

THE ROYAL AIR FORCE

AIR POWER Review

Volume Nine

Number Two

Autumn 2006

RAF AIR POWER REVIEW Vol 9 No 2



2006

SEE THE ROYAL AIR FORCE
AIR POWER REVIEW ON-LINE
VISIT: www.raf.mod.uk

Air Power Review

is the professional flagship publication

of the Royal Air Force

Front Cover

RAF C-130 Hercules from RAF Lyneham: An individual's specialist technical skill, be it aircrew, caterer, engineer, logistician, must be capable of being applied in the context of a war fighting environment.

See Training Robust Warfighters for an Agile Air Force, page 33

CONTRIBUTIONS TO THE ROYAL AIR FORCE AIR POWER REVIEW

The Royal Air Force *Air Power Review* is published under the auspices of the Director of Defence Studies (RAF) and has the sponsorship of the Assistant Chief of the Air Staff. It is intended to provide an open forum for study which stimulates discussion and thought on air power in its broadest context. This publication is also intended to support the British armed forces in general and the Royal Air Force in particular with respect to the development and application of air power.

Contributions from both Service and civilian authors are sought which will contribute to existing knowledge and understanding of the subject. Any topic will be considered by the Air Power Review Management Board and a payment of £200 will be made for each article published.

Articles should be original and preferably not previously published, although those of sufficient merit will not be precluded. Between 2,000 and 10,000 words in length, articles should list bibliographical references as end notes, and state a word count. Lengthy articles may be published in instalments. Contributions from serving military personnel should be in accordance with DCI GEN 313 dated 26 November 1999.

Material should be submitted in Microsoft word, on floppy disk, Zip disk or CD and should be accompanied by numbered page copy plus any photographs and illustrations. Digital pictures should be saved as TIFFs or JPEGs @ 300dpi.

Final design format for article presentation on the printed page will be at the discretion of the editor.

Send articles to:

Director of Defence Studies (RAF)
Headquarters Defence Academy
Shrivenham
Swindon,
Wiltshire
SN6 8LA
Email: jharvey.dds@defenceacademy.mod.uk

FOREWORD

This Autumn edition of *Air Power Review* opens with a timely piece from Dr Ian Gooderson entitled 'Doctrine from the Crucible — The British Air-Land Experience in the Second World War'. Timely because the subject of air/land relationships is one that has assumed much greater prominence over recent years, particularly with regard to the British experience on Op TELIC. Within the paper, the author explains how air-land cooperation developed, with decisive results, over the period from 1939 to 1945. Although the early air-land experience of the Army and newly-independent Royal Air Force in 1918 had laid some useful foundations, these were never adequately examined or translated into doctrine in the inter-war period. By contrast, the Germans keenly embraced the concept of an all-arms force integrated with air support and were able to press home this advantage in the invasions of Poland, Norway and France in 1939 and 1940. Between 1940 and 1942 the War Office and Air Ministry struggled to reach agreement on what air power's support role to land forces should be, and it was only through the experience of the North African theatre that a viable air-land doctrine and command and control structure emerged. Victories such as El Alamein vindicated the effort put into enhanced air-land integration and paved the way for later successful Allied campaigns such as the Op HUSKY in Sicily and Op OVERLORD in North West Europe.

By way of contrast, in his paper 'Air Power and Special Operations: the RAF and Special Duties in Yugoslavia, 1941-1945', Dr Seb Ritchie provides a useful historical case study of an alternate aspect of air/land issue which remains equally relevant today. What is the relationship, within the overall campaign strategy, between conventional and special operations and how can air support best be prioritised between the two? In outlining the development of air support to the Yugoslav

resistance movements in the Second World War, the author covers a number of key factors: firstly, the difficulty of dropping supplies and agents over the Balkans at long range from airfields in Egypt and Malta; secondly, the complexity of the Yugoslav insurgency, which consisted of two distinct ideological groups, the largely royalist and Serb Chetniks and Tito's communist Partisans; and finally, the struggle to secure dedicated air assets for special operations in the face of conflicting demands such the bombing of the German homeland and major airborne operations such as MARKET GARDEN. As Dr Ritchie makes clear, it was only when the significance of the Balkan theatre became apparent in the final phase of the War that the resources were put in place to support the resistance movement in earnest.

The human element of air power is often overlooked, so Air Commodore Abbott's article 'Training Robust Warfighters for an Agile Air Force' provides a useful analysis of the role of adventurous training in shaping individuals for the demands of modern expeditionary operations. The author begins his examination by comparing the comfortable and often risk-averse cultural and social background of today's young generation with the challenges and uncertainties they might face in a Service career. He argues that adventurous training is an excellent means of bridging the gap between comfort and challenge and thus preparing young people for military operations.

Readers will be interested to learn how the origins of adventurous training lay in the Outward Bound Movement, which was set up to strengthen participants' resilience and thus improve survival rates following U-Boat attacks in the Battle of the Atlantic. As Air Commodore Abbott points out, adventurous training provides a unique training environment capable of developing leadership,

teamwork and self-reliance. To round off his analysis, the author outlines the current structure of RAF adventurous training and the resources set in place to support this such as the Force Development Training Centres in Scotland and Wales.

Air Vice-Marshal Peter Dye, in his paper 'Sustaining Air Power — The Influence of Logistics on Royal Air Force Doctrine', explores the relationship, from the outset of military aviation, between logistics and the delivery of military capability. Within this historical overview, the author describes the scale and effectiveness of the logistic system that underpinned the British air effort on the Western Front in the First World War. He relates in detail the features of a support organisation that had to deal with monthly losses of up to 2,000 aircraft; which employed, by the Armistice, the vast majority of the RAF's 50,000 personnel; and, over the course of the War, absorbed well over half the budget of the RFC and RAF. Air Vice-Marshal Dye goes on to describe the key logistical preparations leading up to the Second World War, which resulted in the creation of a permanent system of stations and maintenance units. He rightly points out how the value of this investment in sustainability was demonstrated during the Battle of Britain and the strategic bomber offensive. The Cold War saw the consolidation of the station-centric approach and it is only recently, with the return to expeditionary operations, that supply chains and logistics have become more flexible and responsive. As a timely warning shot in the face of change, however, the author urges us not to forget the logistical lessons of the past in our haste to move forwards.

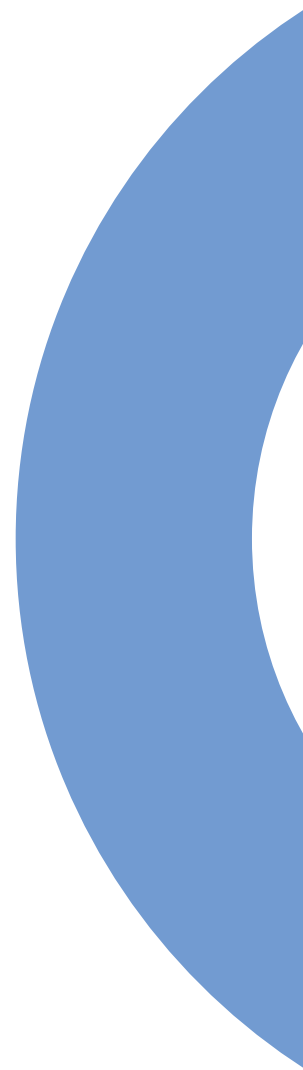
The final article, 'The London Balloon Company' by Michael Dunn, provides a fascinating insight into the formative pre-First World War period of military aviation. The 'Company', set up in 1908, was the first British reserve unit to be specifically

tasked with an aviation-related role. The paper begins with a historical summary of the use of balloons, for observation and artillery spotting, by the British Army in the Southern African campaigns of the late nineteenth and early twentieth century. The author goes on to describe further key developments in early military aviation such as the development of manned kites that could reach up to 3,000 feet, airships and, ultimately, the heavier-than-air aircraft which would be operated by the RFC from its foundation in 1912. As part of this evolutionary process, the London Balloon Company, set up in 1908, attracted a broad array of balloon enthusiasts, although the volunteer unit initially had to struggle to gain formal recognition, adequate equipment and a regular training base. Despite overcoming these problems, however, the unit's existence was gradually thrown into question by the development of the airship and aircraft. Fortunately, before the London Balloon Company's final demise in 1913, a good number of its pilots had re-trained on aircraft and were able to take forward the unit's pioneering spirit in the cockpit rather than the gondola.

As this will be the last edition of *Air Power Review* until 2007, this is an opportune moment to remind readers that they can also become writers! We are always on the lookout for interesting perspectives on air power, whether looking at current or more historical issues, and papers certainly do not have to be hugely academic in nature. So, if you have some thoughts on the subject that you would like to see presented to a broader audience — this is your chance. Contact details and other relevant information are displayed just inside the front cover, so take the opportunity to make 2007 your year to create a mark in the field of air power thinking.

D Def S

—



AIR POWER Review

Editor

Jay Myers

Production and Design Editor

Harvey Grainger

Studio

John Griffiths

Dave Mitchinson

RAF MAGAZINES

Floor 1, Zone A
St George's Court
2-12 Bloomsbury Way
London WC1A 2SH
Tel: 0207 305 2166
Tel: Mil: 96305 2166
Fax: 0207 305 4145
E-mail: jay.myers420@mod.uk

Those wishing to be placed on the distribution list should write direct to the Defence Storage and Distribution Centre (DSDC) Llangennech with their UIN stating the number of copies required per edition together with the address to which material should be sent.

Recurring Publications Desk
DSDC(L)3a
Mwrwg Road
Llangennech
Llanelli
Wales
SA14 8YP

Other general enquires on magazine distribution may be made to the London address.

The views expressed are those of the authors concerned, not necessarily the MoD.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form without prior permission in writing from the editor. Unless by prior arrangement, articles and photographs will not normally be returned.

Contents

- 01** Doctrine from the crucible — The British air-land experience in the Second World War
[Ian Gooderson](#)
- 15** Air Power and special operations: the RAF and special duties in Yugoslavia, 1941-1945
[Dr Seb Ritchie](#)
- 33** Training robust warfighters for an agile air force
[Air Cdre Steve Abbott](#)
- 41** Sustaining air power — the influence of logistics on Royal Air Force doctrine
[Air Vice Marshal Peter Dye](#)
- 53** The London Balloon Company
[Michael J Dunn](#)
- 63** Book reviews

Editorial board:

Gp Capt N Parton, D Def S (RAF), Chairman; **Mr J Myers**, Editor, Head of RAF Information Media Training and Technical Publications (MoD); **Gp Capt D Blore**, MoD; **Gp Capt B Cooper** DRAFD, JSCSC Watchfield; **Mr S Cox**, Head of AHB (RAF); **Dr C J M Goulter**, King's college London at the JSCSC; **Dr D Jordan**, King's college London at the JSCSC; **Mr C Hobson**, Chief Librarian, JSCSC; **Sqn Ldr J Harvey**, Def S (RAF) Trg Off.



RAF Hurricanes could carry two 250lb or 500lb bombs under their wings



Doctrine from the Crucible The British Air-Land Experience in the Second World War

By Ian Gooderson

In September 1939, the British Army and Royal Air Force did not possess an agreed joint doctrine for integrating air power with the operations of an army in the field. There was no tactical air force for working closely with an army, and there was no joint system of command and communications. There were no suitable attack aircraft flexible enough to engage a range of targets at or near the battlefield, or survivable enough to defend themselves against hostile aircraft. In short, the British Army and Royal Air Force had no air-land capability for modern war.

There had been the potential for such a capability. By the end of the First World War, on the Western Front and in other theatres, the Army and the

newly created independent Royal Air Force had achieved a high degree of integration. The final battles on the Western Front in 1918 had been more mobile than those of 1916-17, and they had witnessed close co-operation between troops and aircraft. In particular, aircraft had co-operated with tanks in the offensive, and there had been an effective, if rudimentary, system of signals and wireless communication between air and ground forces. This enabled the relaying of information from the battle area to a control centre that directed further attacks by air or ground units. Aircraft had also attacked German headquarters and lines of communication beyond the battlefield, and German airfields in an attempt to neutralise the opposing air threat.¹



RAF S.E. 5

By the end of the First World War, on the Western Front and in other theatres, the Army and the newly created independent Royal Air Force had achieved a high degree of integration

This air-land effort was not particularly systematic. It had not followed a discernible pattern, it was not doctrinally driven, and it had not reflected close investigation of earlier experience. Subsequent RAF analysis concluded that its focus at or near the battlefield had missed opportunities against more distant communication targets, enabling the Germans to bring forward reserves to seal the breaches in their defensive zone.² It was, however, a signpost to the future of land warfare. It demonstrated the possibilities of a return to manoeuvre warfare enabled by the integration of air and land mobility and firepower and the exploitation of information from the battle area.

The 1918 air-land experience required evaluation and refining into doctrine, but this did not happen in the British Army or in the RAF in the interwar years. The equally compelling potential of strategic air war and the military and political imperative of national air defence pulled mainstream thinking in the RAF away from the nature and requirements of the land battle. Unlike the German Army with its General Staff system, the British Army

possessed no professional tradition for the rigorous examination of its experience. Moreover, after 1918, the severely reduced Army found itself relegated to home and imperial defence — a return to pre-1914 soldiering, which caused it to stagnate. The Army that had pioneered the use of tanks in 1917-18 became equivocal and uncertain in its approach to mechanisation and the possibilities of armoured warfare. With its units dispersed in garrison duty, there was little combined arms training and little infrastructure around which to build an all-arms force. No comprehensive tactical doctrine for integrating tanks, infantry and artillery evolved, a shortcoming that would cause the Army severe battle co-ordination and cohesion problems in 1940-42.³

The interwar years saw a distancing between the Army and the RAF. Both Services with their differing imperatives neglected the study of how air power could interact with and influence the dynamics of a land campaign against a first-class opponent in Europe. The one School of Army Co-operation at Old Sarum held courses for Army



Ju.87 Stukas over Norway

In Norway, the Germans had successfully pre-empted the British and French, whose intervention came too late to break the air superiority already established by the Luftwaffe

and RAF officers, but its emphasis was that of artillery spotting and tactical reconnaissance. This was too narrow and specialised a focus, imparting little sense of the extent of the air-land integration required to fight a successful land campaign that even the 1918 battles had indicated. The procedure for artillery co-operation reflected more the static battles of 1916-17, while air-land communications had regressed rather than progressed.⁴ For the RAF, Army Co-operation was a backwater, with serious retention problems concerning brighter RAF talents. The Army also had little cause, and little incentive, to spare much thought for the integration of air power in operations for which its equipment, training, and doctrine were ill-prepared and which, it was thought, were of a type it was unlikely to undertake again.⁵

At the outset of the Second World War, RAF tactical support doctrine emphasised attacks upon an enemy's air power and its infrastructure. As far as it considered the land battle, doctrine emphasised interdiction of an enemy army's reserves and supplies and the disruption of its headquarters and communications. Battlefront close air support was a temporary measure, justified only in unusual or extreme circumstances. These included attacks

in support of an offensive to enable troops to break into formidable enemy defensive positions, attacks in support of the defensive to prevent an enemy's breakthrough or attacks to rout an already defeated and retreating enemy.⁶ This was a sound enough reflection of the contribution of air power in the land battles of 1917-18, particularly those on the Western Front where losses over the battlefield to low-flying aircraft vulnerable to ground fire had been very heavy. The problems with this doctrine were twofold. One was the fact that by 1940 the RAF no longer possessed the means to implement it effectively. The doctrine was the shadow of 1918. It lacked the substance of progressive examination of land warfare, which would have required much closer liaison with an Army more forward-thinking and progressive than was possible for the British Army at the time, and it lacked the development of relevant capabilities since 1918. The other problem was that it acknowledged only part of what was in reality a far more complex whole. It lacked acknowledgement of how the Army's success against a first rate opponent would depend upon a close linkage and integration with air power across a spectrum of roles in both the planning and execution of its operations. Like the term 'co-operation' itself, it implied only a temporary

confluence of air and land whereas in practice unity had to be constant. The 1918 experience had implied this 'joint' requirement, and the early campaigns of the Second World War would confirm it.

The Norwegian campaign (April-June 1940) and the campaign in France and Belgium (May-June 1940) saw the collapse of the inadequate air support system with which the Army and RAF began the war. This had been outlined in 1938 in a War Office pamphlet entitled *The Employment of Air Forces in the Field*, stating such doctrine as existed for providing air support to an Army Field Force deployed overseas, not necessarily to Europe. There would be an 'air component' of RAF fighter, bomber and reconnaissance squadrons to operate under the direction of the Field Force headquarters. Additional support, however, would have to come from squadrons detached from RAF Bomber and Fighter Commands, and it would not be their primary task. Instead, these squadrons would constitute an independent striking force 'directed in accordance with the general war-plan of the Government', an imperative reflecting the RAF's focus on the strategic level of war.⁷

In Norway, the Germans had successfully pre-empted the British and French, whose intervention came too late to break the air superiority already established by the Luftwaffe. The hastily organised and poorly equipped and co-ordinated Allied land forces and their supporting naval units fought, and lost, without the protection of air power. In France, the British Expeditionary Force of ultimately 10 divisions, for which the British Army had been denuded of trained personnel and equipment, had its Air Component. This consisted of 13 squadrons; no less than nine of them were of specialised artillery and tactical reconnaissance aircraft with, initially, only four squadrons of fighters. There was also the Advanced Air Striking Force (AASF) of 10 light bomber squadrons detached from Bomber Command and deployed to France within range of targets in Germany and to co-operate with the French Air Force. This too had limited fighter strength. Both the Component and the AASF were administered by a single RAF headquarters, that of the British Air Forces in France (BAFF).

However, there was nothing in the way of a concentrated, balanced force of fighter, bomber, and reconnaissance squadrons or a joint system of command and communications for linking air action at or beyond the battlefield with the Army's operations.⁸ The Component was overwhelmed soon after the start of the German offensive in the West, and its surviving aircraft and personnel evacuated. The AASF was tasked in desperation with attacks against bridges to delay the German advance on the French Army front. Most of them were shot out of the sky by German fighters or by the generous scale of automatic anti-aircraft firepower with which the German Army, more jointly air-minded than its opponents at the time, was able to protect the critical points in its lines of communication. Army requests for air support took hours to pass through separate Army and RAF headquarters. If it was possible to respond to them at all, it was by bombers unsuited to the task arriving too late to affect a rapidly changing battle situation. All was lost in a series of disconnected actions. The German air-land combination was not quite the smooth functioning machine assumed by its stunned opponents at the time, and so often depicted subsequently. It did however possess sufficient integration to outpace and defeat the far less cohesive and defensively oriented Allied air and land forces.⁹

In Britain, the War Office and the Air Ministry interpreted the Luftwaffe's employment of air power and the reasons for German success quite differently. This was the consequence of the post-1918 distancing between the Services and their lack of analysis of the First World War air-land experience, and it caused immense problems. In late 1939, following the shock of the rapid German success in Poland, the War Office called for 250 first-line bombers to be at the Army's disposal by the spring of 1940. This was only an interim measure, for the War Office also called for the provision of dive-bombers, and the ability to train its own pilots in air support. This reflected a view that in Poland the Luftwaffe's close air support had been decisive, and that the British Army required similar air support and role-specific aircraft on the lines of the German Ju.87 Stuka. It also reflected an awareness that the RAF was both



RAF Hurricane

Fighter Command was employing bomb-equipped fighters on its cross-Channel offensive sweeps. The versatile 'fighter-bomber' in its various types proved the ideal air support aircraft

unable, and unwilling, to provide them. This was a call for an Army Air Arm.¹⁰ The Air Ministry, in firm contention, argued that, although there were occasions when the Luftwaffe provided effective close support, it was in attacks against airfields, communications and headquarters beyond the Polish forward positions that the Luftwaffe had been primarily and most effectively employed. This had paralysed Polish ability to resist on land and in the air. The Air Ministry also observed that the Luftwaffe would not have been able to provide such close support, had it not been for the possession of air superiority and the weakness of the Polish anti-aircraft capability.¹¹ The Cabinet faced the task of mediating these two diametrically opposite Service views of air power, a situation exacerbated by bitterness on both sides. The War

Office felt it was not getting a fair deal¹² while the Air Ministry felt the ability to prosecute air warfare in its widest sense was under threat of being frittered away on the battlefield. In the event the Cabinet rejected the War Office demands. To meet them would have crippled the existing and potential striking power of the RAF, but assurances that adequate forces would be available to support the Army unless required elsewhere in an emergency offered the War Office small comfort.¹³

The Air Ministry view was, however, closest to the mark by acknowledging that the influence of air power upon a land campaign extended well beyond the ground battle zone. In fact, German success did not depend upon responsive close support by dive-bombers, or upon systematic

attacks beyond the battlefield. It depended above all upon the gaining of the initiative through air superiority. This enabled the concentration of all available air power at the decisive time and place, while a doctrine rooted in their own 1917-18 experience assisted German land and air commanders to recognise when, and where, that was.

The defeats in Norway and France, and those later in the Mediterranean and the Far East during 1941 and into 1942, widened the gulf between the War Office and the Air Ministry. One cause of War Office exasperation was that following Dunkirk the RAF had few aircraft and crews to spare for air support training. The RAF was fully and constantly in action: in air defence, in working up its strategic bombing capability, and engaging in cross-Channel offensive sweeps and anti-shipping operations. In contrast, the Army in Britain was rebuilding. Between Dunkirk and the summer of 1942, only four British divisions engaged German troops, the Commonwealth shouldered the burden in this period by providing ten divisions that served in the Mediterranean theatre.¹⁴ This inevitably undermined the relative urgency of the War Office case. The RAF's Army Co-operation Command, established in December 1940 in response to the obvious need to restore air-land capability and War Office pressure, remained under-resourced and in the RAF, unpopular. The defeats overseas saw the Army subjected to an enemy's air superiority, while enemy troops appeared able to call up supporting aircraft when desired. The RAF in theatre lacked the strength both in aircraft numbers and modern types with which to challenge the enemy and was rarely seen by the soldiers, causing a resentment throughout all ranks of the Army. What were perceived to be RAF failures to support the Army intensified War Office demands, spearheaded by the Chief of the Imperial General Staff General Sir Alan Brooke, for the placing of aircraft under Army control. By the spring of 1942, the question of an eventual Allied cross-Channel invasion to open a land front in Northwest Europe was at the heart of evolving Anglo-American strategy. For Brooke it was imperative to solve the air support question before the bulk of the Army forming and training

in Britain took on the Wehrmacht. In May 1942, the Chief of the Air Staff, Air Marshal Sir Charles Portal responded to the War Office demands by promising that when the Army engaged the enemy it would receive the full support of Bomber and Fighter Commands. Brooke in turn argued the impossibility of properly training Army and RAF commanders in air support unless the RAF formations were at the Army's disposal and air support one of their primary roles.¹⁵ The rift was serious, and at the centre of the controversy were two closely linked but unresolved issues.

