rigour applied to learning lessons was symptomatic of a wider malaise; James Corum contends that the RAF was 'the air force that was least capable of learning and adapting…an intellectually shallow service – a sort of gentlemen pilots club',[99] citing its lack of curiosity about the Spanish Civil War - one of the most significant air power events of the interwar period – as evidence. Recent scholarship suggests that rather than 'blithely ignoring the lessons of Spain',[100] the RAF studied the conflict in detail, but was simply unable to draw the correct conclusions.[101] Although it was difficult to distinguish universal principles from lessons that were likely to be specific,[102] the Air Staff was undoubtedly guilty of perseveration, and used evidence selectively to reinforce its existing preconceptions. The devastation of Guernica, for example, was seen as validating the concept of morale bombing, but as Terraine points out, 'this lesson was so much taken to heart that equally important ones were discarded.'[103] Thus the effectiveness of German air-land technique was attributed to the lack of training of Republican forces rather than any superiority of doctrine, training or equipment employed by the *Condor Legion*, and the RAF discounted further lessons on the basis that 'Experiences in Spain cannot be taken as conditions which would obtain in modern warfare between two highly organised, fully equipped armies and air forces.'[104]

Its more vociferous critics argue that the RAF's conceptual response to the Spanish Civil War demonstrates 'a cultural tradition of anti-intellectualism that was so entrenched that it had become institutionalised'.[105] This may be an overstatement, but nevertheless, it is indicative. As a highly technical service, the RAF was impressively alert and receptive to scientific innovation and new technology, but set little store by a corresponding degree of intellectual agility in its thinking about the employment of air power. This prevailing mindset perhaps helps to explain the Air Staff's failure to review and adapt its proven strategy when the context changed abruptly with the end of limited liability. Arguably, the tradition of subordinating the conceptual to the technical still endures today, and 'a fascination with technology at the expense of thinking'[106] remains a pervasive feature of the RAF's current culture and – to some extent - an impediment to effective strategy-making.

Conclusion

The RAF's experience in France and Flanders reveals lessons of enduring relevance about strategy, and its relationship to policy and doctrine, in three broad areas. First and foremost, it demonstrates that strategy matters. It was strategy that primarily accounts for the dichotomy in outcomes in 1940, and explains how an air force that had suffered a catastrophic defeat in France was able to secure victory in the Battle of Britain within weeks, despite fighting the same opponent with essentially the same equipment.

Second, the development of air strategy throughout the interwar period supports the proposition that strategy is subordinate to policy; however, it also demonstrates that this relationship is symbiotic, not linear. While it was the policy of limited liability - rather than military doctrine - that was the fundamental driver of air strategy, strategy in turn informed and shaped the choices and possibilities of policy. For example, the political decision to abandon deterrence was only taken when it became clear that the necessary means could not be found within existing strategy to resource a credible bomber arm adequately, while technological and doctrinal innovations were making an improved system of air defence both possible and politically desirable. These two factors resulted in the new policy direction to rebalance air strategy in favour of strategic defence. The co-dependence of policy and strategy is, therefore, complex and easily misinterpreted, particularly if the constitution of strategy is not well understood. This is evident in the historiography, where air strategy is invariably – and erroneously – simply regarded as a consequence of the RAF's own doctrinal preferences, rather than being more correctly perceived as a rational response to national policy.

Finally, effective strategy-making is not just about the balancing of ends, ways and means at a single point in time; the Air Staff demonstrated that it could perform this relatively simple evolution sensibly and rationally in the era of limited liability. Rather, strategy is a process, not an event, and it must be continuously reviewed and adapted if it is to retain its relevance. This demands a degree of intellectual rigour and a level of understanding and agility that is unlikely to be achieved in an institutional culture that fails to promote reflexivity or encourage strategic thinking. There are good reasons why the RAF was unable to adapt its strategy effectively

following Britain's acceptance of a continental commitment in March 1939, including the structural impediments inherent in the expansion programme and the reality of what was possible logistically; but its failure to contemplate substantial change seriously tends to reinforce the views of those who regard the RAF's approach to analysis – and learning and education more broadly – as indications of a culture that was deeply sceptical of disciplined intellectual activity. Such institutional cultures may be pervasive and enduring;[107] furthermore, recent evidence indicates that these shortcomings may not be confined to the defence sector, if the Public Administration Select Committee's assertion that 'the United Kingdom has all but lost the ability to think strategically' is accepted.[108]

The last word may be left to Churchill, who unconsciously illustrated the complexity of strategic appreciation, and the co-dependence of strategy and policy, when he declared:

> *As between the different Services, while avoiding invidious comparisons I should certainly say that the outlook of the Royal Air Force upon this war was more closely attuned to the circumstances and conditions as they emerged by painful experience than those of either of the other two Services.'*[109]

This may have been true of the independent air war that was being waged in isolation by the frontline commands as Churchill was speaking in Parliament in 1943, matching almost exactly the assumptions underpinning the strategic air force strategy designed to implement the policy of limited liability; but it completely overlooks the disastrous results that had ensued when a lack of intellectual agility meant that essentially the same strategy had been applied to the very different, and far less appropriate circumstances, of the initial, expeditionary campaigns to Norway and France.

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"Good God, Sir, Are You Hurt?" The Realities and Perils of Operating over India's Troublesome North-West Frontier [1]

By Lieutenant Colonel Andrew Roe

Flying over India's troublesome North-West Frontier (now modern-day Pakistan) was a hazardous undertaking, filled with ubiquitous dangers and hardships. Despite the maze of knife-edge hills, the oppressive furnace-like heat and the ice-cold winds, the constant strain and regular loss of life, this was an experience not to be missed and one to be proud of. This article homes in on the everyday realities and threats faced by aircrews posted to 'The Grim' – the name given to the untamed frontier by the army.

The bomb burst against the hillside in a smother of orange flame with a crack that could be heard in the cockpit above the roar of the engine. The pilot dipped in farewell over the Scout fort before flying back the twenty miles to Miramshah for a tricky landing in the near-darkness.

F. Leeson, *Frontier Legion*

Introduction

Flying over the precipitous and turbulent British-controlled North-West Frontier of India – where conditions of war, or near war, were the rule rather than the exception – was a tense and uncomfortable experience. Aircraft seemed flimsy and underpowered among the towering dust-coloured mountains, while the landing grounds seemed hopelessly small and risky. Aircrew suffered from isolation, extremes of temperature, rarefied air and experienced great difficulty in navigating over such wild territory. Moreover, the breadth of roles for the aircrew was great: reconnaissance, propaganda flights, distributing copies of government terms, visits to remote forts and cantonments,[2] casualty evacuation, air demonstrations, support to columns[3] and isolated piquets, ranging for artillery guns, dropping supplies, one-off flights at the request of local political officers, and bombing recalcitrant tribesmen all combined to place considerable strain on aircrew and the early fleet of fabric-covered aircraft. But, above all, it was the fear of crash landing in tribal territory that caused the greatest anxiety for the aircrew. A flash, followed by a puff of white smoke, was probably the only indication that a crew knew that they were being fired at; tragedy could occur at any moment. If caught by an 'unlucky' tribal bullet, or if engine failure occurred, the chance of crash landing in friendly territory was slim. Tribal brutality – especially amongst the volatile Afridis, Darwesh Khel Wazirs and Mahsuds[4] tribesmen – was legendary and highly feared by all who served on the frontier. Torture and beheadings were not uncommon. However, in the vast majority of cases, the prospect of a bag of gold was more than enough to ensure that downed aviators become hostages for ransom and bargaining, and that their safe return would occur in time. Nevertheless, flying over the wild jumble of towering peaks, sheer gorges and isolated valleys required untiring courage, good fortune and constant vigilance. It was rare for the frontier to be free from trouble for more than a few days at a time. Beneath the veneer of 'government control' was an irrepressible ruthlessness, an aversion to intrusion and a tribal philosophy of living that was liable to erupt into violence at the slenderest provocation. It is little wonder that the words 'North-West Frontier' caused the blood of most aircrew in India to flow more quickly. This article homes in on the everyday realities and dangers faced by aircrews posted to 'The Grim' – the name given to the untamed frontier by the army.

Challenges, Hardships and Dangers

To be effective on the frontier, air power relied on accurate intelligence and speed of employment; any delays in action were increasingly viewed by the tribes as weakness. The main source of intelligence came via the political chain and various informers who were keen to sell

their information. The former depended mainly on personal contacts and tribal knowledge, supported by the *kassadars* (loosely organised tribal policemen paid by the political agent), 'scouts' or Irregular Frontier Corps (a force of lightly-armed local levies led by British officers with a reputation for extreme toughness and endurance), and 'loyal' *maliks* (government-endorsed tribal leaders or elders). This well-established hierarchy provided a regular flow of information on internal politics, tribal groups, rivalries and personalities. It also provided actionable intelligence and information. However, informers were prone to informing both ways and were adept at misleading government forces; false information was ever-present.[5] Likewise, it was not easy to gain 'timely' information in such a xenophobic environment.[6] The Royal Air Force (RAF) possessed its own intelligence officers who linked into the regional civil/military intelligence networks to understand tribal grievances and issues.[7] In contrast, British and Indian battalions stationed in the heart of tribal territory often failed to develop effective intelligence structures or a detailed understanding of the tribesmen and their mental processes. The same was true also at brigade level. Geoffrey Moore, a platoon commander and part-time brigade intelligence officer of the Razmak Brigade in 1936, recalls: 'I was soon to find that my grandiose title of Brigade Intelligence Officer masked the old-fashioned role of Brigadier's Orderly Officer. As my platoon wag [a humorous or jocular individual] remarked later when someone asked the meaning of my B.I.O. armband, "Brigade Ignorance Officer, I expect." He really had hit the nail on the head.'[8]

Once a report had been verified, triggering aircraft in a timely manner was vital. The aim was to isolate any outbreak of violence before it could spread. Air Commodore H. le M. Brock recalls: 'It is as with a fire brigade – one engine can deal with a small outbreak, but if there is much delay in attending to it the fire becomes a big conflagration.'[9] As the mere threat of air power could cause a tribe to reappraise its position, a speedy response was essential. Field Marshal Sir Philip Chetwode recalls: 'In many cases, by taking swift action in a few hours instead of the weeks that it might have taken ground troops, aeroplanes have crushed our incipient trouble which, had it spread, would have involved a serious campaign.'[10] This relied on the efficient working of the administrative machinery to obtain political and government decisions. It also called for effective communications, a short distance from the airfield to the target, and a duty pilot at a high state of readiness.[11] However, the political officer had first to sanction the RAF's use, and this could often take considerable time; 'politicals' were prone to delaying the pronouncement to use force for as long as possible. Decisions could only be expedited if a member of the political administration was in a difficult situation and provided immediate authority to act. Requests for help, often written on a torn sheet of paper from a Field Service Pocket Book and delivered by pigeon,[12] were frequently short and to the point:

> HELD UP BY SNIPER FIRE AT (here followed a Map reference). ONE SCOUT KILLED. TWO SCOUTS SLIGHTLY INJURED. P.A. [Political Agent] SAFE. AIR DEMONSTRATION OVER VILLAGE MIGHT HELP BUT EXPECT TO BE ABLE TO MOVE AFTER DARK. T.O.O. 1146.[13]

To complicate matters for the air force, offensive action taken against hostile tribesmen had

to be confined to those actually engaged with government forces or seen firing at aircraft; the days of conducting active operations without authority were long gone. Those seen approaching a column with apparent hostile intent, or a concentration of tribesmen manifestly preparing for an ambush, could not be engaged until they were seen or known to have opened fire. No action could be taken against tribesmen in villages – tight clusters of mud-brick dwellings and compounds – unless due warning had been given by coloured leaflet and authority granted[14] and, even then, villages offered relatively poor targets.[15] 'Courageous restraint,' a term very much *en vogue* today in coalition operations in Afghanistan, was alive and well on the frontier in the early twentieth century. Moreover, pilots were not allowed to fly within three miles of the Afghan border, except in an emergency, allowing hostile tribesmen to slip back and forth across the Durand Line (the artificial international border, negotiated between British India and Afghanistan, but ignored by tribesmen on both sides of the divide) unmolested. Air Commodore N.H. Bottomley notes wryly: 'Frequently soldiers, who have observed these methods at first hand, have described them to me as fantastically soft-hearted, yet the Foreign Press has characterised our methods as barbarous.'[16]

Except from low altitudes, it was also almost impossible to differentiate between hostile and peaceful villagers as well as government forces, placing a significant strain on the aircrew. Despite regular scanning with field-glasses, pilots and air gunners had to rely on movement or the flash or smoke from a tribesmen's rifle to locate personnel on the ground and identify where their assistance was needed most. Low trees, bushes or scrub routinely compounded the problem and made distinguishing combatants extremely difficult.[17] 'Their targets are tribesmen, who, clothed to assimilate to the exact colour of their background, and scattered in shapeless groups which have no clear outline either when halted or on the move, are all but indistinguishable at ground-level and quite invisible from height,' recalls 'Mauser.'[18] Reciting an incident whilst fighting in the village of Bui Khel, Frank Leeson, a British officer serving with the *kassadars*, highlights the realities of a mistaken identity: 'This time, diving steeply over us, the Tempest [aircraft] strafed the road just as our last section was crossing it. The pilot had evidently mistaken the scouts for pursuing tribesmen.'[19] Fortunately, there were no casualties on this occasion. However, serious accidents did happen. A few years earlier, in 1938, a party of *kassadars* was bombed in error. One man was killed and another three were wounded.[20] Close support was rarely used when *kassadars* were working in front of regular troops. Trying to make a distinction on the ground between friendly and hostile tribesmen often fell to the ground troops or political authorities. 'Bunch' Parsons who, prior to becoming the Political Agent, South Waziristan, served with the North Waziristan Militia, was badly wounded guiding RAF bombers onto hostile villages and tribesmen. For his actions he was awarded a Distinguished Service Order.[21]

More often than not, pilots had to rely heavily on the ground commander, who was often being shot at, to tell them roughly where the enemy was. If a commander wished to send important information, a smoke candle was set alight to draw the attention of the pilot, who, on seeing it, had to leave his task and make every effort to read the message displayed on the

ground. With only cumbersome and rudimentary radios, visual target indication, employing 'Ground Signals' or 'Popham Panels,' was the principal means of communication under these conditions. In the case of Ground Signals, a number of white linen strips, forming an arrowhead visible from the air, pointed in the direction of the attack. A crude system of linen bars across the tail of the arrow provided an approximation of distance. This provided only the most basic information and was slow to lay out. It was, however, a very simple but effective form of communication between ground and air, assuming there was enough light and visibility down a valley for the aircrew to read the message.

Like Ground Signals, the more sophisticated Popham Panels dated from World War I. First introduced in 1918, the panel weighted roughly 12 pounds and consisted of a sheet of dark blue American cloth (a waterproofed fabric, like oilcloth) about 10 feet by 8 feet with a white 'T' shape stitched to it. Branching off from this were more white panels, numbered 1-9, each of which had a dark blue flap that could be used to cover it. By selectively exposing specific combinations of these additional arms, a large variety of numbered shapes could be created, each of which was allocated a pre-determined meaning in accordance with a universally understood code. Between each combination, all flaps were covered to present the basic 'T.' Due to its complexity and slow speed of use, the code was not universally popular. Lieutenant Colonel H. de Watteville notes matter-of-factly in *Waziristan, 1919-1920* that: 'Popham panels proved of no great value [in the fast-paced operations of 1919-1920].'[22] Instead, the author extols the simplicity and swiftness of Ground Signals.

For routine communication, each frontier outpost had a large square patch of ground, often bordered by whitewashed stones, that was clearly visible from the air. Linen strips of various shapes and sizes were carefully laid out in predetermined patterns in accordance with the Ground Signal code. 'A post was thus able to lay out simple messages such as: 'I am under attack from the south,' or 'I have two seriously injured men, send medical help."[23] More complex messages were sent via the Popham Panel code. Having checked the meaning of the configuration of the canvas strips or the digit combination in his code book, the aircraft would 'wobble' its acknowledgement or, in poor light conditions, reply by Aldis lamp. However, if required, a pilot would respond by writing a short answer on paper. This was carefully enclosed in a small lead-weighted canvas bag, with a long tail of red and yellow streamers attached. The streamer not only slowed the descent of the bag but also assisted with identification on the ground. It was the responsibility of the second crewman to drop this as close as possible to the ground signal. Each post was exercised once a month in its ability to convey information by code. No forewarning was given and pilots logged the time taken for the unit to display its first communication.

Routine methods of communication were enhanced on the frontier by the 'X V T Close Support Code' in 1936. Like Ground Signals, the Close Support Code relied on a number of white linen strips weighed down by stones. These were used to create an 'X,' a 'V' or a 'T' to inform the pilot of friendly and enemy positions: 'X' indicated the position of the piquet or troops nearest the

enemy and signified that 'all is well;' 'V' signified that the enemy are in the direction in which the apex of the V is pointing; and 'T' was the SOS signal – a call for help when a piquet was likely to be overwhelmed or a sign that the tribesmen are following up a withdrawal so closely that it was impossible to get away. The advantage of this method was its speed, simplicity and ease of understanding from the air.[24]

But even this method faced practical challenges. It was not always possible to display or change a character to the circling aircraft above, especially if under tribal fire. Moreover, letters were often masked by shadows, bushes, low cloud and pockets of fog, or became so dirty with use that they were difficult to see from above. If not weighed down with stones correctly, windy conditions could result in an 'X' looking like a 'V,' resulting in the pilot wasting valuable time searching for a non-existent enemy. On rare occasions piquets forgot to pick up their ground strips when they withdrew. A common mistake was pointing the 'V' in the wrong direction. Such a rudimentary system was incapable of dealing with dynamic situations or of expressing a commander's intent.[25] Pilots often dropped written messages during an over flight to request clarification, but these were often lost, misunderstood or placed the 'retriever' in unnecessary danger. If conditions allowed, responses were collected using a hook on a slender boom suspended under the aircraft to 'snatch' a message bag on a long string stretched between two light poles. This required an aircraft to fly hazardously low; so low that pilots feared that the airframe's wheels would tangle with the string and 'take the whole contraption into the air.'[26] Moreover, most aircraft had a limited radius of action, and if delayed too long over an outpost trying to understand a message they could run short of petrol, resulting in a forced landing in tribal territory. However, this limitation did not stop the outposts having a little bit of fun. Colonel H.R.C. Pettigrew, a tough frontier campaigner, recalls:

> The hot weather had been very trying and the daily routine had become very dull in that particular post, and the post officer was fed up with putting our practice messages in code for rations or ammunition or wireless batteries, or all the other dull things he did not want anyway. So he decided to ask for something he really did want. But as it was not in the book he had to spell it out letter by letter on the Popham panel. "I want" was easy as it was in the code, but then laboriously came "M–A–E" (group). The aircraft waggled its wings and kept circling. "W–E–S–T" (message ends). The aircraft circled but did not waggle. It wanted a repeat. Again, slowly and painstakingly, the unusual though understandable message was spelt out. This time the pilot waggled his wings, though it seemed a trifle doubtful. A sort of shrug of his shoulders. He just had not heard of Mae West [the forces sweetheart]. However he returned to Miramshah, almost dangerously low on petrol by then, and made his report. No one was at all pleased and someone got a rocket. Post commanders went back to demanding ammunition after that.[27]

Though the tribesmen were not equipped with anti-aircraft weapons, and the RAF enjoyed complete control of the air, flying operations, once authorised, were by no means one-sided.

Sniping by tribal malcontents, of varying persistence and intensity, was an occupational hazard.[28] This was especially common when aircraft supported ground forces in contact with the tribesmen, calling for discriminating attacks. In these circumstances, high-level bombing, out of range of tribal fire, was out of the question. Close approaches, which gave a better view of the battle and greater accuracy in aiming, were necessary. These consisted of diving at the target at high speed at an angle of no more than 45° during which the pilot aimed the whole aircraft as accurately as he could at the objective. In these attacks, 'with the many wires, which seemed to hold the wings, vibrating in song,' aircraft were regularly punctured by bullet holes.[29] To mitigate this threat, aircraft dived on their objective using the forward machine-gun to help reduce enemy fire. They then dropped the bombs before the air gunner, with his face to the rear, fired his Lewis gun to dissuade tribesmen from sniping during the vulnerable pull-up and getaway. This proved to be a relatively effective technique and was known as a 'V.B.L.' (Vickers, bomb, Lewis) attack.[30] However, Group Captain G.M. Knocker recalls that even those flying at altitude (as high as 2,500 feet) were not immune from accurate tribal fire: 'We could not of course prevent sniping, and it was evident from the frequency with which aircraft were hit that the Mahsud had no difficulty in seeing us!'[31] He goes on to recall:

> On one bombing strafe a Bristol from 20 Squadron was shot down and the pilot and observer taken prisoner. We all carried "ransom chits" and these two officers, one a Canadian called Bishop, were exchanged for two camels loaded with bags of silver rupees, with which the Wazirs said they would build more towers and buy more rifles![32]

Such occurrences were not unique. Aircraft were at times forced down by an unlucky hit in the engine or petrol tank from a tribesman's bullet. Colonel C.H.T. MacFetridge notes that during large-scale operations in 1935, a Mahsud tribesman shot down, 'with a brilliant shot,' a reconnaissance aircraft flying over Makin. He recalls: 'It plummeted in sickening fashion to the ground.'[33] On 3 April 1937 an aircraft supporting operations in the Shahur Tangi was damaged by a bullet in the petrol tank, but managed to crash-land beyond tribal harassment on the road near Chagmalai.[34] In April 1939 *The Times* reported that, during operations against the Fakir of Ipi, a Hart aircraft of No. 11 (Bomber) Squadron was fired at near Chaprai and the air gunner was wounded in the leg. The article notes: 'This is the first time during the past two years of operations in Waziristan that any member of the crew of an aircraft has been wounded by rifle fire.'[36] Lewis Gordon, who served on the frontier in 1940, recalls another incident: '[An] unusual casualty was the Westland Wapiti biplane allotted for air reconnaissance and strafing. Ignoring standing orders not to fly below one thousand feet he came within rifle range of the enemy. A single shot rang out, the plane seemed to falter and then dived to the ground. A tribesman had scored a lucky shot and hit the pilot. Because the terrain surrounding the crash was no longer piqueted, we had to put in a substantial counter-attack to recapture the ground and the remains of the aircraft.'[37] Perhaps surprisingly, many soldiers and scouts felt that it was preferable to be fired upon at long-range when on the ground, rather than being fired at when in the air. Major Walter James Cumming, an experienced frontier hand, recalls a single-engined plane being shot down by Mahsud rifle fire in Waziristan and the ensuing operation to secure the stricken crew:

> This pilot, with great skill crash-landed his craft safely in the Taki Zam [a dry river bed or *nullah*] about 200 yards beyond our position on the plain. But from where we were we were not able to see into the *nullah*, and to rescue our Air Force friends about twenty-five of us Scouts ran forward to the far edge of the bend, from where the stranded airmen were seen struggling to get out of their cockpits. While two of our men, one an Indian officer and the other a *sepoy* [infantry soldier], ran down the steep slope of the *nullah* to help back the two Britishers, who could barely walk since both were wounded, the rest of us took up positions and gave the two airmen and our two men covering fire to prevent the Mahsuds from rushing in to capture or kill the four men. With the greatest of courage under heavy fire our two lads helped the airmen along, half-carrying them struggling to get them up the slope of the *nullah*.[38]

Engine failures were also common across the fleet of veteran World War I aircraft – which remained on in India until the early 1930s – and resulted in equal challenges for the downed aircrews and authorities.[39] For example, a DH 9A from 27 Squadron, flown by Flying Officer R.J.M. De St. Leger, encountered engine trouble on 21 January 1922 and force-landed east of Mandesh. The crew escaped uninjured from the crash and, despite an anxious period in tribal captivity, were later escorted unharmed to Ladha.[40] Lieutenant Colonel H.C. Wylly briefly recalls another incident caused by engine failure: 'Two officers of the RAF were captured after a forced landing in the Bazar Valley, and were eventually returned to Landi Kotal after about a fortnight's captivity … The observer who underwent this unpleasant experience – Lieutenant Hoare – served in the Battalion [The Green Howards] for a short time before joining the RAF …'[41] However, engine unreliability was only part of the problem. Many aircraft lacked the power and rate of climb to operate safely in the mountains. Most were designed for European climates and were never envisioned conducting operational tasks at altitude over the mountainous frontier.

RAF crews also faced unique dangers from the continually varying weather conditions. In July 1923, during a series of raids near Razmak, thick cloud suddenly cloaked the hills surrounding a target zone. The lack of visibility resulted in several crashes, including two Bristol F.2 Bs from 20 Squadron.[42] Shimmering heat haze, which amplified as the heat of the day increased, also deteriorated visibility considerably and made take-offs and landings particularly hazardous. However, there were other unique and seemingly inexplicable challenges to visibility. For example, the *gurgura* dust in the Jandola area of Waziristan. It was named the *gurgura* by the Mahsud tribesmen, as it routinely occurred during the time the *gurgura* bushes were in full fruit. These were large olive-coloured shrubbery scattered throughout the area, at a height of roughly 3,000 to 4,000 feet. Colonel H.R.C. Pettigrew recalls: 'Just why these dust clouds formed at ground level I am not so sure. I expect it was some combination of wind and atmosphere, but whatever it was the beastly dust haze would settle over the countryside, cut visibility to fifty yards and fill everything with gritty dust.'[43] Sand and dust storms were also common across the frontier, reducing visibility to almost zero. Pilots caught out in a storm had to navigate as best they could by map, compass and dead-

reckoning. Moreover, keeping in visual contact with other aircraft in such conditions was challenging. 'Zogging,' a means of routine communication between aircraft, by transmitting messages by Morse code by arm signals over the side of the cockpit, was out of the question. For reasons of safety, numerous sorties had to be cancelled due to fierce sand storms. Ferocious squalls also had the strength to damage aircraft on the ground; even those tied down could be flipped over. But there were other natural conditions that could cause equal damage:

> Only when I entered the storm did I realise that it was hail – and no ordinary hail! Hailstones as large as pigeons' eggs crashed down on to the Wapiti, bouncing off the wings and engine cowling in all directions with a noise that I could hear through my helmet above the roar of the engine. I heard a gasp from the back and glanced over my shoulder to see that Sanderson had disappeared onto the floor of his cockpit. A long crack spread over my windscreen as one hailstone hit the centre of the glass panel. I was committed now and the only thing to do was to plough through, hoping that it was a narrow belt. I lowered my seat to the bottom position to protect my head as much as possible and concentrated on keeping straight on instruments. The hail continued to thrash down for two or three minutes and we emerged into bright sunshine as suddenly as we had entered the storm.[44]

Likewise, the terrain, coupled with high temperatures, frequently produced conditions of extreme atmospheric turbulence, often extending up to thousands of feet from the surface of the ground, which made 'flying highly uncomfortable and climbing out of a narrow valley, after reconnaissance or bombing, could be a hair-raising experience.'[45] As the daily temperatures increased, aircraft wallowed and bucked uncomfortably and, by mid-May, were frequently grounded after 09:30 hours. Few pilots possessed regular experience of such an unforgiving environment, especially as flying over tribal territory was closely controlled by the political authorities.[46] Similarly, flying in narrow steep-sided valleys was particularly dangerous and nerve racking. A moment's lapse in concentration could result in catastrophic damage to a wing tip. A combination of bright sunshine and deep shadow could mislead a pilot into thinking that there was more room than was in fact the case. Few aircraft possessed sufficient power to rectify a mistake in judgement, especially at altitude.

It was also relatively common to encounter large birds of prey (mainly kitehawks with a wing span of roughly 5 feet 8 inches and large vultures) hovering close to the landing grounds, usually at about 300 or 400 feet, or on the ground feeding on the carcass of a dead animal close to the boundary fence. This was a routine hazard, well understood by the pilots, as the birds could usually be seen and were generally below circuit height. However, 'if a bird was encountered, the rule was always to climb above it and never to pass below it. When frightened, these birds had a nasty habit of closing their wings and diving; they had been known to go right through the fabric wing of an aeroplane below them.'[47] Air Marshal Sir David Lee recalls an incident:

> Just as we crossed the boundary at about thirty feet, to my horror, a black mass of birds rose up in front of us. There must have been dozens of them and it was quite impossible to avoid going straight into them. Because we were in close formation there was no question of turning sharply and the Wapiti certainly had neither the power nor the speed at that moment to pull up and hope to climb over them. A second later and I was in the middle of the flock and I instinctively ducked into the cockpit as a mass of bodies, feathers and blood hurtled into me accompanied by a series of bangs and thuds as the aeroplane ploughed its way through.[48]

While extreme climatic conditions and large birds of prey proved hazardous, even take-offs and landings at established airstrips offered unique challenges. This was especially true of the remote and unpopular Emergency Landing Grounds (ELGs) dotted throughout the frontier. For example, Lachi, 30 miles south of Kohat and situated alongside the main road to Bannu, was typical of landing grounds on the frontier. It was little more than 400 yards square (the minimum length for an ELG and suitable only for emergency use by Westland Wapitis) and had a surface of hard-packed sand and gravel, known locally as *mutti*, with a white circle in the middle. Thal, in comparison, had an ELG built up on a large escarpment in the centre of the valley, with one side dropping steeply down to the Kurram River. No two ELGs were alike, varying in size, shape, altitude, gradient and surface. The detailed specification of each was found in the official handbook; a must read for any pilot unfamiliar with an ELG. Regardless, each ELG required great care and considerable skill in using them. They also required regular inspection from the air to check for damage or tribal sabotage;[49] tribesmen frequently planted crude improvised explosive devises on the airstrips in the hope of destroying an unsuspecting aircraft on the ground. Inspections were often achieved by circling the landing ground at approximately 1,000 feet, while the air gunner had a good look at the surface. Aerial or ground inspections were more often than not undertaken by a flight of three mutually supporting aircraft. In the case of the latter, one aircraft inspected the ELG cautiously while the remainder provided over watch, circling above.

In contrast, Regular Landing Grounds (RLGs), like the unusually banana shaped Drazinda, 30 miles up the Tochi River from Bannu, possessed boundary markings and a windsock. It also had a permanent tribal *chowkidar* (watchman), who reported local incidents to visiting crews and kept the firm yellow sand surface free from big stones, ruts, camels, donkeys and goats. In addition, a stock of petrol (48 fuel drums, much prized by the tribesmen) and a re-supply of Very cartridges were held in a small locked hut. Like all regular landing zones, Drazinda required customary inspection, especially as there were no army garrison or police posts nearby. This necessitated an aircraft to land to allow the crew to conduct a physical inspection. However, without trained assistance to help operate the Wapiti's low geared winding handles (essentially skilled three-man muscle-power with the strongest grasping the propeller tip) or a 'bag and rope,' it was unsafe to stop an aircraft's engine on the ground.[50] The usual procedure, therefore, was for the pilot to 'taxi' around the perimeter while the air gunner checked the stocks and conducted a rapid inspection of the landing ground.[51] Air Chief Marshal Sir David Lee recalls the dangers of restarting a hot engine:

> It was highly dangerous to enlist the help of most of the *chowkidars* or any itinerant natives to help with the handle winding. If the [Jupiter] engine backfired, as it often did, the sweating, terrified men on the handles could easily fall into the propeller which would probably mean a new propeller, and most certainly a new *chowkidar*. Even among disciplined troops and policemen, engine starting was not a popular task and all pilots and air gunners had to take the greatest care to see that the wheels were properly chocked and the men correctly positioned at the winding handles, with strict instructions to stand still if smoke and flames belched out after a backfire.[52]

Other RLGs, like Wana, in southern Waziristan, had several of the garrison troops trained in the use of winding handles; therefore, it was reasonably safe to stop an aircraft's engine during a short visit. However, prior to a visit it was customary to fire a Very light over the post indicating an aircraft's intention to land. This resulted in a few soldiers or scouts rushing onto the landing ground to ensure that any goalposts or other temporary obstructions were removed from the landing strip.

However, all runways possessed unique challenges and dangers, based on their location and altitude. Razmak landing ground, for example, roughly square in shape and almost 6,500 feet above sea level, strategically placed at the junction of the mountain trails that led from Afghanistan into the Bannu plain, had a surface gradient of 1 in 16. For aircraft with insufficient power at altitude to climb the slope, it was mandatory to land uphill whatever the wind strength and direction. Moreover, it was impossible to 'go round again' if the final approach was unsatisfactory. It was alleged that one in four of all those who landed at Razmak had some sort of an accident or incident.[53] Only experienced pilots landed at Razmak, and it was little wonder that the airstrip was regarded as the most difficult on the frontier.[54] Additionally, maintaining the airstrip was a constant challenge at certain times of year. Water pouring down from the mountains during the torrential rain of the monsoon often made holes and ruts so deep that they could dislodge a tyre. The job of levelling the landing ground and removing stones fell to the resident troops; loose stones could lead to flat tyres, damage to the fabric of the aircraft, particularly the undercarriage, and frayed control wires.

The small, irregular shaped airstrip at Sararogha, 30 miles south of Miramshah, presented significant challenges. The landing ground was tricky in that two sides disappeared over precipices; one was a drop of some 300 feet down to a river. However, it was the take-off that caused greatest consternation. Pilots disliked the take-off from the Sararogha landing ground enormously. On rare occasions, with the wind awkward, aircraft would have to take off at the far end of the airstrip, almost dip momentarily into the Tak-i-zam ravine, a perilous drop, and then climb frantically to avoid the cave-riddled cliffs and hills on the far side.[55] Fortunately, there was experience on hand to assist the aircrews. The RAF had a liaison officer in the army camp in Sararogha. His role was to brief all pilots before a patrol,

including the best way to tackle the difficult take-off.[56] However, it was also relatively common for 'ground experts,' particularly scouts officers with detailed knowledge of the terrain and villages, to fly on specific missions.

Their role was often to point out a designated village or target. Colonel W.I. Moberly recalls:

> One of the less attractive tasks which occasionally fell to Frontier Scouts officers, because of their detailed knowledge of the ground along certain stretches of the Durand Line frontier with Afghanistan, was to lie face down in the belly of a Vickers Valencia [bomber transport] with a map (and a sick bag) as an insurance against the bombardment of any village on the Afghan side of the Frontier. As ground looks quite different from the air and as the tribal villages on either side of the frontier were of identical construction, the task was no sinecure and involved much study beforehand of maps and air photos, all under the threat of some horrific international inquiry if one got it wrong.[57]

Nevertheless, in taking to the air, volunteers experienced the same dangers as the aircrew. But not all hazards occurred in flight:

> It was decided that our aircraft, with a full load of bombs, would take off just after dawn on the morrow. The pilot, the officer who controlled the bomb-releasing devices and myself climbed into our tandem seats in the dark hour before dawn. The two engines were started up and allowed to run for a few minutes to warm up. Then we roared up the *maidan* [an open space, in or near a town], gathering speed until we must have been doing 60 to 80 miles per hour. After a few hundred yards I noticed that we were still skimming along the ground and were not in the air. I began to worry, for not very far ahead, looming up in the distance, was a dark line which, as we got nearer proved to be the end of the *maidan* marked by high trees. I was getting scared and I expect the pilot was too, for he switched down both engines suddenly. We came to a standstill within 10 or 15 yards of the line of trees. The engines had been left ticking over and we turned and taxied back to the starting line. I remained aboard while the others discussed matters and some airmen made an adjustment or two. From the odd word I heard, I gathered that we were slightly overloaded with petrol and bombs and that perhaps some tank had been badly filled. Anyway, after fifteen minutes' delay, by which time dawn had broken, we were screaming along the runway again, this time becoming airborne quickly and, gaining height, were soon up to almost 2,000 feet, at which height we seemed to remain as we headed towards our objective.[58]

Furthermore, some volunteers took to the air themselves. David Williams, a fearless scout officer, whose hobby was flying and who had learnt to fly in Karachi, piloted a Westland Wapiti in 1940 on a routine mission to drop *chapli* leather on Ladha. The flight occurred without tribal incident, although the leather dropped scored a direct hit on the post hospital and went clean through the roof.[59]

Unsurprisingly, there were unique challenges associated with landing on the frontier. Flying Officer Richardson, of 27 Squadron, when landing at Kohat, an airfield on the outskirts of the town, failed to appreciate the length of a long train of camels, tied nose to tail, flanking the runway. Misjudging his height, he hit the last camel in the line which, as it turned out, happened to be the tallest. 'The undercarriage of the Wapiti took the head off the unfortunate animal and carried it onto the aerodrome where the Wapiti, literally tripped up by the impact, stood on its nose after bouncing heavily on its wheels.'[60] Major Walter Cumming recalls a similar incident while observing an aircraft landing in Waziristan:

> After it had circled once or twice it came down to land on our flat *raghza* [plateau overlooking a valley], the surface of which was fairly level. It landed safely, but while taxiing to a halt a runaway mule got into its path and the plane, colliding into it, turned a complete somersault and lay with its wheels in the air. The unfortunate animal that caused the accident paid for it with its life. It died on the spot with a broken back. From under the plane crawled out two figures, the pilot and another officer, both obviously badly shaken but miraculously unhurt.[61]

But other more bizarre occurrences were not uncommon:

> A Wapiti flown by Flying Officer Arnold Wall was coming into land over the road when a small Indian boy threw a stone at it. Unbelievably the stone found its way through the mass of flying wires and struts and hit Arnold in the eye. He managed to land safely despite intense pain but he subsequently lost the sight of his damaged eye. This unhappy incident finished his career as a pilot but he transferred to the Equipment Branch where he started a new career and reached the rank of Group Captain.[62]

The combination of a five year tour of duty with limited possibility of any home leave or mid tour break, added with conditions of extreme heat and danger, placed considerable mental as well as physical strain upon the men of the RAF on the frontier.[63] Flying over hostile tribal territory was probably the greatest underlying psychological strain.[64] Forced landings in tribal territory were viewed with the greatest trepidation by the aircrews. Unnervingly, there were few suitable ELGs for aircraft carrying ordnance. If available, pilots tried to land on the straightest section of government-constructed road nearby or close to a fort or piquet. This was seldom possible and a number of aircrews were killed during forced landings in rugged terrain. Even aircraft fortunate enough to crash-land safely outside a scout or *kassadar* fort on the frontier faced challenges. Group Captain G.M. Knocker recalls one example:

> One of 31's aircraft had to force-land outside the fort (Wana). Five or six *khassadars* did a gallant sortie from the fort, leading two ponies on which the two aviators mounted and set off for the hills, escorted by the *khassadars*, who fought a 10-mile rearguard action, and eventually delivered the aircrew safely at Kaniguram, 80 miles away, the next day,

> the Wazirs covering the whole distance on foot. It was a very fine performance. I gather that the airmen wished that they too had been on foot after 80 miles in the saddle![65]

Wounded aircrew unlucky enough to fall into tribal hands were likely to be held for ransom and, although often roughly treated, rarely came to any real harm.[66] However, it was widely believed that Pathans never took prisoners other than Muslims and the threat of being castrated or beheaded was more likely. Indeed, a popular frontier chant of the time cautioned: 'No balls at all; No balls at all; When your engine cuts out you'll have no balls at all.'[67] Describing the state of a British officer's body after a short time in tribal hands, John Masters recalls: 'He had been castrated and flayed, probably whilst still alive and his skin lay pegged out on the rocks not far from camp.'[68] Such a fate was not unusual for government forces.[69] Likewise, 'it was not unknown for a wounded man to be pegged to the ground and his jaws forced open with a piece of wood to prevent him from swallowing. A woman of the clan would then squat over his open mouth until he drowned in her urine.'[70] It was an unwritten rule never to abandon a wounded soldier. Fortunately, there were many well-documented occasions when the tribesmen did not act as expected, which must have been a constant source of comfort to aircrews operating over the harsh frontier:

> In 1920 the group of Mahsud hamlets and fortified *kots* [walled villages] known as Makin was being burnt as a punishment. A *gasht* [armed patrol] of the North Waziristan Militia, under Lieutenant Barlow, was piqueting a hill overlooking the scene. Smoke from the burning [village] obscured the hilltop, and a machine-gun opened up on it, hitting Barlow with several bullets and knocking him down the enemy side of the hill. He came to rest on a ledge beside a badly wounded Mahsud. Their common misfortunes struck some chord between them. Barlow handed his water-bottle to the Mahsud, who took a swig from it and said, 'Our people will be here soon, *Sahib* [a form of address used as a mark of respect], and will kill you if they find you. Roll down under that rock and hide.' Barlow just managed to do so before he passed out; and was eventually rescued.[71]

There were other examples. Due to an unfortunate accident with a box of incendiaries during a bombing flight on 24 January 1923, a Bristol F.2 B from 28 Squadron had to make a forced-landing in tribal territory. Getting well away from the crash site, the aircrew observed the destruction of the aircraft by explosion, before being captured by irate tribesmen. Both airmen were promptly beaten-up and then moved to separate village locations. Each was then roughly bound to prevent escape. Visits by a political representative persuaded the tribesmen to cease tying the pilot, Flying Officer R.M. Foster, and his gunner up each night. Subsequent visits over the coming weeks brought better treatment, with no bad feeling being shown by their captors. On 12 February the aircrew were escorted back to Sorarogha where they were air-lifted back to their squadron.[72] Money was a useful insurance against torture and ransom notes, often referred to as 'ghoolie chits' (because the Urdu word for ball is ghoolie), guaranteeing a payment for a returned aircrew, provided a degree of protection. These documents, printed in Urdu and Pashtu, were carried on the individual or sealed into the side

of the aircraft. The exact amount paid varied according to the condition in which the aircrew returned.[73] Air Chief Marshal Sir David Lee highlights an out of the ordinary example:

> A Flight Lieutenant Anderson from Peshawar crashed heavily in a particularly hostile part of the Tirah one morning and broke his leg. The Afridis who dragged him from the wreckage carried him 70 miles on a string charpoy to Pashawar to claim the reward. It was a terrible journey for a man with a fractured leg and no medical treatment, and so impressed were the tribesmen by the courage he displayed that they sent a deputation to Peshawar hospital every week until he recovered to enquire about his progress.[74]

While the aircrew faced shared dangers, air gunners – selected tradesmen, mostly fitters and riggers who volunteered and were then selected for the additional flying duty on a part-time basis – endured some unique ergonomic challenges. Due to the rotating Lewis gun ring mountings which formed the top of the rear cockpit, the back seat was a particularly uncomfortable and cramped place. Painful knocks from the many metal projections were common. Moreover, air gunners had to endure many long and wearisome hours on reconnaissance flights with no form of seat, less a small tip-up flap, constantly hoping that the pilot might have a message to pass to alleviate the boredom. Furthermore, standing up in bumpy conditions and hurricane-force winds, attached to the aircraft only via a thin wire cable, was both tiring and risky. However, there were more significant challenges for air gunners:

> During one of the afternoon attacks on the 17th May [1930], Flying Officer P. W. A. Stroud, with No. 364367, A. C. 1. Wiltshire, C.S., as air gunner, descended to a low altitude [600 feet] in order to use his rear gun effectively, and was shot from the ground and died almost immediately. The air gunner took over control of the aircraft and flew it back to the aerodrome [at Risalpur], but crashed on landing and received injuries from which he died.[75]

It is likely that Wiltshire immediately clipped an emergency 'stick' into the flying controls, where they passed through the rear cockpit, and eased the aircraft away from further danger. In an emergency, this rudimentary control allowed a competent gunner to fly the aeroplane back to base employing the auxiliary throttle, but without the benefit of a duplicate rudder control. It was good practice to allow air gunners to fly Wapitis in this way from time-to-time to allow them to gain a basic level of flying competence. 'Wiltshire's courageous act was officially recognised by a near-unique posthumous promotion to the rank of Corporal – an 'award' which may seem curious to any present-day airman but indicative of the esteem and authority enjoyed by a junior non-commissioned officer in that period.'[76] However, pilots were not immune from painful knocks in the cockpit. Air Commodore Tindal Carill-Worsley recalls:

> One occupational hazard for pilots in those times, especially new ones, was the danger of getting a good wallop on the head from the Lewis gun as the gunner decided to move it from side to side, via a forward arc instead of towards the rear. When doing high-

> level, as opposed to dive-bombing, the air gunner did the bomb-aiming, using the High Altitude Drift sight clamped alongside the fuselage. To do this he had to lean out over the side and, since there was no intercom, he 'requested' alterations of course by reaching over and thumping the pilot on the appropriate shoulder – the only legitimate opportunity for an airman, except in certain sporting activities, to 'bash' his superior officer …![77]

Perhaps unsurprisingly, in such an extreme environment, various forms of mental breakdown were common. The chain of command was always on the lookout for withdrawn or uncommunicative aircrews. Unless addressed early and sympathetically, these could result in a fear or an extreme dislike of flying. Air Chief Marshal Sir David Lee highlights one case of a complete mental breakdown after a mysterious morning crash:

> … it was perfectly clear that George's mind was unhinged, and the cause of the strange crash that morning was no longer a mystery … George recovered after a few weeks in the BMH [British Military Hospital] sufficiently to be invalided home by hospital ship and he subsequently returned to normal and remained in the RAF for a time, but not to fly. Eventually I believe he retired voluntarily and disappeared into civil life. It was an unhappy incident but it could have had much more tragic consequences.[78]

Even the routine pressure of sitting in a cockpit continuously for three to four hours in long sorties over columns and convoys placed considerable stress on the aircrew, especially in bumpy conditions or the intense heat of the summer. By the end of April, midday temperatures were creeping up to the 100° mark. By mid May, it was approaching 110° and in June temperatures routinely reached 120°. Such was the summer heat – equal almost to that of the Punjab – that even the irritating frontier mosquitoes died. A flying *topee* (hat) was essential to prevent sunstroke when airborne. 'Flying, even at six o'clock in the morning, was exhausting and uncomfortable and it was hell for the airmen working on the aeroplanes inside the hangers with no cooling of any kind … tempers were short and even after changing clothes as often as five times a day, one was permanently bathed in sweat.'[79] Fatigue was most noticeable when night temperatures prevented adequate restful sleep – generally above 100°. For those not in permanent buildings, all tents utilised for sleeping or working accommodation possessed a double canvas roof and, in addition, a roof of *chapper* matting to help lower temperatures.