One was the question of which Service should provide and control the air support without which the Army's operations could not hope to succeed. This began to be resolved when a mainstream RAF Command with its existing infrastructure and aircraft types assumed the principal air-land responsibility. Only then was the Army's lack of confidence in the RAF's ability and willingness to provide air support overcome. By October 1941, Fighter Command was employing bomb-equipped fighters on its cross-Channel offensive sweeps.¹⁶ The versatile 'fighter-bomber' in its various types proved the ideal air support aircraft. It combined in a single weapon the ability to secure the all-important air superiority and the ability to attack a wide range of land battle targets when equipped with bombs, cannon or rockets, and it was available in large numbers. Fighter Command, no longer restricted to the air defence role, determinedly embraced air support and by late 1942, had begun exercising with the Army.¹⁷ Army Co-operation Command lapsed and on 1 June 1943 ceased to exist. By then an RAF Composite Group with squadrons of fighters, fighter-bombers, medium and light bombers and reconnaissance aircraft had developed initially through the framework and infrastructure of Fighter Command. On the day of Army Co-operation Command's demise it became officially the Second Tactical Air Force, the RAF formation that was partner to the British and Canadian armies in Northwest Europe in 1944-45.

In the meantime, the other issue had been to determine how to employ air power in support of a land campaign. This required operational

experience. Not the negative and recriminatory experience of defeat, of which there had been all too much, but the evidence provided by success. Only an active theatre involving both the RAF and the Army could provide such experience and, with it, a proven doctrine upon which both Services could rely. Validation of principles and procedures through operational success, when it finally came, had a direct influence upon the outcome in Britain of which Service should control the Army's air support and the form it should take. These questions were of such import as to bring the direct intervention of the Prime Minister, Winston Churchill, in his role as Minister of Defence. His decision, and the formation of the Composite Group/Tactical Air Force, reflected the active theatre experience.

The active theatre was the Middle East. In September 1941, Churchill issued a directive stating that the Army must never again expect, as a matter of course, to be protected against air attack by standing patrols of aircraft over moving columns. This he termed a 'mischievous practice', and contrary to the requirements of air superiority. He added that with a battle in prospect, the Army Commander-in-Chief in the Middle East will 'specify to the Air Officer Commanding-in-Chief the targets and tasks which he requires to be performed both in the preparatory attack on the rearward installations of the enemy and for air action during the progress of the battle. It will be for the Air Officer Commanding-in-Chief to use his maximum force for those objects in the manner most effective.' The latter was expected to employ all the air power available in theatre, and in the 'preparatory period' to attack the enemy rear areas not only at night, but also during daylight with bombers protected by fighters. This would draw the enemy fighters into a 'trial of strength' to achieve command of the air.¹⁸

The implications of Churchill's directive were immense. It was affirmation at the highest political level that air power was not a tool at the Army's disposal, but a partner element with imperatives of its own that were nevertheless integral to a land campaign. It acknowledged that air power was a single weapon, to be directed under RAF

command, though, as Churchill's directive made clear, because the 'interests of the two C-in-Cs are identical it is not thought any difficulty should arise'. The directive was an acknowledgement that the prosecution of a land campaign required a close air-land partnership. By identifying the importance of air superiority and of attacking targets in the enemy's rear zone, it also indicated wherein the principal air contribution lay.

Churchill's directive reflected the fact that in the campaign in North Africa the Army and RAF had begun to integrate their operations. In September 1941, there was still much to be done, but the air-land pattern necessary not only to avoid defeat, but also to secure victory was recognisable. It had emerged out of chaos, though initially in the Middle East the early British victories over the Italians in Libya and in East Africa during 1940-41 offered some significant indicators.

These successes had been commendably 'joint', an approach driven not least because the air and land resources available to Middle East Command had been slender. In East Africa, close air support had often proved vital in terrain unsuited to artillery, or on occasions when it had been in short supply. The air support had been provided by the novel expedient of an RAF commander with his own communications advancing with the forward troops. This ensured a timely support in response to changes in the battle situation, and this was more flexible than that pre-arranged.¹⁹ It was a luxury, however, of having no formidable air opposition. This was also the case during Operation 'Compass' (December 1940-February 1941), the remarkably successful offensive that destroyed a numerically superior Italian army and its supporting air force in Libya. 'Compass', the concept of the Middle East Commander-in-Chief General Sir Archibald Wavell, benefited from joint planning. Wavell's own headquarters was co-located with that of the air Commander-in-Chief, Air Chief Marshal Sir Arthur Longmore. This situation was replicated, initially at least, by General Richard O'Connor of the Army's Western Desert Force and Air Commodore Raymond Collishaw of the RAF's No. 202 Group in the forward area. During

'Compass' Collishaw employed his strength, some 48 fighters and 116 bombers, in an intensive offensive against Italian air strength in the desert. This was so successful that the Italian air units completely lost the initiative, played no effective part in the campaign and lost some 1,200 of their aircraft destroyed — mostly on the ground — or captured. The consequent air superiority enabled the RAF to respond flexibly to, and influence, the unfolding campaign on land. Fighters and bombers harassed Italian columns and when essential maintenance and replenishment halted O'Connor's armour, they kept up the pursuit, flying from captured Italian airfields. They provided close support, along with artillery and naval gunfire, for the attacks on strong defensive positions such as Bardia and Tobruk, while reconnaissance squadrons, for the first time using less vulnerable and faster fighters in the role, provided the information to direct the armoured thrusts. O'Connor's fulsome tribute to the RAF acknowledged the importance of its contribution: 'Compass' had been an air-land success. As such, it had enabled Western Desert Force, of never more than two divisions (one armoured) to advance over 500 miles, destroy an Italian army of ten Italian divisions and capture 130,000 prisoners along with some 400 tanks and over 800 artillery guns.²⁰

There was too little time to assess the doctrinal implications of the victories over the Italians in East Africa and Libya. Moreover, success over the poorly co-ordinated Italian air and land effort, undermined by its severe administrative, logistical and equipment shortcomings, offered a dangerously complacent model of competence both on land and in the air. This success and the threat of an Italian collapse in North Africa brought German intervention, and for the British the real test.

With the arrival of even a limited force of German troops and armour, and of Luftwaffe fighter and bomber units, the campaign took on a different dimension. In the Afrika Korps, the British Army was confronted by an enemy with generally better (if fewer) tanks, well integrated with infantry and anti-tank artillery, and of superior manoeuvre skill. Its commander, Rommel, was an aggressive and

opportunistic master of the tactical battle. Until the British Army overcame the doctrinal neglect of the interwar years and learned greater tactical cohesion and control, employing its arms in mutual support, its formations in the desert could not hope to beat Rommel in battle and indeed never did so. For much of the desert war, the Middle East Commanders-in-Chief, Wavell, until early July 1941, and thereafter his successor General Sir Claude Auchinleck, were trying to fight with an army and at the same time train it.²¹ The RAF also had to meet operational demands while ensuring that, as far as possible, its replacement pilots and squadrons newly arrived in theatre were adequately trained and prepared for desert operations.²² Churchill's persistent calls for an offensive to defeat Rommel complicated the situation.

The burden placed upon the RAF in the desert was heavy, and under the intensive pressure of combat against a formidable enemy, the smooth air-land partnership of 'Compass' was swept away, and serious co-ordination problems emerged. This was seen in two unsuccessful offensive operations launched during 1941. In 'Brevity' (15-16 May) the Army wanted the RAF to engage German tanks. Collishaw, knew that individual tanks were too small to make good air targets and that their laagers were too well protected by anti-aircraft fire. He argued for attacks upon the columns of thin-skinned vehicles carrying troops and the supplies upon which the German tanks depended, and eventually won his point.²³ In 'Battleaxe' (15-17 June) constant standing patrols of fighters to protect the Army's advancing columns from German air attack proved costly, and if continued would have surrendered the initiative, and air superiority, to the Luftwaffe.²⁴ Air-land communications had also broken down; army and air headquarters were no longer co-located and at critical times during the fighting it was impossible to discover the locations of the forward British troops. Army headquarters staff, with communications problems enough of their own, did not know, and the RAF's reconnaissance flights were not always able to tell. Ground-air recognition procedures lapsed in the see-saw confusion of desert fighting, a situation made worse by both sides using similar or captured

vehicles that were near impossible to distinguish from the air. In such circumstances 'bomb-lines' beyond which it was safe to attack targets became meaningless, and much potential air support was lost.

'Battleaxe' prompted a fundamental revision, at the direction of Auchinleck and Air Marshal Sir Arthur Tedder, (acting AOC-in-C since May 1941 and confirmed in post in June), and Air Vice-Marshal Arthur Coningham, who replaced Collishaw in July. An inter-service committee, joint exercises, and a joint conference resulted in the issue of *Middle East Training Pamphlet No. 3 – Direct Air Support* in September 1941. This established some agreed fundamentals, which Churchill's own directive endorsed. The Army and RAF now agreed that Direct Air Support referred to air action that had an immediate effect upon the land battle. It consisted of either defensive support to halt or impede the enemy's air and ground attacks, or offensive support aimed at the destruction of the enemy ground forces. Either form of support could be pre-arranged, or impromptu. Close air support was defined as offensive support in close proximity to friendly troops, though Coningham was keen to ensure that his light bomber squadrons would not be called upon to attack targets within 500 yards of friendly positions, or targets capable of being engaged by the Army's own artillery. Air action directed against enemy forces and installations beyond the battle zone but of effect upon the land battle, albeit not immediate effect, was termed Indirect Support. Most significantly, it was agreed that the level of air support available at any time would depend upon the extent of air superiority attained.²⁵

Air support depended upon command and control, which in turn depended upon communications, and upon mobility. Coningham established his advanced headquarters with that of the Army, and following the joint exercises, the RAF and Army began to set up a command and control system for air support that welded both Services together to an extent never previously attained operationally. In October, Air Support Control (ASC) headquarters with joint Army and RAF staffs were established at army corps and with each armoured division,

linked by mobile wireless equipped 'tentacles' to the forward brigades. Each was assigned RAF 'Forward Air Support Links' (FASLs) equipped with radio for communicating with aircraft and receiving reconnaissance reports. Requests for air support from the forward units could be rapidly evaluated and approved by the ASC, and from there passed to the RAF airfields by radio-equipped Rear Air Support Links (RASLs). When functioning, the system cut the time previously required to respond to air support requests by hours.²⁶

Before this system of air-land command and control and its doctrine were fully implemented, the Army in the Western Desert (by then designated the Eighth Army), and what had become the Desert Air Force, took the offensive against Rommel again. This was Operation 'Crusader' (18 November 1941-20 January 1942). Although initially successful, the Eighth Army's advance ultimately faltered against Rommel's superior tactical handling. His counterstroke pushed the Eighth Army back in retreat towards Gazala, but this time under the protection of an RAF air superiority that had been established early in the offensive and that remained unshaken. 'Crusader' also saw the first RAF use of the 'fighter-bomber' in air support, in attacks against German and Italian transport.

The subsequent desert fighting proved the soundness of the air-land organisation, and it withstood the setbacks during 1942. Early in the year diversions of strength to the new theatre of war in the Far East weakened the RAF in the desert, and in a series of successful tactical battles Rommel once again advanced to threaten Egypt. However, tactical success could not compensate for strategic error, nor for the increasing strength and competence of the British air-land combination. The German failure to take the opportunity to seize Malta in the summer of 1942 ensured the continued vulnerability of Axis supply lines across the Mediterranean, and Rommel's own extended communications across the desert came under increasing air attack. The Desert Air Force had greatly increased the mobility of its squadrons, and could 'leap-frog' back to operate from a chain of prepared landing grounds at short



RAF Typhoon

One important development was the increasing emphasis upon close air support in the later campaigns in Italy and Northwest Europe. This was made possible only by the possession of air superiority and the existence of large Allied tactical air forces

notice,²⁷ and it maintained the initiative in the air. The Afrika Korps increasingly suffered under RAF air superiority and lost much of its tactical manoeuvre as a result.

In August 1942, General Sir Harold Alexander succeeded Auchinleck, who blunted Rommel's advance at the first battle of El Alamein in July, as Commander-in-Chief. General Bernard Montgomery took command of the Eighth Army. Montgomery possessed a sound appreciation of the role of air power, as his training of army formations in England had shown.²⁸ One of his first initiatives in the desert was to ensure that

his Army headquarters was located with that of Coningham, a separation having again occurred during the Army's eastward retreat. Montgomery fully endorsed the air-land pattern already in place and under development. His first victory was at Alam El Halfa, (30 August – 2 September 1942) in which Rommel's resuming of the offensive was broken by a well-prepared Army defence and co-ordinated round-the-clock pounding from the air. Montgomery's offensive victory at the second battle of El Alamein in October was the first major victory over German forces that could be described as 'British', and the last as those subsequently would be Allied victories. This was

an air-land victory in the widest sense, with air power not only exploiting air superiority and harassing the German and Italian forces at and immediately beyond the land battlefield, but also striking at communications targets far in the rear.

In less than two years the British Army and RAF had progressed considerably in their joint appreciation and application of air-land warfare. Personalities undoubtedly played their part in influencing and progressing this development, but the underlying and constant imperative had been the reality of air power's influence upon land warfare. As Coningham later acknowledged, there were basic principles and in early 1943 they were promulgated in staff exercises under his influence and Montgomery's direction:

- The first requirement for any major land operation was air superiority
- Flexibility and the capacity for rapid concentration constituted the main strength of air power
- Control of air power must therefore be centralised in an air commander and exercised through air force channels
- Air forces must be concentrated and not dispersed in 'penny packets'
- The Army and Air commanders and their staffs must work closely together
- The plan of operations must be joint from the start, and mutually adjusted.²⁹

As Montgomery himself observed: "There are not two plans, Army and Air, but one plan, Army-Air, which is made by me and the Air Vice-Marshal together." His most significant acknowledgement in terms of the British war experience to date came later in the same statement of principles: "There used to be an accepted term of 'army co-operation'. We never talk about that now. The Desert Air Force and the Eighth Army are one. We do not understand the meaning of 'army co-

operation'. When you are one entity you cannot co-operate."³⁰

By the beginning of 1943 the British air-land system and doctrine was set, and it would remain constant throughout the war.³¹ It proved flexible enough to absorb innovations, and robust enough to survive later inter-Service disputes and controversies.

One important development was the increasing emphasis upon close air support in the later campaigns in Italy and Northwest Europe. This was made possible only by the possession of air superiority and the existence of large Allied tactical air forces, and the imperative was the difficulty faced by the soldiers in overcoming the robust efficiency of the German army fighting on the defensive. In March 1943, Air Vice-Marshal Broadhurst, then commanding the Desert Air Force, agreed to provide intensive low-level attacks in close support for the Eighth Army breakthrough at El Hamma in Tunisia. Neither Tedder nor Coningham were pleased, fearing heavy casualties to the aircraft from ground fire, and, most likely, the undoing of much that they had achieved in shaping the Army's expectations of air power. In the event, the 'air blitz' was successful and enabled the Army to break through, setting the trend for similar attacks. Broadhurst considered it an employment of air power in accordance with the principle of concentration, and in this he was right.³² In Italy, and later in Northwest Europe, fighter-bomber 'blitzes' closely co-ordinated with the advance of friendly troops and a moving bomb-line were often employed, as were the provision of aircraft on 'cab-rank' patrols waiting to be directed onto targets. In the absence of the Luftwaffe, the employment of tactical air power came to reflect the trend of ground fighting. Offensives tended to see an increase in close support, while in more static periods the emphasis became that of sweeps against targets of opportunity beyond the battlefield. The latter was the 'armed reconnaissance' role, a means of dominating the enemy army's rearward zone. It bore little relation to the requirements and provision of reconnaissance, which remained a specialised role.³³

The most controversial aspect of air support was the persistent Army calls for the employment of the strategic heavy bomber forces in close support, both in Italy and Northwest Europe. In most cases, the effectiveness of this employment was questionable. In some cases, such as in the bombing of urban defended areas such as Cassino in Italy (March 1944) and Caen in Normandy (July 1944), it was counterproductive, causing a good deal of resentment against the Army at the diversion of the strategic forces and the failure to exploit it. Until late in the war, when adequate communications and air-ground recognition procedures and bomb-lines were put in place, it was also a hazardous enterprise for the troops it was intended to support. Hundreds of Allied soldiers were killed or wounded in error in 'short bombings' by the heavy bombers. For the most part, the senior airmen, and certainly Tedder and Coningham, remained opposed to their use on the battlefield, although their opposition never achieved the force of doctrine during the war.

That the possession of air superiority and large numbers of available aircraft resulted in a profligacy, otherwise impossible in tactical air support in 1943-45, can hardly be doubted. Nor can the reliance of the Army upon its provision be doubted, or that it was the decisive factor in the success of the land campaigns. The development of British air-land doctrine in the Second World War was the essential element of the adoption of joint warfare on land by the British Army and the RAF. In 1939, neither Service was prepared for this challenge, but in 1945 they left the battlefields, whether in the plains of Northwest Europe, the mountains and valleys of Italy, or the jungles of Burma, as close partners. Like the armies and the tactical air forces that came into being under the pressure of war, it was a remarkable achievement.

Notes:

¹ Shelford Bidwell and Dominick Graham, *Fire-Power: British Army Weapons and Theories of War 1904-1945* (London: Allen & Unwin, 1985), pp. 142-145; Hilary St. John Saunders, *Per Ardua: The Rise of British Air Power 1911-1939* (London: Oxford University Press, 1944), pp. 270-273.

² For example Air Staff Memorandum Bomber Support for the Army 18 November 1939, in The National Archives CAB 21/903. This was admittedly a paper produced to resist Army calls for the development of role-specific close support aircraft, but it had a compelling analysis.

³ Bidwell and Graham, *op. cit.*, Chapters 8, 10 and 11; for detailed examination of the British Army in the inter-war period see Brian Bond's important *British Military Policy Between the Wars* (Oxford: Clarendon, 1982).

⁴ Brigadier Peter Mead, *The Eye in the Air* (London: HMSO, 1983), pp. 148-149.

⁵ In his memoirs Major-General Sir Francis De Guingand, Military Assistant to the Secretary of State for War in 1939, recalled that the Army never gave sufficient thought to the problem of air support in the years leading to the outbreak of the Second World War. See *Operation Victory* (London: Hodder and Stoughton, 1947), p. 30.

⁶ AP 1300 (February 1940) Part I – Operations, Chapter XI Paragraphs 45-46; Air Staff Memorandum Bomber Support for the Army 18 November 1939, The National Archives CAB 21/93.

⁷ War Office 26/Manuals/1869 – September 1938, quoted in Lieutenant-Colonel C E Carrington, *Army/Air Co-operation 1939-1943* in *Journal of the Royal United Services Institute*, December 1970, p. 37. See also W A Jacobs, *Air Support for the British Army 1939-1943* in *Military Affairs*, December 1982, p. 174. Jacobs' article is an essential source for students of the subject.

⁸ Brigadier Mungo Melvin, *The Land/Air Interface: An Historical Perspective*, Chapter 7 in Peter W Gray (Ed), *Air Power 21: Challenges for the New Century* (Defence Studies Royal Air Force/London: The Stationery Office, 2001), pp. 163-164.

⁹ German Army/Luftwaffe integration is evident in *Luftwaffe Air Field Manual No. 16* (1935). See *Spearhead for Blitzkrieg: Luftwaffe Operations in Support of the Army 1939-1945* by General der Flieger Paul Deichmann, edited by Alfred Price (London: Greenhill, 1996), pp. 28-32. Details of German co-ordination problems are in Williamson Murray *The Luftwaffe Experience 1939-1941*, Chapter 2 in Benjamin Franklin Cooling (Ed) *Case Studies in the Development of Close Air Support* (Washington DC: Office of Air Force History, 1990), pp. 93-94.

¹⁰ J R M Butler *Grand Strategy* (London: HMSO, 1957), pp. 154-155.

¹¹ Air Staff Memorandum Bomber Support for the Army 18 November 1939, The National Archives CAB 21/93.

¹² For example, Letter and Report Air Requirements for the Army, Admiral Lord Chatfield to the Prime Minister.

15 November 1939, in The National Archives CAB 21/903.

¹³ Butler, *op.cit.*, p. 155.

¹⁴ See Russell A Hart, *Clash of Arms* (Boulder USA and London: Lynne Rienner, 2001), p. 107 and note 22, p. 151.

¹⁵ DO (42) 34, Air Forces for Cooperation with the Army and the Navy, 1 April 1942, in The National Archives CAB 69/4 and COS (42) 246, 2 May 1942, in The National Archives CAB 80/36, both referred to in Jacobs, *op.cit.*, p. 176. For Brooke's personal views confided to his diary see Alex Danchev and Daniel Todman (Eds) *War Diaries 1939-1945: Field Marshal Lord Alanbrooke* (London: Weidenfeld and Nicolson, 2001). P. 258.

¹⁶ Christopher Shores *Ground Attack Aircraft of World war II* (London: Macdonald and Jane's, 1977), p. 104.

¹⁷ Jacobs, *op.cit.*, p. 177

¹⁸ Quoted in Marshal of the Royal Air Force Lord Tedder, *With Prejudice* (London: Cassell, 1966), p. 169. A version with somewhat different wording is in CAB 69/4, and quoted in Jacobs, *op.cit.*, p. 180.

¹⁹ See John Terraine, *The Right of the Line* (London: Hodder and Stoughton/Sceptre, 1988), p. 324-325.

²⁰ Major-General I S O Playfair, *The Mediterranean and Middle East Volume I* (London: HMSO, 1954), p. 262, p. 357 and p. 362; Terraine, *op.cit.*, pp. 316-318.

²¹ A point made by Auchinleck to Churchill in June 1942. See Marshal of the Royal Air Force Lord Tedder, *With Prejudice* (London: Cassell, 1966), pp. 299-300.

²² For example see Major-General I S O Playfair, *The Mediterranean and Middle East Volume II* (London: HMSO, 1956), p. 290.

²³ Playfair (1956), *op.cit.*, p. 160; Terraine, *op.cit.*, pp. 344-345

²⁴ Playfair (1956), *op.cit.*, p.171 and Tedder, *op.cit.* p. 128

²⁵ Terraine, *op.cit.*, pp. 345-346; Playfair, *op.cit.*, p. 295; See also Vincent Orange *Getting Together*, Chapter 1 in Daniel R Mortensen (Ed), *Airpower and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-43* (Maxwell, Alabama: Air University Press, 1998), pp. 11-14.

²⁶ This system mirrored vital work initiated in Britain in 1940. Following Dunkirk, Group Captain A Wann and Colonel J D Woodhall began air support control and communications experiments in Northern Ireland. These involved wireless equipped 'tentacles' with the forward troops that relayed air support requests to a joint control centre for evaluation and passing to RAF squadrons. The system proved successful and was adopted. The tentacles, grouped into independent units and attached to army corps, became known as Army Air Support Controls (AASC) and later Air Support Signals Units. A fusion of the work in Britain and that in North Africa occurred when

an AASC was sent to gain operational experience in the desert in December 1941. See Charles Carrington, *Soldier at Bomber Command* (London: Leo Cooper, 1987), pp. 10-11; Bidwell and Graham, *op.cit.*, pp. 264-269; early war British evaluation is in Directive on Close Support Bombing, 6 December 1940, in The National Archives WO 106/5162.

²⁷ Air Marshal Sir Arthur Coningham, *The Development of Tactical Air Forces*, lecture to the Royal United Services Institute, 20 February 1946, reproduced in the Journal of the Royal United Services Institute, May 1946, p. 214.

²⁸ See Nigel Hamilton, *Monty: The Making of a General* (London: Hamish Hamilton, 1981), p. 450 and 459.

²⁹ Coningham, *op.cit.*, p. 215.

³⁰ Quoted in Philip Guedalla, *Middle East 1940-1942: A Study in Air Power* (London: Hodder and Stoughton, 1944), pp. 207-209.

³¹ Its tenets were followed not only in the war in Europe, but also in the Far East.

³² A report on the El Hamma operation, The Eighth Army Breakthrough at El Hamma on 26th March 1943 is in The National Archives AIR 23/1708.

³³ Mead, *op.cit.*, pp. 201-202.

An RAF Halifax being loaded with supplies





Air Power and Special Operations: the RAF and Special Duties in Yugoslavia, 1941-1945

By Dr Seb Ritchie

The provision of air support for special forces and other covert organisations has received only limited attention from historians of the Royal Air Force. A lack of open source material and other security restrictions inevitably poses major problems for those researching more recent operations, so that such work as has been undertaken has tended to focus on longer term history — chiefly the Second World War — which is no longer subject to security constraints. However, popular interest in clandestine or ‘cloak-and-dagger’ warfare has ensured that the wealth of documentary evidence available on so-called ‘special duties’ (SD) flying during the war has mainly been incorporated into tactical level histories. These reveal much about the bravery and expertise of SD aircrew, and about the activities of such organisations as the Special

Operations Executive (SOE).¹ But they tell us little about the higher direction of SD operations — about their place within Allied strategy or about command, control and administrative issues. At a time when special forces (or, in US parlance, special operations forces) are being ever more intensively employed, there would thus seem to be good reason to reconsider some of these issues and to study the way in which they have been addressed by the RAF in the past.

SD operations were undertaken by the Allied air forces in all theatres to a greater or lesser extent between 1939 and 1945, but they were nowhere more important than in the former Yugoslavia. Indeed, without air power the Allied influence in Yugoslavia during the war would have been at best minimal, and at worst non-existent.

From 1942 to 1945 the Allied air forces infiltrated agents and supplies to Yugoslav resistance groups, at first by parachute drops and later by landings at makeshift air strips. They were largely responsible for establishing the presence of both SOE and the Secret Intelligence Service (SIS) in Yugoslavia, and the supplies they brought into the area made an important contribution to the Partisan insurgency against Axis forces of occupation there. In short, Yugoslavia provides a perfect case study for an analysis of the higher direction of SD air operations.



267 Squadron Dakota in Yugoslavia

However, the story of SD flying in this theatre is made more intriguing by a number of puzzling contradictions and discrepancies, which emerge from even the most cursory comparison between the surviving documents and the limited quantity of published literature.² For example, it is clear that there are widespread misconceptions concerning both the volume and apportionment of the Allied SD effort that have been heavily coloured by debates about the respective merits of Yugoslavia's rival resistance movements, the communist Partisans, under Tito, and the royalist and largely Serb Chetniks under Mihailovic. Supporters of the Chetniks often imply that the Allies favoured the Partisans in the allocation of airborne supplies, and that these supplies were ultimately of critical importance in transforming Tito's movement into an effective fighting force, capable of challenging the German occupation and imposing communist government on Yugoslavia after Germany's defeat. According to David Martin, for example, "by October 1943, Tito had become the monopolistic beneficiary of the greatly augmented Allied support that had become logistically possible after the collapse of Italy".³

Yet the official records demonstrate that the Partisans had barely received any supplies from the Allies by October 1943, and that they obtained only a trickle before April 1944, by which time

they were already well established as the stronger of the two resistance movements by far. Recent research on British clandestine operations in Croatia is particularly illuminating in this regard. The Partisan force in Croatia was the largest in Yugoslavia. It controlled a considerable tract of territory that was strategically important to the Allies by virtue of its proximity to both Italy and Austria. And yet it is clear that the volume of airborne supplies reaching the Croatian Partisans was minuscule until the spring of 1944. Before that, in periods of good weather, they might have hoped to receive one aircraft load per week — a negligible volume of stores in relation to the many thousands of guerrillas in the region. In November and December 1943 they received nothing at all.⁴

This obvious contradiction becomes more interesting still if the documented aspirations of the British government and of both SOE and SIS are considered. For example, Churchill's official biographer has shown that from the early months of 1943 he attached the very highest priority to increasing the quantity of supplies reaching the Yugoslav Partisans.⁵ And yet the evidence from Croatia suggests that almost a year passed before his hopes were fulfilled on a significant scale. How can this delay be explained? Why did it prove so difficult to supply by air one of Europe's largest resistance forces until the final year of the Second

The Adriatic was far too close to Italy for seaborne supply to be a safe proposition. The only alternative was the air

World War in Europe? The aim here is to address this question, and to show how and why the more serious obstacles to airborne supply in Yugoslavia were finally overcome. The story sheds some interesting light on the enduring characteristics of air operations in support of covert organisations, as well as on the more general subject of military air transport.

* * *

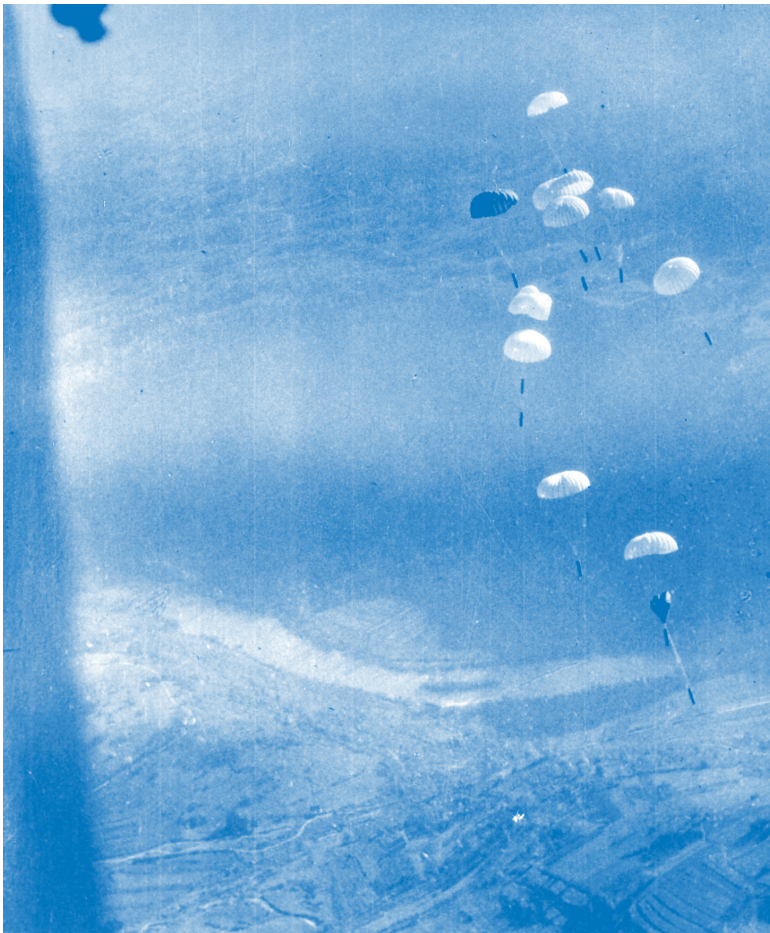
Yugoslavia became an important focus for British special operations and intelligence gathering during the first year of the Second World War.⁶ But no detailed plans were formulated for clandestine operations there in the event of an Axis occupation. By the time German and Italian forces invaded Yugoslavia in April 1941 SOE and SIS had set up new headquarters in Cairo which were soon made responsible for running agents into enemy territory in south-eastern Europe. But any hopes of re-establishing a presence in Yugoslavia were

confronted by two fundamental problems: first a chronic shortage of reliable intelligence about conditions inside the country, and second the impracticality of conveying agents or supplies to the northern Mediterranean. The presence of a resistance movement — the Serb Chetniks — was not confirmed until the end of 1941, so the question of supplies only began to arise thereafter.⁷ Clearly, the Adriatic was far too close to Italy for seaborne supply to be a safe proposition. The only alternative was the air.

Unfortunately SOE and SIS soon found that the Royal Air Force was very poorly placed to assist them. There is no evidence in the British archives to indicate that the RAF undertook any significant planning or preparation for SD operations in the years immediately preceding the outbreak of the Second World War.⁸ A few officers with an expertise in SD from the First World War were still serving (or were recalled) in 1939. The most influential was Air Commodore Lionel Payne, who effectively acted as senior liaison officer between the RAF and SIS between 1941 and 1945.⁹ But the RAF otherwise developed no doctrinal, training or equipment infrastructure to support SD in the rearmament years. This was not entirely unreasonable, of course, for SOE, which created a very much larger demand for air transport than SIS, was only formed in 1940 as a direct result of Germany's occupation of Europe — an eventuality that could not reasonably have been foreseen in the late 1930s.

More generally, the RAF's air transport infrastructure was also deficient at the start of hostilities. Yet it would be simplistic to suggest that the problems encountered in supplying the Yugoslav resistance by air merely reflected the RAF's neglect of air transport. Although it is often argued that the British Air Staff shunned co-operation with the Army between the wars, emphasising instead the independent role of air power, air transport was an integral part of inter-war RAF operations in the Middle East, where Army units were moved regularly by aircraft to potential flashpoints such as Iraq and Transjordan.¹⁰ It is true that the RAF paid far less attention to air transport in the metropolitan

An air drop to Yugoslav Partisans



theatre, but this was partly because the Army made hardly any demand for it.

The RAF had very few transport aircraft at the beginning of the Second World War. The need to combine combat and lift capabilities in parts of the empire had spawned so-called bomber transport aircraft in the 1930s with limited carrying capacity, but there were no dedicated transport aircraft. The slow growth of commercial aviation in interwar Britain was partly to blame. The two best known military transport aircraft of the period, the C-47 Dakota and the Junkers JU-52, both originated in civil aircraft designs.¹¹ Yet neither of these aircraft could have assisted with the provision of airborne supplies from Egypt or North Africa to Yugoslavia, for they lacked sufficient range when heavily laden. Hence even the gradual emergence of a dedicated RAF transport fleet in 1941, largely equipped with Dakotas, did not solve the problem of supplying the Yugoslav resistance.

In fact, the only aircraft capable of supplying Yugoslavia from the Middle East were the larger multi-engined bombers. Suitably converted medium bombers such as the Wellington were just capable of bringing agents and some stores from Egypt or North Africa to southern Yugoslavia. But only the newer four-engined bombers promised to provide the combination of both range and lift needed to convey supplies to the region as a whole.¹² Inevitably the demand for such aircraft was very high. In northwest Europe Bomber Command represented the sole means by which Britain could wage war directly against the German homeland. But the Command was too small to execute this role effectively in the first years of the war and lacked sufficiently capable aircraft.¹³

In 1942 the large-scale production of new four-engined bombers such as the Lancaster and Halifax at last offered Bomber Command the enhanced capability it needed to expand the strategic offensive against Germany. But a range of commitments — Coastal Command, the Middle East, operations against French docks and harbours — continued to limit the number of aircraft available for strategic bombing.¹⁴



A Halifax drops supplies to the Partisans

Understandably, then, the Command did not take kindly to proposals that its all-important heavy bombers should be made available for SD.¹⁵ The RAF and the clandestine organisations found themselves in direct competition for the same equipment. The RAF consistently opposed the diversion of aircraft to SD on the grounds that Bomber Command's operational capability would be impaired, while SOE maintained that they could not fulfil their directives from the Chiefs of Staff (COS) unless the necessary transport aircraft were made available.¹⁶ It should be noted at this stage, however, that SOE's founding directive envisaged only a fairly limited role for them and insisted that their plans should be kept in step with the general strategic conduct of the war. In other words, while irregular warfare had a vital role to play, SOE's activities should ultimately complement and certainly not impede the broader prosecution of hostilities. Moreover the directive

was largely concerned with limited scale sabotage and subversion operations of a type likely to make far more restricted demands on air transport than the supply of guerrilla armies.¹⁷

As SD missions were usually confined to moon periods, it seemed at first that there might be scope for aircraft and crews to be shared in any given month, so that they undertook SD sorties during moon periods and afterwards resumed routine flying.¹⁸ But SOE and SIS soon began to demand the permanent allocation of aircraft to SD, for the temporary reversion of aircraft and trained air crew to normal duties often placed their operations in jeopardy. Expert SD air crew might be lost during bombing operations, while aircraft might become unserviceable or due for major inspections when they were required for SD missions. Less time would be available in non-moon periods for training.¹⁹

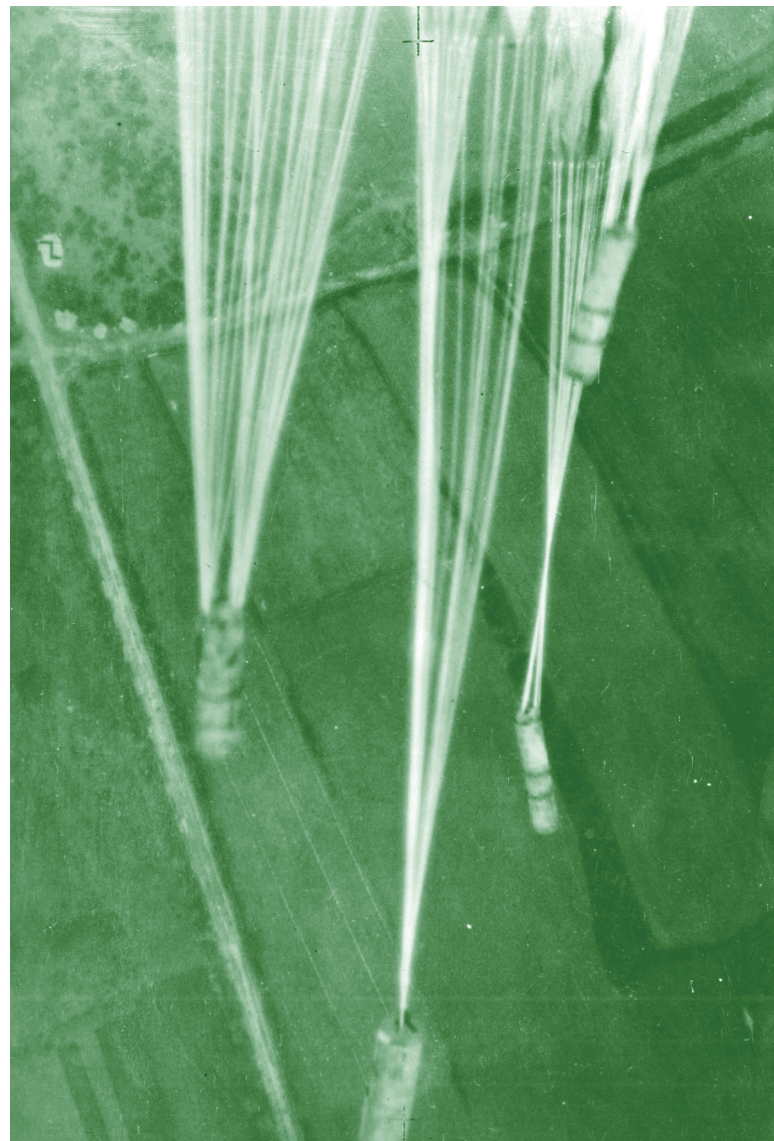
The provision of SD aircraft first became an issue in the summer of 1941 in connection with SOE plans for operations in northwest Europe, at a time when there was still only one flight of aircraft allocated to SD in Britain.²⁰ But the focus of the debate then shifted to the Mediterranean. During the later months of 1941 it became clear that a substantial resistance movement had emerged in Yugoslavia. SOE and SIS immediately sought to establish contact with these forces, and demanded air transport for the infiltration of both agents and supplies.²¹

The RAF's inability to respond is graphically illustrated by one particular fiasco involving early SIS proposals to mount air operations from Malta and Egypt. In September 1941 SIS advised the Minister of State in Cairo of their interest in mounting clandestine air drops into the Balkans from Malta, and in 'dropping or parachuting personnel, stores and pamphlets . . . from Egypt to Greece, Crete, [and] Yugoslavia'; they also envisaged 'landing or collecting agents and stores off enemy coasts' employing flying boats or sea planes. They were hoping to base two aircraft in Malta and two in Egypt for these purposes.²² In the absence of suitable British seaplanes or of land-based aircraft, the RAF rather improbably

assigned four Heinkel 115 seaplanes (formerly the property of the Royal Dutch Air Force) to Malta for SIS operations. The first was lost on only its second flight, while the second was destroyed at its moorings during an air raid in February 1942 without flying a single sortie, and neither the third nor the fourth ever reached Malta.²³ Four converted Whitley bombers positioned in Malta to supply the Yugoslav resistance suffered a similar fate.²⁴

By the beginning of 1942 the first British field officers to reach Yugoslavia (who were infiltrated by sea) had joined the Chetniks.

Parachute-dropped supplies



This was important, because airborne supplies could not commence until Allied liaison officers were located in the field. Field officers were required to identify and prepare drop zones and landing grounds, to organise reception committees, to relay resistance requirements to headquarters, and to manage the distribution of stores.

Their presence encouraged SOE to develop more ambitious plans for supporting the Chetniks, which were reinforced by a plea for assistance from the Yugoslav government-in-exile, then located in London.²⁵ The Air Staff recognised the importance of providing at least some assistance to the Chetniks. As the Air Ministry's Deputy Director of Plans remarked: "Surely this is a golden opportunity to help ourselves and our Allies, to worry the Hun, and to give encouragement to other small nations now under German domination."²⁶ Soon afterwards, too, the COS issued a new and more expansive directive to SOE, which specifically tasked them with 'organising and co-ordinating the action of patriots in the occupied countries', although insisting that they should 'avoid premature large scale risings of patriots.'²⁷

Yet the precise role of the Yugoslav insurgency within Allied strategy was not defined, and the scope for supplying the Chetniks in any case remained very limited. The Air Staff eventually decided to form an SD Flight of four Consolidated B-24 Liberators within 108 Squadron (based at the Nile Delta), known as X Flight. X Flight would afterwards shoulder virtually the entire burden of the SOE and SIS infiltration and supply programmes to Yugoslavia and other Mediterranean countries until the spring of 1943. Enemy air defences were not particularly effective in the Yugoslav theatre; only 18 SD aircraft were lost there throughout the war.²⁸ But SD missions had still to be conducted at night, and were only flown nightly in moonlit conditions. Their success was dependent on highly accurate navigation — by map-reading



Partisans and civilians are evacuated from Yugoslavia

and dead reckoning — and good visibility: many operations were aborted because aircraft failed to locate their reception committees, or because of adverse weather, particularly between October 1942 and March 1943, and serviceability also became an increasing problem. The aircrew of X Flight discharged their duties with extraordinary courage, determination and skill; they deserve a history of their own. But they could only provide the most limited and ineffectual support to the Chetniks.²⁹ Any hopes of enlarging the SD Liberator force were frustrated by the burgeoning global demand for the aircraft — from the USAAF, from Coastal Command (Liberators played a crucial role in the Battle of the Atlantic), and from the RAF Commands in both the Middle East and Far East, which required them for conventional bombing operations.³⁰ Nor was it possible to supplement or replace the Liberators with British-built Halifax bombers for many months, as a number of serious teething troubles with the aircraft had to be resolved before it could be considered for overseas service.³¹ The Lancasters were of course all required for Bomber Command. Not until October could the Air Ministry offer to provide six converted Halifaxes to augment the Liberator flight, but their arrival was delayed until February 1943, and their first operational sorties were only flown in March.³²

The volume of supplies reaching the Chetniks remained small, then. But it is far from certain that a more ambitious supply programme would have furthered the Allied cause significantly

Large numbers of enemy troops were being held in the region, but the principal source of resistance was the Partisan movement in north-western Yugoslavia

during 1942. Indeed the winter of 1942 produced a crisis in British policy towards Yugoslavia and a serious split within SOE, as doubts emerged in their Middle East section concerning Mihailovic's commitment to fighting the Axis. By January 1943 there was mounting evidence that his forces were not engaged in very active resistance, and there were even indications that they were collaborating with the Italians. Large numbers of enemy troops were being held in the region, but the principal source of resistance was the Partisan movement in north-western Yugoslavia, which was not as yet in contact with the Allies, and which consequently had received no supplies at all.³³ There was no question at this stage of abandoning Mihailovic

government to support him. But there was an obvious case for backing the Partisans too. So SOE began tabling demands for still more aircraft, arguing that an increase in supplies would enable Mihailovic to contemplate more overt resistance, and give much needed assistance to Tito's followers. Their Middle East staff were able to present proposals to this effect directly to Churchill when he visited Cairo in January 1943.³⁴

The changing Allied perception of Yugoslavia's resistance groups did not in itself lead directly to a decision to enlarge the air supply programme. Of greater importance were broader developments in the Mediterranean and beyond, which created

a more tangible strategic rationale for Allied intervention in Yugoslavia. By the beginning of 1943 the desert war was moving west, the conclusion of the North African campaign was in sight, and the Allies were devising new strategies for opening a second front in mainland Europe. Following the Casablanca conference in January 1943, plans were drawn up for the invasion of Italy through Sicily (Operation 'Husky'). The implications of Operation 'Husky' for British policy towards Yugoslavia were indeed profound. At the grand strategic level, Stalin was infuriated to learn that there would be no Anglo-US landings

in France in 1943. Hence, for reasons of Alliance cohesion, Churchill now looked to encourage resistance activity in south-east Europe in the hope of drawing Axis forces away from the eastern front.³⁵ At the same time it seemed likely that