Fortunately, there was a degree of respite from the heat and routine dangers of operations. Every airman spent two months each year at Lower Topa, a hill depot situated in the Muree hills above Rawalpindi, 7,200 feet above sea level, between the beginning of May and the end of October. The daily routine was deliberately relaxed and stress-free, with training confined to the morning.[80] Time at Lower Topa did not count as annual leave and few needed any encouragement to relax in the cool mountain air. However, even winter provided little respite from the extremes of temperature on the frontier. Biting ice-cold winds that blew from the snow-covered mountains and sub-zero temperatures made life equally uncomfortable, and

dawn take-offs in freezing conditions were particularly unwelcome. Snow drifts ten to twelve feet high on the Razmak Plain were not uncommon in January. Cockpits became extremely cold at high altitude and aircrew had little option but to wear as much clothing as possible to keep warm and prevent hypothermia. It is little wonder that the seasons were never alluded to on the frontier. Instead, 'the hot weather' (roughly April to October) or 'the cold weather' were terms that denoted the time of year.

Medical officers were constantly on the watch for any mental change in a pilot and gunner and, if observed, a day or two off flying duties usually allowed a complete recovery. Having a medical officer reside in the Officers' Mess, with intimate social contact with the pilots, allowed a rapid diagnosis and immediate treatment.[81] Air gunners and airmen were also kept under close medical observation. With the first aircraft leaving the ground at 05:00 hours and the last one not down routinely until 20:00 hours (unless night operations were occurring), the hours of work for the ground crew were of necessity very long. However, the strain of flying over hostile territory and physical fatigue were only part of the problem. Rabies, malaria, typhoid, sandfly fever and dysentery were all usual and added further to the tension of frontier duty. Although medical services were developing rapidly, the treatment for such common ailments was rudimentary at best.

Moreover, concerted attacks on aerodromes were also common. For example, in July 1919, a daring raid occurred on the landing field at Bannu. On this occasion, the raiders were beaten off with considerable loss and without damage to the aeroplanes.[82] Nonetheless, this was an unsettling experience for those present. In addition, the frontier suffered from regular earthquakes, which were destructive, fear-provoking and disconcerting occurrences.[83] Fortunately, tours of duty began to reduce in length and modern comforts such as large ceiling fans, air conditioning and refrigeration were gradually introduced. Moreover, advances in medical science assisted with prevention and effective treatment of frontier ailments and diseases. Nonetheless, flying over the frontier was always a stressful and anxious undertaking, even when the slow, old two-seater Wapitis and Audaxes – which, usefully, could turn and twist in a small space and fly slowly enough to allow sufficient time for detailed observation of the terrain – were replaced by more modern and faster types.[84]

Conclusion

Few stationed on the frontier rarely met, or even saw, the aircrew that supported them so valiantly on a daily basis. Except for an occasional glimpse of a gauntleted arm, most only recall aircraft slowly circling overhead or diving head-on towards a tribal target with a rattle of machine-gun fire followed by the 'crumph' of a bomb as the explosion echoed off the surrounding hills. Hardly any stopped to think of the hardships and dangers faced by the aircrew on a daily basis, which were often comparable to those operating on the ground. For many airmen, the frontier was a highlight of their careers and lives, never to be repeated, but never to be forgotten. Despite the maze of knife-edge hills, the oppressive furnace-like heat and the ice-cold winds, the constant strain and regular loss of life, this was an experience not

to be missed and one to be proud of. Chaz Bowyer provides an even-handed summary of a posting to a frontier squadron: 'A period of real hardship, deprivation, separation from kith and kin for a majority, yet also years of true comradeship and united purpose which would never be surpassed and rarely equalled in any other facets of Service or civilian life. Service on the Frontier had brought most men into direct contact with the deaths of close friends and acquaintances, often in horrifying circumstances, yet such tragedies had served curiously in binding even tighter the communal spirit of all units.'[85] Nothing ever dampened the cheerfulness and dedication with which the airmen performed every duty allotted to them. It is a very real tribute to the efficiency and professionalism of the service that casualties were so small in such an unforgiving environment and that the RAF were held in such high regard by their land brothers.

Notes

[1] India's North-West Frontier (now modern-day Pakistan) was divided into three areas for the RAF The northern area comprised the region to the north of the Khyber Pass up to the foothills of the Himalayas – referred to as the 'Roof of the World.' The second or central area lay south west of the Khyber Pass roughly between the rivers Kabul and Kurram. This was universally mountainous, criss-crossed by deep valleys and dried up water courses. The third region was the southern area which lay to the south west of Kohat, from the Kurram River down towards Fort Sandeman and Baluchistan. This was dominated by Waziristan, the storm centre of the frontier and stronghold of tribal resistance.

[2] Areas owned by the government, with barracks, military hospitals, clubs and institutes, and rifle ranges and training facilities nearby.

[3] The term used for the Razmak, Wana and Bannu Brigades when engaged in moving about Waziristan. Throughout the year the three Army brigades carried out columns of several days in tribal territory, with the dual purpose of training the troops and showing the flag.

[4] A particularly well-organised and dangerous tribe.

[5] J. Prendergast, *Prender's Progress: A Soldiers Life in India, 1931-7* (London: Cassell Ltd., 1979), 88.

[6] H.L. Davies, "Military Intelligence in Tribal Warfare on The North-West Frontier of India," *Journal of the United Services Institution of India*, vol. LXIII, no. 272 (July 1933), 289-291.

[7] J.B. Glubb, *War in the Desert: An RAF Frontier Campaign*, (London: Hodder and Stoughton, 1960), 51-66.

[8] G. Moore, *Just As Good As The Rest* (Bedford: Jaycopy Ltd., 1979), 23.

[9] H. le M. Brock, "Air Operations on the NWF 1930," *Journal of the Royal Central Asian Society*, vol. 19 (1932), 42.

[10] P. Chetwode, "The Indian Army," *The Journal of the Royal United Service Institution*, vol. LXXXII, no. 525 (1937), 12.

[11] For example: Peshawar to Chitral is 130 miles; Peshawar to Razmak is 135 miles; Peshawar to Wana is 165 miles; and Chitral to Wana is 280 miles.

[12] Every scout patrol, known as a *gasht*, carried with it a basket of four carrier pigeons, trained to home to the area headquarters. In the event of a need for help or an ammunition drop, pigeons were always released in pairs, each one with the same message in the tube attached

to its leg. The tribesmen's bullets might kill one with a lucky volley, more likely that a hawk might get one, but the other one at least would get through.

[13] R. Lee, *Never Stop The Engine When It's Hot* (London: Thomas Harmsworth Publishing, 1983), 145.

[14] Sir John Slessor recalls: 'It may be hard to believe, but on one occasion during a small battle in Waziristan when I, as Air Force Commander, was requested by the Army Commander to bomb a village from which heavy fire was holding up our advance, and had regretfully to refer him to the instructions of the Government of India on this point, I was told, "Oh come on, that will be all right, we'll say we shelled it!" That indeed would have been all right and in accordance with the extraordinary rules of the game.' J. Slessor, *The Central Blue: Recollections and Reflections* (London: Cassell & Coy Ltd., 1956), 66.

[15] M. van Creveld, *The Age of Airpower* (New York: PublicAffairs, 2011), 344.

[16] N.H. Bottomley, "The Work of the Royal Air Force on the North-West Frontier," *Journal of the Royal United Services Institute 193* (1939), 773.

[17] General Sir Andrew Skeen notes: 'Their power of moving concealed is outstanding not only in moving from cover to cover, but in slipping from light to shadow, and background to background. It has to be seen to be believed.' A. Skeen, *Passing It On: Short Talks on Tribal Fighting on the North-West Frontier of India* (Aldershot: Gale & Polden, Ltd., 1932), 3.

[18] 'Mauser,' "A Forgotten Frontier Force," *English Review*, no. 52 (1931): 71.

[19] F. Leeson, *Frontier Legion: With the Khassadars of North Waziristan* (Ferring: Selwood Printing Ltd., 2003), 195.

[20] IOL MSS EUR D 944 (Mitchell Collection) "Years That Have Ended," 123-7.

[21] C.C. Trench, *The Frontier Scouts* (London: Jonathan Cape, 1985), 135.

[22] H. de Watteville, *Waziristan*, 1919-1920 (London: Constable & Co. Ltd, 1925), 200.

[23] R. Lee, *Never Stop The Engine When It's Hot*, 59.

[24] In addition to the 'X V T Close Support Code' there were a number of other ground strip signs used only by headquarters controlling sorties. These included: 'KT' which indicated that a withdrawal is about to, or has commenced; 'CI' informed the pilot that he was no longer required and could return to base; 'F' made clear that a message had been found or provided a 'yes' in answer to a question dropped by a pilot; and 'N' highlighted that a message had not been found or 'no.'

[25] B. Robson, *Crisis on the Frontier* (London: Spellmount, 2004), 260.

[26] G. Morley-Mower, *Flying Blind: A Memoir of Biplane Flying Over Waziristan in the Last Days of British Rule in India* (New Mexico: Yucca Tree Press, 2000), 140.

[27] H.R.C. Pettigrew, *Frontier Scouts* (Selsey, Sussex: privately printed, 1964), 89-90. Reverting to the basic 'T' between characters, and using the 1918 code, the name sequence would have read: 89 (89 was the 'call up' combination) T 27 T 12 T 16 T 79 T 46 T 16 T 37 T 38 T 6789.

[28] Practically every adult male possessed a rifle and most carried long barreled weapons from boyhood.

[29] W.J. Cumming (Ed J Stewart), *Frontier Fighters: On Active Service in Waziristan* (Barnsley: Pen & Sword, 2010), 61.

[30] 'V.B.L.' attacks were made parallel to and not directly over a position. At times mistakes were

made, especially by young and inexperienced pilots. The greatest fault was an over-eagerness to take action. Instead of searching carefully for the enemy and making certain that no mistakes had been made on the ground, pilots were known to attack immediately and bombs were dropped in error on government forces.

[31] G.M. Nocker, "Hawai Jehaz," *The Army Quarterly*, vol. XCIX, no. 1 (October 1969), 114.

[32] Ibid., 116.

[33] C.H.T. MacFetridge and J.P. Warren (Eds.), *Tales of the Mountain Gunners* (Edinburgh: William Blackwood, 1973), 126.

[34] A. Warren, *Waziristan, The Faqir of Ipi, and the Indian Army* (Oxford: Oxford University Press, 2000), 157.

[35] A brutal, treacherous religious man – even by Pathan standards – who for 11 years before India's independence in 1947 confounded and eluded British forces on the frontier, gaining the notoriety of a most implacable enemy.

[36] "Waziristan Operations," *The Times*, 10 April 1939.

[37] L. Gordon, "13 (Dardoni) Mountain Battery on the North West Frontier – 1940)," *British Army Review*, no. 144 (Spring 2008), 40.

[38] W.J. Cumming, *Frontier Fighters*, 77-78.

[39] G.M. Nocker, "Hawai Jehaz," 122.

[40] C. Bowyer, *RAF Operations 1918-38* (London: William Kimber, 1988), 168.

[41] H.C. Wylly, *The Green Howards in the Great War* (London: Butler and Tanner Ltd., 1926), 26.

[42] C. Bowyer, *RAF Operations 1918-38*, 169.

[43] H.R.C. Pettigrew, *Frontier Scouts*, 19.

[44] R. Lee, *Never Stop The Engine When It's Hot*, 114.

[45] C.B.E. Burt-Andrews, "Guarding the Mountain Wall: Air-power on the Northwest Frontier of India," 216.

[46] There were also practical restrictions on flying. For example, in 1939 pilots were only allowed to fly a maximum of 12 hours a month on the frontier. This was due to the tense political situation in Europe and the government order to ration aviation fuel.

[47] R. Lee, *Never Stop The Engine When It's Hot*, 72.

[48] Ibid., 69.

[49] A number of aircraft were fitted with cameras so that photographs of any unusual ground disturbance or damage to the landing sites could be taken for intelligence or maintenance purposes.

[50] A 'bag and rope' consisted of 20 feet of rope with a canvas bag at one end which fitted neatly over the propeller tip. Two or more trained airmen grasped the rope and, on the pilot's signal, rushed away from the aircraft, hopefully starting the engine.

[51] The problem of evaporation, even from sealed drums, was serious on all landing grounds, particularly during hot weather. The Public Works Department (PWD) was responsible for positioning all fuel stocks and changing them over at the six-month point, when the aviation fuel would deteriorate and had to be down-graded and diluted for other uses.

[52] R. Lee, *Never Stop The Engine When It's Hot*, 50-51.

[53] Ibid., 58.

[54] G. Morley-Mower, *Flying Blind*, 146.
[55] H.R.C. Pettigrew, *Frontier Scouts*, 96.
[56] This included: the time his 'sortie' begins and ends; where the army is going, and where he may expect to find column headquarters, piquet positions and advanced and rear guards; information about the enemy and any special areas to watch; and 'call sign' and signals details.
[57] W.I. Moberly, *Raj and Post-Raj: Low Level Reminiscence of Life – Two Armies* (Edinburgh: Pentland Press, 1985), 72.
[58] W.J. Cumming (Ed J Stewart), *Frontier Fighters*, 60.
[59] H.R.C. Pettigrew, *Frontier Scouts*, 96.
[60] R. Lee, *Never Stop The Engine When It's Hot*, 67.
[61] W.J. Cumming, *Frontier Fighters*, 85.
[62] R. Lee, *Never Stop The Engine When It's Hot*, 63.
[63] Ibid., 216.
[64] Of note, the first general use parachutes arrived in India in late 1928. These consisted of Irvin seat packs for the pilot and the 'lap type' for the gunner.
[65] G.M. Knocker, "Hawai Jehaz," 119.
[66] Sir John Slessor notes: 'It is, I think, significant here that though through the years a number of crews were shot down or force-landed during operations (and we made it a principle never to relax pressure just because we had hostages in enemy hands), as far as I know there was no case when they were killed or even seriously ill-treated.' J. Slessor, *The Central Blue*, 67-8.
[67] G. Morley-Mower, *Flying Blind*, 40.
[68] J. Masters, *Bugles and a Tiger* (London: Cassell & Co., 1956), 73.
[69] G. Morley-Mower, *Flying Blind*, 40.
[70] D.S. Richards, *The Savage Frontier: A History of the Anglo-Afghan Wars* (London: Pan Books, 2003), 182.
[71] C.C. Trench, *The Frontier Scouts*, 146.
[72] C. Bowyer, *RAF Operations 1918-38*, 168.
[73] The notice carried stated: 'The bearer of this letter is on official duty with the air force and is under the protection of the Indian government. He should be well treated and be immediately and safely brought to the nearest government post. A reward is offered if this is done. The government will severely punish any attempt to harm him.' This was signed by the Governor of The North-West Frontier Province.
[74] R. Lee, *Never Stop The Engine When It's Hot*, 47.
[75] Despatch by H.E. Field Marshal Sir William R. Birdwood, Bart., GCB, GCSI, GCMG, CIE, DSO, Commander-in-Chief in India, on the Disturbances on the North-West Frontier of India from 23rd April to 12th September, 1930, 8.
[76] C. Bowyer, *RAF Operations* 1918-38, 201.
[77] Ibid., 188.
[78] R. Lee, *Never Stop The Engine When It's Hot*, 222-223.
[79] Ibid., 311.
[80] While there, the airmen attended ground training lectures, carried out their annual rifle tests, some drill and played sport.

[81] Each of the four Army co-operation squadrons (Nos. 5, 20, 28 & 31 Squadrons) had a Medical Officer on their permanent establishment – although, interestingly, the four bomber units (Nos. 11, 27, 39 and 60 Squadrons) did not.
[82] H. de Watteville, *Waziristan, 1919-1920*, 59.
[83] On Friday, 31 May 1935, a major earthquake, followed by a series of tremors in the early hours of the morning, struck Quetta. Home to Nos. 5 and 31 Squadrons, 55 airmen and 66 Indians were killed, while countless others sustained injuries. All RAF buildings, less the aircraft hangers, collapsed and the majority of married quarters were destroyed or ruined. Only three of 31 Squadron's aircraft were undamaged, while all of 5 Squadron's machines were out of commission.
[84] F. Leeson, *Frontier Legion*, 92.
[85] C. Bowyer, *RAF Operations 1918-38*, 235.

The Indian Air Force in Wars

By Air Commodore Jasjit Singh

This article is a review of the part played by the Indian Air Force (IAF) in, and the background to, conflicts across the sub-continent (mainly post-independence). It is written from an Indian viewpoint. The early history of the IAF started with its formation in 1932 and continued through to its contribution to the Second World War supporting Slim's 14th Army. On Indian independence the Air Force was restructured and supported land operations in the aftermath. Lack of an accurate intelligence picture preceding the Sino-Indian War 1962 led to significant logistics problems for the Indian Army and subsequently to a large proportion of IAF effort being directed to air transport at the cost of the deployment of combat air power. The War for Kashmir 1965 saw the use of Mystere and Vampire aircraft in anti-armour and – infantry sorties, with air superiority being sought by dominating the skies rather than attacking airfields. India and Pakistan again went to war in 1971 with India initially operating to limited objectives set prior to the opening of hostilities. The IAF flew more combat sorties compared to their opponents but both air forces lost similar numbers of aircraft. In 1999, in Kashmir, the IAF provided high-altitude helicopter and tactical airlift logistics and communication support, with Canberra, Mig and Mirage providing recce and close air support. The IAF is modernising with 40% of its combat force being 4th generation aircraft and has set its sights on becoming a strategic force.

Introduction

The Indian Air Force was "mothered" by the RAF and many of the first commanding officers of the newly raised squadrons were British. The first three chiefs were British; and the linkages remain deep and professionally sound. The first war in which the then fledgling Indian Air Force (IAF) was to be employed was the Second World War in support of the Burma Army during its famous retreat from South East Asia in early 1942. While established on 8th October 1932, its first squadron, No. 1AC Squadron (IAF), had reached its full strength only in 1939 by which time it was employed in "Watch and Ward" duties along with RAF squadrons in NWFP (North West Frontier Province, now in Pakistan). But, with the Japanese rapidly advancing in Southeast Asia, No. 1 Squadron equipped with Lysander aircraft was moved from Kohat (in NWFP) right across India to Tongou airfield on Burma's eastern border with Thailand on 2nd February, 1942 in company with No-28 Squadron (RAF).

The Japanese promptly bombed the base the same day. Getting his aircraft locally modified during the night to carry two under-wing 250lb bombs each, the young squadron commander led the squadron to bomb the Japanese base of Mae-Haungsaun from where the Japanese had launched their strike the previous day and destroyed a hangar and damaged the flying control. This "counter-air" operation (with slow recce aircraft) marks the beginning of the operational history of IAF in wars, and the tussle within the service about its primary role. Two years from that date the squadron was back in Imphal under the command of Squadron Leader Arjan Singh (now Marshal of the IAF) and stayed there during the siege, providing offensive air support to the 14th Army which was defending India against Japanese invasion. In March 1945 the title of Royal was added to the Air Force. Lord Mountbatten, Supreme Commander South East Asia Command, flew into besieged Imphal to pin the DFC on Arjan Singh in person.[1]

In the final years of the war in the East, IAF had been built up to nine squadrons and at one time all of them were deployed in Burma alongside Slim's XIVth Army. With victory in the East also came the demobilization of the Air Force soon to be followed by Indian independence and partition where the RIAF was reduced from nine squadrons to six plus a half squadron equipped with transport aircraft. The RIAF lost all its permanent stations to Pakistan along with all maintenance and equipment depots. Thus began the raising of IAF (the title of Royal being dropped when India became a Republic on 26th January, 1950) to 10-squadron force. This was being undertaken concurrently with the war launched by Pakistan into Jammu & Kashmir on 22nd October gaining rapid success which forced the Maharaja and political leaders of the State to seek accession to India.[2]

Based on the principles laid down in the Transfer of Power to India (and Pakistan), the accession of Jammu & Kashmir was approved by the Cabinet on 26th October and with the approval of Lord Mountbatten, the Governor General, the Indian Army was launched into Kashmir by air lift in IAF Dakotas followed by requisitioned transport aircraft from the civil

airlines to rapidly reinforce the troops. This was the first operation of IAF after independence conducted while it was still engaged in airlifting refugees from both sides of the border to safer places. Considering that there was no land route into Kashmir and the enemy forces were on the outskirts of Srinagar, without this rapid and "just in time" airlift by the IAF, the map of the subcontinent would well have been different. Through the war IAF transport aircraft continued to support the land operations, of special mention being the first ever flight to Leh by crossing the Himalayas higher than the Dakota's service ceiling, without oxygen and pressurization, to land troops on a strip cleared along the river bed. Dakotas landed troops and arms at Punch, a football-size ground hurriedly prepared. In fact two Dakotas carrying mountain guns even delivered them to the Punch garrison at night without any airfield lighting! The handful of Tempest kept up pressure from the air supporting the Indian Army at crucial stages and even dropped ammunition for the garrison at Skardu besieged by Pakistan Army in mid-1948. The war was almost won when the government decided to go to the UN for a peaceful settlement of the dispute; and this actually perpetuated the dispute!

Sino-Indian War 1962

Relations between the PRC and India had begun to deteriorate after 1959 when on one side Chinese military had killed a dozen Indian policemen manning the border in the High Himalayas, and the Tibetan revolt which led to the Dalai Lama fleeing to India. As of now there are nearly 150,000 Tibetan refugees living in India most of them in the Himalayan regions alongside the Dalai Lama. Indian defence minister Krishna Menon, a brilliant man who strongly believed that China was not a threat and whose personalized style of functioning often cut through military command chains, had left the higher defence organization in disarray when the Chinese struck on 20th October, 1962.[3] The Indian Army had assumed responsibility for the borders only the previous year.

There were clear failures of assessment of intelligence about the Chinese capabilities and intentions beyond generalised conclusions based on simplistic extrapolations. What perhaps tilted the final balance in defence decision making at the top was that not only did Prime Minister Nehru did not expect the Chinese to launch a major offensive, but he seems to have a great belief that the Indian army was well prepared and could handle any situation. An objective study of Indian foreign and defence policy of that period by an Israeli scholar concluded that "Nehru was oblivious to the relative weakness of the Indian Army, to the inadequacies of its logistics, numbers, and training, and the impact of all these factors on its ability to carry out India's Forward Policy in the face of massive Chinese military reaction."[4] He seems to have not included the Air Force in the calculations one way or the other; and it is not clear if he consulted the air chief at any time. The Defence Minister who should have briefed him correctly perhaps did not. This was a different Nehru from that who directed the military strategy so effectively in the Defence Committee of the Cabinet during the 1947-48 war. Nehru's "faith that even if he was underestimating the Chinese threat, the Indian Army could successfully cope with any resulting scenario" only tended to work against looking at alternatives in case the Chinese did not act as they had in the past.[5]

The most critical factor adverse to Indian Army operations was of logistics requirements. There were really no roads beyond the few leading to a couple of hill stations built by the British. Building roads in the Himalayan Mountains would take time and the construction work had started only after 1959. The army was thus dependent on air supply only; and air supply had its own problems. "The paucity of road communications on the Indian side of the border was such that the deployment, maintenance and even the very survival of ground forces was dependent upon air supply. This was especially true of Ladakh, as right up to August 1962, Leh was still to be connected by a road."[6] Meanwhile the Chinese were pushing their claim line further into Indian territory. The nature of the challenge may be grasped by the fact that in June 1962 the Army required a total of 44,000 tons to be airlifted by the end of the year in Ladakh, while total capacity was less than half (21,600 tons) of this requirement. The situation in the eastern sector was worse.