A Halifax drops supplies to Partisans

completely. Much of the SOE hierarchy continued to favour the Chetniks over the Partisans, and in any case it was the declared policy of the British

the Allies' progress in Italy could be materially assisted by the presence of a large, capable and active resistance movement in adjacent areas. Thus, as a direct result of the decision to launch 'Husky', the north-western Yugoslav territories of Croatia and Slovenia assumed a new significance in Allied thinking. Both bordered Italy, while Slovenia additionally shared a common frontier with Austria. The region was also vital to Axis communications across south-eastern Europe.³⁶

The Partisans were known to be responsible for virtually all resistance activity in Croatia and Slovenia.³⁷ Churchill therefore decided that it was vital to establish formal contacts with Tito's movement, and simultaneously sought to increase the volume of airborne supplies to the Yugoslav resistance as a whole. A powerful triumvirate consisting of the Prime Minister, the Foreign Secretary, and the Minister of Economic Warfare (who controlled SOE), now began to press the Air Staff very hard to provide more heavy bombers for SD in the Mediterranean.³⁸

In February 1943 the Chief of the Air Staff, Air Chief Marshal Sir Charles Portal, agreed to provide an additional four Halifaxes, bringing the total SD fleet in the Middle East to 14 aircraft — a single squadron now numbered 148.³⁹ The

reports recently received on the Partisans clearly influenced this decision; presumably the Air Staff expected that by providing four more Halifaxes, which were capable of reaching Greece and south-eastern Yugoslavia, they would give SOE more scope for using the Liberators — boasting superior endurance — over the Partisan territories further north. Yet the situation was soon made more complicated by a further COS directive to SOE, tasking them to encourage resistance activity further east, particularly in Greece, to bolster Allied deception operations designed to divert German attention away from Sicily and Italy.⁴⁰ Reviewing the situation in Yugoslavia, the COS in the meantime upheld the existing Allied strategy of supporting Mihailovic, and although they decided to send agents to make contact with the Partisans, a decision on whether to despatch supplies to Tito was deferred until they had reported.⁴¹ This came as music to the ears of those senior SOE staff who were determined to maintain Allied backing for the Chetniks. In April they duly presented a further request for aircraft to the COS, claiming that the Chetniks controlled around 100,000 troops, a number that 'could be increased to 250,000 if arms, equipment and British staff officers could be delivered in sufficient quantities . . . SOE's inability as yet to supply the resistance groups in Serbian territory with a reasonable proportion of arms and

Squadron Dakotas in Italy





An injured Partisan is off-loaded from a Dakota

equipment they demand has so far prevented the establishment of a controlling Allied influence over General Mihailovic'. Six of their 10 Halifaxes were to be used to supply the Greek resistance, leaving the remaining four for Mihailovic. But the serviceability of the four ageing Liberators was now said to be so low that no significant airlift capacity was left for the Partisans.⁴²

The Air Staff hesitated once more. By this time they were clearly coming to suspect that the fulfilment of apparently limited SOE requirements was only serving to encourage demands for still more aircraft. They might also have been forgiven for questioning whether additional aircraft were really warranted, given the prevailing uncertainties over the internal situation in Yugoslavia, the contradictory signals being received from SOE, and the fact that, at that time, there were still no Allied officers with the Partisans. But the Air Staff instead — no doubt wisely — chose not to immerse themselves in the intricacies of Yugoslav politics and clung to the broader argument that SOE requirements had to

be balanced 'against the strategical background of the bombing of Germany and the Anti U-Boat war'. As the Director of Plans wrote, 'they have reached a position which is, I consider, not unreasonable in relation to the strategic importance of the U-Boat war and the bomber effort'.⁴³ Hence the Air Staff continued to rely on the COS's ultimate stipulation that SOE activities should support the broader thrust of Allied strategy; in other words they should not divert resources from conventional air operations.⁴⁴ By 1943 SOE clearly had stronger grounds for demanding air resources than they had possessed in the previous year. Yet the relative importance of their work, compared with more conventional military activity, was still not properly defined.

In April the first SOE reconnaissance teams made contact with the Partisans in Montenegro and Croatia, and discovered that they were a far larger and better organised force than Allied appreciations had hitherto suggested.⁴⁵ They were soon followed by SOE liaison officers. As formal links with Tito had now been established, as liaison officers were now in the field, and as the Allies now possessed bases in Libya and Tunisia — far closer to northwest Yugoslavia than Egypt — there was at last more scope for organising an air supply programme using British bombers like the Halifax. SOE duly renewed their efforts to obtain more aircraft. They argued that while supplies should still be targeted primarily at Mihailovic, closer contacts should also be established with the Partisans 'with a view to encouraging their resistance to the Axis'. It was suggested, rather optimistically, that if a significant volume of supplies could be sent to Yugoslavia the Allies would improve their chances of securing the co-operation of the main resistance movements and of co-ordinating anti-Axis activities there.⁴⁶ Again, Churchill was supportive, and on 22 June he minuted the COS:

*I consider that at least a dozen [more aircraft] should be placed at the disposal of the SOE authorities for this, and that this demand has priority even over the bombing of Germany.*⁴⁷

A further 12 Halifaxes were therefore made available to form a second Squadron – 624 Squadron; – and a new Wing, numbered 334 Wing, was created to supervise SD work in the Mediterranean.⁴⁸ These additional aircraft were expected to enlarge the supply programme to Yugoslavia to an estimated 150 tons per month – an impressive feat, judged by earlier standards. But unfortunately those standards were now dramatically revised. The Prime Minister declared that the despatch of 500 tons per month was desirable by September 1943.⁴⁹ In response the Chief of the Air Staff agreed to provide four more Halifaxes, and offered to divert to the Middle East another 10 that were due for delivery to SD squadrons in Britain. He made it plain, however, that he strongly opposed the reallocation of further aircraft from Bomber Command to SD. “Desirable as it may be to maintain and foster SOE activities”, Portal wrote, “we must bring the problem into focus with the whole strategic picture”.⁵⁰ It is notable that Churchill chose not to press SOE’s requirements over those of Bomber Command again at this stage.

In August the Quebec conference gave priority status to assisting the Balkan resistance movements and to the provision of aircraft to supply them. Yet throughout the second half of the year weather and other constraints limited airborne supplies to both the Chetniks and the Partisans to an average of only 45 tons per month.⁵¹ What this meant in terms of supplies to the Partisans alone has already been described but it is worth reiterating: in optimal weather and moon conditions the largest Partisan formation in Yugoslavia could expect just one supply aircraft per week in this period. In anything other than optimal conditions they invariably received nothing. It was against this background that a momentous change occurred in British policy towards Yugoslavia. In July, Churchill decided to despatch his own personal emissary to Tito — Brigadier Fitzroy Maclean. And although Maclean’s mission employed SOE’s operational infrastructure, it was otherwise entirely independent and responsible to Churchill alone.

After arriving at Tito’s headquarters in September, Maclean spent his first months in the field



An injured Partisan is carried off a Dakota

gathering information and preparing an infamous and decisive report recommending Allied support for the Partisans alone, and the abandonment of Mihailovic and the Chetniks. Whatever the strengths and weaknesses of Maclean’s analysis of the Yugoslav resistance (and it remains highly controversial to this day), his report must also be seen as an attempt to balance limited resources and extensive commitments. Far from proposing that Tito should become the monopolistic beneficiary of an immense volume of airborne supplies, Maclean very sensibly sought to concentrate available air transport capacity on the resistance movement that seemed most likely to contribute to Allied strategic objectives, — namely, the Partisans. Not only were they more numerous than the Chetniks, and more actively engaged in operations against German forces of occupation; they were also located in territories bordering Italy and the Third Reich itself. By contrast, the Chetniks were very largely confined to Serbia and Montenegro.⁵² To have continued supplying the Chetniks at this time would have involved the wasteful diversion of scarce resources to an organisation that was both poorly placed and disinclined to contribute much to the Allied cause. Maclean’s report reached Churchill in the second

week of November at a time when the Prime Minister was again acutely unhappy about the air supply situation. Italy's capitulation in September left Yugoslavia's Dalmatian coast largely undefended and it was quickly occupied by the Partisans. To Churchill, who had long been advocating a forward Allied strategy in south-east Europe, it seemed that the initiation of a far more ambitious programme of support for the Partisan insurgency at this time could bring very significant dividends, but the opportunity passed and by December the Germans had overrun much of the coastal area. Churchill was simplistically blaming this disappointing reversal on the Allies' failure to keep Tito's armies supplied when Maclean's report, extolling the merits an enlarged pro-Partisan strategy, landed on his desk.⁵³ It subsequently accompanied him to the Sextant conference in Cairo, with Roosevelt, which in turn laid the ground for the Teheran conference with

both Roosevelt and Stalin.⁵⁴ The report was also considered by the COS in mid-November 1943, and Mihailovic received no further Allied supplies thereafter.⁵⁵ Most of the Allied liaison officers located with the Chetniks were withdrawn early in 1944.⁵⁶

* * *

In the ultimate expansion of the Allied air supply programme to Yugoslavia in 1944 it is possible to identify many of the themes that have recurred in this paper so far. The precise role of the Yugoslav Partisan insurgency within Allied strategy was now more clearly defined than before. At the Teheran Conference at the end of November 1943 it was agreed that all possible help should be given to Tito and his followers, the aim being to maintain pressure on Germany across Europe in the lead up to Operation 'Overlord', or in Churchill's words, 'to stretch the enemy to the utmost'.⁵⁷ Allied

leaders envisaged increasing supplies of arms and equipment, clothing, medical stores, and food to the Partisans, and commanders were directed to furnish whatever air support was considered necessary to achieve this aim.⁵⁸

Yet the issue of prioritisation was still left open. SOE duly attempted to translate the Teheran objectives into specific air transport requirements, preparing a statement which showed that the 32 aircraft then available for all Balkan operations could deliver a maximum of 278 tons of supplies per month. By contrast, they asserted that the COS had tasked them to supply 680 tons per month. Thus, assuming these figures were correct, more than double the number of aircraft then available for SD operations in the Balkans was required. It transpired, however, that the target figures were of dubious validity: SOE were ultimately forced to admit that they had been 'calculated' from a recent COS directive, but the precise basis of their calculations

is not recorded. Subsequently the Chief of the Air Staff yet again emphasised the detrimental effect



Pack horses are loaded into a Dakota

that the proposed transfer of aircraft would have on Bomber Command, then in the most desperate phase of the so-called 'Battle of Berlin'. Although he promised a small increase in transport capacity, it fell far short of SOE's requirements.⁵⁹

Fortunately the pervasive obstacle of range — and hence SOE's problematic dependence on converted heavy bombers — was on the point of being eliminated once and for all. After the Allies landed in mainland Italy they secured air bases in the Brindisi area, from which dedicated transport aircraft and converted medium bombers could easily reach northern Yugoslavia fully laden.⁶⁰ The necessary transport aircraft were not immediately forthcoming. Beyond the established SD fleet in the Mediterranean, under the control of the C-in-C Middle East, the RAF managed to provide one Dakota squadron. A very much larger (American) air transport fleet was controlled by the Commander-in-Chief Allied Forces Headquarters in the western Mediterranean, but this was at first unavailable for SD. The answer lay in the unification of Allied command in the Mediterranean under SACMED, which was also approved at the Sextant conference in November.⁶¹ Some 60 Dakotas from the 62nd American Troop Carrying Group were then made available for SD in the entire Balkan area, along with 36 Italian aircraft. The Dakotas introduced an entirely new dimension into air operations in support of the

Yugoslav resistance, for they were the first Allied supply aircraft capable of landing in the field.⁶²

SD operations from Italy to Yugoslavia did not start until January and were initially still seriously impeded by two factors. The first was the weather, which was particularly poor in early 1944;⁶³ the second was the small scale of Allied reception arrangements. Few additional liaison officers were infiltrated into Yugoslavia between October 1943 and March 1944 so that when, in the latter month, really large-scale supply drops and landings suddenly became possible, Allied planners were unexpectedly confronted by the unpleasant realisation that there were not enough trained reception personnel in the field.

Partisan headquarters in Croatia provides a perfect illustration of the problem. Major Owen Reed, the Allied liaison officer at the headquarters, worked for SIS and was infiltrated into Croatia in October 1943 with a two-man team and with instructions to work alongside an SOE mission at the same location. In November his SOE counterpart left the mission, and was not replaced; in January one of Reed's subordinates joined the Partisans and was likewise not replaced. Reed was left to represent both SIS and SOE at the mission with a staff of just two radio operators and, predictably enough, he soon found himself massively over-burdened with work. This was the situation when, on 14 March 1944, he received a signal from Italy asking 'for saturation point [of] numbers [of] containers and

packages, i.e., how many do you estimate you can receive [in] one night should mass sorties be laid on?' Reed was obliged to point out that there could be no mass drops to Partisan headquarters Croatia until his staff was enlarged.⁶⁴

Poor weather and inadequate reception arrangements served to restrict airborne supplies to the Partisans to an average of just 84 tons per month in the first quarter of 1944.⁶⁵ But then the weather improved and

Partisans' flare path, Topusko



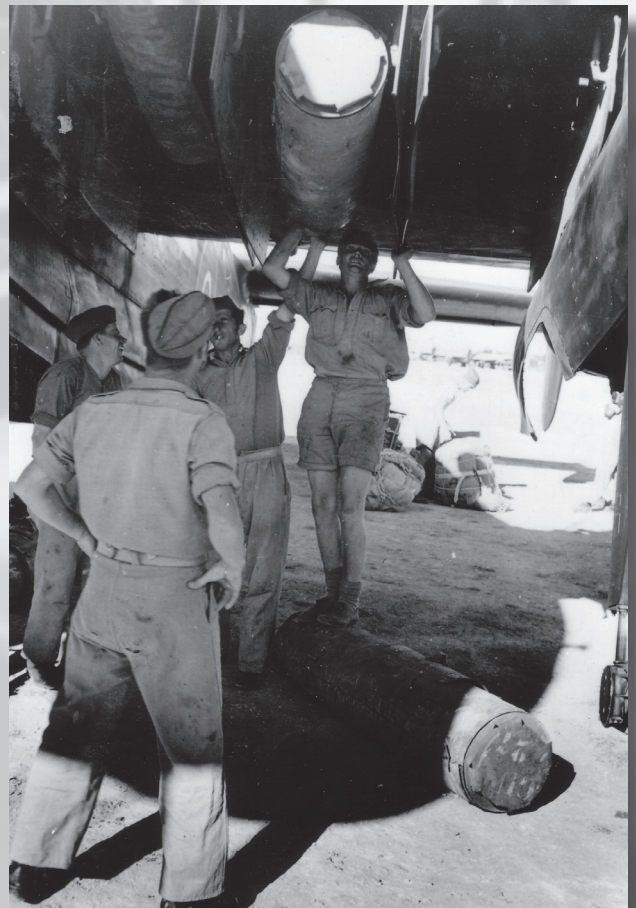
more Allied personnel were sent into the field. A formal British military mission to Yugoslavia assumed the role hitherto played there by SOE and, as the mission was staffed by regular soldiers, the pool of manpower available for deployment as field liaison officers increased substantially. As a result, the few Allied missions already located with the principal Partisan headquarters could be augmented by sub-missions attached to smaller formations. The RAF also became involved in reception provisions. The Balkan Air Terminal Service (BATS) sent specially trained personnel into Yugoslavia to help field officers with the location, preparation and operation of landing strips.⁶⁶ Large-scale daylight supply missions with fighter escorts began at the end of March, allowing available aircraft to be utilised throughout the month for the first time. Such missions became the norm in June after Allied air strikes against German airfields around Zagreb virtually eliminated the Luftwaffe as a fighting force in the region.⁶⁷

Against this background, the second and third quarters of 1944 witnessed a spectacular rise in the volume of supplies reaching the Partisans: between 900 and 1,000 tons of stores per month were delivered throughout this period. There were mass drops and mass landings, which also provided the opportunity to evacuate vulnerable personnel — the wounded, women and children. During these six months nearly 13,000 people were brought out by air from Yugoslavia. So it was that air support to the Yugoslav resistance at last came to fulfil the most optimistic aspirations harboured by Churchill and the covert organisations since 1942.⁶⁸

* * *

This paper began by posing the question: why was it so difficult to supply the Yugoslav resistance movements by air? A few answers may now be suggested. On the outbreak of the Second World War the RAF was poorly prepared for SD operations, and more generally for air transport. But the scale of wartime SD requirements could not reasonably have been foreseen before 1940, nor could the demands of SOE or SIS in Yugoslavia have been met by a dedicated air transport force

before Italy's capitulation in September 1943. Until then, only converted four-engine bombers could fulfil this task. Although their large-scale production coincided with the growing demand for SD aircraft for the Mediterranean in 1942, few could at first be diverted from bombing operations. Indeed, no British-built heavy bomber was allocated to SD in the Mediterranean until October 1942 and no SD sorties were flown by British



Supplies are loaded into a Halifax

heavy bombers to Yugoslavia until March 1943. The aircraft available for SD were only gradually augmented thereafter. From the first positive identification of a Yugoslav resistance movement in 1941 through to the establishment of a virtual air bridge from Italy to Yugoslavia in 1944, there

was a continuous struggle between the covert organisations — principally SOE — and the Air Staff over the allocation of these aircraft.

In so far as the directives given to Bomber Command and SOE were contradictory where the allocation of aircraft was concerned, there were no obvious rights and wrongs in these arguments. However, it is important to remember that SOE was originally formed to support British strategy by conducting sabotage and subversion in enemy-occupied territory, and this limited measure of their task unquestionably coloured the Air Staff's position in the early stages of the debate; SOE was not at first assigned the far more ambitious objective of sustaining large guerrilla armies, with all the resource implications that implied. Even when they broadened SOE's directive to encompass such activities, the COS still did not intend that SOE's work should in any way lessen the impact of conventional military operations by, for example, diverting much-needed aircraft away from the strategic bombing offensive or the Battle of the Atlantic. And although the Air Staff sometimes appeared to be guarding their resources somewhat jealously for bombing and other operations, it is also true that SOE periodically made demands for aircraft that they were unable to employ to good effect. Bad weather, poor visibility and inadequate reception arrangements in the field all impeded SD operations from Egypt and North Africa to Yugoslavia, and delayed the initiation of supply sorties from Italy.

The fact is that until 1943 Yugoslavia simply did not assume a level of strategic importance to the Allies that might have justified the allocation of more heavy bombers to SD. Only the decision to invade Italy enhanced the importance of special operations in this theatre and resulted in the provision of more aircraft, after Churchill and other senior government ministers brought pressure to bear on the Air Staff. At the same time it focused Allied attention on the Partisans, who were by far the most important resistance force in Croatia and Slovenia, close to the Italian frontier. But Allied strategic aspirations, notably those of Churchill, at first ran far ahead of practical possibilities. The numerous constraints already

described in this paper prevented any very significant expansion of Allied supplies to the Partisans for almost a year. Throughout 1943 Tito's forces were very largely sustained by weapons and ammunition taken from surrendering Italian troops following Italy's capitulation, rather than by supplies received from the Western Allies.⁶⁹

At the end of 1943 strategy at last became more closely aligned with operational feasibility. At the Teheran conference the Allies agreed to support the Partisans (as well as other resistance groups in Western Europe) in order to stretch German forces to the limit in the months before Overlord. The first step towards operational feasibility was taken when Allied air bases were established in Italy, drastically reducing the distance of SD missions to Yugoslavia. Large numbers of transport aircraft — chiefly Dakotas — were then made available for SD operations, and ground reception arrangements in the field were belatedly expanded. Allied air supremacy subsequently permitted continuous daylight operations to be conducted when weather conditions improved in the spring of 1944. Then, and only then, was it possible to deliver a significant volume of airborne supplies to the Partisans.

Within military circles it is almost a truism to say that there is never enough air transport. This is partly because air transport resources are ultimately finite, but it is also because air transport has a way of generating its own demand. The RAF unquestionably began the Second World War with inadequate numbers of transport aircraft, but the transport fleet was steadily enlarged as hostilities progressed, and was by 1942 being augmented by the very much larger fleet of the USAAF. Yet there was never enough air transport: long before specific lift requirements had been fulfilled, new and more ambitious plans emerged, which required still more aircraft. Some of these plans were fully justified by the results achieved — for example, the use of airborne logistics to support Allied armies during the liberation of northwest Europe after June 1944, or to sustain Slim's Fourteenth Army in Burma from 1944 to 1945. Others — particularly large scale airborne operations such as 'Market Garden' and Varsity —

were arguably both extravagant and unnecessary. More than 2,000 aircraft and gliders were employed in the first 'Market Garden' air lift on 17 September 1944, yet it is still frequently maintained that the operation failed because insufficient transport aircraft were available on that day.⁷⁰ It would be interesting to know precisely how many aircraft would have been required to snatch victory from the jaws of defeat. It repeatedly fell to the Air Staff to inject some realism into this process, as they did, for example, by opposing the formation of a second British airborne division in 1942-43, at a time when the war effort was already stretched to the limit.⁷¹

The story of the Allied air forces' SD operations over Yugoslavia in the Second World War provides another — albeit far smaller — illustration of this basic pattern. To this day, writers sympathetic to Mihailovic are fond of reiterating SOE's wartime contention that his inactivity resulted in large part from the Allies' failure to keep his forces adequately supplied by air. Clearly, very few aircraft were allocated to SD in the Mediterranean theatre during 1942, but this was at a time when the only suitable aircraft were desperately needed for general bombing operations, for Coastal Command, and for the USAAF. Subsequent well-intentioned efforts by the Air Staff to build up the SD fleet were simply greeted by demands for more, and still more transport aircraft. When the Air Staff sought to balance these demands against the broader requirements of the Allied war effort, Churchill repeatedly intervened on SOE's side. Yet despite SOE's protestations the enlargement of the SD fleet did not produce a very marked improvement in the supply position for many months, because the availability of lift capacity was not in itself enough to ensure that supplies were actually delivered. The lesson is crystal clear: optimistic claims about 'what it might be possible to achieve if only there were more air transport' must be treated with caution. The Air Staff were entirely correct to vet rigorously SOE's repeated requests for more aircraft.