The IAF put in a Herculean effort to supply the army by air in spite of shortages of aircraft and aerial delivery equipment. The classical example that stands out is the airlift of three AMX light tanks from Chandigarh to Chushul airfield in Ladakh which was under heavy attack by the Chinese army. The urgency of the task did not allow time for dismantling the tank's turret to bring the weight down to permissible levels. The An-12 aircrew decided to reduce the fuel to the barest minimum (which would not permit any diversion) and the tanks were manhandled into the aircraft and ferried to Chushul and immediately went into action. Chushul was saved.

On the other hand the hazards of aerial dropping aside, dropping zones were few and far between, and any minor error in air drop in the Himalayan regions (in west and east) would result in significant loss of dropped supplies. A handful of light transport squadrons and a few helicopters in service performed far beyond their capabilities. The worst handicap for the army was the deficit in force levels and reinforcements that did not possess winter clothing. The rapidly moved up troops, (to heights of 10,000 to 18,000 ft) were not acclimatized and hence were fighting under severe adverse physical limitations. Given the institutional as well cultural weaknesses to analyse and assess the enemy's capabilities and intentions beyond the "bean count" this created a serious deficiency in our ability to make an objective assessment so vital to military operational planning. This inherited weakness came from the infirmities that had developed over the previous decade at the higher inter-service levels and even above that at the higher defence management institutions.

The most adverse factor that contributed to the defeat of Indian Army in 1962 was the non-use of combat air power of the IAF. This was no doubt due to the dissipation of a coherent functioning of the higher defence organization due to the personalized way of functioning of Krishna Menon as the defence minister. Looking back, one can identify multiple reasons for this serious lapse which might have made the critical difference since the Chinese Air Force, though reported to possess over 2,600 combat aircraft, would have had serious problems of operating from airfields in Tibet (at an average altitude of 10,000 ft) and would have been handicapped in payload and fuel supplies. The information about airfields in Tibet was even

more sketchy and vague even on the number of airfields let alone the deployment of Chinese air force on them. The only reference available in the official history is to the use of the air force to bomb and strafe Tibetan forces in the early 1950's and to 102 air violations in the Ladakh sector 52 of which took place during a six month period in early 1962.

The most likely causes of not employing combat air power can be traced to multiple factors. Firstly, at the political level there were serious concerns about the Chinese likelihood of bombing Indian cities. It needs to be noted that most of the political leaders were conscious of the city bombing of the Second World War and the havoc it had created among people; and more so the Japanese fleet having bombed Indian cities (though only with a handful 250lb bombs) from Madras to Calcutta on India's east coast in early 1942 which had led to the British governor ordering the evacuation of Madras city. Secondly, Indian army leadership was deeply worried that the use of IAF combat squadrons for close air support in the high Himalayas would not be effective particularly since the army organization for close air support was non-existent at that time. Thirdly, the Army leadership was concerned that the Chinese air force may retaliate to IAF being employed in a combat role and could disrupt the air drop campaign which was considered more important. The IAF apparently had not thought through the potential of interdiction and did not recommend close air support, the only mission the army was interested in. Lastly, it appears that the US embassy also advised that combat air power should not be used on the grounds of its being "escalatory." We lost the war, especially near dramatically in the eastern sector where the Chinese finally declared a unilateral ceasefire and withdrew even from the territory they still claim.

The War for Kashmir 1965

Pakistani leadership, especially its then foreign minister, ZA Bhutto, had been keen to take advantage of India's preoccupation with the Sino-Indian War, which resulted in an Indian defeat, to try to grab Kashmir. By any logic the timing looked right: Nehru was sick and died in May 1964 to be replaced by Lal Buhadar Shastri, known for his strong leaning toward non-violence. The nation was demoralised with the trauma of the defeat, the Indian military was in a state of near-disorganisation because of the major expansion and reorganisation having to be generated mostly from existing resources, and the expected military equipment from the US had not materialised. Such a situation would not present itself again and Kashmir could not be captured militarily once Indian military expansion had stabilised. Finding little support from the army leadership and President Ayub, Bhutto started in 1964 to prepare for an irregular war in Kashmir with a properly trained and organised militia given the name of Force Gibraltar. China's change of position on Kashmir in favour of Pakistan further encouraged Bhutto. However, in order to clear up two uncertainties, the war was planned in three phases in 1965. Apparently, Pakistani strategy was to test: one, whether India would cross the international border to launch a counter-attack or opt for arbitration (India opted for the latter), and, two, whether the US would take stern action against Pakistan for using its US-supplied weapons (meant for defence against Communist bloc offensive as part of CENTO, SEATO and bilateral defence agreements) against India since the US President had also assured India that the

conditions of the massive arms aid was that US weapons would not be used against India.

The first phase began in March 1965 with skirmishes in the area of the Rann of Kutch with contesting claims on small villages and border posts with Pakistan army attacks in divisional strength against a battalion level Indian force stretched across nearly 150-km border. The large tract of the Rann of Kutch located in India (east of India-Pakistan border toward its south) gets flooded around early-mid May every year thus limiting the size of land forces that India could deploy in response to the Pakistani attacks. After holding out, India accepted the British proposal for arbitration and a cease-fire came into being.

But meanwhile Pakistan, curiously under the control of Mr Bhutto and the foreign ministry, had started planning (after 1962) and continued to train and build up Force Gibraltar which was planned to be infiltrated into the Indian side of the cease-fire line in Jammu and Kashmir (J&K). By the beginning of August 1985 the infiltration of trained militia had started in batches of around 1,000 men each with the aim of carrying out sabotage, terrorism and inciting the local population to rise in a revolt against the government of the state. In reality there was no such revolt and in fact it was the people who started to capture these infiltrators and reporting their movements to the police. By mid-August a total of 8,000 jihadi infiltrators (out of the 30,000 trained) had crossed into the state. These guerrilla fighters were also being supplied by the Pakistan Air Force with its C-130 Hercules aircraft. According to the official history of the Pakistan Air Force, its C-in-C, Air Marshal Nur Khan, himself flew in at least one such mission dropping supplies at night in Bandipur area in the valley not far from Srinagar![7] Unfortunately, the IAF had no fighters or radar stationed in J&K in accordance with the restrictions imposed by the UN resolutions.[8] The Indian Army quickly moved to block the infiltration routes on the cease-fire line by the third week of August and the Pakistani jihadis were progressively rounded up or killed. This triggered the third phase of the war - a surprise armour offensive code named `Grand Slam'.

Based on an appreciation, Pakistan's GHQ (the Army Headquarters) had expressed its unhappiness with the plan for Operation Gibraltar. The Chief of the General Staff had put up the conclusion of the general staff to the C-in-C, General M Musa that India was bound to react strongly and that the Pakistan Army was not in a position to hold its advance. Musa agreed with this and put up the file to the president, Field Marshal M Ayub Khan who noted that he would not let the Gibraltar plan be implemented. The public euphoria after Ran of Kutch affair changed the thinking. Pakistan planned the war and invasion meticulously; PAF War Plan No. 6/65 was issued on 29th June, 1965, before Force Gibraltar was launched. The actual Pakistani offensive across the international border began in the early hours of 1st September with one Infantry Division, two regiments of Patton tanks and all the firepower of the Corps Artillery aiming to take Akhnur, 40-km away, where a crucial bridge over River Chenab was the central line of communication into Kashmir. The Indian Army, in the words of its commander, had a truncated infantry brigade in the area and the Pakistani advance reached Chhamb by the evening.

It is at this stage that the IAF was called in. The Air Force flew 26 sorties – 14 Mystere and 12 Vampire --- and played havoc among Pakistani armour and infantry at Chhamb "in the open in close formation and very vulnerable to air attack" according to Brigadier Amjad Ali Khan Chaudhry, Pakistani 4 Corps Commander Artillery.[9] PAF had two F-86 and one F-104 airborne over Chhamb. IAF lost three Vampires to F-86s and one to ground fire the pilot ejecting to safety. In the swift and fierce action, ten tanks, 2 ack-ack guns and 30-40 vehicles were destroyed. The loss of a quarter of its tank force had an enormous impact on morale and fighting capabilities. General Musa told Chaudhry that "there was no point of taking Akhnur."[10] Musa acknowledged later that "Taking Akhnur had become a difficult proposition after India used its Air Force in the Chhamb-Jaurian sector."[11] PAF doubled its air defence CAPs over the area. On 3rd September an IAF Gnat shot down an F-86 Sabre and the PAF went on the defensive even further.

With Pakistan mobilising for a larger response, the Government issued instructions to the Armed Forces that they could choose the time and place of any counter-attack required. On 3rd September the Indian government laid down the war aims as follows which clearly confirm the intention to exercise restraint achieving minimum goals:[12]

1. To defend against Pakistan's attempts to grab Kashmir by force and to make it abundantly clear that Pakistan would never be allowed to wrest Kashmir from India;
2. To destroy the offensive power of Pakistan's armed forces;
3. To occupy only the minimum Pakistani territory necessary to achieve these purposes and which would be vacated after the satisfactory conclusion of the war.

The Indian Army launched its two-pronged counter attack on 6th September, 1965 to relieve pressure in the Chhamb sector and to threaten the Lahore sector. The IAF planned to strike at the PAF only when it was attacked and was tasked to undertake offensive support to the army and carry out fighter sweeps in an area around 30-km deep into Pakistan. It was ordered by the government not to take any offensive action in the East. PAF attacked in what was expected to be its major air strike against three main IAF airfields in the West. It was very successful in catching the IAF on the ground at Pathankot and destroyed 11 combat aircraft. On the morning of the 7th September it managed to destroy another 9 aircraft in the airfields in the East. The IAF's concept of air operations in the context of the war aims of the government was to gain and maintain air superiority; but the method was through dominating the skies rather than seeking to attack airfields. At the same time, air interdiction, yielded enormous dividends, due to trains carrying ammunition, stores and fuel were destroyed in air attacks. This resulted in Pakistan Army Patton tanks having a very limited number of rounds and led to 18 tanks being captured intact on 12th September alone.

Contrary to many accounts the IAF had only 25 combat squadrons in September 1965 (although a force level of 35 combat squadrons had been authorised in 1963). Of these, ten squadrons had remained in the East in case China started something. Hence the force ratio

in the West between Pakistan and India was 1.5:1 in India's favour which was compensated substantially by the technological superiority of US-supplied Pakistani arms, compared to the IAF still relying on aircraft like the Vampires acquired in 1949. The overall exchange ratio in air to air warfare losses between PAF and IAF during the war was nearly 3:1. The IAF had flown a total of 3,937 sorties in the Western sector and lost 59 aircraft both in the air *and on the ground* in both sectors thus resulting in an attrition rate of 1.4986 per hundred sorties. PAF, according to its official history had flown a total of 2,364 sorties.[13] It was estimated to have lost 43 aircraft resulting in an attrition rate of 1.8189 aircraft per hundred sorties. Looking at the losses in the air alone, the IAF attrition (with 24 aircraft lost in air to air combat and ground fire) comes to 0.6096% as compared to PAF attrition of 1.7766% (with 42 aircraft lost in air).

The War in 1971

The India-Pakistan war in 1971 grew out of an obviously destructive and anti-Pakistan set of circumstances like the unwillingness to call the National Assembly after what was clearly the first fair and national elections which led to increasing political dissent in East Pakistan reeling under a series of grievances and gross discrimination over the previous quarter century and Pakistan army's military repression of East Pakistan while arresting the political leaders. One of the objective studies by a Pakistani Lt. General Kamal Matinuddin, who had earlier headed Pakistan's premier strategic studies think tank says it all in the title of the book he wrote: "Tragedy of Errors."[14] The longer the Martial Law Administrator General Yahya Khan (under the strong pressure of ZA Bhutto who held the majority position in West Pakistan) ignored the demands by Mujib ur Rehman (the undisputed leader of East Pakistan's Awami Party which held clear majority in the National Assembly after the 1970 elections) and the political leaders from East Pakistan to call the National Assembly and form an elected government, the greater was the rise of political dissent in East Pakistan against the leadership in West Pakistan.

It is in this milieu that Pakistan deployed the army to apply pressure and very soon the army action became extremely repressive particularly targeting the intellectual and students and professors at Dhaka University. This in turn blew up into a full-fledged insurgency which the Pakistani army tried to control with ever increasing and indiscriminate violence which many Western observers described as "genocide" during the ensuing weeks and months leading to reportedly 3 million civilians being killed. Over ten million Bengalis of diverse religions fled to India as refugees. The Commander of the army in East Pakistan even planned an invasion of India in April 1971 which was turned down by Yahya Khan.

It is in this context that Pakistan launched its pre-emptive air strike on 3rd December, 1971 and a regular full-scale war started on both east and west. As the situation in the east kept deteriorating, Pakistan mobilised its forces in the west. In October 1971, India laid down the following limited objectives for its possible military operations which it did, with some to spare:[15]

1. To assist the Mukti Bahini in liberating a part of Bangladesh, where the refugees could

be sent to live under their own Bangladesh government.
2. To prevent Pakistan from capturing any Indian territory of consequence in Jammu and Kashmir, Punjab, Rajasthan or Gujarat. This was to be achieved by offensive defence and not merely passive line-holding.
3. To defend the integrity of India from a Chinese attack in the north.

It is clear that the capture of Dhaka was not one of the aims of the war at its start. The IAF had deployed 15 (out of its 35) combat squadrons on the eastern sector, largely to allow for a possible intervention from China (as in 1965) though it never came.

In East Pakistan the IAF made short shrift of the solitary F-86 squadron within the first day or so. From then onward, with total air superiority, the IAF went in to provide massive close support to the army, used its helicopters to provide "heli-bridges" for the advancing troops across the innumerable water obstacles and rivers in East Pakistan. The original war plan was to undertake limited action and occupy some bridgeheads across the borders while supporting the Mukti Bahini (the Bengali militia fighting now for independence). This was to be used for pressing both sides to arrive at a political solution and move toward a democratically elected government. The unwillingness of West Pakistan and lack of interest by the international community left no option but to carry forward the military advance. At that stage a reduced Para drop by IAF C-119G Packet aircraft as undertaken in East Pakistan which by then had declared independence as sovereign state named Bangladesh.

Ultimately, based on signal intelligence picked up by an IAF unit about the likely meeting the following day in Dhaka in the Governor's residence a formation of four MiG-21FL undertook a strike when the meeting was in progress and achieved direct hits that disrupted the meeting. The Governor along with other members of the government quickly agreed to accept surrender ultimately leading to 94,000 POWs in Indian custody (at the request of the Pakistani army's Eastern Command to save them from the Mukti Bahini's likely reprisals which were likely to lead to massive killings).

On the western front Pakistan planned an all out war in order to improve its negotiating position. During the eight months between the army crack down in the east to the pre-emptive air strike on the evening of 3rd December in the West, Pakistan had worked out a bold and ambitious war plan. The Pakistan army was to launch a coordinated offensive by both the Army Reserve North and the Army Reserve South under one command to be held by Lt General Tikka Khan, reputed to be an outstanding commander. The two-pronged thrust was expected to cut through Indian defences south of the Sutlej River and achieve substantive forward movement in the first week. The PAF was fully involved in this plan and would undertake air strikes primarily on Indian forward airfields to try and cut down the air effort it could provide to its army. The official history states that:[16]

"The overriding priority of the PAF was to give maximum support to General Tikka Khan's

> *proposed offensive into India; every other air force objective was to be subordinated to this requirement*. The air chief considered this commitment to be pivotal because the success or failure of the PAF's support would in all likelihood determine the fate of Pakistan's crucial offensive. When the estimated 'cost' of *fulfilling this commitment was calculated at his behest by the planning staff in July 1971, it worked out at a loss of 100-120 combat aircraft and pilots over the projected 7-10 day period*. (Air chief) Rahim Khan was aware that this would amount to losing one-third of his force but he had the full support of his senior commanders when he directed them in August to prepare their units to pay this price for ensuring the success of the army's offensive." (Emphasis added)

However in the opening stages when the Pakistan army was probing and trying to find the most suitable thrust lines, the IAF had started extensively destroying Pakistani armour and vehicles in the launch areas of the Tikka Offensive. Consequently the ambitious Tikka Offensive could not even start although he (Lt Gen Tikka Khan) flew down to the GHQ to persuade them to "let him go" without success. IAF had once again thwarted an intended armour offensive which if successful could have had serious implications for the region.

The war also saw a not-so-common phenomenon of a pure fighter aircraft versus tank battle. The PAF had kept asking for months to let them know if any offensive move was planned further south in the Rajasthan sector since it would take a week to prepare Jacobabad, the nearest airfield, for air operations. The army headquarters had kept informing PAF headquarters that no such plans had been made. But 18 Division deployed east of Jacobabad and west of the IAF base at Jaisalmer started an offensive into India at night and encircled a small post at Longewala in Indian territory manned by a company of 23 Punjab regiment. The gallant company kept up fire and noise to mislead the Pakistani tank regiments into believing that the area was heavily defended. By early morning Hunter aircraft from Jaisalmer began to destroy the two regiments of Pakistani tanks and finally only a few got away by retreating at night. Air power had once again proved its potency for air to surface dominance.

The Indian Air Force flew a total of 11,549 (combat and airlift) sorties during the war. It lost a total of 56 aircraft (including three aircraft on the ground due to enemy action) during the war due to combat factors (another 15 were lost due to flying accidents). This works out to an overall attrition rate of 0.48 per cent in respect of combat losses. A total of 6,604 combat sorties were undertaken by the IAF in both sectors, losing 56 aircraft. Taking combat losses into account, this corresponds to an attrition rate of 0.85 per cent during the 14-day war. Compared to this, the Pakistan Air Force carried out a total of 3,027 sorties on combat aircraft.[18] It lost a total of 55 aircraft (44 in the western sector and 11 in East Pakistan) to IAF action besides another 6 (in the western sector), claimed by the IAF to have been shot down, though not confirmed, which are not included in this total. This figure also does not include the 12 aircraft (9 F-86 and 3 RT-33) which were "de-commissioned" on the ground by the PAF itself when the airfields in Dhaka and other places became unusable due to incessant air attacks by the IAF.[19] With a loss of 55 aircraft due to direct IAF combat action, the Pakistan Air Force

attrition rate comes to 3.2 per cent (compared to 0.85% of IAF) during the war.

The Pakistan Air Force, unlike its 1965 aggressiveness, carried out only 9.58 per cent of its total sorties against Indian airfields and radar units during day and night, compared to the 11.21 per cent of its total sorties on similar missions. In practical terms, it did not penetrate Indian air space beyond about 30-50 km. For example, Pathankot was hit 30 times in 14 days, though Adampur – a major airbase – to its south was not even hit once, while Halwara, another major airbase, was attacked only once, with limited effect.

When we look more closely at attrition rates, we find that the PAF with 13 combat squadrons (plus one F-104 and two F-86 squadrons received from Jordan and Iran) undertook a total of 1,279 sorties on offensive missions, with a loss of 33 aircraft leading to an attrition rate of 2.6 per cent. The Indian Air Force loss rate on offensive missions in the western sector was 1.2 per cent. In response, the IAF flew a total of 280 sorties in both sectors on counter-air missions in the first 24 hours after the war started at last light on December 3, compared to 35-odd by the PAF. The sheer weight of attack forced the Pakistan Air Force to go on the defensive immediately, conceding air dominance to the IAF in substantive terms which also reduced the necessity of air effort required for counter-air in the following days. The abiding principle of war – that of concentration of force – and that of concentration of firepower endemic to the optimum employment of air power, were validated once again. Counter-air operations continued over the following days but at a progressively reducing level and were basically intended to keep the PAF off-balance and on the defensive. The most successful IAF counter-air strike was by a Hunter aircraft on the fifth day of the war on December 8, resulting in the total loss of five F-86 aircraft on the ground at Murid airfield in Pakistan. Overall, the Indian Air Force devoted 8.9 per cent of its combat air effort to counter-air operations. The end result was that the PAF devoted a much higher proportion of its air effort and was forced to employ as much as 57.8 per cent of its total air effort for air defence. Air Chief Marshal P.C. Lal, then CAS, has covered the war in Chhamb area in some detail in his book.[20] He says that the army commander "General Candeth confirmed that tactical air support was given to the army in the Chhamb area whenever it was required. There was never any shortage of aircraft, they were always readily available and they did whatever they were asked to do."

The Summer of '99

The 1971 war had a profound impact on the military conflict situation in the subcontinent. Pakistan, in gross contravention to the framework of Transfer of Power under which Pakistan was also created, reverted to its strategy of covert war, but now under the nuclear umbrella.[21] Pakistan decided to acquire nuclear weapons to offset Indian conventional capabilities. India, on the other hand, put all its faith in the 1972 Simla Agreement which stipulated that the Line of Control emerging after the 1971 war "would not be disturbed by the use of force or any other means" making it a de-facto accepted frontier. Within a decade it started its cartographic aggression by claiming rights over Siachen Glacier in violation of the 1949 Agreement on Cease-fire in J&K brokered by the UN which specified that the accepted line demarcated up

to Point NJ9842 would run due northward from this point to the glaciers (that is between the two main glaciers in the region – the Siachen to the east of the crest line of the mountain range, and the Baltoro glacier to its west), and the line was to be demarcated later. Pakistan, after its first test of a nuclear device at Lop Nor with Chinese assistance in 1983, planned to take over Siachen Glacier and adjoining areas up to the Karakoram Pass (not to be confused with the Chinese built highway of the same name far to the west in Gilgit region of Kashmir).[22] The Indian Army, in a pre-emptive move in early 1984 was able to just occupy the high crest marking the watershed before the Pakistan army could get to it the same day.

Here at an altitude of 14,000 to 22,000 ft continues a small war on the world's highest battlefield since then though after successive attempts Pakistan Army failed to dislodge the Indian Army from the high crest and the Indian Army limited its positions to the approximate alignment mandated in the Karachi Agreement. Combat air power was not employed; but IAF helicopters performed – and over the past 27 years continue to perform a Herculean task day after day of supplying the troops and reinforcements to the ridge held by the Indian Army.

Failing in its clandestine repeated attempts to take over a part of Kashmir in the Siachen region, Pakistan devised another approach planned in 1987 but executed in the summer of 1999. This was to clandestinely occupy the peaks in and around the Kargil area in J&K state after the Islamist terrorism propagated first in Punjab's border states (1983-1993) and in J&K since 1988 with the aim to trigger a violent anti-India insurgency failed to produce the desired results largely due to the disillusionment of the people of the state with Pakistan and its expanding use of terror as a foreign policy tool. Occupation of the heights in an area nearly 120x9 kilometres across the agreed upon Line of Control which Pakistan had committed not to disturb in the 1972 Simla Agreement placed the only road from Srinagar to Leh and Ladakh and Siachen under Pakistani army firepower. The Indian Army was completely taken by strategic surprise when the scale and density of intrusion was found in May 1999. The Indian Army from then on demonstrated heroic combat capabilities in dislodging the Pakistani army from their protected bunkers at, and close to the peaks.

The IAF had been pressed into service for logistics and communication duties with its helicopters and tactical airlift into the valley for reinforcement. Given the strong opposition in adverse terrain at altitudes of 12,000-18,000 ft, the IAF was called in after an IAF helicopter was shot down and a Canberra on a recce mission was damaged by hostile shoulder-fired SAMs. IAF MiG-21/27 and Mirage 2000 provided exceptional support to the army in spite of being heavily restricted by government orders not to cross the Line of Control. Mirage 2000 strikes destroyed the supply dumps of the Pakistani troops (belonging to 12th Northern Light Infantry which was finally decimated). The Pakistani army was pushed back on all sectors close to the Line of Control and the final withdrawal across the LOC was brokered by the US president.

Conclusion

Given the above brief background, the central role of the Indian Air Force rests on conventional

deterrence, while at the same time that of being the key component of nuclear deterrence. For a variety of reasons the IAF is in the process of a historical transformation in moving toward a philosophy of air power based on the principle of "air dominance" both in terms of air-to-air dominance (classical air superiority) as well as air-to-surface dominance so as to play a strategic role. It is pertinent to recall that Lord Trenchard had stated that "A strategic force can be defined as a military force capable of assuming command of its own medium by its own resources. Until the advent of the airplane, the army and navy were valid expressions of the nation's ultimate military power on land and sea, respectively. With the development of aircraft, however, that ceases to hold true."

Toward that end, over 40% of the IAF's combat force is already composed of 4th generation aircraft and this proportion will increase to almost 80% in another decade. India has already undertaken a joint venture with Russia to design and develop a 5th generation fighter. Force multipliers like the AWACS and aerial refuelling is already part of routine employment. India is negotiating with the US for the acquisition of ten C-17 with an option to double this figure. The stretched and mission-specific C-130J Super Hercules has already entered service. Many more advanced weapons and systems are in the pipeline. In short, in keeping with the dominant trends in Asia, the IAF has set its sights to really become a strategic force which can win the nation's wars jointly, as well as singly in certain circumstances and for out-of-country contingencies.

Notes

[1] For an account of the IAF in Second World War see SC Gupta, *History of Indian Air Force 1933-45* (Delhi, Combined Inter-Service Historical Section India & Pakistan, 1961). For an account of No. 1 Squadron (IAF) in the war in Burma see Jasjit Singh, *The ICON: Biography of Marshal of the IAF Arjan Singh DFC* (New Delhi: KW Publishers, 2009). See also Jasjit Singh, "Birth of an Independent Air Force" in Jasjit Singh, *Defence From the Skies; Indian Air Force Through 75 Years* (New Delhi: Knowledge World, 2007).

[2] For a detailed account of the Kashmir war see SN Prasad, *Operations in Jammu & Kashmir 1947-48* (New Delhi, History Division, Ministry of Defence, GOI, 1987). A recent account focusing more on the role and operations of IAF may be found in Air Marshal Bharat Kumar, *An Incredible War: IAF in Kashmir War 1947-48*, (New Delhi: Knowledge World, 2007). See also C Dasgupta, *War and Diplomacy in Kashmir 1947-48*, (New Delhi: Sage Publications, 2002); Air Marshal SM Chaturvedi, *History of IAF* (New Delhi: Vikas.). For a Pakistani version see Maj Gen. Akbar Khan, *Raiders in Kashmir* (Delhi, Army Publishers, date not mentioned).

[3] For a detailed account of the war (probably the best from the Indian side) see Major General DK Palit, *War in the High Himalayas: The Indian Army in Crisis, 1962* (New Delhi, Lancer International, 1991); Neville Maxwell, *India's China War*, (Bombay, Jaico Publishing House, 1970); SN Prasad (ed), *History of the Conflict with China*, 1962, (New Delhi, History Division, Ministry of Defence, Government of India, 1992); for an account of Sino-Indian relations leading to the war see Margret W. Fisher, Leo Rose and Robert A. Huttenback, *Himalayan Battleground: Sino-Indian Rivalry in Ladakh* (London, Pall Mall Press, 1963), and AG Noorani, *India-China Boundary Problem*

1846-1947, History and Diplomacy (New Delhi, Oxford University Press, 2011). *The Officials' Report* (New Delhi, Publications Division, Govt of India, 1961) by the officials of China and India on the Sino-Indian boundary dispute is a useful source for reference of the basis of respective claims.

[4] Yaacov Y.I. Vertzberger, *Misperceptions in Foreign Policymaking: The Sino-Indian Conflict 1959-1962*, (Boulder Colorado, Westview Press, 1984), p. 149.

[5] Yaacov Y. I. Vertzberger, p. 197.

[6] SN Prasad (ed), *History of the Conflict with China, 1962*, (New Delhi, History Division, Ministry of Defence, Government of India, 1992), p. 345

[7] *The Story of the Pakistan Air Force* (Shaheen Foundation, 1988), pp. 338-340.

[8] PVS Jagan Mohan and Samir Chopra, *The India-Pakistan Air War of 1965* (New Delhi, Manohar Publishers and Distributors, 2005), pp. 64-65.

[9] Brigadier Amjad Ali Khan Chaudhry, *September '65: Before and After* (Lahore: Ferozesons Ltd., 1970), p. 57.

[10] Chaudhry, ibid, p. 56.

[11] General M Musa, *My Version: India Pakistan War 1965*, (Lahore: Wajidalsis, 1983), p. 42. For other accounts by senior Pakistani military persons see Air Marshal Asghar Khan, *The First Round: Indo-Pakistan War 1965*, (New Delhi: Vikas Publishing House, 1979); John Fricker, *The Battle for Pakistan*, (London: Ian Allan Ltd, 1979); Denix Kux, *The United States and Pakistan 1947-2000: Disenchanted Allies* (Karachi: Oxford University Press, 2001); Maj Gen Shaukat Riza, *The Pakistan Army 1965*, (Dehra Dun: Natraj Publishers, 1977); Air Commodore S. Sajad Haider, *Flight of the Falcon* (Lahore: Vanguard Books, 2009);

[12] RD Pradhan, *Debacle to Revival: YB Chavan as Defence Minister, 1962-65* (New Delhi: Lancer International, 1991), p. 262.

[13] *The Story of Pakistan Air Force*, op. cit.

[14] *Tragedy of Errors: East Pakistan Crisis 1968-71* (Lahore: Wajidalis, 1994); *Report of the Hamoodur Rehman Commission of Inquiry into the 1971 War* (Lahore: Vanguard Books); Maj Gen. Fazal Muqeem Khan, *Pakistan's Crisis of Leadership* (New Delhi: Alpha & Alpha, 1984); Lt. Gen. A.A.K. Niazi, *The Betrayal of Pakistan* (New Delhi: Manohar Publishers, 1998); Lt. Gen. Jahan Dad Khan, *Pakistan Leadership Challenges* (Karachi: Oxford University Press, 1999); Maj. Gen. Shaukat Riza, *The Pakistan Army 1966-71* (Dehra Dun: Natraj Publishers, 1977); *The Story of the Pakistan Air Force* (Shaheen Foundation, 1988) is useful to get clarity on Pakistan's war plans and PAF performance; Indian accounts include among many others, the then air chief, Air Chief Marshal P.C. Lal, *My Years with the IAF* (New Delhi: Lancer International, 1986); Lt. Gen. K.P. Candeth, *The Western Front: The Indo-Pakistan War 1971* (New Delhi: Allied Publishers, 1984); Maj. Gen. D.K. Palit, *The Lightning Campaign* (New Delhi: Palit & Palit, 1972); Lt. Gen. J.F.R. Jacob, *Surrender at Dacca:Birth of a Nation* (New Delhi: Manohar Publishers, 2001); K.C. Praval, *Indian Army After Independence* (New Delhi: Lancer International, 1990). Others include Richard Sisson and Leo E. Rose, *War and Secession: Pakistan, India and the Creation of Bangladesh* (New Delhi: Vistaar Publications, 1990)

[15] S.N. Prasad, ed., *Official History of 1971 War* (New Delhi: Ministry of Defence, Government of India, unpublished placed on the net by *The Times of India*, September, 1992), p. 279, henceforth mentioned as Official History.

[16] *The Story of Pakistan Air Force*, n.14, pp. 447-448.
[17] A former PAF senior officer claims that in spite of the difficulties involved, two F-104 aircraft (probably on December 6) were sent to fly over the area; but they failed to make any contact with IAF aircraft. See Mansoor Shah, *The Gold Bird: Pakistan and its Air Force: Observations of a Pilot* (Karachi: Oxford University Press, 2002) p. 262.
[18] *The Story of Pakistan Air Force*, n.14, p. 469.
[19] Pakistan admitted to the loss of 24 aircraft in the west and 11 in East Pakistan besides the 11 "self-immobilised" by it after IAF attacks. It is obvious that it has not included another 13-odd aircraft destroyed on the ground by IAF action in the west. See *The Story of Pakistan Air Force*, n.17, p. 469.
[20] Air Chief Marshal P.C. Lal, *My Years with the IAF* (New Delhi: Lancer International, 1986), pp. 227-234.
[21] For a detailed exposition of Pakistan military's strategy see Shalini Chawla, *Pakistan Military and its Covert Strategy*, (New Delhi, Knowledge World, 2008). See also Shuja Nawaz, *Crossed Swords: Pakistan, Its Army, and the Wars Within*, (Karachi: Oxford University Press, 2008).
[22] On the first anniversary of its nuclear tests, Dr Samar Mubarakmand (in charge of building the bomb) publicly stated that Pakistan had tested a nuclear device in 1983; see *Gulf Today*, 31 May, 1999.

Operation IRAQI FREEDOM Air Campaign: A Tactical Military Success, or a Strategic Information Failure?

By Squadron Leader Mark Tobin

Operation Iraqi Freedom began on 19 March 2003. Unlike the 1991 Gulf War, the 2003 air campaign was very different both in its execution and its implications for air power thought. This article first examines the OIF air campaign, looking at how its historical lineage and the military and political factors of the day shaped its development and execution. It then moves on to consider the effectiveness of the air campaign, in terms of both its military outcome for Coalition and Iraqi forces and importantly in today's media-savvy environment, in terms of whether or not the Coalition successfully translated military and technological superiority to information superiority amongst the public. The article concludes that the complexities of modern air campaigns are such that tactical military success can easily turn to strategic information failure if air power's capabilities are not clearly understood and matched to specific operational requirements. Furthermore, the contemporary operating environment is now too complex to characterise air campaigns as being a success or failure, raising questions as to whether previous absolute theories on the utility of air power are still relevant to complex non-linear campaigns in the twenty-first century.

Introduction

Operation IRAQI FREEDOM (OIF)[1] started on 19 March 2003 with an attempted decapitation strike against Saddam Hussein. At the time thought to be the start of a second spectacular air campaign against the Iraqi regime similar to the Desert Storm air campaign in 1991, it quickly became clear that OIF was to be very different both in its execution and in its implications for air power thought. Rather than being overshadowed by the land component, the air component effectively redefined the notions of how airpower can be used to best effect in twenty-first century warfare.

Analysis of the OIF air campaign clearly demonstrated that the effectiveness of airpower lies as much in the perception of its achievements as in the actual achievements themselves. The complexities of OIF with the multitude of measures of effectiveness that can be applied across the physical, cognitive and information domains, make assessing the outcome of the air campaign a complicated process. If that assessment is then viewed against a backdrop of an uncertain campaign end state and the political and societal demands and expectations of an information hungry, media-savvy population, it can be argued that the assessment of any air campaign based solely around the absolute notions of success or failure is overly simplistic.

With this in mind, this article examines the 2003 air campaign in terms of both its military outcome and the public's perception as an indicator of how successful the air campaign was in the information domain. It aims to show that if considered in isolation, the OIF air campaign seemingly corroborates Robert Pape's thoughts on the utility of air power as an independent strategic option;[2] viewed in this sense, the air campaign can only be described as a qualified success at best. However, if viewed as a key component in a fully integrated joint campaign, simultaneously operating across the levels of warfare, then it can be argued that the air campaign was militarily successful to such a degree that it effectively made previous absolute theories redundant. But when examined against the broader background of the media and information domains, the outcome of the air campaign, whilst predictable from a western perspective, was an overall failure because of its inability to affect Iraqi and Arab opinion, possibly to the extent that the public relations failure helped sow the seeds of anger and potential insurgency amongst the Iraqis and Arabs.

The article will start by seeking to better understand the 2003 air campaign, how it developed and how it was influenced both by the earlier Desert Storm campaign and the Rumsfeld Doctrine which was gathering momentum at the time. From there, the article moves on to briefly examine the execution of the air campaign, specifically looking at the notion of 'Shock and Awe' which the campaign quickly became synonymous with and seeks to draw out the implications this had for both the Coalition and Iraqi forces. In doing so, and whilst not doctrinally correct, the article considers the air campaign to include both air and aviation assets. Furthermore, whilst the air campaign is considered to have been executed over the period 19 March – 18 April 2003 (as defined by US Central Command[3]), it also notes the significance of Operation SOUTHERN FOCUS, the campaign to systematically degrade Iraqi

air defences in the south of the country prior to the start of OIF. Having assessed the air campaign from a military perspective, the article seeks to assess it from the perspective of the information domain, examining whether or not the military and technological superiority displayed by the Coalition extended to the public relations battle. However, it should be noted that analysis of the air campaign's impact on public relations at the time is complicated by much of the available material being bound in general opinions on the war rather than providing specific insights into the air campaign. Furthermore, some of the official reporting on the air campaign either remains classified and cannot be included here, whilst other open source material is drawn from potentially unverifiable interviews and blogs.

The Air Campaign

It has been argued that the air war in Iraq in 2003 was effectively won during the first Gulf War in 1991[4] when large numbers of the Iraqi Air Force's aircraft were either systematically destroyed in their supposedly hardened shelters or fled to Iran having escaped the Coalition attacks.[5] In order to more fully understand the OIF air campaign, it is worth examining the concepts involved in its planning and how it compared to the 1991 air campaign and the concept of "Shock and Awe".

The 1991 DESERT STORM campaign was in reality one of separate ground and air campaigns brought together rather than being a fully integrated joint campaign. The initial plans drawn up by US Air Force's Tactical Air Command and the US Navy seemed to draw inspiration from the Vietnam-era Rolling Thunder campaign, suggesting that the relatively static Cold War had stifled innovation and thinking. In this sense, the initial air plan for DESERT STORM saw air power to be a strategic asset[6] only in so much as the numbers of aircraft, distances flown and numbers of bombs dropped were as important, if not more important than assessing how the air campaign contributed to the overall strategic effect. Eventually, a revised air plan was drawn up, heavily influenced by a team lead by Colonel John A Warden III. The revised plan - Instant Thunder – was based around incapacitating Iraq's strategic leadership and destroying key military capabilities. Warden believed that hitting these centres of gravity simultaneously would lead to strategic paralysis and would force the Iraqis to comply with UN and US demands. Although Warden's plan morphed once in the hands of the theatre planners, his target sets remained at the heart of the air campaign which had developed into a plan to achieve four operational-level goals: a "strategic" component, suppression of enemy air defences in the Kuwaiti theatre of operations, shaping the battlefield and support to the ground campaign.[7] Although widely portrayed as a success, Murray and Scales suggest that the overall plan was disjointed. Rather than maximising the synergistic effects of air and ground forces, the 1991 air campaign was conducted in isolation from the ground campaign, and was actually a composite campaign with the "strategic" element in Iraq remaining separate from the element in Kuwait which focused on destroying Iraqi military hardware.[8]

Just as the 1991 air campaign had its roots in an earlier conflict, the plan for the 2003 air campaign evolved against the backdrop of Afghanistan when CENTCOM Commander General

Franks was ordered to update the plan for invading Iraq. However, unlike the 1991 campaign in which the air and land components operated within their own distinct environments, General Franks, echoing Secretary Rumsfeld's thinking, was heavily influenced by the ongoing Afghan campaign where the use of precision airpower and special forces achieved in weeks what might have taken 50,000 ground troops months or years to achieve.[9] Rumsfeld in particular viewed the successful combined action by US Special Forces and Northern Alliance at Bai Beche in the battle for Mazar-e Sharif in November 2001 as a prime example of what could be achieved by lighter, mobile ground forces supported by precision air power[10] and was as such the ideal template for operations in Iraq. This approach, sometimes dubbed "the Afghan Model",[11] signified a move away from the Powell Doctrine of overwhelming mass used in 1991 to a new doctrine of overwhelming force – the Rumsfeld Doctrine.[12] This new approach sought to use airpower to target the institutions supporting the Iraqi Regime, simultaneously attacking the Iraqi military forces, rather than targeting national infrastructure and the Iraqi people. This integrated approach was a direct contrast to the 1991 campaign where the air component effectively operated in isolation from the ground component.[13]

As with Warden's Instant Thunder plan, the air-heavy nature of the initial 2003 plan caused consternation amongst the Washington planners who demanded significant amendments. CENTCOM air planners wanted an opening air campaign based on the Gulf War model,[14] the original plan for an initial twenty day air campaign was gradually cut back to three days of air operations only to have the land campaign begin before the massive air offensive.[15] Whilst much of the detailed planning for OIF remains classified, it is not inconceivable that criticism of the initial air-heavy plan had as much to do with opposition to Secretary Rumsfeld's ideas on defence transformation as it did with the plan itself. Rumsfeld's ideas effectively required a wholesale cultural change which ran contrary to the belief in some quarters that the Army's role should be to prepare for conventional wars rather than 'non-traditional missions'.[16] In these 'non-traditional missions', precision firepower, rapid mobility and situational understanding favoured lighter, high tech forces supported by the full spectrum of air power capabilities over the 'heavy metal' of the Cold War army. Set against the background of the 'Rumsfeld transformation', planning for OIF was not only a debate about how to fight a war, it was a debate on how to organize, equip and resource the future US military.[17] With the lack of open source reporting on the planning process, it is difficult to assess airpower's intended role,[18] but according to the Ministry of Defence the air campaign intended to:

1. Neutralize the Iraqi Air Force and its Integrated Air Defence System.
2. Conduct strategic attacks against leadership targets.
3. Provide armed air support to own ground and maritime forces.
4. Deter and counter possible threats from Iraqi ballistic missiles.
5. Destroy the Republican Guard.[19]

Whilst campaign planning was ongoing, the US and UK had already started using airpower to prepare the Iraqi battlespace for future operations. From summer 2002 onwards, the US and

UK intensified operations in the southern No Fly Zone, implementing Operation SOUTHERN FOCUS to degrade the Iraqi air defences,[20] with the attacks in early 2003 intended to prepare the ground in advance of any invasion force. This allowed the initial air effort to focus on gaining air supremacy over the rest of Iraq and attacking strategic targets.[21] It seems clear that SOUTHERN FOCUS was an integral part of the Coalition's broader air campaign, executed in advance of OIF starting on 19 March 2003.

Central to the wider understanding of the OIF air campaign is the principle of 'Shock and Awe'. It was thought that by combining a total knowledge of the enemy, rapidity, brilliance in execution and control of the environment, a smaller invasion force could induce 'shock and awe' in the Iraqi Regime, rendering it impotent.[22] This concept gained momentum as it resonated with Rumsfeld's thoughts on transforming the US military to one of effect rather than mass. It also gained media attention,[23] and when General Franks promised that four times the ordnance used in Desert Storm would shock the Iraqis into submission[24] it seemed to confirm 'Shock and Awe' was the basis for forthcoming operations.

The air campaign's execution surprised many on both sides. The attempted decapitation strike on 19 March 2003 caused confusion amongst Coalition air commanders[25] as well as amongst Iraqi commanders such as Gen Hamdani (Republican Guard II Corps Commander) who expected a repeat of the first Gulf War.[26] Hamdani's thinking echoed Saddam's, who also expected an initial bombing campaign before the ground war. Believing the Iraqi Air Force could not mount a credible defence, Saddam reportedly ordered it to disperse its aircraft for future use.[27] Whilst Woods believes this points to Saddam's belief that the Regime would survive it also implies recognition by the Iraqi Regime of the Coalition's overwhelming airpower dominance.

Assessing the Air Campaign

It should be difficult to describe any campaign that lasted three weeks and seized a country the size of California as anything less than a brilliant victory.[28] However, to label the air campaign as a success or failure is to over simplify it.

Before OIF started, the media expected a short decisive campaign to break the Regime within days. As the Regime was built around Saddam, Ullman believed his swift removal might be sufficient to cause its collapse: "…if you kill the emperor, the empire's up for grabs. And had we killed him, it would have been a classic application [of the theory]: $50m of ordnance, and we won the war."[29]

This thinking puts the 19 March and 7 April decapitation strikes into context; however, both strikes were unsuccessful leading to suggestions that all they achieved was to create a state of uncertainty.[30] The apparent failure of airpower to decapitate the Regime and forestall a protracted campaign seemingly substantiated Pape's argument that air power cannot in itself achieve strategic effect.[31] From the perspective of the air campaign as an independent

strategic action, this key element appeared to have failed.

As well as an apparent failure to achieve independent strategic effect, the air campaign also appears to have been unable to achieve air supremacy, despite pre-emptively targeting the Iraqi air defence network and Saddam grounding the Air Force. This failure was seen nowhere more clearly than during a deep strike operation against the Republican Guard's Medina Division by the US Army's 11th Attack Helicopter Regiment on 23 March 2003. Thirty Apache gunships were launched against armour and artillery targets in the Karbala area, but the mission failed after coming under heavy surface-to-air fire, resulting in the loss of one aircraft, its crew later appearing on Iraqi television,[32] and the remaining twenty-nine aircraft aborting, some with heavy battle damage without causing any appreciable damage to the Medina Division.[33] The months of Coalition airstrikes had the unintended consequence of familiarizing the Iraqi military with Coalition capabilities, leading them to use simple but effective localized tactics based on optical tracking, cell phones and low power radios[34] rather than an integrated air defence system. Despite their technological inferiority, the Iraqis demonstrated they could still mount an air defence, albeit an unconventional one and at a local level, leaving the Coalition only with sufficient control of the air rather than blanket air supremacy.

11 AHR's failure at Karbala also pointed to deficiencies in the initial air-land integration process, further questioning whether the air campaign could be described as a definitive success. V Corp's Fire Support Coordination Line (FSCL) was set to enable them to employ organic aviation and ATACMS[35] to shape operations in depth. However, in doing so, it also meant that V Corps created a barrier to air assets operating between the Corp's forward lines and the FSCL, limiting the air component's ability to attack targets that ground forces could not effectively hit. Indeed the outcome of 11 AHR's ill-fated Karbala mission, which fell in the gap between the forward line and the FSCL, all but closed the air space to the very air assets that could have assisted the ground forces.[36] For all the air component's advances in technology, it appears that in the early days doctrinal incompatibility between the Air and Land Components effectively prevented the use of precision air power at the cost of missing at least one full night of fixed strike targets inside the FSCL.[37] Not only did the failure of the decapitation strikes support Pape's ideas that air power was more likely to achieve success when used in direct support of ground forces – so called hammer and anvil operations – the failure to address battlespace coordination issues, something previously highlighted at the end of the 1991 campaign[38] - meant that airpower could also be limited in its tactical utility by Component parochialism.

Despite these failures, when viewed in a broader sense, a number of aspects point to the air campaign being highly successful above and beyond what are effectively procedural rather than doctrinal failings. Despite failing to achieve their aims, the attempted decapitation strikes demonstrated the Coalition's ability to respond to strategically important time sensitive targets in cluttered urban environments. From the initial tasking by the Joint Chiefs of Staff to striking the targets during the strike on 19 March 2003 was approximately four hours,[39] whilst

the strike on 7 April 2003 was conducted within twelve minutes of intelligence agencies receiving reports of Saddam's location.[40] The ability to minimise targeting cycle timelines allowed the Coalition to get inside the Regime's OODA loop and prosecute a further 156 time sensitive WMD, leadership and terrorist targets as well as enabling the air component to dynamically re-task airborne assets against a further 686 highly mobile and tactically significant targets.[41] This was a major development compared to the 1991 campaign where the Land Component complained that air tasking was fixed to the seventy-two hour ATO cycle,[42] demonstrating improvements since 1991 in airpower's ability to deliver effect against precision targets of opportunity in a cluttered and congested environment.