Otherwise, this story contains two basic messages for those with an interest in the provision of air support for special operations. First, the place of

special operations within overall strategy must always be established and agreed at the very top level; no room should be left for doubt or dispute about the contribution they are required to make, relative to conventional military activity. This in turn should provide the basis for determining the apportionment of resources, air assets included. In the Second World War the Allies' failure to specify the relationship between special operations and broader strategy until mid-1943 was primarily responsible for the friction that characterised SOE's earlier dealings with the Air Staff. Second, the experience of the Second World War demonstrated that special forces and other covert organisations must have at least some dedicated air transport facilities — thoroughly prepared in peacetime for use in war — and also suggested that these facilities are unlikely to be obtained on the cheap. To the RAF, with its doctrinal emphasis on centralised command, the entire concept of a dedicated SD fleet seemed to imply the undesirable division of resources into 'penny packets'. Air Chief Marshal Sir Arthur Harris himself referred to the SD squadrons as 'Mr Dalton's private air force'^{72/73} and Portal often questioned the wisdom of assigning aircraft permanently to SD on the basis that they spent much of their time parked around airfields awaiting the right moon periods or weather conditions, or the organisation of reception arrangements in enemy territory. "What is in dispute", he wrote in April 1942, "is whether we can afford to devote their overheads entirely to this special task and get no dividend during the three weeks in the month when they can do nothing."⁷⁴ However, as we have seen, experiments in re-tasking aircraft during such periods proved unacceptable to SOE and SIS for quite legitimate operational reasons. The need to maintain at least some dedicated air assets for units like the SAS has since been accepted by the RAF, but still with the caveat that the assets concerned may if necessary be re-apportioned elsewhere.⁷⁵

Notes

¹ Typical examples of this literature include Hugh Verity, *We Landed by Moonlight: Secret RAF Landings in France, 1940-1944* (Ian Allen, 1978), KA Merrick, *Flights of the Forgotten* (Arms and Armour, 1989) and, from a more autobiographical perspective, Wing Commander John Nesbitt-Dufort, *Black Lysander* (Jarrolds, 1973).

² The literature on Allied special operations in Yugoslavia is far too extensive to list comprehensively here, but it can broadly be divided between autobiographies and academic studies. Autobiographies written by those involved stretch from Fitzroy Maclean, *Eastern Approaches* (Jonathan Cape, 1949) to FWD Deakin, *The Embattled Mountain* (Oxford University Press, 1971) and on to more recent personal accounts such as Franklin Lindsay, *Beacons in the Night: With OSS and Tito's Partisans in Wartime Yugoslavia* (Stanford University Press, 1993), and Peter Wilkinson, *Foreign Fields: The Story of an SOE Operative* (IB Taurus, 1997). From within the academic community research has advanced significantly since the release of the first official British records on wartime Yugoslavia into the National Archives in the 1970s. Important recent contributions to the historiography are Simon Trew, *Britain, Mihailovic and the Chetniks, 1941-42* (Macmillan, 1998) and H. Williams, *Parachutes, Patriots, and Partisans: The Special Operations Executive and Yugoslavia, 1941-1945* (Hurst & Company, 2003). On the more general history of SOE, see MRD Foot, *SOE in France* (HMSO, 1966) and *SOE in the Low Countries* (St Ermin's Press, 2001); and Charles Cruickshank, *SOE in the Far East* (Oxford University Press, 1983). Secret Intelligence Service activity in Yugoslavia is less well documented but has recently been analysed in detail in Sebastian Ritchie, *Our Man in Yugoslavia: The Story of a Secret Service Operative* (Frank Cass, 2004) and John Earle, *The Price of Patriotism: SOE and MI6 in the Italian-Slovene Borderlands During World War II* (The Book Guild, 2005). Many of these accounts provide useful insights into the importance of special duties air operations, but little detailed coverage of air supply or infiltration issues.

³ David Martin, *The Web of Disinformation: Churchill's Yugoslav Blunder* (Harcourt, Brace, Jovanovich, 1990); extract quoted in <http://www.meltingpot.fortunecity.com/grenada/543>.

⁴ Sebastian Ritchie, *Our Man in Yugoslavia*, pp.76, 88.

⁵ Martin Gilbert, *Churchill Vol. VII, Road to Victory, 1941-1945* (Heinemann, 1986), p.319.

⁶ Ritchie, *Our Man in Yugoslavia*, pp.42-43.

⁷ FH Hinsley, EE Thomas, CFG Ransom and RC Knight, *British Intelligence in the Second World War, Vol. 3, Part 1* (HMSO, 1984), pp.137-138.

⁸ AHB file II/17/7, *Special Duty Operations in Europe* (unpublished official narrative, 1946), p.3. The first aircraft were set aside for SD work in the summer of 1940, when 419 Flight was formed at North Weald.

⁹ TNA Air 1/2387, AH No. 228/11/53 (3rd Course), memorandum entitled 'My War Experiences', by Flight Lieutenant LGS Payne, undated.

¹⁰ On RAF air transport operations between the wars see C. Cole and R. Grant, *But Not in Anger: the RAF in the Transport Role* (Ian Allan, 1979), chapters 5-8.

¹¹ Sir Maurice Dean, *The Royal Air Force and Two World Wars* (Cassell, 1979), p.80.

¹² AHB file II/17/7, *Special Duty Operations in Europe*, pp.10-11.

¹³ John Terraine, *The Right of the Line: The Royal Air Force in the European War, 1939-1945* (Sceptre, 1985), p.266.

¹⁴ *Ibid.*, p.470.

¹⁵ TNA Air 20/7962, AOC-in-C Bomber Command to CAS, 28 March 1942.

¹⁶ TNA Air 20/7954, appreciation on SOE Activities in 1943 by ACAS (P), 28 April 1943, prepared for COS (43) 98th meeting.

¹⁷ TNA Air 20/7954, COS (40) 27 (0), directive entitled 'Subversive Activities in relation to Strategy', 25 November 1940.

¹⁸ TNA Air 20/7962, CAS to DCAS, 1 April 1942.

¹⁹ AHB file II/17/7, *Special Duty Operations in Europe*, pp.15-16.

²⁰ *Ibid.*, pp.6-7.

²¹ TNA Air 20/7962, COS (41), 390th meeting, minute 6; AE to Prime Minister, 7 December 1941; Prime Minister to CAS, 9 December 1941.

²² TNA AIR 40/2605, ISLD to Minister of State, 28 September 1941.

²³ TNA AIR 40/2659, RAF Resources made available to SIS, 1939-1945.

²⁴ TNA Air 20/7962, HQ RAF Malta to Air Ministry, 4 January 1942; Plans 1 to D of Plans, 19 January 1942.

²⁵ TNA Air 20/7962, COS (42) 215, 13 April 1942.

²⁶ TNA Air 20/7962, DD Plans (O) to D of Plans, 3 February 1942.

²⁷ TNA Air 20/7954, COS (42) 133 (0), 12 May 1942.

²⁸ TNA Air 2/8336, *History of Special Operations (Air) in the Mediterranean Theatre*, p.13.

²⁹ TNA Air 20/7975, annex to COS (43) 44, 11 February 1944. Between February 1942 and January 1943 just 25 supply sorties were mounted to Yugoslavia.

³⁰ TNA Air 20/7962, COS (42) 141st meeting, 6 May 1942; TNA Air 20/7975, annex to COS (43) 106 (0), 7 March 1943.

³¹ TNA Air 20/7962, ACAS(P) to ACAS(I), 26 April 1942.

³² AHB file II/17/7, *Special Duty Operations in Europe*, p.14.

³³ TNA Air 20/7975, annex to COS (43) 44, 11 February 1944.

³⁴ TNA Air 20/7975, COS (43) 44, note by the Secretary, 11 February 1944, and accompanying annex.

³⁵ Williams, *Parachutes, Patriots, and Partisans*, pp.117-118.

³⁶ Hinsley et al, *British Intelligence in the Second World War, Vol. 3, Pt 1*, pp.141-147; Gilbert, *Churchill VII*, pp.318-319.

³⁷ TNA Air 20/7975, annex to COS (43) 44, 11 February 1944.

³⁸ TNA Air 20/7975, COS (43) 76 (0), letter and memorandum from the Foreign Office, 20 February 1943; Mideast to Air Ministry, 22 February 1943; COS (43) 44, note by the Secretary, 11 February 1943; COS (43) 94 (0), minute by the Secretary of State for Foreign Affairs and the Minister of Economic Warfare, 22 February 1943.

³⁹ TNA Air 20/7975, COS (43) 82 (0), 25 February 1943, note by the Chief of the Air Staff; COS (43) 106 (0), Secretary of the COS to the Foreign Office, 7 March 1943.

⁴⁰ TNA CAB 80/68, COS (43) 142 (0), memorandum entitled 'The Balkans', 20 March 1943.

⁴¹ Hinsley et al, *British Intelligence in the Second World War*, Vol. 3, Pt 1, pp.143-144.

⁴² TNA Air 20/7954, SOE activities in 1943, appreciation by SOE, based on the directive issued to SOE by the Chiefs of Staff, 21 April 1943.

⁴³ TNA Air 20/7954, Appreciation on SOE Activities in 1943 by ACAS (P), 28 April 1943, prepared for COS (43) 98th meeting.

⁴⁴ AHB file II/17/7, Special Duty Operations in Europe, p.17.

⁴⁵ Deakin, *The Embattled Mountain*, pp.211-213.

⁴⁶ TNA Air 20/7975, COS (43) 336 (0), annex 1, Lord Selborne to Prime Minister, 18 June 1943; annex 2, memorandum by SOE entitled 'Situation in Yugoslavia', 18 June 1943.

⁴⁷ TNA Air 20/7975, Prime Minister to General Ismay, 22 June 1943.

⁴⁸ AHB file II/17/7, Special Duty Operations in Europe, p.57; TNA Air 2/8336, *History of Special Operations (Air) in the Mediterranean Theatre*, p.12.

⁴⁹ TNA Air 20/7975, COS (43) 135th meeting (0), minutes of a War Cabinet staff conference, 23 June 1943.

⁵⁰ TNA Air 20/7976, CAS to S of S, 23 July 1943; note by the Chief of the Air Staff, 24 July 1943.

⁵¹ AHB file II/17/7, Special Duty Operations in Europe, Appendix I.3.

⁵² FO 371/37615, report by Maclean entitled 'The Partisan Movement in Yugoslavia', 6 November 1943.

⁵³ Gilbert, *Churchill VII*, pp.557-558; 561-562.

⁵⁴ Williams, *Parachutes, Patriots, and Partisans*, p.186.

⁵⁵ Hinsley et al, *British Intelligence in the Second World War*, Vol. 3, Pt 1, p.156.

⁵⁶ Williams, *Parachutes, Patriots, and Partisans*, pp.204-209.

⁵⁷ Gilbert, *Churchill VII*, pp.564-565, 571.

⁵⁸ AHB file II/17/7, Special Duty Operations in Europe, p.62.

⁵⁹ *Ibid.*, pp.79-82.

⁶⁰ TNA Air 2/8336, *History of Special Operations (Air) in the Mediterranean Theatre*, p.5; TNA Air 20/7954, report by Air Commodore Payne, 13 October 1943.

⁶¹ AHB file II/17/7, Special Duty Operations in Europe, pp.58-60.

⁶² TNA Air 2/8336, *History of Special Operations (Air) in the Mediterranean Theatre*, pp.5, 11, 12.

⁶³ *Ibid.*, p.12.

⁶⁴ Ritchie, *Our Man in Yugoslavia*, pp.78, 86.

⁶⁵ AHB file II/17/7, Special Duty Operations in Europe, Appendix I.3.

⁶⁶ TNA Air 2/8336, *History of Special Operations (Air) in the*

Mediterranean Theatre, p. 17.

⁶⁷ *Ibid.*, p.12; Hinsley et al, *British Intelligence in the Second World War*, Vol. 3, Pt 1, p.166.

⁶⁸ AHB file II/17/7, Special Duty Operations in Europe, Appendix I.3.

⁶⁹ Williams, *Parachutes, Patriots, and Partisans*, pp.173-176.

⁷⁰ AD Harvey, *Arnhem* (Cassell, 2001), p.37.

⁷¹ Lieutenant-Colonel TBH Otway, *The Second World War, 1939-1945, Army: Airborne Forces* (War Office, 1951), pp.93-94.

⁷² TNA Air 20/7962, AOC-in-C Bomber Command to CAS, 28 March 1942.

⁷³ Hugh Dalton, as Minister of Economic Warfare, was at that time the Cabinet Minister responsible for SOE.

⁷⁴ TNA Air 20/7962, CAS to DCAS, 1 April 1942.

⁷⁵ See, for example, *Royal Air Force Operations, Second Edition* (Air Warfare Centre, 2000), chapter 6, section VIII, para 4.



Training Robust Warfighters for an Agile Air Force

By Air Cdre Steve Abbott¹

The Royal Air Force Future Air and Space Concept describes clearly that to succeed in the future strategic environment the United Kingdom's air power capability must be strategically operationally and tactically agile. In this specific sense, agility has four attributes: responsiveness, robustness, flexibility and adaptability.² Delivering a tactically agile air force is first about people and the training and education that they receive. Regardless of the march of technology, warfare, whatever its form, is a human endeavour and we will win only if we bring our people to the fight with the attitude of mind that does not accept second best backed by behaviour that sets the conditions for success. It is the training and education that our people enjoy that shapes their attitude, conditions their behaviour and imbues in them a burning will to win.

In 1941, Churchill famously remarked that every airfield should be a stronghold of fighting airmen prepared to fight and die in defence of their airfields. In essence, he recognized that our airmen

had to be much more than just consummate professionals in their particular disciplines. His dictum lives on today in the strap line, *Warfighter First, Specialist Second*. War fighters are mentally agile, physically robust, self-confident leaders and followers who trust themselves and their comrades. The task facing the Royal Air Force is to train and educate our people such that they can meet this exacting standard. Exposure to Adventurous Training, as an essential component of our Force Development initiative can achieve this. Experience and rigorous academic research demonstrate the validity of this approach. This article will outline the issues we face with our recruits, the lessons of history and experience, the practicality of using Adventurous Training, its aims, structure, resource commitment and an assessment of its perceived value.

The human issues we face

In considering the demands of life in the Royal Air Force versus those of civilian life, we can identify that it is more than just an issue of organizational

culture. Culture undoubtedly serves an important purpose but there are also real practical differences. In the Royal Air Force — a fighting service — an individual's specialist technical skill be it aircrew, caterer, engineer, logistician, must be capable of being applied in the context of a war fighting environment. For example, the Royal Air Force movement team that carried out the offload, refueling and dispatch of transport aircraft on a blacked-out airfield under artillery attack in Kabul in April 2002³. Equally, all of our people are required to undertake tasks that fall outside of their primary trade such as guarding or convoy support. Again, to use an example from recent operations in Kabul, when a dozen Royal Air Force firefighters faced up to a hostile crowd of over 300 people to rescue two individuals in danger of being beaten to death⁴.



These people are often very young, the oft-maligned 'youth of today'. Some key statistics define this population. The average 18-year-old today has 10 times the disposable income of his and certainly her, counterpart of 1960. However, this group does not achieve financial independence until the age of 26, as opposed to 18 in 1960. Today, 40% of young people enter higher or tertiary education compared to 19% in 1960, with all of the consequent inevitable challenges to the demographics of the recruiting pool. Today, young people have their imagination stimulated and consequently their expectations expanded by the big world of television, the internet, and newspapers. These media are not necessarily accurate indicators of the real world of work. In consequence, our recruit pool suffers a mismatch between expectation and reality. However, despite this, young people do still join the Service, indicating that there is still a match between their personal ethos and values and those that the Service espouses. We can state with confidence to any recruit that the Royal Air Force offers early financial independence, security, social structure, support and most importantly, identity. The organization clearly meets the individual need. The challenge is to determine how we train and educate the individual to meet the needs of the Service where operations are expeditionary in nature, Joint with the Royal Navy and Army, invariably combined with multi-national Allies and where ambiguity in terms of the roles to be performed is the norm. The key issue that faces all Servicemen in modern warfare is ambiguity, the paradigm of the '3 block war', that shifts between combat, peace keeping, peace enforcement and humanitarian assistance in no time at all. Yet many of today's young recruits



It is a truism that those who ignore the lessons of history are doomed to repeat them

lack any real experience of the hard mental and physical challenge this paradigm demands. Their expectations are all too often media based; their exposure to risk conditioned by the Playstation environment of unlimited energy and immortality. The Service requires them to substitute this vicarious experience for the real life environment and it needs them to do so quickly. Moreover, it is not just a recruit training issue. All of our people must be able to operate in small adaptable teams in environments of increasing complexity and risk.

So why Force development (adventurous) training?

It is a truism that those who ignore the lessons of history are doomed to repeat them. Societies throughout history have identified and overcome this challenge before. Throughout human history, all societies have embraced adventurous, physically and mentally demanding 'rites of passage'. Plato believed that we develop 'the virtues' through active experience and exposure to risk. Yet the paradox is that modern British society, and in particular its educational system, is more risk averse than at any other time in our history. A training gap exists for the modern Royal Air Force. The solution the Service has chosen to follow and needs to develop further has its roots in the school of progressive and experiential education; an area principally influenced by the thinking and teaching of Kurt Hahn. Crucially, we can identify a defining moment when the modern use of adventurous activities as training media emerged, specifically, the story of how the Battle of the Atlantic in World War II led to the establishment of the Outward Bound Movement.

Lawrence Holt, a shipping magnate, identified a problem. Young Merchant Navy seaman of the Blue Funnel Shipping line suffered lower survival rates post a U-Boat attack than their older comrades. He approached Kurt Hahn seeking to redress the issue. Hahn derived an experiential solution that used adventurous activity to equip young sailors with real life experiences that would help to build up their mental and physical resilience. The first Outward Bound programme was run at Aberdovy in 1942. Outward Bound derived its motto 'to serve, to strive and not to

yield' from Tennyson's poem Ulysses — 'The Hero's Journey'. Hahn called Outward Bound the 'moral equivalent of war'. His words resonate today:

"There is more in us than we know. If we can be made to see it, perhaps, for the rest of our lives we will be unwilling to settle for less."⁵

An essential tenet of the Outward Bound experience was that it should not be directive or dictatorial. The concept was and still is to develop free thinking, resourceful individuals with a high degree of social awareness and responsibility. Again, Hahn's words resonate:

'It is the sin of the soul to force young people into opinions — indoctrination is of the devil — but it is culpable neglect not to impel young people into experiences.'⁶

In the Service, our task is to kindle the spirit of adventure with its components of physical and mental resilience and risk-taking by providing opportunity — the crucial step forward. The Royal Air Force approach to Force Development (adventurous) training reflects this and it has also been influenced by and developed through the schools of experiential education and humanistic psychology. There has been continuous programme development ever since the Royal Air Force opened its first specialist-training centre at Grantown on Spey in 1971.

Established educational theory has identified that adventurous training plays an important role in educating and training people. In terms of experiential education, David Kolb defined a four-stage learning cycle: concrete experience, reflective observation, abstract conceptualisation and active experimentation.⁷ The United Kingdom educational system and importantly, much of Royal Air Force specialist training concentrates upon only two of these: abstract conceptualisation and active experimentation. Adventurous training programmes use all four, which makes them both effective and memorable. In terms of humanistic psychology, the Service is increasingly turning to the concept of learner centred education, versus

system centred. In such a humanistic approach, the acceptance of personal risk and responsibility in an environment of mutual respect is fundamental. It is clear that such an outcome is wholly in tune with the core values of the Royal Air Force Respect, Integrity, Service and Excellence.

Service personnel engaged in adventurous training also gain health and well-being benefits from undertaking such activities. Even modest bouts of adventurous activity provide psychological advantages. The least fit gain the most advantage from inactivity to modest activity in the outdoor environment. Moreover, the psychological benefits of exercise (stress reduction, enhanced mood, improved self-esteem and self-confidence) are greatly enhanced if completed through the wilderness experience.

The practicality and aims of Force development (adventurous) training

Adventurous training provides an exceptional experiential training environment. Activities are easily tailored to develop, promote and test leadership, team dynamics and personal development. The medium makes it relatively simple to engineer variable outcomes for differing individuals within the same programme and in a resource constrained environment. Adventurous training activities are easy to organize at varying levels of complexity and are relatively inexpensive when compared to other aspects of technical and operational training. In addition, adventurous training provides practical training in military skills alongside its core life skills training, such as field living, navigation, self-management and a minimalist attitude leading to personal resilience. It is worth noting that minimizing the deployed footprint in expeditionary operations is a problem currently uppermost in the minds of military planners. The degree of support required by our people in adverse environments can even influence the decision to commit or not. British Servicemen have long rejoiced in the epithet the 'Flintstones' amongst our Allies for their ability to do more and live with less.



RAF Force Development through the medium of adventurous training has the following aims:

Leadership Training. The use of real scenarios with demonstrable consequences that involve the management of live risk and ambiguity. In addition, we seek the development of our leaders' conceptual skills, those of judgment and creativity.

Team Development. An understanding of team dynamics and team performance in a testing environment requiring a resourceful and collective approach.

Personal Development. The challenging of individual perception and behaviours to realise personal potential. In addition, the development of 'human factor' skills relevant to the Service: resilience, self-awareness, self-efficacy, communication skills, determination, courage, resourcefulness, humility, followership and social responsibility.

The training structure

The Royal Air Force structures the use of adventurous training as a medium in two ways:

1. Formal Training. Formal Training involves the use of specific syllabi for specified Phase One (recruit) and Phase Two (specialist trade) courses.

British Servicemen have long rejoiced in the epithet the 'Flintstones' amongst our allies for their ability to do more and live with less

Initial Officer Training delivers two of its leadership phases through adventurous training. The first is a self-awareness week (*before you lead others, you must lead yourself*) run in Snowdonia. The second is a week of applied leadership (*the Hero's Journey*) based upon an extended self-supported expedition through the Scottish highlands.

Royal Air Force personnel undertake a resource and initiative training course during their Phase 2 specialist training.

2. Informal Training. Service Force Development training, a command led activity, aims to develop operational capability beyond the confines of trade specific training. It uses adventurous training in its leadership, ethos and collective training domains. In addition, the Service runs a partially public funded scheme to encourage personnel to organize and undertake adventurous training activities on a voluntary basis.

Resource commitment

The primary Service commitment to Force Development (adventurous) training is through its specialist, uniformed, Physical Education specialization. There are 122 formally qualified Adventurous Training Instructors throughout the Service. Forty are employed at three Force Development Training Centres: Crickhowell, Grantown on Spey and Fairbourne. These centres offer 3,500 spaces per year for five-day training programmes. In addition, individuals throughout the Service can acquire adventurous trainings qualifications in specified disciplines on a voluntary basis.

The development of the uniformed instructor cadre has been crucial to the success of our training strategy. The role of the instructor/facilitator is integral to effective delivery. They are able to provide both the adventurous training experience and the vital contextual link to the operational environment.



The Royal Air Force enjoys significant advantages over civilian providers of this style of training, albeit direct comparison is difficult. Our pool of programme leaders are already formally trained Physical Training Instructors — our Physical Education specialization. This Branch enjoys a good retention rate justifying the investment in each individual instructor's adventurous training skills. We are thus able to field an instructor cadre that has both the technical competencies and coaching skills to deliver the desired level of physical challenge and conceptual depth. Such training takes some years to acquire and both the qualifications and practice are continuously benchmarked against the requirements of the Adventurous Activities Licensing Authority and the Adult Learning Inspectorate. Significantly, many of our training interventions occur whilst our personnel are in the formative stages of their training. This affords a unique opportunity to imbue a strong sense of our Service values and our culture. At an impressionable period in the development of our people, the instructor cadre — air minded and operationally experienced — provides exemplary role models.

In addition to this, each station in the Royal Air Force deploys a Force Development Squadron, which promotes the concepts described at unit level. Station commanders are subject to a performance indicator that requires 15% of their personnel to undertake some form of adventurous training each year. This is commonly exceeded.

Perceived value

No military activity today is immune from the most rigorous and regular scrutiny to confirm its continued relevance. Force Development (adventurous) training has been extensively researched from a variety of perspectives: corporate, educational, therapeutic and military. Some key findings for the service have looked at:

Psychological Resiliency. Neill and Dias⁸ showed that in the face of stressful events, the existence of a social support group could have a positive effect on individual resilience. The practical testing of this factor, through experiencing an adventurous training programme, leads to a transferable belief

in self-efficacy and the team unity.

Longevity of Training Outcome. Hattie et al⁹ demonstrated that there was a significant longevity of benefit from the outcomes of adventurous training compared to non-experiential and indoor based programmes. During Operation FINGAL in Kabul, it is worth recording that the five key executives in the Royal Air Force deployed operating base command chain had enjoyed regular exposure to adventurous training. One had been commended for his bravery and leadership during the rescue of an injured climber on an expedition to climb Mount Aconagua in Chile.

Aggregating a wealth of published research reveals the following potential benefits from Force Development (adventurous) training:

Psychological	Sociological	Practical	Physical
<i>Self-concept</i>	<i>Respect for others</i>	<i>Leadership</i>	<i>Fitness</i>
<i>Confidence</i>	<i>Group cooperation</i>	<i>Problem solving</i>	<i>Skills</i>
<i>Self efficacy</i>	<i>Communication</i>	<i>Value clarification</i>	<i>Strength</i>
<i>Actualization</i>	<i>Behaviour feedback</i>	<i>Field skills</i>	<i>Coordination</i>
<i>Well-being</i>	<i>Compassion</i>	<i>Improved academics</i>	<i>Catharsis</i>
<i>Personal testing</i>	<i>Friendship</i>		<i>Exercise</i>
	<i>Belonging</i>	<i>Environmental awareness</i>	<i>Balance</i>

However, perhaps the most powerful assessment of the training value comes from the Servicemen and women who have undertaken this training. These are our war fighters; they are being tested daily in Iraq, Afghanistan, Sierra Leone and the Balkans to name but a few of the world's hot spots. The mental and physical agility to cope in adversity is vital, as is the discipline and restraint demanded by what General Rupert Smith has

recently described as the new paradigm in post-industrial warfare — war amongst the people.¹⁰ There is overwhelming evidence that exposing our Service men and women to rigorous, challenging adventurous programmes that by design involve significant real physical risk, develops the attitudes, behaviours and above all the determination to win that marks us out from the rest.

“The course was not what I had expected. There was a thinking side to all the activities and I thoroughly enjoyed the end of the day reflection sessions.”

“I have found it a valuable experience and an opportunity to get involved in a risk environment with a team of people I did not necessarily know well.”

“I was surprised at what I was capable of and will have more respect for my own abilities and trust in my team mates.”

“The activities certainly met their aim of being more ‘real life’ orientated than a lot of my other RAF training.”

“I certainly learned things about myself on the high ropes day and I learned how to deal with anxiety in an alien environment.”

Notes:

¹ The author acknowledges the unstinting support and assistance of Sqn Ldr R Clark, OC FDTC Fairbourne, in the production of this article.

² UKFASOC, p2.

³ RAF Leadership Anthology, p.109.

⁴ op cit p.108.

⁵ This was one of Hahn’s fundamental aphorisms and a tenet that he used as a motto “plus est en vous”.

⁶ Address by Dr. Kurt Hahn at the Annual Meeting of the Outward Bound Trust on 20th July, 1960

⁷ Kolb D A (1984) Experiential Learning: experience as the source of learning and development New Jersey: Prentice-Hall

⁸ Neil J T & Dias K L (2001). Adventure education and resilience: The double-edged sword. Journal of Adventure Education and Outdoor Learning, 1, 35-42

⁹ Hattie J. Marsh, H. Neil T & Richards G (1997) Adventure Education and Outward Bound: Out-of-class experiences that have a lasting effect. Review of Education Research, 67, 43-87.

¹⁰ Smith, General Sir Rupert, The Utility of Force, (Allen Lane, 2005).



Sustaining Air Power – The Influence of Logistics on Royal Air Force Doctrine

By Air Vice Marshal Peter Dye

Writing in 1942, Sir Frederick Sykes, the first Commander of the Royal Flying Corps (RFC) and later Chief of the Air Staff, briefly outlined how the motto *Per Ardua ad Astra* had been selected. Although he noted that some thought it bad Latin, he did not choose to elaborate on why it was the “best possible choice”.¹ For Sykes and his contemporaries the reasons would have been self-evident. The RFC had emerged in the face of institutional hostility, inter-Service rivalry, political indifference and significant technical and environmental challenges. The struggle to master the air — and the language of the time continually repeats this combative tone — had exacted a heavy price. The ethereal (the heavens) had been gained through human (mortal) effort. But, there was perhaps an even deeper message: the paradox that was the aspirational nature of air power and the laborious, sometimes mundane and frequently complex arrangements needed to support military aviation. Thus, while the bravery and dedication of those individuals who helped to create the RFC was not in question, it was evident that the freedom of the skies (and the boundless military potential they offered) was

in stark contrast to the fragility (often literal) of powered flight.

This paper explores how the question of sustainability has influenced British thinking on air power. It explores the often-troubled relationship between support activities, particularly logistics, and the delivery of military capability. It also touches on organisational and cultural issues and finally it considers how current paradigms may change with the increasing focus on effects-based operations and the arrival of network-centric warfare.

Sustainability and logistics

Logistics and sustainability are not the same thing, although there is sometimes an implication that they are. Strictly speaking, sustainability is the “ability of a force to maintain the necessary level of combat power for the duration required to attain its objective”.² Logistics, as the science of planning and carrying out the movement and maintenance of forces, clearly contributes to sustainability but then so do training, intelligence, planning and a wide range of other support or enabling activities

that are certainly not embraced by the term 'logistics'.

Sustainability is now properly regarded as a Principle of War and, while logistic activities are hugely important in contributing to this core capability they are subordinate to this end, together with the associated support strategies and organisational arrangements.

Enabler or impediment?

Military aircraft spend much of their working lives parked comfortably on the ground, protected from the very elements that they supposedly conquered at the turn of the twentieth century. It is not just gravity that keeps them there. The cost, complexity and effort needed to sustain military aviation are considerable. Air forces have learnt how to manage these activities by focusing on process and organisation, but there remains a suspicion that the logistician is as much an impediment as an enabler in the delivery of air power. For example, does the supply chain drive the machine forward or drag it back? Current sentiment seems to prefer the latter perspective. The popular press certainly seems unable to employ the word 'logistic' without the juxtaposition of 'failure', 'shortage' or 'crisis'.

These views are neatly encapsulated in Hoffman Nickerson's observation that "*Air Power is a thunderbolt, launched from an eggshell, invisibly tethered to a base*".³ Dramatic effect is balanced by a sense of fragility while still leaving one to wonder whether the tether should be viewed as an umbilical or as a brake.

Organisational egg or doctrinal chicken?

To address the question of how sustainability has influenced British thinking about air power we need first to confront the conundrum of what came first, the doctrinal chicken or the organisational egg? The widely used Doctrinal Development Model suggests that the process is best seen as a continuous loop linking doctrine, output, feedback and input. While this may be an entirely adequate concept, it does beg the question of what came first. My personal view is that logistic processes have so dominated the delivery of air power that doctrine has largely followed in their wake. This

is as true today as it was when the Royal Air Force (RAF) was created.

The First World War

On the morning of 7 April 1918, with the airfield at La Gorgue shrouded in heavy fog and the advancing German Army expected shortly, Major Chris Draper ordered the burning of all 16 Sopwith Camel fighters belonging to No 208 Squadron, RAF. Two days later, the squadron had relocated to Serny, over 20 miles to the west and was actively engaged in the continuous air operations that sought to halt the German March Offensive before it could threaten the Channel ports. As the squadron commander later recalled "*It says a lot for the Supply Depots that we got our full complement of 20 new machines within 48 hours*".⁴

This small incident, in a long and intensive war, provides some indication of the scale and effectiveness of the logistic system that underpinned the British air effort on the Western Front. The value of the machines burnt at La Gorgue represented £5 million at today's prices; yet new aircraft were available almost immediately as were the technical personnel, ground equipment, spares, fuel, ammunition, vehicles, tools, repair facilities and hangarage needed to support a frontline squadron.⁵

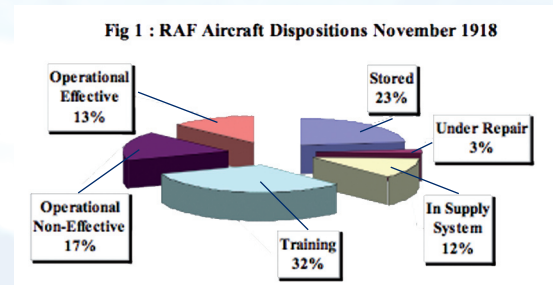
The First World War and its aftermath largely shaped the 20th Century. In scale and intensity it was quite different from any other war previously fought. It was also a conflict in which technology dominated events to an unparalleled degree. John Terraine has observed that "*the Great War was from the beginning the greatest war of technical innovation ever fought*", adding that modern wars had become — as a war of masses with modern weapons sustained by modern mass production — "*a matter of organisation and specialist skills in all the complex areas of logistics*".⁶

It is arguable that the most complex logistic challenge was faced by the air services as they sought to realize the potential of air power. Over recent years there has been a gradual recognition of the immense and sophisticated efforts needed to sustain the Western Front, as part of a more

balanced and dispassionate analysis of the conflict. The air war has not attracted the same level of interest, let alone controversy, even though it presaged the great air offensives of the Second World War. In fact, there has been a remarkable lack of debate about how, in a matter of a few years, a pre-war novelty was turned into a weapon capable of influencing the course of battles and ultimately war itself.

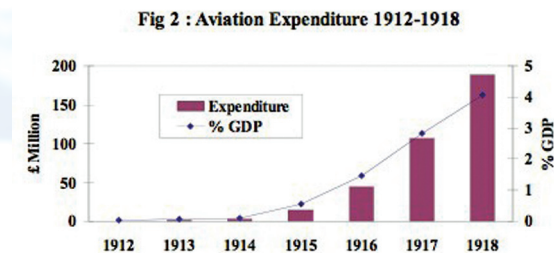
Between 1914 and 1918 the air arms of all the major belligerents, with the exception of Turkey, underwent a revolutionary transformation, but none more so than the British Air Services. By the Armistice, the RAF possessed 22,171 aircraft and boasted a total strength of 274,494 personnel compared to the RFC and Royal Naval Air Service combined strength of 270 aircraft and 2,073 personnel on the outbreak of war.⁷ The RAF also possessed, according to the author of a post-war study, the most fully developed system of aviation supply amongst the Allies.⁸

There is some danger, however, in focusing just on the gross number of aircraft. It masks a fundamental characteristic of air power — the high ratio of support to operational activities. If the frontline squadrons were the RAF's cutting edge of the spear, the shaft represented the greater part of the weapon. Of the 22,171 total, just 6,740 were assigned to operational duties (including the Western Front, Home Defence and Anti-Submarine activities). Out of these, only 2,896 could be regarded as effective (11% of those on charge: the remainder being in store, in transit or under repair. At any one time a further 10-15% were unserviceable, leaving approximately 2,500 aircraft to be employed on operations. While much of the difference is explained by the need to hold significant reserves against attrition, the number of operational aircraft was unquestionably modest compared to the total inventory (*Fig 1*).⁹ The scale of the resources needed to sustain this frontline, equivalent to some 200 squadrons in 1918, was unprecedented. The national effort was substantially larger than the total uniformed strength of 274,494 implies. When the civilian labour involved in aircraft and aero-engine production, provision of spares and repair is taken



into account, the number of personnel required rises to around 630,000 (including trainees, instructors and support staffs).¹⁰

By the Armistice, the total cost to the nation, in materiel and human terms, amounted to the equivalent of £200million per year, or 4% of the UK GDP. Daily expenditure on the RAF had reached over £0.5 million, or 7% of Britain's total daily war expenditure (*Fig 2*). This was set to rise still further with some £165 million of outstanding aviation orders, more than half the production commitments of the Ministry of Munitions, at the time of the Armistice.



The result of this huge investment was the production each month of an average of 4,000 aircraft, 3,900 aero-engines (including those repaired or rebuilt), 1,200 pilots and 3,000 other ranks. Without this effort, average monthly losses of 2,200 aircraft and 3,000 aero engines (written off and damaged) and some 800-900 pilot casualties would have rapidly curtailed operations.

The logistic system embracing these varied activities had few if any parallels in history. By the Armistice, the RAF's technical inventory

comprised more than 50,000 separate line items. No business had ever had to manage a stock holding of this size or complexity; a challenge made all the more difficult by the delicate nature of much of the equipment and spares involved, rapid obsolescence and high modification rates.

Organisational implications

The First World War demonstrated that sustaining an effective air force required significant economic and industrial power allied to a large and complex support organisation. It is not surprising, therefore, to find that the level of increase in resources committed to the air services was significantly greater than to the Army (Fig 3). Trenchard's strategy of the "relentless and incessant offensive"¹¹ was only tenable because the necessary human and material resources were made available.

Fig 3 : Relative Increase in Military Resources 1914-1918



It was known before the war that the arrangements needed to support military aviation possessed quite distinct characteristics. Sefton Brancker described, in June 1914, how the difficulties of maintenance were sometimes lost sight of and that the fragility of aircraft, the need for repair and large quantities of spares together with the difficulty of supply meant that "only a small proportion of the aeroplanes in the field will be fit to take to the air at any given moment".¹² In fact, sustainability was a major consideration in the decision to standardise on the squadron as the basic organisational building block for the RFC and, ultimately, for the RAF.¹³

Wastage rates were high as a result of accidents and low reliability as much as from enemy action. This demanded a constant stream of replacement aircraft and aircrew. The disparity between new production and supply, particularly in aero-engines, meant that salvage, repair and

maintenance made a significant contribution to sustainability. Obsolescence, design and manufacturing shortcomings and shortages in critical equipment meant that a high level of modification and rework had to be undertaken in the field. A wide range of special equipment, tools and a myriad of individual parts and components needed to be readily available on the frontline squadrons to support these activities as well as routine maintenance — under the constant threat of a short notice move. The result was an extensive ground organisation, employing large numbers of skilled and semi-skilled personnel, underpinned by a supply chain that stretched from the frontline, via the repair depots and air parks, to the factories at home.

Aircraft and their component parts largely populated the supply pipeline, together with a constant flow of technical information, spares, equipment and personnel. Unlike traditional military logistic systems, it was not dominated by a one-way flow of consumables but by scarce, high value items that moved to and from the frontline in a constant cycle of replacement, salvage and repair.¹⁴ As a result, and unlike any other arm or any previous army, non-combatants greatly outnumbered combatants. This was no subtle shift in the balance of roles but a step change in the 'teeth-to-tail' ratio. Thus, of the 51,000 RAF uniformed personnel serving in France by November 1918, only 8% were classed as combatants (pilots, observers, air gunners, etc) while the majority, some 29,000 (57%) were technicians. By comparison, 896,000 personnel (65%) of the British Army were classed as combatants (Fig 4).

The other defining feature was the balance of expenditure between personnel and equipment.

Fig 4 : Relative Proportion of Combatants - France 1918

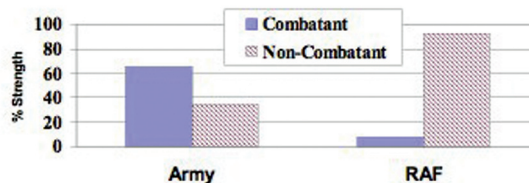
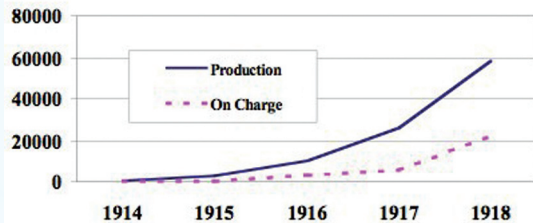
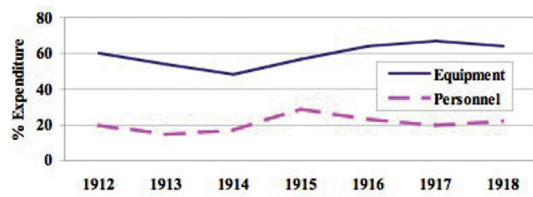


Fig 5 : Aircraft On Charge - British Air Services 1914-1918



During the course of the war more-than 50,000 aircraft were delivered to the British air services of which only 36% remained on charge by the Armistice (Fig 5). In 1918, squadron frontline establishments were replaced on average every two months. Notwithstanding the importance of repair and salvage in helping to recycle aircraft, aero engines and components, huge sums had to be committed to sustain the frontline. Throughout the war, between 50% and 60% of the budget allocated to the British air services was expended on equipment (Fig 6).

Fig 6 : Air Service Expenditure by Category



In summary, the RAF was created around a system of inter-linked and interdependent logistic activities, that moved high-value materiel continuously backwards and forwards at a tempo determined by daily attrition, combat operations and technological advances — JFC Fuller's 'constant tactical factor'.¹⁵ It was a system unprecedented in both scale and intensity. Moreover, the efficiency and effectiveness of these arrangements directly governed the degree to which air power's potential could be realised. In this sense, logistics acted as air power's wet nurse and, in so doing, established a dependency that has lasted for 90 years.

The creation of the Royal Air Force

Concerns about sustainability also provided the catalyst for the creation of the RAF. The political imperative for an offensive air strategy and secure home defence could only be realised by the deployment of substantial national resources and closer military-industrial co-operation. The Joint War Air Committee formed early in 1916 (and the subsequent Air Board) were direct responses to the squabbling between the Services over the supply of aircraft and engines and the self-evident need to set priorities for the allocation of aeronautical material. In as much as this established a favourable environment for an independent air arm, it may be claimed that the RAF was created as a structural solution to the wartime problem of maintaining an adequate supply of aircraft and aviation personnel.

Strategic bombing

The creation of the Air Board and the more effective direction of production under the Ministry of Munitions saw significant improvements in sustainability. The expectation of a surplus in aircraft and aero-engine production by the end of 1917 led directly to the creation of the Independent Force intended to attack military and strategic targets in Germany. In the event, the full increase in production was not achieved but by then the Independent Force had been created to employ the notional surplus of men and machines. Eventually, some 10 squadrons out of the planned 40 were formed. Even if the numbers employed fell short of those planned, and the operational results lacklustre, the experience had a profound influence on RAF doctrine. Thus, an optimistic view of sustainability in 1917 led to the RAF's first steps in strategic bombing and, ultimately, to the Second World War's combined bomber offensive.

The First World War legacy

I have laboured the point about the interdependence of air power and logistics because the nascent RAF, at an organisational level, was designed around the support arrangements needed to sustain operations in war. While there was no 'lessons identified' process, the central role of logistics in the delivery of air power was widely recognised and understood. Air Commodore Robert Brooke-Popham, lecturing

shortly after the end of the First World War, stated that:

*"It is, therefore, of the highest importance that spare machines and spare parts of every sort shall be instantly available. This means large base depots and an efficient channel of supply between depots and squadrons and on the sound working of this supply system the efficiency of the Air Force in any theatre of war very largely depends."*¹⁶

In the years that followed, Trenchard sought to construct (literally) an air force worthy of the name. The RAF Cadet College and the RAF Apprentice School were the most obvious elements in this strategy but they were part of a wider programme that enshrined a logistic-centric view of air power based on a substantial investment in support activities. Speaking in 1944, Trenchard recalled that:

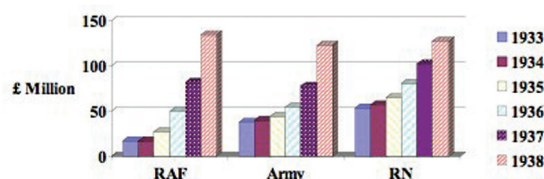
*"When we originally formed the Air Force in those days we were told that we were spending all our money on bricks and mortar, and on ground staff and ground personnel. In fact . . . it was called 'the Ground Force' and I believe I was myself once described as 'GOC Ground Force'."*¹⁷

The importance attached to organisation and process was reflected in the RAF War Manual. *"Under the modern conditions in which fighting services are called upon to operate, victory inclines to the force which is most thoroughly and efficiently organized."*¹⁸ A recurrent theme in pre-war planning was the high wastage that war would bring. In a paper on 'Some Problems of a Technical Service' read at the RUSI in 1934 (with Air Marshal Sir Robert Brooke-Popham in the chair), the author stated that the average life of an aircraft in war would be two months — based on First World War experience — and that large reserves and high production rates were essential, underpinned by long preparation and skilled repair personnel.¹⁹

Thus, the expansion of the RAF from 1934 onwards, although overtly dominated by the need to match the Luftwaffe's frontline, also sought to provide the resilience needed to fight

a modern war. This was not a policy of quantity over quality, although there was some criticism — from even within the Service — that there were dangers in pursuing the mass-production methods employed in the First World War.²⁰ By and large, new technology was successfully introduced while substantially increasing the size of the frontline and the supporting reserves — consuming some 36% of the rearmament budget in the process (Fig 7).

FIG 7 : COMPARISON OF ANNUAL DEFENCE EXPENDITURE 1933-1938

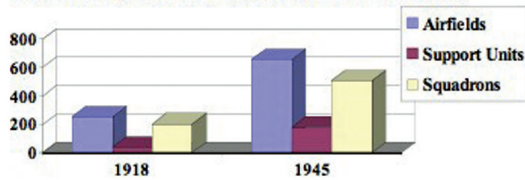


The result was a vast array of depots and maintenance units, specialising in storage, repair, salvage and armament — that had no parallel in the Luftwaffe where the doctrine of a short war negated the need for investment on a similar scale. Thus, over a period of 20 years the home-based RAF had been transformed from what was largely a training organisation based around grass airfields and temporary accommodation to a permanent system of stations and maintenance units that would provide the fighting platform for both defensive and offensive action.