Higher order effects of the failed decapitation strikes concerned their disruptive effects on Iraqi strategic command and control. Iraqi command and control was already limited by its highly centralised nature and the elaborate steps Saddam put in place to ensure his protection. The ability to conduct short notice precision air strikes against key targets forced Saddam to implement increasingly restrictive security measures, effectively paralysing the Regime's ability to act and hindering Saddam's ability to direct senior commanders as these security measures hampered the ability to arrange meetings.[43] The resulting paralysis was clearly seen on 2 April 2003 when Saddam, believing that the Coalition's main advance was coming from the west rather than the south, ordered commanders to move forces to the north of Baghdad.[44] Although Saddam was receiving intelligence reports, they were worthless by the time they finally reached him. As many senior commanders lived in fear of death for acting on their own initiative rather than Saddam's orders,[45] Saddam's continued existence was an important part of maintaining the sense of paralysis. Contrary to the notion that the decapitation strikes were a strategic failure, they are useful examples of the second and third order benefits the Coalition derived from its ability to conduct precision strikes at a time and location of its choosing. That the intended target was not at either location appears to have more to do with the quality of the intelligence reporting rather than the air component's inability to prosecute the targets.

Technological improvements in ISTAR, aircraft avionics and precision guided munitions (PGMs) also contributed to the air campaign's effectiveness by enabling air assets to operate at night and in poor weather. When the *shamal* set in on 25 March 2003, Iraqi commanders repositioned their forces using the weather as cover. However, Coalition ISTAR assets such as JSTARS allowed Iraqi movements to be tracked even under sandstorm conditions.[46] The prevalence of PGMs (sixty-eighty per cent of all munitions vs. ten per cent in 1991)[47] along with infra-red sensors and laser designators allowed air assets to precisely target Iraqi ground forces in all weathers and at day or night. This induced incapacitating fear in Iraqi troops as the Commanders of both Republican Guard I Corps[48] and the Al Nida Division described during post war interviews, the later describing how his Division dissolved in the face of Coalition air power.[49] Saddam's orders to his Air Force not to fight and the Republican Guard's unwillingness to fight clearly illustrate the successful deterrent and coercive effects of Coalition airpower on Iraqi forces.

The Public Relations Battle

The controversial and divisive nature of OIF meant that public relations and information would always have a significant role in the campaign, helping participating governments present their messages and influencing key audiences. The media and information battlespace of 2003 was very different from that in 1991. During the 1991 Gulf War, CNN introduced the concept of 'real-time' war with its twenty-four hour news coverage of the campaign. By 2003, the twenty-four / seven news concept had grown across the major western networks[50] but importantly now also included regional Arab networks such as Al Jazeera. The growth of the internet also created a new breed of independent journalist, able to transmit alternative messages to a global audience,[51] free from the constraints of the official government line. In the context of the air campaign, such reporting provided a unique and personal view of events by individuals on the receiving end of the Coalition's precision strikes.

The immediacy of the news environment was a major challenge facing the Coalition in its efforts to influence public relations. As Sambrook noted, during the first Gulf War one or two editors had the luxury of checking facts and reaching judgements in order to present an accurate account of events; by 2003 they were not afforded that luxury. The general public of 2003 were entering the information chain far earlier than in 1991,[52] making it even harder for officials to counter potentially damaging stories, requiring an innovative public relations approach.

The aim of the UK's information campaign was 'to influence the will of the Iraqi regime, the attitudes of its security forces and civilians as well as the regional audience, and to inform international audiences'[53] whilst the US position was a simple acknowledgement of the role that the media would play in shaping "public opinion now and in the years ahead."[54] The public relations strategy was centred on formal Press Information Centres (PICs) in theatre and the use of media personnel embedded directly with combat units (embeds). Whilst the PICs provided an overall appreciation of and context to the campaign, embeds provided a real time view of events on the front line directly to TV studios. As well as influencing domestic and wider public opinion, efforts to influence Iraqi military and domestic opinion through the use of a coordinated information operations campaign were vital, leading to descriptions of OIF being "a conflict in which information fully took its place as a weapon of war."[55]

Assessing the Public Relations Battle

Against the background of widespread scepticism about the need for the war, the air campaign suffered from negative publicity before it began. Unfortunately, rather than focusing on its potential to shorten the war and minimise casualties, the concept of 'Shock and Awe' quickly turned into a public relations disaster.

Ullman's use of Hiroshima and Nagasaki to illustrate the principles of 'Shock and Awe' did nothing to pacify anti-war protestors who argued the air campaign would be little more than 'terror inducing destructiveness',[56] comparing it to the bombing of Guernica and Nazi Blitzkrieg

tactics.[57] Once the air campaign started the negative publicity continued, even extending to generally pro-war newspapers such as the Daily Telegraph with its headline 'Baghdad Blitz' alongside images of explosions in Baghdad.[58] Despite Pentagon officials' attempts to distance themselves from the concept of 'Shock and Awe',[59] and Ullman arguing that the air campaign was not actually about 'Shock and Awe',[60] significant damage had already been inflicted on the air campaign's image.

The public relations campaign was further weakened when elements of the media seemed to view the air war as little more than 'infotainment' or a video game. Having created the expectation of a decisive campaign, elements of the media began comparing the air war to an action movie or computer game, potentially trivialising what the Coalition were trying to achieve and prompting Colin Powell to warn that "this isn't a video game, it's a war. It's a real war."[61] As well as Powell's criticism of the media coverage, the British Commander in theatre openly accused the media of turning the war into a spectator sport,[62] effectively warning against the dangers of western populations sympathizing without suffering and empathizing without experiencing, thanks largely to media providing all the imagery and information necessary for its information-hungry audiences to develop a relatively shallow interest in events until the next stimuli appears.[63] Whilst sport and war share many sociological characteristics, they have key differences; for Bill Shankley football was more important than life and death, but for those directly involved on both sides of OIF, it was exactly a matter of life or death.[64] However, in aiming to satisfy the demand for twenty-four / seven news coverage, the resulting trivialization of the conflict was a serious set back to the credibility of the public relations and information campaigns.

Neither was the faltering domestic information campaign improved by the in-theatre information campaign and public relations strategy. There were some tactical successes to offset the weaknesses of the domestic campaign, with the use of capabilities such as the EC-130 Commando Solo aircraft to broadcast radio messages to both military and civilian populations, along with and radio broadcasts from HMS Chatham and USS Tarawa targeting southern Iraq combined with more traditional leaflet drops.[65] Such efforts served to undermine the Regime and encouraged desertion amongst both enlisted soldiers and importantly amongst some officers.[66] However, these tactical successes were effectively negated by operational level information and public relations failures linked to the air campaign's strike list and the Coalition's management of the Arab media. Regime media and propaganda targets were deleted from the strike list in the hope that they might be used to help facilitate Regime collapse. However, failure to restrict the Regime's propaganda capability simply allowed it to exploit Arab and Western media, providing it with a voice to the world[67] as well as demonstrating to the Iraqi people that Saddam was still in alive and in power.

However, the biggest public relations failure was potentially the Coalition's failure to effectively manage the media across Iraq and the broader Arab world. Despite an estimated 800 embedded media across the Coalition, there were no Arab embeds with UK forces and only

one with US forces.[68] From a UK perspective, the primary target was the domestic audience, which needed to be influenced to help bolster support for the forces and the government.[69] Such attitudes towards Arab embeds meant that a significant opportunity to reinforce the Coalition's message was missed. In a campaign intended to liberate the Iraqi people, but about which many were sceptical, the failure to actively engage with the Arab media could only ever lead to Arab news agencies presenting their own independent views. The fallout from the Coalition's mishandling of the Iraqi and Arab media were editorials criticizing the Coalition's public relations campaign by condemning the western media's independence and credibility[70] along with damning Arab media interpretations of events such as the front page of the Saudi Arab News with its headline "Liberated by US bombs" alongside images of dead Iraqis.[71] Whilst the Coalition media effort focused on a quick victory, the Arab media concentrated the human cost of the war, something the Coalition seemingly failed to grasp.[72]

The general opinion of the Coalition campaign amongst Arabs was rooted in the concept of pan-Arab solidarity. Many Arabs demonstrated hatred for Saddam but sympathy towards the Iraqi people in equal measures and viewed the Coalition campaign as a war *against* Iraq rather than a war *for* Iraq. Although only one source,[73] an anonymous Baghdad resident known only as Salam Pax,[74] produced an internet blog which achieved international acclaim for its open and sometimes critical descriptions of the invasion and the effect that the air campaign was having in particular on the Iraqi people it intended to benefit:

> *23/3 …. Today before noon I went out with my cousin to take a look at the city. Two things: 1) the attacks are precise. 2) they are attacking targets which are just too close to civilian areas in Baghdad … There are no waving masses of people welcoming the Americans nor are they surrendering by the thousands. People are doing what all of us are, sitting in their homes hoping that a bomb doesn't fall on them and keeping their doors shut.*[75]

> *2/4 … Two hours ago we could hear the rumbling of the planes over us and it took them ages to pass. Afraid is not the right word. Nervous, edgy, sometimes you just want to shout out at someone, angry. I wish the Iraqi and the American governments would stop saying they are doing this for the people. I also want to hold a "not in my name" sign … Non stop bombing. At the moment the US/UK are not winning any battle to "win the heart and mind" of this individual. No matter which way this will go my life will end up more difficult.*[76]

Whilst the Salam Pax blog was only one voice amongst the millions in Baghdad, it was heard by an international audience. Furthermore, as a voice of the people that the campaign aimed to liberate rather than an institution with an agenda, Salam Pax's experiences achieved a resonance across both the western media outlets, especially those with an anti-war agenda, but also across an already largely sceptical Arab world.

Against this background, the only way that an aggressive air campaign would be accepted was

through an Arab face in much the same way that Saudi Arabia's Prince Khalid occupied a key position within the 1991 Coalition. In doing so, Prince Khalid effectively became the Arab face of the campaign and providing a degree of acceptability and credibility to a predominantly occidental force operating in the heart of the Middle East. However, the highly divisive nature of the 2003 campaign denied the Coalition the benefits of such a unifying Arab face. Ahmed Chalabi, a dissident Iraqi opposition politician, was arguably the closest the Coalition came to an Iraqi face; however, he was quickly discredited by, amongst other things, accusations by sections of Iraqi society that he was little more than a western stooge.[77] The Coalition's failure to appreciate the need to actively manage the Iraqi and regional Arab PR campaign created anger and resentment amongst the people the campaign was supposed to benefit. This anger quickly developed a physical form with ordinary Iraqis taking up arms against Coalition forces[78] along with the first signs of foreign fighters, who would later form a significant part of the insurgency, heading to Iraq.[79]

Conclusion

As a standalone, independent strategic bombing effort, the air campaign was at best a qualified success. The attempted decapitation strikes failed in their objectives, highlighting air power's reliance on inconsistent intelligence to be effective, almost single-handedly corroborating one of Pape's key arguments, whilst years of attacks against the Iraqi air defences also failed to guarantee air superiority. But as a key component in an integrated multi-dimensional campaign, it showed that air power has a vital, war winning role and its success in OIF must be viewed in this context. This success appears, in part, to have been linked to an understanding of airpower and its capabilities amongst key planning staffs who noted what airpower had achieved in Afghanistan. When the capability developments since 1991, coupled with an appreciation of how they might be best utilised to support dynamic operations, were combined with the planning staff's flexible approach to airpower employment, it enabled Coalition forces to maximise airpower's tactical effect which in turn conferred strategic benefits in a relatively quick campaign.

In doing so, it further brings into question how relevant Pape's arguments are in the context of the OIF air campaign which was never about large scale attacks on population centres and Iraqi's military-industrial infrastructure. Where Pape is correct is in his scepticism of some of the more definite claims about airpower's ability to independently deliver campaign success.[80] However, the OIF air campaign showed that air power rather than being as simple as a blunt instrument or a rapier,[81] is an instrument of policy that is most effective when its capabilities are clearly understood and matched to specific operational requirements. In this respect, the OIF air campaign clearly demonstrated that it is the consequences of airpower's employment that should be considered in a strategic sense rather than the capability itself. The OIF air campaign, simultaneously executed across all levels of warfare, as well as across geographic and temporal boundaries effectively raised questions as to whether previous absolute theories on airpower's strategic utility are still relevant to complex, non-linear twenty-first century campaigns.

However, if the Coalition demonstrated a thorough understanding of the application of air power, they demonstrated a poor understanding of how to effectively influence public opinion – most importantly that of the sceptical population on whose behalf they were allegedly fighting. The advent of mass, uncontrollable media effectively opened another front, but in a virtual rather than a physical war, a front where success is based not on military capabilities but on perceptions and the integrity of the message being disseminated. The Coalition's handling of the regional Arab media and information campaign failed to recognise the importance of this key centre of gravity to the overall success of the campaign. Or rather, if as Tatham[82] and Rantapelkonen[83] suggest that Coalition leaders did actually recognise the importance of the local rather than domestic public relations and information campaigns, good intentions appear to have become bogged down by operational security, mistrust and most importantly a misunderstanding of the local information environment. Although commenting on irregular warfare, Freedman's assertion that: "… superiority in the physical environment is of little value unless it can be translated into an advantage in the information environment… "[84] could have been written with the OIF air campaign specifically in mind. Thus, whilst the physical manifestation of the air campaign took weeks, the failure to effectively manage Iraqi and Arab sentiment had significant longer term implications. In this respect, the air campaign can only be described as a resounding military success but an information and public relations disaster.

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Notes

[1] Although the Iraq campaign was known as Operation TELIC in the UK Ministry of Defence, this article will use the name Operation IRAQI FREEDOM (OIF) to cover all Coalition operations to minimise confusion and simplify the analysis and discussion.
[2] Robert Pape, "The True Worth of Air Power," *Foreign Affairs*, 83 no.2 (2004): 127
[3] USCENTAF Assessment & Analysis Division, "Operation Iraqi Freedom by the Numbers," *USAF*, **http://www.fas.org**, (accessed June 9 2011).
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The British Joint Area Combined Headquarters Scheme and the Command and Control of Maritime Air Power*

By Dr Richard Goette

The defeat of the German U-boat attack on Allied shipping during the Second World War required the close co-operation of the RN and RAF Coastal Command. However, constant debate over the command and control of maritime air resources overshadowed the operational relationship between the two British services and touched on some of the fundamentals of air power. The RN wanted to ensure that the RAF gave its trade protection role proper attention, and thus endeavoured to secure greater control over Coastal Command's operations. The RAF held true to the fundamental concept of the "indivisibility of air power," and was weary of losing command over its maritime air power forces. The key to the success of the joint trade defence task was operational effectiveness. Therefore, the RN and RAF developed a series of Area Combined Headquarters along Britain's coast in order to work together effectively in a joint construct and the RN was eventually granted operational control over Coastal Command. Though debates continued at higher levels, efficient command and control arrangements at the operational level meant that sailors and airmen in the joint headquarters were eventually able to work out their differences and foster a positive and effective working relationship to ensure the proper prosecution of the trade defence mission.

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Introduction

Winston Churchill declared after the Second World War, "the only thing that ever really frightened me during the war was the U-Boat peril."[1] The defeat of this threat required the close co-operation of the Royal Navy (RN) and the Royal Air Force (RAF). As such, the RN and RAF Coastal Command worked hand-in-hand to protect Allied shipping from attacks by German U-boats. Nonetheless, the formalisation of this partnership into a joint headquarters (HQ) scheme was difficult, as there was an ongoing debate between the RAF and the RN regarding the fundamentals of air power and the command and control arrangements of military air resources. Since the inception of RAF Coastal Area in 1919 (succeeded in 1936 by Coastal Command), the Air Ministry and the Admiralty frequently debated who should command the maritime air organisation. Coastal Command was officially a part of the RAF and the Air Ministry was careful to safeguard its ownership of maritime air assets.[2] Fearing that the British Army and the RN were plotting to dismember the RAF during the inter-war period, the Air Ministry grasped upon the concept of the "indivisibility of air power." It stressed that all military air assets of a nation – including maritime air power – should be under a separate service, the air force, to ensure the proper concentration and specialized use of air power in the hands of those best trained for it, air force officers.[3]

However, the Admiralty also had a vested interest in Coastal Command. As a maritime air organisation, Coastal Command carried out responsibilities that were intimately connected to the war at sea, which was the primary responsibility of the Royal Navy. Maritime air operations, British senior naval officers argued, required a high degree of specialisation in areas such as torpedo bombing, air reconnaissance, trade protection, etc. Therefore, even though the British Government formally placed ship-borne aircraft of the Fleet Air Arm under the RN and flying boats and land-based maritime patrol aircraft under the RAF in 1937, the Admiralty continuously sought to extend greater control and influence over Coastal Command's trade defence role during the late 1930s and into the Second World War.[4] As Coastal Command's motto indicates, it thus became a "constant endeavour" to fulfill the RN expectations of adequate co-operation in joint trade defence efforts during the Second World War. The key to accomplishing this goal was the establishment of an effective joint Coastal Command-RN headquarters and command and control system for the protection of Allied shipping.

The Origins of the Area Combined Headquarters Scheme

It was Air Vice-Marshal Arthur M. Longmore, the Air Officer Commanding (AOC) Coastal Area, who first articulated the need for a joint naval-air force headquarters scheme in 1935. Reporting on a joint fleet exercise with the RN, Longmore stated that one major difficulty experienced was the "problem of control of the separate air searching and striking forces in relation to the naval forces with which they were co-operating." Such operations, he argued, necessitated close liaison with naval command headquarters, which could best be achieved by a system of air operational headquarters with corresponding communications facilities. In addition, Longmore argued that on the coasts each Group AOC in the area would need a

local operational headquarters from which he could direct aircraft to the target and that such a headquarters needed to be sited geographically to enable the air commander to cooperate with the corresponding naval headquarters. As a result, the Air Ministry decided to create two Coastal Command Group Headquarters based on the navy's geographical area organisation. Thus, No. 15 Group HQ was located at Plymouth, while No. 16 Group HQ was established at Chatham.[5] The co-location of these headquarters marked a start at naval-air *coordination*, but it was a failed joint Coast Defence Exercise that turned the corner in the development of a *joint* Area Combined Headquarters (ACHQ) scheme.[6]

In 1937 the RN, RAF and British Army held a joint Coast Defence Exercise to practice their coastal attack and defence skills. The exercise planners hoped that the Commanders-in-Chief (CinCs) of all three services would come together to form a Directing Staff for the exercise, but the Naval CinC opposed the idea, desiring instead to command and control the operations of his defending forces himself in his own independent operations room. The result of the exercises was that all three services failed to appreciate the role and capabilities of the others. This led Air Marshal Phillip Joubert de la Ferté to write a letter, just before his replacement by Air Marshal Sir Frederick Bowhill as the Air Officer Commanding-in-Chief (AOCinC) Coastal Command,[7] advocating the adoption of a joint system of coast defence command based on strategic considerations. The ideal situation, Joubert believed, would be to have the combined staffs of the three services work in a joint operations room. The problem, however, was that at the time the three British services organized and located their commands differently, which made the formation of joint operations rooms difficult: the naval commands were organized on a port basis, the air force on a functional basis, and the army on an area basis. Joubert instead offered that coast defence should be divided into three main areas, the English Channel, the North Sea and the Western Approaches, where operations would be commanded by a joint staff and headed by the senior commanders working on equal terms. Such a system, Joubert stressed, "would reduce the number of authorities responsible for coast defence and thereby simplify the establishment of combined [i.e., joint] operational headquarters."[8]

In December 1937 the Deputy Chiefs of Staff reached an agreement in principle that Area Combined Headquarters (ACHQs) should be located at the major naval command ports of Rosyth, Chatham, Portsmouth, and Plymouth. By April 1938 they had submitted a report recommending that ACHQs should be established at these locations in order "to be used by the Naval and Air Force commanders controlling the units of those Services in the area concerned."[9] The Committee of Imperial Defence approved the scheme in May 1938 and it was put into effect starting at the end of June that year.[10]

The British put their new ACHQ system to the test in a joint coastal and trade defence exercise in summer 1938, which included a series of staged submarine attacks on merchant vessels.[11] Compared to the exercises in 1937, these operations were much more successful and this was largely due to closer cooperation between the services which was facilitated by the

ACHQ system. It was also clear, however, that it was most important that the air force and naval staffs work closely together in trade defence. Accordingly, in December 1938 the three services agreed at a joint conference that "the Navy and Air Force should be represented by officer[s] and operational staffs with full executive authority whereas the Army was only to be represented by liaison officers from Army Commands or Areas."[12] This scheme was implemented immediately and the Air Ministry also redrew the Coastal Command Air Group areas (see Figure 1) to correspond with the new naval Commands, with No. 18 Group supporting the Rosyth Naval Command (ACHQ at Rosyth), No. 16 Group supporting the Nore Naval Command (ACHQ at Chatham), and No. 15 Group (later No. 19 Group) supporting the Liverpool Naval Command (ACHQ at Plymouth).[13]

The ACHQ system became an effective naval-air force headquarters structure for conducting operations during the Battle of the Atlantic. The Group AOCs worked closely with the Admirals commanding the various naval commands in the individual joint headquarters to ensure adequate air coverage for Allied shipping. The structure and operation of the ACHQ was best described by Air Marshal Sir John "Jack" Slessor, the AOCinC Coastal Command during the climax of the Battle of the Atlantic:

> The inner core of the ACHQ was the operations room – usually underground – with its great wall chart showing all they day's activities and its displays of all the necessary current information, convoys and independents at sea, escorts, movements of aircraft, weather and all the rest of it. From here, the Admiral and Air Vice-Marshal and their staffs controlled, as a team, the operations of surface and air forces in the area.[14]

In the operations room an RAF Controller was also on duty, working alongside a RN Duty Commander. Each morning the Admiral commanding the port and the Group AOC visited the plot room together, where they allocated "priority for protection to be given any particular convoy, both surface craft and aircraft, having regard to the value and nature of shipping concerned."[15] The ACHQ system would provide the crucial ability for the RN and Coastal Command to command and control both air and sea resources to ensure the safe and timely arrival of shipping and ultimately defeat the U-boats during the Battle of the Atlantic. However, early in the war, as the U-boat campaign began to intensify, the ACHQ system and the degree of naval influence on maritime air operations came under sharp criticism from the RN.

Despite the development of the ACHQ system in the late 1930s, at the outbreak of the war Coastal Command was not ready for what would become its principal task: the defence of trade from German U-boat attacks. At the beginning of the war the primary role of Coastal Command was to be the "eyes of the Royal Navy"; that is, to provide aerial reconnaissance for the fleet over the North Sea looking for German warships seeking to escape into the Atlantic Ocean to attack shipping. Since it was the German navy's large surface warships, not the U-boats, that the British originally felt were the greatest threat to seaborne trade,

anti-submarine and convoy escort duties were relegated as secondary tasks.[16] By late 1939, however, losses to German U-boats became a serious problem. After conducting a thorough review, in November 1939 trade defence became Coastal Command's primary responsibility.[17]

Nonetheless, the RAF's inter-war focus on strategic bombing theory and Coastal Command's emphasis on flying boat reconnaissance resulted in a neglect of planning and training for maritime patrol operations which could not be remedied overnight.[18] Added to the fact that Coastal Command did not have sufficient resources in aircraft to perform its new role, the Admiralty became increasingly concerned about whether Coastal Command could meet its new responsibilities for trade defence.