The impact of this change was deeper than might be imagined as it touched on that most intangible of issues — ethos and culture. The station became not only the key element in the exercise of command and control but also a microcosm of the Service itself. In this sense, the station occupied a very different position to the garrison, shore establishment or dockyard. This was reflected, if nothing else, in the status and authority of the station commander enshrined, for example, in King's Regulations and the Air Force Act. While squadrons were the fighting arm, the majority of RAF personnel would serve on the strength of a station, undertaking the wide range of support activities needed to keep aircraft flying.

To shed some light on the differences between the Services it is interesting to note that in both 1918 and 1945 the RAF possessed more airfields and support units in the UK than frontline squadrons (Fig 8). The same could certainly not be said about the number of ports and warships or the number of garrisons and regiments.

FIG 8 : UK AIRFIELDS AND SUPPORT UNITS

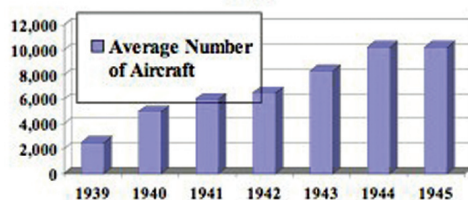


The Second World War

This massive investment in sustainability came into its own during the Battle of Britain. The disparity in approach to logistic issues became clear as the campaign progressed. Fighter Command maintained, if not enhanced its frontline numbers during the battle while the Luftwaffe declined in strength as aircraft availability fell and aircraft and pilot wastage rose beyond the supply of replacements.

Notwithstanding heavy losses (fighter wastage reached over 50% per month during 1940) RAF reserves continued to grow throughout the war. The average number of aircraft in storage in awaiting issue to the Metropolitan Air Force rose steadily, reaching over 10,000 by 1944, where it remained until the end of the war (Fig 9).²¹

FIG 9 : AIRCRAFT IN STORAGE 1939-1945



While some commentators have criticised the Allies for employing their significant economic and industrial capacity to support a military

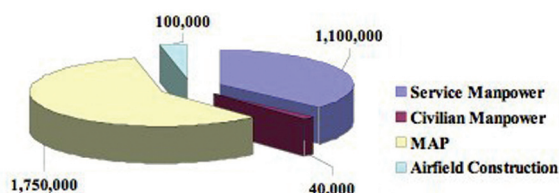
strategy built on brute force, the attritional nature of modern warfare and the pace of technological development allowed little choice.²² It is true that both the RAF and the USAAF drew relied on high production rates, an extensive supply system and comprehensive support arrangements in order to overcome significant wastage. However, it is also true that this abundance of resources arose from careful and detailed planning that drew heavily on what had been learnt about sustainability and air power in the First World War. Both air forces had long recognised that warfare in an industrial age demanded supply on an industrial scale.

The closest parallel to Trenchard's 'incessant offensive', the combined bomber offensive, was founded on a massive industrial effort and a world-wide training programme that produced sufficient heavy bombers and crews to maintain operations in the face of desperate attrition. During the course of the war Bomber Command lost more than 74,000 aircrew killed, wounded or prisoners of war and 12,330 aircraft to operational and non-operational causes²³ — against a frontline strength that reached 4,384 aircraft by May 1945. During the course of 1944, 12,295 heavy bombers were delivered to Bomber Command — 3,285 repaired and the remainder new production²⁴ — a wastage rate of 95%.²⁵

The manufacture, modification and repair of aircraft had, by 1943, become Britain's largest industrial operation.²⁶ From 1939-1945 over 131,000 aircraft were produced, compared to 55,000 in the First World War. However, the complexity and weight were a magnitude greater, as was the cost. In 1943 alone, expenditure on new production by the Ministry of Aircraft Production (MAP) totalled some £800 million (equivalent to £83 billion at today's prices).²⁷ Total wartime expenditure on aircraft and related equipment exceeded £3,750 million (£385 billion) while the capital cost expended in creating the necessary industrial capacity amounted to £350 Million (£36 billion). Overall, more than 36% of wartime defence expenditure²⁸, around 20% of the UK GDP, was committed to the RAF, of which some 40-50% comprised equipment costs.

At its peak, in the summer of 1944, more than three million personnel were employed in aviation-related activities — including 1.7 million in MAP and more than one million in uniform (Fig 10). This compares to a total employment of 630,000 in the First World War. In fact, the remorseless consumption of labour by the RAF and the MAP soon became unsustainable and had to be scaled back in favour of the Army and other critical war industries.

FIG 10 : BRITISH AVIATION MANPOWER - JULY 1944

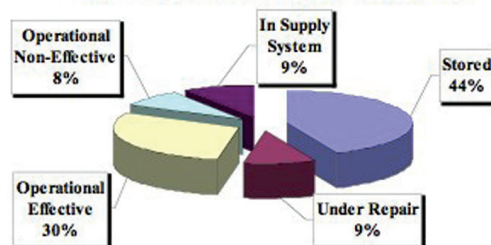


Nightly attacks by hundreds of heavy bombers against targets in Germany and Occupied Europe also demanded a sound and secure infrastructure. The airfield construction programme from 1939-1945 was Britain's largest civil engineering project since the building of the railways in the nineteenth century. A total of 444 new airfields were constructed in the UK from 1939-1945 at a cost of £200 million (£20 billion) and employing more than 300,000 men at its peak.²⁹ Roughly 1,800 airfields were constructed world-wide over the same period.³⁰ Each airfield consumed a vast range and quantity of resources, ranging from hardcore, concrete and bitumen for the runways, taxiways, dispersals and roads to wood, bricks and steel for the technical accommodation and hangars. Stations — and there were 59 distinct designs dependant on functional role³¹ — also required dedicated utilities, water and waste disposal as well as extensive storage facilities and domestic accommodation. In 1942 more than £145 million (£16 billion) were spent on works for the RAF compared to just £4 million in 1935, at the start of the expansion programme.³²

By the end of the war, the RAF frontline comprised more than 500 squadrons and 9,250 aircraft. More than 10,000 aircraft were in store and 2,200 under

repair in the UK alone. New aircraft were being delivered at the rate of some 2,000 per month. The total RAF inventory was closer, therefore, to 23,000 airframes — a similar picture to that found 40 years before (Fig 11).

Fig 11 : RAF Aircraft Dispositions May 1945



Post-war organisational models

While the scale of the effort expended on the RAF during the Second World War was impressive, every brick laid and ton of concrete poured, anchored the Service's future to its infrastructure. Demobilisation and substantial reductions in manpower and estate did not alter the emphasis on the station as the RAF's centre of gravity. The Cold War, and the decreasing importance of expeditionary operations, enshrined this perspective, assisted by further infrastructure investment to accommodate heavier and faster aircraft as well as new roles, such as nuclear deterrence.

The early post-war years also saw a succession of studies and trials designed to determine optimum working patterns and organisational structures. This work had commenced during the war with research into improving manpower utilisation and aircraft availability through 'planned flying' and 'planned servicing'.³³ The focus was very much about treating operational output as a mechanistic process that could be improved using work study methodologies.

A similar effort was expended on determining best practice in the deployment of station manpower and appropriate station structures. An experimental station organisation was trialled at RAF Tuddenham in 1946.³⁴ One of the aims was to relieve the station commander of a mass of

administrative work. It was also hoped to weld station personnel into a single unit and thereby foster a good station loyalty and morale. A related study at RAF Binbrook also took place in 1946 — it is perhaps the more famous of the two trials. From this latter study emerged the ‘standard’ three wing station structure (Executive, Technical and Flying) that has been the foundation of RAF station structures to this day.³⁵ The subsequent ‘Benson Experiment’, conducted in 1956, sought to address a number of detailed process and procedural issues largely related to personnel conditions and group cohesion.³⁶

The effort put into these studies — in addition to related work on squadron structures and the management of maintenance (centralised, autonomous and semi-autonomous) — was tacit recognition that the station was central to how the RAF went about its business. They might also be seen as ‘legitimising’ the role of sustainability in determining the organisation and management of the Service.

While the Cold War reigned, and with expeditionary warfare a remote prospect, there was little incentive to change structures and certainly no challenge to the station’s primacy in the organisational hierarchy. Command of a station remained the aspiration of every ambitious officer and was widely seen as a critical test of an individual’s ability and career potential. The station also loomed large in RAF culture, providing the social and domestic focus for the wider Service community. It is hardly surprising, therefore, that attempts to modify the basic station structure or to develop innovative administrative and operational arrangements, such as the Bentwaters/Woodbridge ‘Twin-Base Concept’ in 1991, met considerable hostility.

Expeditionary warfare

RAF organisational structures and their associated processes continue to reflect the arrangements developed during the Second World War. The emphasis on infrastructure, the heavy investment in equipment and the high ratio of support to combatant personnel have been defining characteristics of our Service for nearly 90 years.

Expeditionary warfare and network enabled capability may be about to shift this particular paradigm. The End-to-End Logistic Study³⁷, now known as the Logistic Transformation Programme (LTP), and continuing work on station structures offer the prospect of a significant change in the way the RAF is organised. Expenditure on aviation logistic support and on the procurement of aviation and aviation-related equipment continues to represent a significant proportion of the defence budget. History teaches us that this is not an unprecedented position, but, while it may prove challenging to reduce substantially the cost of sustaining air power, the way the frontline is supported will certainly alter in the next few years.

We will see fewer uniformed support staff with some functions no longer carried out at station level — and many no longer under the control of the station commander. The four lines of maintenance and repair that have held good for more than 50 years will disappear. The effect will be to dilute the status of the station in the overall organisation with a greater emphasis on force elements as the RAF’s centre of gravity. We may therefore need to unpick the ‘Binbrook’ model. The difficulty will be to sustain Service ethos while creating a more agile and adaptable arrangement. The basic building block in the new construct may well be the squadron, if not the flight, rather than the station.

There is no doubt that the ‘brute force’ approach to logistics is no longer viable. Not just because it is unaffordable but because it does not provide the flexibility and responsiveness that network centric warfare demands. The logistic problems faced in Iraq were less about quantity and quality and more about availability. The continuing concern about the inability to track individual items and the debate about ‘precision-guided’ logistics presage fundamental changes in the way that supply chains and logistics will be managed in the future.³⁸

We will gradually see a transition from a supply chain, built around a hierarchy of organisations, to a distributed network that can respond rapidly to changes in demand. The LTP echoes this approach

although it does not (yet) offer the self-synchronisation needed to provide a 'sense and respond' network.

We need to be cautious about what can be quickly achieved. After all, the RAF has toyed with serial number item tracking for at least 30 years. We also have a vast inventory, support processes and policies tied to legacy weapon systems. Much as we might wish to move from supporting platforms to supporting military effect there is a limit to what can be done with our older assets.

Although I have stressed the distinguishing characteristics of aviation logistics, as compared to defence logistics in general, these differences are likely to diminish with time as all military equipment becomes more complex and support systems more sophisticated and interdependent.³⁹

As warfare moves from the industrial age to the information age we will inevitably see a change in the nature of logistics. Success will be measured by the adaptability of the support organisation rather than by its scale or scope. If nothing else, this threatens to transform the relationship between air power and sustainability that has held sway for nearly 90 years.

But, however much we succeed in transforming our logistic processes, there will continue to be a tension between efficiency and effectiveness. A just-in-time philosophy built around a responsive and agile supply pipeline, a minimum deployment footprint and extensive host nation support, may not always provide the resilience needed to sustain military capability.

A final word of warning: we must avoid the temptation of believing our predecessors to have been somehow less imaginative or more hidebound than we like to think we are. The logistic systems deployed by the RAF in both World Wars, and throughout the Cold War, were more than effective — they were winning solutions. We should build on this success while seeking better ways to meet today's needs. To my mind, caution and a degree of humility are called for rather than a relentless dash for the new and untested. Paradigms are rarely 'shifted' overnight.

Notes:

¹ Sir Frederick Sykes, *From Many Angles*, page 97, Harrap & Co, London, 1942.

² NATO AAP-6 - Logistics.

³ Gulf War Air Power Survey, Logistics Support, Vol III, page 391, Washington, D.C., 1993.

⁴ Chris Draper, *The Mad Major*, Letchworth, Air Review, 1962.

⁵ At 2002 prices using historic GDP (a Sopwith Camel and its Clerget engine were priced at some £1,700 – *War In The Air*, Vol 6, Appendix XXXII, OUP, 1935).

⁶ Terraine, *Essays on Leadership and War*, pages 27-35, Western Front Association, 1998.

⁷ These figures are drawn from Appendix XXXI to *The War In The Air*. Although the data is undoubtedly correct and is supported by extensive and detailed tables, the purpose seems more to provide a flattering comparison with the overall strength of the German and French air services (20,000 and 15,342 aircraft respectively).

⁸ NA/PRO AIR 2/151/290308/20.

⁹ A similar position was to be found on the Western Front where, at the time of the Armistice, out of a total 3,522 aircraft on charge, some 1,799 were held by the frontline squadrons with 1,576 in a serviceable condition.

¹⁰ NA/PRO AIR 1/686/21/13/2252 contains a detailed breakdown of this analysis.

¹¹ NA/PRO AIR 1/522/16/12/5.

¹² Sefton Brancker, *The Aeroplane In War*, Flight, pages 632-633, 12 Jun 14.

¹³ Sir Frederick Sykes, *op cit*, page 95.

¹⁴ This sort of activity is now described as 'reverse logistics', to distinguish it from 'traditional logistics'!

¹⁵ Holden-Reid, JFC Fuller : *Military Thinker*, pages 137-138, Macmillan, London, 1987.

¹⁶ Brooke-Popham, *The Air Force*, pages 43-70, RUSI Journal, 1920.

¹⁷ Hansard, 1944.

¹⁸ Air Ministry, *Royal Air Force War Manual*, AP 1301, Part II, 1939.

¹⁹ Williamson, *Some Problems of a Technical Service*, pages 780-800, RUSI Journal No 513, February 1934.

²⁰ Thus Ludlow-Hewitt wrote in 1939 that "I am convinced that the idea that we will be able to fight the next war with mass-produced pilots and crews as we did in the last war is fallacious" Terraine, *The Right of the Line*, page 86, Hodder and Stoughton, London, 1985.

²¹ NA/PRO AVIA 46/149, *The Storage and Distribution of Aircraft*.

²² Ellis, *Brute Force*, page 527, Andre Deutsch, London, 1989.

²³ Chorley, *Bomber Command Losses - 1945*, page 187, Midland Counties Publications, 1998.

²⁴ NA/PRO AVIA 46/168, *The Repair and Maintenance of Aircraft 1939-1945*.

²⁵ Overy, *Bomber Command*, page 211, HarperCollins, London,

1997. Bomber Command's frontline in January 1944 comprised 1,298 heavy bombers. Operational losses in 1944 amounted to just over 3,000 heavy bombers.

²⁶ Barnett, *The Audit of War*, pages 145-146, Macmillan, London, 1986.

²⁷ This and subsequent comparisons are based on historic UK GDP.

²⁸ Terraine, *op cit*, page 602.

²⁹ Higham, *Bases of Air Strategy*, page 23, Airlife, 1998.

³⁰ *Ibid*, page 19.

³¹ Air Ministry, *Works*, page 212-122, AHB, 1956.

³² A Cat 'A' airfield cost some £2 Million to complete.

³³ Harrop, *Planning for Economy*, *Air Clues* April 1948, pages 15-20.

³⁴ NA/PRO AIR 20/6617 – Trials of Experimental Station Organisation.

³⁵ NA/PRO AIR 20/6616 – Trial of Experimental Station and Squadron Organisation.

³⁶ AHB IIR/60/7/13 – The Benson Experiment.

³⁷ The End-to-End (E2E) Study reviewed aircraft support arrangements and recommended reducing the traditional 4 lines of maintenance to 2 (Forward and Depth), concentrating support facilities at logistic centres of gravity.

³⁸ *Aviation Week & Space Technology*, 12 January 2004, pages 45-46.

³⁹ The US M-1 Abrams tank has been described as "the world's fastest strategically immobile tank" because of its huge logistics tail. *Ibid*.



The most technical arm of the British Army at this time was the Corps of Royal Engineers. They were given the responsibility for operating the balloons and in 1878 the first tethered observation balloons were purchased, and balloon schools and balloon sections were established. During the next 10 years the balloon sections developed their techniques; a section was deployed successfully on an army expedition to Bechuanaland and at the close of the century, a number of sections operated with great, even decisive effect, in the Boer War. The use and value of the balloon section as a war fighting support unit was now well established

The London Balloon Company

By Michael J Dunn

The first units of what is now the Royal Auxiliary Air Force were raised in 1925. However, 18 years previously, in 1908, a little known unit of the Royal Engineers (Territorial Force) was formed, becoming the first unit of the UK's reserve forces that was specifically tasked with an aviation-related role. The London Balloon Company (T) only existed for five years, but, during this brief period, its experiences mirrored those encountered by many of today's reserve units. The London Balloon Company (LBC) was the only Territorial Force balloon company ever formed. Prior to 1925, only one other reserve forces 'aviation' unit was ever created. The Hampshire Aircraft Parks RFC (T) was established during the Great War, from staff at the Royal Aircraft Factory, Farnborough and was disbanded in 1919. The purpose of this article is to describe the development of the LBC and the context in which it existed.

An Era of military reform

The formation of the LBC can be set against the background of two major factors in the evolution of the UK's armed forces: Haldane's Army Reforms and the evolving emergence of military aeronautics in Britain. In 1905, Richard Haldane became the Liberal Secretary of State for War, a post he held for seven years. During this time, he introduced a series of major reforms that helped prepare the British Army for the forthcoming war with Germany. The reforms included the formation of the Imperial General Staff, the setting up of the British Expeditionary Force, the creation of the Special Reserve and the Officer Training Corps, and the improvement of the Army's medical services. They also included the total re-organisation of the reserve forces (Volunteers and Yeomanry) into the Territorial Force (later to become the Territorial Army). The TF was set up as a properly structured Home Defence Force of



Balloon sections were mobile units, able to operate close to the front line. Units could follow the line of advance by towing their inflated balloon. A captive balloon was fixed to a steel cable attached to a manually-operated winch, mounted on a horse-drawn, GS wagon

14 infantry divisions and 14 cavalry brigades. The TF's establishment, which included 203 infantry battalions and 56 cavalry regiments, was set at a maximum strength of 302,000. The TF came into existence on 1 April 1908 — a date that marked an important step forward in the professionalism of Britain's reserve forces. Specialist support units such as the LBC were raised in order to give the TF a properly balanced force structure. This was a period of renewed public interest in Britain's reserve forces. This was a time when serious consideration was given to how best they should be organised and employed in support of the country's relatively small regular forces.

Military ballooning

In 1908, military aviation in the UK was still in its infancy and ballooning was very much the focus of British military aeronautics. The design and operation of military balloons by the British Army in the first decade of the 20th century was based very largely on the experience built up in South Africa. Balloon sections were mobile units, able to operate close to the front line. Units could follow the line of advance by towing their inflated balloon. A captive balloon was fixed to a steel cable attached to a manually-operated winch, mounted on a horse-drawn, GS wagon. The wagon also carried the deflated balloon, plus ancillary equipment. Hydrogen was stored in heavy, steel cylinders that were carried on specially modified

wagons. In the field, hydrogen was manufactured by the zinc-acid process. However, this task was not the responsibility of the balloon sections. Military balloons varied in size but the 10,000cu ft balloon was typical. They operated at heights of 1,000-1,500, in winds up to 25mph. Their role was primarily observation, but it was soon extended to include spotting for artillery. Communication was initially by dropped messages. However, a telephone link was later incorporated with the balloon cable and communication became two-way and immediate. When conditions were right, two observers could be carried. Good map reading and drawing skills, plus powerful binoculars and a plentiful supply of coloured pencils, were essential tools for these aeronauts.

The early years of British military ballooning

Following the use of balloons by the US Army in the American Civil War, an interested group of British Army officers started to experiment with hydrogen-filled balloons. Over the next quarter century, British military aviation began to evolve. Although official interest was limited, in 1878, the Army Balloon Equipment Store was set up at Woolwich. The unit was part of the Corps of Royal Engineers and came under the control of the Director of Fortifications and Works. Captain J L B Templar, of the Middlesex Militia, was appointed as its instructor and over the next 25 years he became instrumental in the development of ballooning within the British Army. The British Army first used observation balloons operationally during the Bechuanaland (1884) and Sudan (1885) campaigns. In 1890, a permanent Balloon Section of the Royal Engineers was formed, together with the Balloon Depot and Factory and, in 1892, the *School of Ballooning* was established. The first successful, more general operational use of balloons was during the Second Boer War (1899-1902). Three balloon sections were deployed to South Africa and participated in many actions. No 1 Section took part in the Battle of Magersfontein, No 2 Section was besieged throughout the Siege of Ladysmith and No 3 Section formed part of the force that relieved Mafeking. Their successes led to a wider acceptance of the view that balloons could make valuable a contribution to the conduct of modern warfare.



Military balloons varied in size but the 10,000cu ft balloon was typical. They operated at heights of 1,000-1,500ft, in winds up to 25mph. Their role was primarily observation

In 1902, Arthur Lynch who commanded the Boer's 'Irish Commando', said that balloons, on many occasions, had "saved the British forces from disaster, or enabled them to discover ambushes and stratagems of the Boer commanders". He added "The Boers took a dislike to the balloons . . . the balloons were a symbol of the scientific superiority of the English which seriously disquieted them".

Lessons from the South African War

The South African War clearly demonstrated the value of balloons in a military context. However, the limitations of balloons were also recognised. Their inability to manoeuvre 'at-will' restricted commanders to only the immediate tactical picture. Balloons were unable to operate in bad weather (they were limited to winds of up to 25mph) and restricted to altitudes of 1,500ft. The higher a balloon ascended, the more it was inclined to pitch violently across the sky, making observation difficult and life very uncomfortable

for the unfortunate observer. Spherical balloons were prone to rotate on their vertical axis. This made continuous observation for a fixed location extremely difficult. In South Africa, major problems were encountered due to the height above sea level at which the balloons were flown. This affected their carrying capacity. The standard 10,000cu ft balloons were often only able to operate with one rather than two observers. To overcome this problem, larger capacity balloons were deployed. A further problem with the use of balloons concerned communication. The use of telephone lines allowed immediate, two-way communication between the balloon observers and their ground crew. However, it was difficult to control the indirect fire of guns that were several miles distant. During the war, the installation of wireless sets in balloons was seriously considered. However, this was eventually ruled as unsafe owing to the possible danger from a spark from the set's induction coil. By the end of the Boer War, captive, hydrogen-filled, spherical balloons had virtually reached the peak of their technological development and a practical alternative was needed.