The Intensification of the U-boat Assault on Allied Shipping

Following the fall of France in 1940 the Germans were able to base U-boats in French Atlantic ports, allowing easier access to the North Atlantic shipping lanes. In direct response to the growing U-boat menace, First Lord of the Admiralty A.V. Alexander demanded long term increases in the strength of Coastal Command. In early November the British War Cabinet took up the issue at one of its meetings but it quickly developed into claims to have Coastal Command transferred entirely from the RAF to the Admiralty.[19] Alexander noted that the Admiralty had "always been in favour of having full control [i.e., full command], not only of Coastal Command, but of all aircraft whose normal function is to fly over the sea" and argued that if the Cabinet were to carry out the proposed transfer "the Admiralty would be strongly in favour of this change."[20]

Prime Minister Sir Winston Churchill was not so concerned about who had command over Coastal Command so long as it did its job efficiently. Therefore, since it seemed to him that Coastal Command was not performing its duties adequately, Churchill called for a full examination of the current system of RAF command over Coastal Command. Secretary of State for Air Sir Archibald Sinclair advised against the transfer of Coastal Command to the Admiralty, arguing that it would shrink the RAF's resources (i.e., a competition for men and machines) and lead to unavoidable overheads and overlapping of function. Furthermore, he pointed out that the timing of the issue was inappropriate because it would distract the RAF from its most immediate and pressing concern of the time, "winning the air war against Germany." Finally, Sinclair argued that even if there were to be a transfer "it would be impossible for the [proposed] Naval Air Command to be self-sufficient. It would still rely on Fighter Command for the defence of Fleet Bases and in-shore convoys, and upon the Metropolitan bomber force for a striking arm."[21] In addition, the transfer would also be a devastating blow to the morale of the personnel of Coastal Command, as it would appear that the change was being made because the navy did not consider that Coastal Command airmen were capable of performing their functions as part of the RAF.[22]

The RN in fact was pleased with the cooperation that Coastal Command provided at the tactical level. Although the British naval leadership acknowledged that there were deficiencies

in RAF organisation itself, these were not grounds for the complete transfer of Coastal Command to the Admiralty. Instead, the naval brass believed that the main problem was the limited influence that the RN had on how Coastal Command carried out its operational responsibilities for trade defence. Two of the three primary Admiralty complaints were that the RN had "no voice in the design and equipment of aircraft of Coastal Command… [and] no voice in the operational training of the Command."[23] The problem for the Admiralty was that the Air Ministry was responsible for such matters, as they consisted of part of the full command that the RAF exercised over Coastal Command. Therefore, the only way for the Admiralty to have some say in the design and equipment of aircraft and over operational training was to have Coastal Command transferred entirely under RN command. The Admiralty's third complaint was that the RN had "no responsibility of the day-to-day operational control of Coastal Command aircraft which are carrying out what are essentially naval operations."[24] Coastal Command countered by arguing that the ACHQ system provided adequate naval influence over Coastal Command operations, as "the day-to-day control of operations in the defence of trade in Home Waters was the primary responsibility of the local Naval Commanders-in-chief, assisted and advised on air matters by the Air Officers Commanding of the respective general reconnaissance groups."[25] Nonetheless, the Admiralty was not satisfied with the arrangement, thereby necessitating that the Defence Committee (Operations) of the War Cabinet come up with some kind of compromise between the two services.

Following much discussion, the committee announced on 4 December 1940 that "Coastal Command should remain an integral part of the Royal Air Force, but that for all operational purposes it should come under the control of the Admiralty."[26] It did not, however, give a detailed description of the new arrangement, so a joint Naval and Air Staff Committee met in February 1941 to determine the Coastal Command's new command and control relationship with the RN. The resulting document, released on 19 March 1941, became known as the Coastal Command Charter. Some of the most important provisions of the Charter were:

i) Operational control of Coastal Command will be exercised by the Admiralty through the Air Officer, Commanding-in-Chief, Coastal Command.
ii) Subject to the over-riding operational authority of the Admiralty referred to above, the Air Officer, Commanding-in-Chief will normally delegate the day-to-day detailed conduct of the air operations to the Coastal Command Groups, who will be responsible to him for meeting the air requirements of the Naval Commander-in-Chief.
iii) In the event of any operational difficulty arising which cannot be resolved locally by Commanders-in-Chief, it will be referred to the Admiralty who will make a decision in consultation with the Air Officer Commanding-in-Chief, Coastal Command.
iv) Coastal Command resources will not be diverted to other services without the express concurrence of the Admiralty, except as a result of a decision of the Defence Committee.
v) A Joint Admiralty-Coastal Command Committee will be set up to keep under review such matters as numbers; types and equipment of aircraft scales or reserves, formation

> of squadrons; types of weapons; numbers and training of aircrews; methods of patrol, escort and search; expansion of Coastal Command; proposed dispositions of newly formed squadrons; allocation of aircraft and aerodromes; methods of protection of trade from air or submarine attack; requirements for effective reconnaissance and methods of perfecting attacks on ships.[27]

The Admiralty and the Air Ministry soon approved the Charter and the change in the Coastal Command-Admiralty command and control relationship took place on 15 April 1941.

The Charter provided one major concession for the Admiralty in point iv). By giving the Admiralty the final say (except, of course, for a Defence Committee decision) regarding the diversion of Coastal Command resources, the Charter in effect granted a part of the RAF's operational command, which includes authority to deploy units and/or reassign forces, of Coastal Command to the RN. This was a very important concession for the Admiralty: it ensured the British naval service a say in the diversion of Coastal Command resources to non-maritime roles. Indeed, it was, after all, the apparent lack of maritime air power resources dedicated to the Battle of the Atlantic that brought forth the operational control issue in the first place.

Full command of Coastal Command, however, still remained with the Air Ministry, which was responsible for its training, administration and technical development.[28] Therefore, despite the transfer of operational control, "Coastal Command was still funded, organized and based on RAF lines and was, to all intents and purposes, a constituent part of the RAF."[29] The Charter's provision of a Coastal Command Committee with membership from both the Admiralty and Coastal Command Headquarters was also an important step, as it ensured closer consultation and greater understanding between the two services and it guaranteed that the Admiralty had a voice in the design and equipment of aircraft and in the training of crews.[30]

Although the Admiralty was satisfied with the new arrangement, the Air Staff did not really see how different it was from the previous one. Indeed, Air Marshal Sir John Slessor, who in February 1943 would become the AOCinC Coastal Command, argued that the "so-called operational control by the Admiralty" was a "polite myth" that "in effect left the real position just as it had been before all this fuss."[31] Although the charter emphasized the predominance of the naval element in the current operational partnership and strengthened the authority of the operational naval CinCs *vis à vis* the Group AOCs, "it *did not*, however, place the Coastal Command Groups under the operational control of the local Naval Commander[s]-in-Chief."[32] In fact, the operational control in the new arrangement consisted of the "day-to-day detailed conduct of the air operations" that the Group AOC exercised (delegated by the Coastal Command AOCinC) in point ii) of the Charter. Therefore, instead of having operational control, the local naval CinC only had the authority to state his requirements for air coverage to the air commander, who would then exercise operational control by assigning Coastal Command forces to accomplish the mission. It was Slessor who articulated the Coastal Command-RN

command and control relationship best: "the sailor tells us the effect he wants achieved and leaves it entirely to us how that result is achieved."[33]

Despite the provision in point i) of the Charter, control of the actual operations of Coastal Command forces remained with the Group AOCs, which meant that the Admiralty did not in fact exercise actual operational control over Coastal Command. In effect, Admiralty "operational control" meant "the power of [the Admiralty] issuing *general directives* as to the broad strategic [i.e., operational] objective to be pursued and did not include the power of issuing detailed commands for the employment of air units."[34] At the higher level, it was only *through* the AOCinC Coastal Command that the Admiralty "exercised merely a general control" over Coastal Command's operations. Therefore, the Charter's description of the relationship as "operational control" does not reflect current usage of the term as defined by the North Atlantic Treaty Organisation (NATO): "the authority delegated to a commander to direct forces assigned so that the commander may accomplish specific missions or tasks."[35] Instead, the Coastal Command-Admiralty relationship emphasized issuing "general directives" rather than the planning and issuing of detailed instructions for the execution of operations. In today's parlance this would be described as "operational direction."[36]

Thus, according to the Air Ministry, actual operational control over the maritime air organisation remained with the Coastal Command AOCinC. He in turn delegated operational control to the Group AOC, who controlled the actual day-to-day operations in close association with local naval CinCs in the ACHQ and in consultation with the AOCinC Coastal Command.[37] The Admiralty's understanding of the system at the operational level was not much different:

> The working of the Area Combined Headquarters, in which the naval and air sides of every command were intimately integrated, remained unaffected. Under the new arrangement the naval Commander-in-Chief stated his requirements for protection, escorts or patrols and the Air Officer Commanding the Coastal Command Group then issued his orders to meet the Naval requirements.[38]

Although the command was centralized, the execution of control over air assets was decentralized; this arrangement was indeed not much different from the modern concepts of mission command and centralized command and decentralized execution.[39] Put simply, the relationship, according to Slessor, was that "Naval Commanders-in-Chief are certainly not in a position to order air operations, but they are in a position to say what effect they would like achieved by their associated Air Officer Commanding."[40] Therefore, Slessor was annoyed by the fact that even though the Admiralty went to all the trouble to gain "operational control" of Coastal Command, in the end it was the Group AOCs who in effect actually exercised operational control. Moreover, the new arrangement did not come without a price to the relationship between Coastal Command and the Admiralty. The RAF maritime air organisation did not appreciate the apparent lack of confidence by the Admiralty in Coastal Command's ability to do its job properly and the result, according to Slessor, was "a legacy of mistrust and

bad feeling on the part of the Royal Air Force which was not fully eradicated for more than two years."[41]

The new RN-Coastal Command arrangement was an especially important achievement given the restructuring of the trade defence organisation in Britain in early 1941. Because of the intensified U-boat assault on shipping following the German acquisition of naval bases on France's Atlantic coast, it was no longer safe to route shipping through the southwest approaches (i.e., south of Ireland) to British west coast ports. Instead, shipping had to be routed north of Ireland and after numerous discussions from the late summer until late autumn of 1940, the British established a new command at Liverpool: Western Approaches. At the head of this new command was Admiral Sir Percy Noble, RN, who worked in an ACHQ with Air Marshal Sir L.H. Slatter's No. 15 Group, RAF Coastal Command. The Commander-in-Chief, Western Approaches, was responsible for all North Atlantic convoy routes and he, along with Slatter, also directed the aircraft tasked to protect the convoys. The command was established on 16 February 1941, and its authority spread across the Atlantic.[42] In addition to increased cooperation at the operational headquarters level, tactical cooperation also improved and as early as May 1941 exchange visits between RAF and RN officers engaged in trade defence work began. Officers from escort vessels flew on Coastal Command aircraft while aircraft captains went on trips in escort vessels. As a RN officer on the staff of Coastal Command noted, the result was an improvement of "the basis of all true co-operation – mutual understanding of each other's difficulties."[43]

Joubert's Concerns in 1942

With the command and control issue resolved and greater aircraft resources being dedicated to Coastal Command, the co-operation that the RAF provided to naval forces in the defence of shipping improved markedly throughout 1941 and 1942. With a stronger working relationship between naval and air forces at the operational and tactical levels, there was greater RN confidence in and satisfaction with Coastal Command. This should have allayed RAF concerns over the command and control issue – and the fear that it might lose its maritime air organization. Nonetheless, this new RN appreciation for Coastal Command had an entirely different effect on Air Marshal Sir Phillip Joubert de la Ferté, who grew increasingly concerned with RN intentions after beginning his second tour as AOCinC Coastal Command during the summer of 1941.

In early June 1942, Joubert sent a letter to the Chief of the Air Staff (CAS), Air Marshal Sir Charles Portal, regarding the current state of the Coastal Command-Admiralty command and control arrangement. Noting that naval officers had in the past three years of war grown to appreciate the value of aircraft in sea warfare, Joubert grew suspicious that the RN was anxious to obtain more aircraft for Coastal Command "with the obvious intention, when they do not possess them themselves," of securing command over them. Indeed, the Coastal Command chief believed that with the political power of the RN and the United States Navy there was a "real danger" that they would attempt to secure command over all maritime air forces of the two

nations. To counter this threat, Joubert advocated that the Air Ministry mount a press campaign to build up support for continued RAF command over Coastal Command in order to ensure that a transfer of the RAF's maritime air organisation to the Admiralty would never be possible.[44]

Joubert also suggested that the Air Ministry achieve the "long overdue" removal of Coastal Command from the "operational control" of the Admiralty. He gave several reasons for this conviction. Joubert was an advocate of the concept of "the indivisibility of air power," and thus felt that "it is a fact that the admiralty [sic] are incapable of exercising operational control because they have neither the knowledge nor the experience necessary for the handling of air forces."[45] In reality, Joubert stressed, the navy "leaned heavily" on his expertise as AOCinC Coastal Command, and it was thus he "who ha[d] to take all the important decisions and run all the operations." In short, Joubert did not feel that the Admiralty exercised any degree of actual control over Coastal Command operations, leaving the execution of operations to himself and the Group AOCs. In Joubert's opinion, therefore, "this operational control has made no contribution whatsoever to the war effort and in fact has proved a dead letter."[46]

In Joubert's opinion, since the "operational control" exercised by the Admiralty was a farce and since it did not reflect the actual operational situation, the Coastal Command Charter arrangement should be discontinued. Indeed, it appears that Joubert feared that the growing successes of Coastal Command's trade protection operations would lead the Admiralty to take the term "operational control" more literally by allowing naval commanders to plan and issue specific orders on how to employ the maritime air organisation's aircraft on operations. Not only would this lead to the RAF losing its grip on its maritime air organisation, but the RN's lack of experience and knowledge of handling maritime air operations, he felt, would also result in a drop in the effectiveness of Coastal Command.[47]

Portal felt that Joubert was being overly alarmist. In his response to the AOCinC Coastal Command, the CAS did admit knowing of a few RN officers who wanted to acquire shore-based aircraft, but he did not see how they could be successful in an effort to make Coastal Command a part of the RN unless the maritime air organisation was "insignificantly small." Given Coastal Command's large responsibilities for trade defence and its subsequent expansion, this was certainly not the case. Instead, Portal believed that the RN would most likely try to develop a parallel shore-based aircraft force like the USN had done. To emphasize his point, the CAS expressed his belief that the Admiralty was so set on obtaining command over shore-based aircraft that they would prefer to get ownership of one shore-based squadron rather than the addition of several squadrons for Coastal Command. However, understanding the unnecessary annoyances that a public debate over the issue would cause in wartime, Portal also felt that Joubert should let the matter rest and therefore instructed the Coastal Command chief not to initiate his proposed press campaign.[48]

Regarding Joubert's second concern, although Portal agreed that the exercise of operational control of Coastal Command by the Admiralty "is a rather meaningless formula and that, in fact,

you exercise operational control in their interests," he stressed that "the less they interfere the less reason there is for us to raise the matter."[49] Portal believed that Coastal Command would stay intact under the RAF so long as it "continues to be efficient; and if it is inefficient it will deserve whatever may happen to it."[50] The airmen need not have feared – Coastal Command continued to be an efficient organisation and played an important part in the joint effort with the RN in defeating the U-boats during the climax of the Battle of the Atlantic in mid-1943, and ensured that the U-boat never again became a serious threat to Allied shipping. Pleased with the performance of Coastal Command, the Admiralty did not revisit the issue of operational control. In fact, the issue only reappeared once more in early 1944 when it was raised by the RAF. Indeed, this discussion of RN-Coastal Command operational control arrangements clearly demonstrated how central the efficiency issue was to the command and control debate.

Coastal Command Operational Control and Operation "Overlord"

When he took over as AOCinC Coastal Command in January 1944, Air Chief Marshal Sir Sholto Douglas found none of the ill-feeling by Coastal Command towards the Admiralty that Sir John Slessor suggested had existed following the transfer of operational control in 1941. Instead, as Douglas recalled in his memoirs, with a decreased U-boat threat to shipping since mid-1943 – due in no small part to effective joint RN-Coastal Command trade protection operations – he was "enjoying my freedom from any harassment from the Admiralty."[51] However, when planning for Operation "Overlord," the Allied invasion of Normandy, in the spring of 1944, Douglas soon discovered that the operational control agreement between the Admiralty and Coastal Command was not operating the way it should be. Douglas and his staff at Coastal Command HQ had made all the arrangements for the dispositions of their squadrons, their patrol areas and their duties, and had already delivered these detailed instructions to the Group AOCs when the Coastal Command chief realized that he "had no formal or definite directive from the Admiralty about what was expected from us." "...Since we were nominally under the operational control of the Admiralty," Douglas recalled, "this seemed to be rather an odd state of affairs."[52]

Douglas queried the Deputy Chief of the Naval Staff (DCNS), but "in the pleasantest fashion, the DCNS tried to assure me that there was nothing to worry about." Undaunted, the Coastal Command chief insisted upon having a proper directive. Although Douglas appreciated the confidence that the Admiralty put in him and his command to get the job done adequately, he feared that if something went wrong because Coastal Command did not have proper instructions from the Admiralty, he as the AOCinC, would be held responsible. Apparently, the DCNS did not see the seriousness of Douglas' concern, so it was with "an amused note in the voice of the DCNS" that he replied, "I see your point. You'll get your directive."[53] Still, when no such directive arrived from the Admiralty, a very annoyed Douglas went straight to the First Sea Lord himself, Admiral Sir Arthur Cunningham, only a scant ten days before the invasion to demand a directive. Cunningham also did not take the matter seriously, and, "laughing as he said it," he replied, "You know perfectly well what you've got to do, Sholto. Get on with it."

This did not sway the RAF officer, and he insisted on a directive from the Admiralty "for what is going to be our part in the greatest operation in history." Although he was still not convinced, Cunningham, perhaps simply to calm Douglas, assured the Coastal Command chief that he would receive a directive.

However, when the directive arrived, it only "consisted of about six lines of generalisations, and in effect it left everything to me." It not only confirmed the Admiralty's faith in the ability of Coastal Command to complete its tasks efficiently, but, more importantly, it demonstrated what the issue over operational control had come to after so many years:

> It was then that I came to feel that, after all the arguments and quarrels about the operational control of Coastal Command, the question had turned out, in the face of the final and crucial test, to be largely an academic one.[55]

To put it in simpler terms, the main concern of the Admiralty in regard to Coastal Command was that the RAF, in RN official historian Stephen Roskill's words, gave "proper priority for the allocation of aircraft and trained crews to the maritime war."[56] As Portal mentioned above, so long as Coastal Command did its job efficiently, "operational control" was not an issue. It was only when it appeared that the Air Ministry was not dedicating sufficient resources towards Coastal Command for the joint defence of trade that it made an issue of the operational control of the RAF maritime air organisation.

Conclusion

In the end, the operational control arrangement agreed to between the Admiralty and the Air Ministry had little influence on the actual prosecution of Coastal Command operations, which remained securely in the hands of the local Group AOCs. Admiralty operational control over Coastal Command, in essence, was simply a reassurance to the RN that the trade defence war would receive proper and adequate attention from the RAF. As Air Chief Marshal Sholto Douglas' experiences have demonstrated, once Coastal Command began to do an exemplary job protecting trade and sinking U-boats, the operational control issue simply became academic. Earlier in the war, however, when it appeared that Coastal Command was not performing its tasks properly in the trade defence war and insufficient resources were being allocated to it, the operational control issue was not academic but a very serious concern for the Admiralty. Despite all the controversy surrounding the operational control of Coastal Command, as Slessor points out, in the end it must be remembered that the "…disagreements in high places must be put in their proper perspective and it should not be imagined that they diverted more than a small percentage of our energies from the real business of fighting the war at sea."[57]

Even though the RN-Coastal Command ACHQ operational control arrangement had become academic in the eyes of the Admiralty by D-Day, it did set an important precedent for joint command and control arrangements. Indeed, after experiencing difficulties dealing with

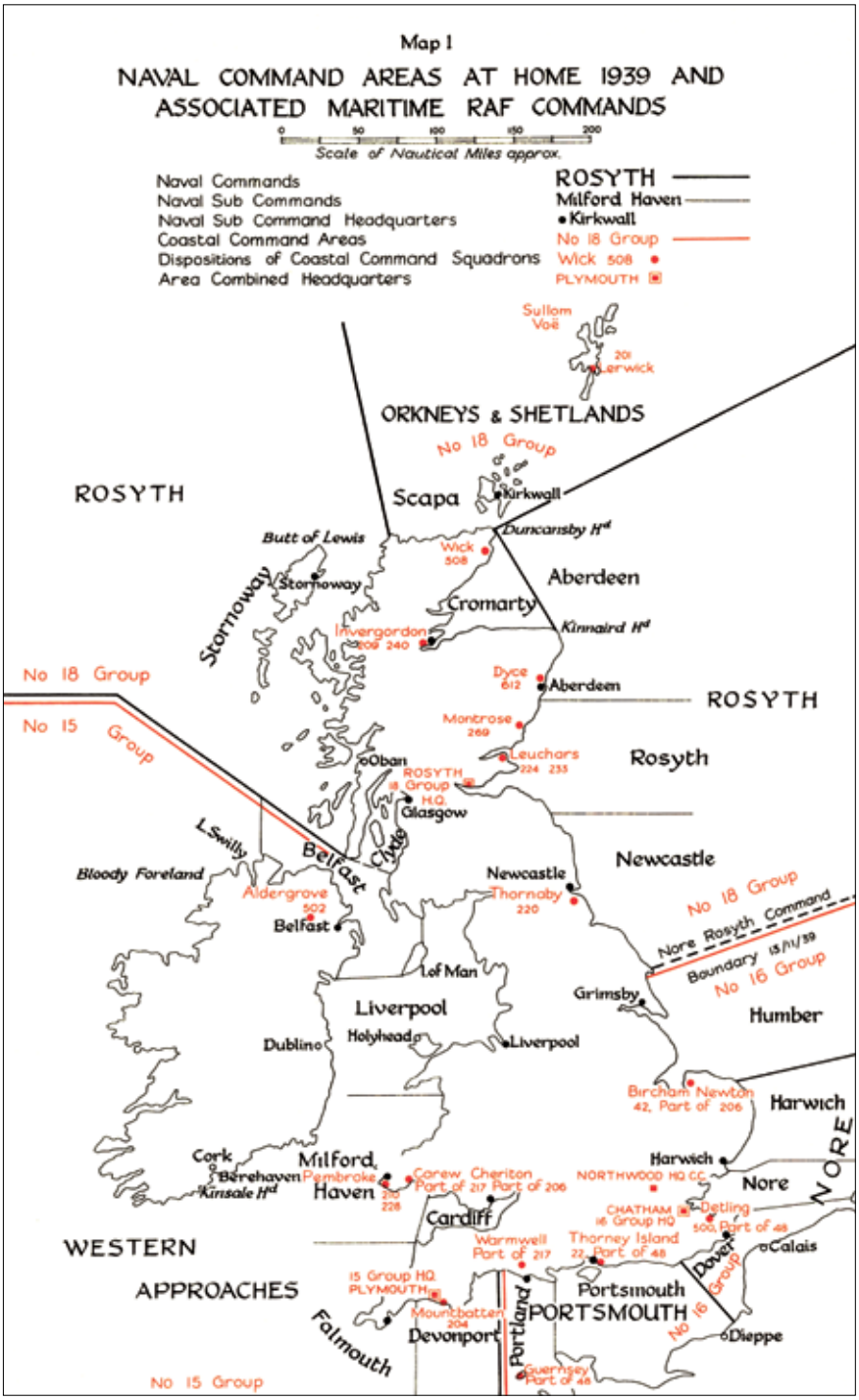

Figure 1: RN-RAF Coastal Command Commands and ACHQs, 1939

U-boat attacks in the Western Atlantic and following subsequent visits by experienced RN and Coastal Command officers to North America in 1942 to address the command and control situation there, both Canadian and American naval and maritime air forces eventually adopted the joint ACHQ system by the spring of 1943.[58] Moreover, requests to the British by the Americans to clarify the operational control arrangement further led to the establishment in early 1944 of a formal definition of operational control:

> Operational Control comprises those functions of Command involving composition of Task Forces or Groups or Units, assignment of Tasks, disignation [sic] of objectives and co-ordination necessary to accomplish the Mission. It shall always be exercised where possible by making use of normal organisation Units assigned, through the responsible Commanders. It does not include such matters as Administration, discipline, Internal Organisation and training of Units… It is recognised that the Operational Authority may in emergency or unusual situations employ assigned Units on any task that he considers essential to effective execution of his operational responsibility.[59]

Significantly, not only does this definition of operational control conform to current usage of the term,[60] but operational control also became one of the cornerstone command and control principles for joint, bilateral, and combined commands during the Cold War, including (most notably), NATO and the North American Air Defence Command (NORAD).

It is clear from operational experience that the detailed employment of forces to accomplish a given task remained the prerogative of the service/component commander from which the forces were derived. Slessor's simple description of "the sailor tells us the effect he wants achieved and leaves it entirely to us how that result is achieved," and the more formal definition above show the practical employment of the joint ACHQ system operational control arrangement. The key to joint RN-RAF operations in the defence of trade was therefore not about who ultimately controlled the assets, but rather ensuring that both airmen and sailors had an understanding of – and appreciation for – each other's problems and advantages. Such a positive working relationship, in addition to an effective command and control arrangement, was crucial for winning the Battle of the Atlantic and provides an important empirical example of successful jointness from which modern military forces can learn.

Notes

[1] Sir Winston S. Churchill, *The Second World War*, Volume II (New York: Time, Inc., 1959), 598.
[2] The best account of the history of RAF Coastal Command during the inter-war period and Second World War is John Buckley, *The RAF and Trade Defence, 1919-1945: Constant Endeavour*, (Keele, U.K.: Ryburn Publishing, Keele University Press, 1995).
[3] Stephen Roskill, *Naval Policy Between the Wars, Volume II: The Period of Reluctant Rearmament, 1930-1939* (London: Collins, 1976), 401; Marshal of the Royal Air Force Sholto Douglas with Robert Writht, *Years of Command: The Second Volume of the Autobiography of Sholto Douglas*,

(London: Collins, 1966), 246. See also James A. Winnefeld and Dana J. Johnson, *Joint Air Operations: Pursuit of Unity in Command and Control, 1942-1991* (Annapolis, Maryland: Naval Institute Press, 1993), 7.

[4] The UK National Archives [TNA], Air Ministry [AIR] file 41/47, Captain D.V. Peyton-Ward, *The RAF in the Maritime War, Vol. I: The Atlantic and Home Waters: The Prelude, April 1918-1939*, RAF Air Historical Branch (AHB) Narrative, 1947, 140, 148-150. Copy available at Canada, Department of National Defence, Directorate of History and Heritage [DHH], Ottawa, file 79/599.

[5] TNA AIR 41/47, Peyton-Ward, I, 212. Britain's coast was divided into a number of naval commands with headquarters at Rosyth, Chatham, Portsmouth, and Plymouth.

[6] For the sake of clarity and consistency, modern military terminology will be used throughout this article. For example, joint refers to two or more services whereas combined refers to the military forces of two or more countries working together. For quotations, modern terminology will be included in [square brackets] next to contemporary terms – i.e., "full control [i.e., full command]."

[7] Coastal Area was elevated to a Command on 14 July 1936 and the Air Officer Commanding Coastal Area became the Air Officer Commanding-in-Chief Coastal Command. Chaz Bowyer, *Coastal Command at War* (London: Ian Allan, Ltd., 1979), Appendix I, 157.

[8] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War I*, AHB, 213-214; Buckley, *Constant Endeavour*, 86-88.

[9] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War I*, AHB, 215-216.

[10] Ibid., 217.

[11] "General Service Notes: The Coast Defence Exercise of July, 1938," *Journal of the Royal United Service Institution*, Vol. LXXXIII, (November 1938), 859.

[12] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War I*, AHB, 89 and 233.

[13] Ibid., 234; S.W. Roskill, *The War At Sea, 1939-1945: Volume 1: The Defensive* (London: HMSO, 1954), 36. Another ACHQ was established at Liverpool later on in the war (see below).

[14] Marshal of the Royal Air Force Sir John Slessor, *The Central Blue: Recollections and Reflections* (London: Cassel and Company Limited, 1956), 487.

[15] Minutes of the 105th Meeting of the Naval Board of the Royal Canadian Navy (RCN), 18 March 1943, RCN Naval Board Minutes, DHH. The arrangement was complemented by a monthly meeting of Trade Division Representatives at Admiralty, attended by the Commander-in-Chief Western Approaches or his Chief of Staff, where "suggestions were made by interested authorities and troubles aired, as a result of which more complete cooperation resulted."

[16] Buckley, *Constant Endeavour*, 117; Roskill, *The War At Sea*, I, 35 and 107; TNA AIR 41/47, Captain D.V. Peyton-Ward, *The RAF in the Maritime War, Volume II: The Atlantic and Home Waters: September 1939-June 1940*, RAF AHB Narrative, 1947, 2.

[17] Buckley, *Constant Endeavour*, 118; Alfred Price, *Aircraft Versus Submarine: The evolution of the anti-submarine aircraft, 1912 to 1972* (London: William Kimber and Co. Ltd., 1973), 46.

[18] Price, *Aircraft vs Submarine*, 38-44. The only joint aircraft-surface vessel exercises conducted in the months before the war was an exercise between 15 and 21 August 1939 which was "designed to deal with surface raiders breaking out from the North Sea." Roskill, *The War At Sea*, I, 38.

[19] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 274-278. The person who first suggested this brash move was the expatriate Canadian, Lord Beaverbrook, who was the British Minister of Aircraft Production. TNA, Cabinet file [CAB] 66/13, Memorandum by the First Lord of the Admiralty, 4 November 1940 and Memorandum by Minister of Aircraft Production, 11 November 1940.
[20] TNA CAB 66/13, Coastal Command Memorandum by the First Lord of the Admiralty, 20 November 1940.
[21] TNA CAB 66/13,Coastal Command – Memorandum by the Secretary of State for Air, 21 November 1940 and Coastal Command – Note by the Secretary of the War Cabinet, 23 November 1940.
[22] Ibid.; TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 280.
[23] TNA CAB 66/13,Coastal Command – Memorandum by the First Lord of the Admiralty, 22 November 1940.
[24] Ibid.; TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 280.
[25] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 280. General reconnaissance was the term used by Coastal Command for what today are known as maritime patrol aircraft.
[26] Ibid., 280 and 285. Churchill noted further that "while it might have been desirable, if they had been stating afresh in peace time, to make the great change which had been proposed, it would be disastrous, at that stage of the war, to tear a large fragment from the Royal Air Force." Ibid., 283-284.
[27] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, Appendix VII, 394.
[28] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 286. It by no means ended the Admiralty's long-standing desire to have control over shore-based aircraft, however.
[29] Buckley, *Constant Endeavour*, 123. The arrangement also avoided the overheads and duplication that would have resulted with two maritime air organisations, which were the main reason for combining the Royal Flying Corps and Royal Naval Air Service together into the RAF in 1918.
[30] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, Appendix VII, 394.
[31] Slessor, *The Central Blue*, 482; TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 28.
[32] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 286. Emphasis added.
[33] Air Marshal Sir John C. Slessor, Air Officer Commanding-in-Chief RAF Coastal Command, to Air Vice-Marshal N.R. Anderson, RCAF Air Member for Air Staff, 24 June 1943, DHH 181.009 (D6734).
[34] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 275. Emphasis added.
[35] NATO, *Allied Joint Doctrine for the Conduct of Operations*, AJP-3(B), March 2011, Chapter 1, Section 0194c., 1-27.
[36] See the following for a brief discussion of operational direction: Allan English, *Command and Control of Canadian Aerospace Forces: Conceptual Foundations* (Ottawa: Her Majesty the Queen as represented by the Minister of National Defence, 2008), 5-6; Richard Evan Goette, *The Struggle for a Joint Command and Control System in the Northwest Atlantic Theatre of Operations: A Study of the RCAF and RCN Trade Defence Efforts During the Battle of the Atlantic* (MA Thesis, Queen's University, 2002), 47, 88-97.

[37] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 286-287.
[38] Roskill, I, 361.
[39] NATO, *Allied Joint Doctrine*, AJP-01(D), December 2010, Chapter 6, Section I – Command Philosophy, 0612, 6-3. For a discussion of the principle of centralized command and decentralized execution, see: Allan English, "Rethinking 'Centralized Command and Decentralized Execution,'" in Douglas L. Erlandson and Allan English, eds. *Air Force Command and Control* (Toronto: Canadian Forces College, 2002), 71-82.
[40] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 287.
[41] Ibid., 286.
[42] Ibid., 294; William Chalmers, *Max Horton and the Western Approaches: a Biography of Admiral Sir Max Horton* (London: Hodder and Stoughton, 1954), 152; Slessor, *The Central Blue*, 487.
[43] TNA AIR 41/47, Peyton-Ward, *RAF in the Maritime War II*, AHB, 307.
[44] Joubert to Portal, 2 June 1942, Christ Church [CC], Oxford, Papers of Marshal of the RAF Lord Portal, Folder 8A, copy held at DHH, file 87/89. At the time, the USN and United States Army Air Forces each had their own separate maritime patrol force.
[45] CC, Portal Papers, Joubert to Portal, 2 June 1942.
[46] Ibid.
[47] Ibid.
[48] CC, Portal Papers, Portal to Joubert, 11 June 1942.
[49] Ibid.
[50] Ibid.
[51] Douglas, *Years of Command*, 246-247, 263. Quote from page 263.
[52] Ibid.
[53] Ibid., 263-264.
[54] Ibid., 264.
[55] Ibid.
[56] Roskill, *The War At Sea*, I, 361.
[57] Douglas, *Years of Command*, 249.
[58] Report by Commander P.B. Martineau, RN, on Visit to Eastern Air Command, 31 October 1942, Air 15/217; Canning to Slessor, 27 May 1943, Air 2/8400; W/C S.R. Gibbs, RAF, "Report on Visit of EAC Halifax and RCAF Station, Dartmouth, NS," n.d. [July 1942], Air 15/217; W.A.B. Douglas, *The Creation of a National Air Force: The Official History of the Royal Canadian Air Force Volume II* (Toronto: University of Toronto Press and the Department of National Defence, 1986), 523.
[59] COMINCH to USN Commands, Admiralty, Air Ministry and COS Army, 11 February 1944, Air 15/339.
[60] NATO, *Allied Joint Doctrine for the Conduct of Operations*, 1-27.

Book Reviews

'Cables from Kabul: the Inside Story of the West's Afghanistan Campaign'

By Sir Sherard Cowper-Coles

Reviewed by Wing Commander Greg Hammond

Introduction

Few wars in history have ended without, ultimately, a political solution. It is Sir Sherard Cowper-Coles' central contention that insufficient effort was placed – particularly during the Bush Administration – on developing an enduring political settlement for Afghanistan and that, therefore, the military campaign was to a large extent fruitless. As HM Ambassador to Kabul from May 2007 to February 2009 and then the Foreign Secretary's Special Representative for Afghanistan and Pakistan (SRAP) until September 2010, including another stint in Afghanistan as acting Ambassador, Cowper-Coles was at the centre of debate on Afghanistan during a period covering the changeover from Bush to Obama, the whole of Gordon Brown's premiership and President Karzai's controversial re-election.

Much of Cowper-Coles' critique is valid. For example, to say, as he does with the benefit of hindsight, that the UK "blundered in" to Helmand in 2006 is a less controversial statement in Defence circles now than it would have been at the time. He also rightly identifies the discontinuities resulting from the rotation of the fighting brigade every six months, the pattern of each brigade having to learn much from scratch while preparing for the major kinetic operation with which the brigadier hoped to make his mark, often conducted while only playing lip service to counter-insurgency doctrine and any wider theatre campaign plan from the Headquarters of the International Security and Assistance Force (HQ ISAF) in Kabul. Furthermore, he rightly criticizes his London in-briefing, with its hubristic focus on documents such as the 'United Kingdom' strategies for Afghanistan and Helmand, as if action in the isolated

province of Helmand, a world away from the centres of power in Afghanistan, would decide the overall result of the campaign; and, on arrival in Kabul, he is told by a senior staff member that his most important relationship as Ambassador will be, not with President Karzai, but with the US Ambassador. Afghanistan is a US campaign with the UK in a significant supporting role: it is certainly not a campaign run from Whitehall.

Yet despite these valid criticisms, there are some fundamental flaws in Cowper-Coles' analysis. A political settlement, which his evidence suggests did not feature on the Bush Administration's agenda at all, will ultimately involve some kind of accommodation with the groups collectively known as the Taliban. Yet, what incentive would there be for the Taliban to enter negotiations if they thought they were winning and only had to 'stay the course' longer than the West's tolerance for casualties? The point of ISAF's tactical military activity in Helmand and elsewhere, and still more important the efforts to train the Afghan National Security Forces and develop Afghan governance capacity, is to engender a sense of hopelessness amongst the Taliban to make their leadership realise that their campaign is unwinnable and that a negotiated settlement is the way forward. Cowper-Coles does not seem to understand that there is a real job for the military in buying the space necessary for political action. Happily, recent evidence suggests that the results of President Obama's 2010 troop surge, coupled with a more open American approach to negotiations, may be moving the whole effort in the right direction. Cowper-Coles views 2010 as a continuum best illustrated by the tired – and in its first part inaccurate – briefing phrase he had heard so often, "we are making progress, but challenges remain". However, there is a possibility that 2010 may in time be seen as the turning point. Nevertheless, he is undoubtedly right to point out that "Since the British… subsidized the 'Iron Amir', Abdurrahman, in the nineteenth century, no Afghan government [has] survived without external funding": if Afghanistan is to have a stable future, the West's involvement must continue long after political deadlines for troop withdrawals have expired.

Despite not understanding the operational level of war (which is not, of course, his profession), Cowper-Coles does appear to be captivated by the 'glamorous' side of military life. His child-like excitement at the honour given him of taking the salute at the Edinburgh Tattoo, his grinning picture next to all kinds of military personnel and equipment, and the moving tribute he wrote after attending a repatriation ceremony at Camp Bastion, are all testament to his genuine regard for military folk, especially the front-line soldiers. And the RAF, as part of the supporting effort in Afghanistan, comes out of the book well: he regularly illustrates the importance of air mobility, and pays elegant tributes to Chinook and Hercules crews and the often overlooked Movements staff. A particular highlight is his description of the party he held in the Embassy to mark the eightieth anniversary of the first ever mass air evacuation of civilians, from Kabul by No 70 Squadron RAF in 1928 following an Islamist uprising. Yet no-one who writes that, "In general, the casualties seemed to upset the officers rather less than they did me", can ever be said genuinely to understand the military, although – to be fair – he does attempt an explanation for his harsh words. There are also a few blunders such as his assertion that despite the heroic efforts of the counter-IED teams, "somehow the bomber always gets through"; in

fact, because of the efforts of the counter-IED teams, the bombers are successful far less often than they would wish, although – tragically – counter-IED will probably never achieve a 100% success rate.

Cowper-Coles is at his best when he is immersed in his own areas of competence. His chapter on the external influences on Afghanistan is a masterly summary of the often conflicting motivations of the neighbouring states, and the rises and falls in their respective influence over events. He makes sense of the complexities Afghan politics, with elegantly-written character assessments of all the main players and descriptions of interesting places. And, more widely, he records his impressions of many of the leading British and international political and military leaders as they grappled with the seemingly intractable problems posed by Afghanistan.

Overall this book is worth reading on several levels. It is a well-written introduction to the grand strategic view of Afghanistan, a country in which many of us will continue to serve for some years to come. The book also demonstrates that the British contribution to Afghanistan is a cross-HMG effort: the military is but one component of the instruments of national power and Cowper-Coles illustrates the contributions made by departments ranging from the Home Office to the Department for International Development and the Intelligence agencies. Finally, it is worth reading to understand how a senior diplomat works and thinks: there is a great deal more to diplomacy than the 'cocktail party circuit' and, while there may always be differences between the viewpoints of military and diplomatic personnel, the skill sets of both professions are needed to advance our country's interests.

Book Reviews

The Art of Action: How Leaders Close the Gaps Between Plans, Actions and Results

By Stephen Bungay

Reviewed by Air Commodore Neville Parton

Introduction

Anyone who regularly scans the list of new publications in the business management area will have realised that this an area where fads are rife, and the cynic would say that one of the main aims in this particular publishing domain is simply to find new ways of presenting old truths in a way that makes them attractive – and so of course sells. Over the last decade or so there has also been a steadily growing trend in a two-way traffic: the selling of business approaches to the military, and the selling of certain aspects of the military to business. It would be very easy to simply look at the title of *The Art of Action*, read the dust-jacket description and assume that this was another in that genre – however, that would be a mistake. Stephen Bungay's name is one that should be familiar to Air Power Review readers, as the author of the Battle of Britain tour de force *The Most Dangerous Enemy*, and the follow-on *Alamein*, and this book contains exactly the same qualities of great scholarship, detailed analysis, rigorous logic and insightful conclusions that have marked out his previous work. Bungay himself has an extremely broad background; initially as an academic, but then a business consultant, business director, military historian and lecturer.

So much for the writer – what about the book itself? Fundamentally it offers an analysis of a range of common problems within the business world, and then suggests a particular approach to dealing with them, however, Bungay's unusual background gives him a unique perspective which in turn provides the reader with a closely-linked set of historical examples, detailed analysis and contemporary examples from the business world. Much of what is said

is not hugely original, as the author states himself. After all, the concepts are built largely on a construct developed within the Prussian and then German armies over a 150 year period – but the way in which it is explained, and made relevant to the world that we now live in, is remarkable. The author's clear mastery of the differing worlds that he refers to is evident throughout, and the way in which significant tenets are extracted from history and then applied to the world of business strategy and delivery make it a genuinely compelling read.

The key insight is the drawing of a very clear analogy between the business of war, and the business of, well, business, and thus drawing out that the most important factor in both are those aspects which make up what Clausewitz referred to as friction. This begins with an examination of what Bungay sees as the problem, which are the difficulties that many organisations seem to have in actually getting anything done. He also identifies considerable similarities between the military environment and business, and looks at issues with a range of previous approaches from scientific management through to strategic planning before considering what the cause of the problem is - which is identified as the concept of 'friction', first introduced into the human domain by Clausewitz in the 1700s. Bungay identifies from this the idea of three particular gaps: the knowledge gap (which is the difference between what we would like to know and what we actually know), the alignment gap (the difference between what we want people to do and what they actually do) and finally the effects gap (the difference between what we expect our actions to achieve and what they actually do). The impact of these gaps is typically seen in organisations as more and more centralised control, greater use of detailed metrics and eventually paralysis by indecision.

Having identified the problem and cause by considering the environment of war, elements of a solution are found from the same source, this time by considering the approach of Helmuth von Moltke who identified the solution as being able to give a high degree of autonomy to individuals but at the same time also to get high alignment between their actions, resulting in what we now know as mission command. This approach deals with the three gap problem by closing each in turn: addressing the knowledge gap by limiting the direction given to defining and expressing only the essential intent, doing the same for the alignment gap by allowing each level to define what it has to do to achieve that intent, and finally for the effects gap by giving individuals the freedom to adjust their actions to deliver that intent. The overall approach is termed as 'business opportunism' by Bungay, who sees it as a theory that is very different from the scientific and engineering approaches that have been prevalent in management literature in recent years.

Particular consideration is given to the role of strategy, which is seen as fundamentally important as providing the 'aim' towards which the main effort will be deployed and against which all levels of a business can measure whether they are contributing or not. The importance of briefing and back-briefing is stressed, using a number of examples to illustrate that individuals at all levels will find themselves in situations where they have to exercise independent thinking, for which they need to be prepared with information to enable them to

make decisions. Although Bungay does not use the term, the concept of the 'strategic corporal' is quite clearly in his mind here, and the concept of starting with a statement of intent which boils down the strategy to its fundamentals, and then briefing this down at each level to cover the higher intent two levels up, the tasks that this means for the organisation concerned and the main effort and freedoms and constraints will be familiar to most military readers. However, there are other enablers of course, and the need to train, develop and support people so that they feel 'empowered' to use their initiative, and in particular are encouraged to make decisions but not blamed if they get it wrong, is stressed. A cautionary note is also sounded with regard to the area of organisational processes such as budgeting and performance management, which can stifle any use of initiative, and of the dangers of metrics and scorecards, where achievement of the elements rather than the end becomes key.

The concept of 'commanding', and its importance is also explored, and a number of recent examples drawn from the author's recent experiences are used to illustrate the results obtained from applying this approach in the real world. The fact that commanders tend to use simple orders to guide actions is noted, with Napoleon's 'march towards the sound of the guns' given as a case in point, and the main tenets of the book are summed up in what Bungay terms GBOs (Glimpse of the Blindingly Obvious). There are ten of these, which are not repeated here - to get them you will need to read the book!

At a practical level, this can be read in a linear fashion, and every chapter usefully has a summary of the key points to aid understanding – but it can equally well be dipped into after reading the introduction to identify specific points that may be relevant to a particular issue. It is not written for the academic (although there is enough signposting of sources and evidence to satisfy those who might wish to look further) it is fundamentally written for those who are involved with the practice of leading organisations. Furthermore, the overall approach is most definitely stimulating to the mind, as it not only has a great deal to say about the way in which most large enterprises could be better led, but at the same time provides a good introduction to the military history that resulted in the doctrine that we now best know as mission command.

This is, at its heart, a book about the use of mission command in everyday life – but especially for those who are in a position of leadership and trying to effect change. Those who have been exposed to mission command, either theoretically or practically, may consider that they already know enough about the subject to employ it to good effect, and certainly do not need to be told how to apply it by a management consultant. But Bungay is much more than that, and so is his book. It offers genuine insights into the application of mission command in the day-to-day business of life, and does so in a manner that makes the reader think 'could I do that'? Who should read this book? Anyone, I would suggest, who has come up against the very real problem of having to deliver and experiencing the gaps that are so logically identified. This is not a book which promises that if followed it will turn your life and career around, but it does provide a huge amount to think about, and packaged in a manner which is inherently

understandable to those in the military – go read it!

Bibliography

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Notes

[1] Bungay, S. (2000). *The Most Dangerous Enemy*. London, Auram Press Ltd.
[2] Bungay, S. (2002). *Alamein*. London, Aurum Press Ltd.
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