Developments following the South African War

The years between the end of the Second Boer War and the outbreak of the Great War saw a revolution in British military aviation. Initially, efforts were concentrated on applying the lessons learned in South Africa. These led to improvements in the design and operation of balloons, and in the organisation of ballooning, within the British Army. At the same time, Britain began the construction of its first, powered dirigible, and for a number of years, the airship seemed to be the future direction of manned flight within the UK. It was only after the first successful flights by the Wright brothers in 1903 that a growing realisation of the potential of heavier-than-air aircraft began to evolve.

In January 1904, the report of an Army committee, set up to enquire into the future of military aviation, was published. The committee investigated the role of ballooning in the South African War and the progress made in aviation by other nations. The committee recommended



Cody made the first, officially-recognised flight in a heavier-than-air aircraft in the United Kingdom). Cody was made responsible for the design and manufacture of kites at the Balloon Factory and was appointed as kite instructor at the Balloon School

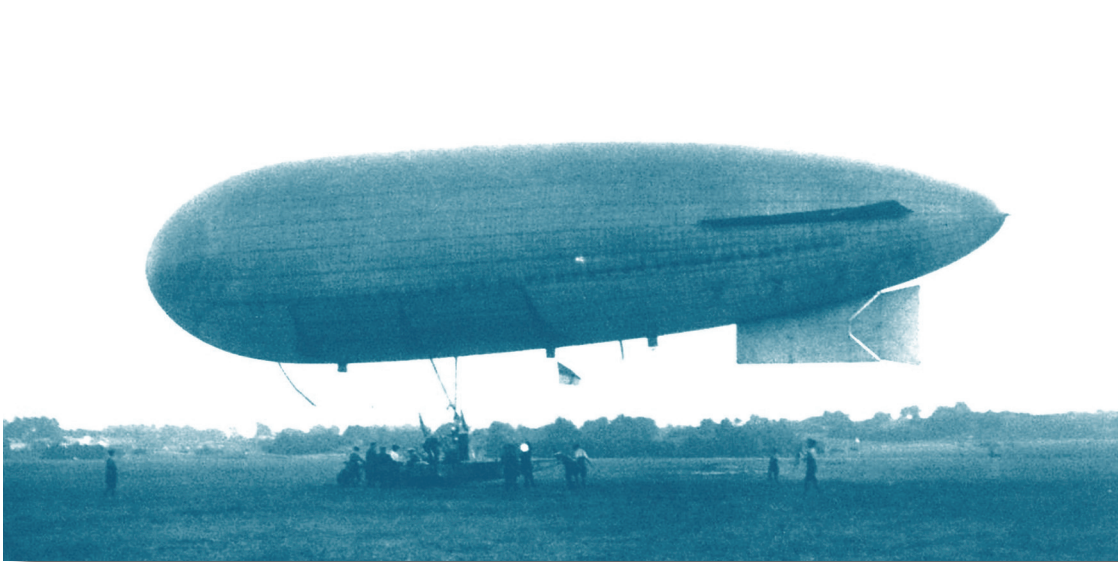
reform of the balloon sections, the deployment of an airship by the British Army and the movement of the Balloon Factory to a larger site. In 1905, six Balloon Sections (later Balloon Companies) were established, one for each army corps. In practice, there was only ever sufficient manpower and equipment to deploy two full time units. In 1905, the Army Balloon Factory and the Balloon School (which, by then, incorporated the field units) began moving from their restricted site in Aldershot to Farnborough. Between 1903-1910, the Commandant of the Balloon School was Colonel J E Capper RE. In 1906, he was also appointed as Superintendent of the Balloon Factory. He held this post until 1909, when he was replaced by a civilian, Mervyn O'Gorman. It was the enterprise and enthusiasm of Colonel Capper, and his early recognition of the potential of airships and, more importantly, of heavier-than-air aircraft, that helped drive British military aviation out of the ballooning era it first entered over 30 years earlier.

Ballooning

During the interwar years, experimental work was carried out at Farnborough in the handling properties of different shaped balloons (spherical and elongated), the use of mechanical winches to fly and to haul down balloons, the improvement of photography from balloons and the use of

traction engines to haul the balloon wagons. A specially designed, limbered balloon wagon, which improved balloon handling and could transport balloons and kites, was introduced. Balloon handling drills were refined, balloon training systematically developed and co-operation with the artillery became a regular feature at their practice camps. Balloon sections also attended the annual divisional field days and army manoeuvres.

An important development that took place in 1904 was the introduction by the British Army of manned kites to supplement its captive balloons. The kite system that was adopted was designed by Samuel Cody. In October 1908, Cody made the first, officially-recognised flight in a heavier-than-air aircraft in the United Kingdom. Cody was made responsible for the design and manufacture of kites at the Balloon Factory and was appointed as kite instructor at the Balloon School. The kites were manned and operated by the Balloon Sections of the Regular Army. Cody's system was based on a series of pilot and lifter kites, attached to a steel cable, which were used to carry the cable aloft. When sufficient height and cable tension had been achieved, a carrier kite, to which was attached a manned basket, would ascend the cable. The passenger controlled ascent and descent by working a system of lines and brakes that effectively allowed the basket to climb up or down the cable, as required. Typically, a man-carrying kite could operate in winds of between 20 and 50mph, at a height of around 1,000ft. In May 1905, Lieutenant Broke-Smith set a new manned altitude record by reaching a height of 3,340ft. Much of the equipment needed to fly kites and balloons was common to both devices: winch, cable and basket, and similar drills were used for flying and for hauling down. Kites were cheaper and more easily transported than balloons. They required no additional transport, were less vulnerable to artillery fire and could be used when it was too early to send up a balloon. Balloons and kites were seen as being complementary and a set of kites was eventually carried by each balloon section. Kites were still available when the RFC was formed in 1912.



In 1910, 'Beta' participated in the annual Army manoeuvres, flew more than 1,000 miles and made a notable night flight from Farnborough to London, and back

Airships

By the beginning of the 20th century, both France and Germany had successfully flown airships powered by internal combustion engines. It was Santos-Dumont in France and, more particularly, Zeppelin in Germany who took these navigable balloons beyond the experimental stage. In 1901, Colonel Templer, superintendent of the Balloon Factory, persuaded the War Office, to authorise the development of Britain's first airship. Design work on the experimental Dirigible No. 1, 'Nulli Secundus', began at the Balloon Factory in 1902. Progress was slow and was hampered by lack of funds. Colonel Capper took eventually over from Colonel Templer responsibility for its design and completion. Delays were caused because of problems in finding a suitable engine and a 50hp engine was eventually purchased from France. The maiden flight of 'Nulli Secundus' took place in September 1907. It was piloted by Colonel Capper, with Samuel Cody in charge of its engine. 'Nulli Secundus' was a non-rigid type, 122ft long, 26ft in diameter, with a 55,000cu ft, cylindrical envelope. In 1909, 'Nulli Secundus' was followed by Dirigible No. 2, 'Baby'. 'Baby' was a small airship

designed to test the piscoform shape of the balloon. It was soon re-designed, enlarged and re-named 'Beta'. In 1910, 'Beta' participated in the annual Army manoeuvres, flew more than 1,000 miles and made a notable night flight from Farnborough to London, and back. Later the same year, a third experimental airship, the 72,000cu ft 'Gamma', was also built at the Balloon Factory. Both airships were still in use when the Royal Flying Corps was formed in 1912.

Whilst Britain made steady, but relatively slow progress, in airship development, Germany moved steadily ahead, developing the Zeppelin as a weapon of offence. By the start of the Great War, Germany possessed 10 of these giant, rigid airships, and the infrastructure to support them. An element within the British military establishment, also promoted the airship as future direction of British military aviation. Foremost amongst them was the War Minister, R B Haldane. He used his influence and authority to direct government resources towards airship, rather than aircraft, development and pursued a policy of promoting the Balloon Factory to a predominant

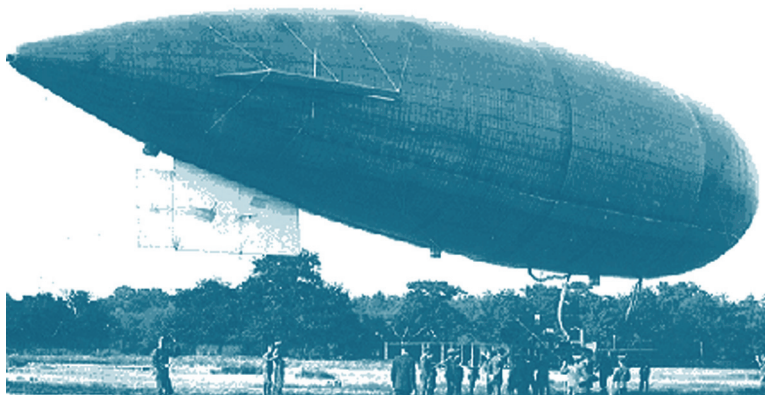
position over the fledgling British military aviation industry.

Aircraft

Following the success of the Wright Flyer in 1903, Colonel Capper visited the USA and met the Wright Brothers. He became an advocate in all forms of aviation, including manned aircraft. On his return, he reported enthusiastically on the potential of aircraft in the reconnaissance role. He then embarked on several years of negotiations, trying unsuccessfully to persuade the British government to purchase the Wright Flyer. By 1907, under Capper's direction, the Balloon Factory was authorised to begin experimental work on the design and construction of the British Army's first, manned aircraft. Progress, which was made by trial and error, was restricted by the lack of suitable engines and limited by a shortage of funding.

Lieutenant C W Dunne supervised the development of an aircraft based on his own, revolutionary design. Successful trials were eventually carried out, but not before the maiden flight of Army Aircraft Number 1 in May 1908. Piloted by its designer, Samuel Cody, this was the first officially recorded flight of an aircraft in the United Kingdom. Further trials of both aircraft continued until 1909, when the War Office forbade further expenditure on these experiments. A sub-committee of the Committee of Imperial Defence that had inquired into the future of military aviation had concluded that expenditure on aircraft development to date did not justify the results. It recommended that it would be more practicable to purchase aircraft from outside sources, and adapt them for military purposes. Both Dunne's and Cody's contracts were terminated and, officially, the Balloon Factory stopped all work on aircraft development. They were required to focus on the repair and overhaul of existing Army aircraft.

Despite the War Office's apparent failure to recognise the military possibilities of manned aircraft, other countries, particularly France and Germany, had no such reservations. Civilian aviation pioneers, such as Thomas Sopwith, Alliot Verdon Roe and Frederick Handley Page, without



Beta 2

government support, began establishing a British aviation industry. They continued to experiment, design and construct, and to promote aircraft development. They helped popularise flying with the British public. Flying schools were set up and flying races and competitions held.

The attitude of the War Office began to change in 1910. C S Rolls had placed a Wright biplane at the disposal of the military authorities and Lieutenant R A Cammell loaned a Bleriot. In 1911, the War Office purchased its first aircraft from industry, a Henry Farman biplane. During the army manoeuvres of 1910, three aircraft took part for the first time. The British and Colonial Aeroplane Company loaned two Bristol biplanes, and Lieutenant L Gibbs piloted his own Faman biplane. The success of these aircraft helped change official attitudes towards the future use of aircraft. The Balloon Factory was re-organised under civilian control and re-named the Army Aircraft Factory. Aircraft development at Farnborough was officially resumed and moved onto a more scientific and orderly basis.

Formation of the Royal Flying Corps

The government further acknowledged the growing role of aircraft in military aviation when, in April 1911, the Air Battalion RE was formed under the command of Major Sir Alexander Bannerman. The Balloon School ceased to exist when the Air Battalion was formed and its personnel transferred to the new unit. The Air Battalion consisted of a headquarters at Farnborough and two companies: No. 1 Company (operating airships, balloons and kites) based at Farnborough and No. 2 Company (operating aircraft) based at Larkhill. A reserve was also formed. The role of the Air Battalion was to

create a cadre of skilled military aviators that could be used to form field units in times of war. On its formation the unit comprised 14 officers, 23 NCO's and 155 men and operated five aircraft and two airships (Beta and Gamma). The numbers of both aircraft and of trained pilots gradually increased over the next 12 months.

In 1911, the Prime Minister Herbert Asquith instructed the Committee of Imperial Defence to examine the questions of naval and military aviation in order to suggest measures to create an efficient air force. The Committee recommended the formation of a Royal Flying Corps (RFC) comprising a Military Wing, a Naval Wing, a Reserve, the Royal Aircraft Factory at Farnborough and the Central Flying School. The RFC was formed on 13 April 1912 and the Air Battalion was absorbed into it. The formation of the RFC can arguably be said to mark the point at which the pre-eminent role of heavier-than-air aircraft in British military aviation was firmly established.

The London Balloon Company

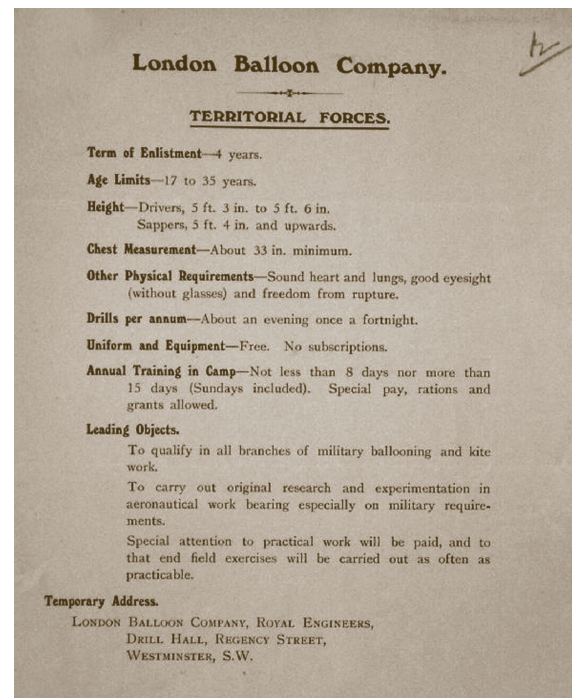
The official date of the formation of the LBC was 1 April 1908, the date that Haldane's re-organisation of the UK's reserve forces took effect. For several years before this date, a case for the formation of a Volunteer Balloon Corps had been argued by a number of enthusiasts, most notably Frank Hedges Butler, a prominent proponent of ballooning and co-founder of the Royal Aero Club (RAeC). However, there was a general opposition within the British Army to the creation of such a unit. Colonel Capper, Commandant of the Balloon School (and, by now, Superintendent of the Army Balloon Factory), considered that a Volunteer Balloon Corps could, at best, perform only a limited role. This would require:

"a good deal of captive ballooning" and "somewhat uninteresting work". This led Capper to wonder "who under such circumstances would be likely to take up such a scheme." "If volunteers were forthcoming," Capper continued, "he could make special arrangements for training the officers. If they are men of sufficient leisure to give up some time to the work; however, he did not want, if he could avoid it, to get the professionals involved in such

an organisation as this would only further confuse matters."

In March 1907, the War Office half-heartedly approved instructions for the establishment of a Volunteer Balloon Corps Reserve. However, by then, there was a small but growing view that military ballooning would, before too long, be superseded by manned aircraft flight. A volunteer balloon unit would then become superfluous. Within four years of the LBC's formation in 1908, this proved to be true.

The immediate driving force behind the raising of the London Balloon Company was a number of ballooning enthusiasts with connections to the former Volunteer Force, principle amongst them was Mr Harold E Holtorp. Holtorp, a former member of the Volunteer Force with an interest in ballooning, had previously made a number of unsuccessful approaches to the War Office about setting up a Volunteer balloon unit. He became the first person to enlist in the LBC and



immediately took on the tasks of recruiting, basic military training, and trying to obtain equipment and training facilities for the unit. Advertisements were placed in the Press, including in special interest journals such as *Automotor*. Letters were also written to members of the Aeronautical Societies. In a recruiting leaflet, Holtorp described the main objectives of the LBC thus:

"To qualify in all branches of military ballooning and kite work, To carry out original research and experimentation in aeronautical work bearing especially on military requirements, Special attention to practical work will be paid and to that end field exercises will be carried out as often as practicable".

Initially, until it was formally recognised, Holtorp acted as the Honorary Secretary of the new unit. He was particularly keen on enlisting recruits with previous ballooning experience, and well educated men with an interest in aviation. Openings were advertised for Sappers (responsible for maintaining and handling balloons and kites), and Drivers (responsible for the GS transport wagons and horses). Recruits were enlisted on four-year engagements and were required to complete an annual 8-15 days training camp, plus a drill night every fortnight. Recruitment of Sappers was the initial priority. The unusual role of the LBC, coupled with a general interest in the new Territorial Force, meant that recruitment was brisk and, within a few months, the requisite 30% of establishment had been reached. A temporary HQ was established at Regency Street, Westminster. It later moved to Palmer Street. Basic recruit training was carried out with the assistance of other units of the London Royal Engineer TF, despite the fact, at this stage that no officers had been appointed and no unit equipment had been issued. During this period, the administration of the LBC was carried out by HQ Army Troops Royal Engineers London District TF, to which the LBC belonged.

In a letter to Colonel J E Capper, Commandant of the Balloon School, Holtorp referred to the difficulties facing the newly-formed LBC: *"I trust*

that if you can see your way to make things a little easier for us you will be so kind as to do so, as we are not being warmly received in certain quarters up here".

However, at this stage, a series of requests by Holtorp to Colonel Capper to allow the LBC to train at Farnborough were denied, as formal recognition of the unit had still not been granted.

Although official recognition of the London Balloon Company (T), by the Army Council, was not announced until August 1908, it was made retrospective to 1 April. The appointment of the first officers, Captain Frederick Tolley and 2nd Lieutenant Maurice Bidder, was announced shortly afterwards. The LBC's establishment was set at three officers and 65 other ranks, plus 50 horses: enough to work one balloon, or one flight of kites. In 1909, two Regular Army, permanent staff instructors were authorised. By the time of the unit's second annual camp, in 1909, three officers, three staff sergeants, five NCOs and 57 men were attached to the Regular balloon companies for training.

Officers of the London Balloon Company

Name	Rank	Joined	Left
Frederick Tolley	Capt	1 Apr 08	10 Jun 11
Maurice McClean Bidder	2 nd Lt Capt	1 Apr 08 1 Nov 11	19 Nov 08 16 Jan 13
Oscar Leonard Bickford	2 nd Lt	23 Oct 08	10 Jun 11
Theodore John Ridge	2 nd Lt	1 Apr 10	18 Aug 11
Victor Annesley Barrington-Kennett	2 nd Lt	1 Nov 11	14 Aug 13
Samuel Pepys Cockerell	2 nd Lt	3 Feb 12	3 Jan 14

Despite the LBC's success in recruiting, and the general proficiency it achieved, the War Office refused to issue the equipment and horses for which the unit was scaled. It was not until June 1909 that the LBC was able to 'acquire' some equipment, on loan, from the Balloon School. The equipment, described as 'Drill Stores', included:

10,000cu ft balloon — qty 1

13,000cu ft balloon — qty 1

Nets for above balloons

Cars, balloon — qty 1

Kite, A Class — qty 1

Kite, B Class — qty 1

In a War Office minute, 'Drill Stores' were officially defined as "*stores that are not fit for serious instruction*"; ie "*balloons that were rotten or leaked*". The training value of this equipment was distinctly limited. Drill nights could be spent practicing ballooning drills (as well as standard military skills such as weapon handling), but the only real opportunity the unit had of actually flying balloons was during their annual camps. Driver training was also restricted and could only be carried out using borrowed horses and wagons. Despite the high level enthusiasm and skills of its members, the LBC's lack of its own specialist equipment, transport and horses, and of a suitable training ground for operating balloons, limited the operational effectiveness that the unit was able to achieve. The reasons for the War Office's refusal to issue the LBC equipment and transport are not documented, but ballooning equipment for the regular balloon sections was in short supply and the limited funding that was available was increasingly directed towards airship, and later aircraft, development.

Despite his initial unwillingness to help the LBC before it gained official War Office recognition, Colonel Capper provided invaluable training support and advice, especially during their annual training at the Balloon School, Farnborough. In 1909, 62 members of the LBC trained at Farnborough. Both Colonel Capper and Samuel Cody gave lectures to the unit, ascents were carried out in captive balloons and kites (some members ascending to 1,500ft), and the unit assisted in the ground handling of the experimental, non-rigid airship 'Beta'. By 1911, unit training had progressed to the point where the LBC was able to make captive and free balloon

and kite flights, give a demonstration of balloon observation work under field conditions during exercises at Basingstoke and assist the Air Battalion in the ground handling of the airship 'Gamma'. As a portent of things to come, members of the LBC were also given flights in a biplane flown by the Aircraft Factory's test pilot, Geoffrey de Havilland.

In November 1911, *The Times* reported that the LBC had been offered the use of two aeroplanes for the purposes of instructing members in aviation. 'The Times' concluded by saying:

"By next camp, it is hoped that the company will possess a number of fully qualified pilots ready to undertake any work which the authorities may find them to do".

The offer was made by Francis McClean, a pioneer aviator and businessman. Previously, he had made a similar offer to the Admiralty, and four Royal Navy officers began training on Short Sommer biplanes, owned by Mr McClean, at the Royal Aero Club's (RAeC) airfield at Eastchurch, Kent. LBC personnel began training in December, under the instruction of James Lindsay Travers who was, at that time, designer and assistant to Short Brothers at Eastchurch. Over the next three months, members of the LBC were trained to fly by Mr Travers and, in March 1912, three of them (Sergeant H D Cutler, 2nd Lieutenant V A Barrington-Kennett and Sapper C W Meredith) were awarded RAeC pilots certificates. A number of other members, who began their training at Eastchurch, qualified later at other flying schools.

On 27 February 1912, *Aeroplane* reported that that officers and men of the LBC had spent their own time and money (including rail fares and lodgings) to learn to fly, but the Army had "declined to approve the training as normal drill and refused to issue special travel vouchers". Despite the generosity of Francis McClean, and the success of the training, the War Office stated in a special order that, "owing to a scheme for military aviation now being in hand at the War Office, no further flying is to be done by the London Balloon Company". For all practical purposes, this announcement signalled the beginning of the end for the LBC, leading to its final disbandment a year later.

LBC Personnel who qualified as pilots

Name	RAeC Certificate	Date Awarded	Flying School	Aircraft
2 nd Lt Theodore John Ridge	119	17 Aug 11	B&C Larkhill	Bristol
Sapper Samuel Pepys Cockerell	132	12 Sep 11	Salisbury Plain	Bristol
Sgt Herbert Dennis Cutler	189	5 Mar 12	Eastchurch	Short
2 nd Lt Victor Annesley Barrington Kennett	190	5 Mar 12	Eastchurch	Short
Sapper Cyril Wright Meredith	193	9 Mar 12	Eastchurch	Short
Sgt Thomas O'Brien Hubbard	222	4 Jun 12	Hendon	Howard-Wright
Sgt William Snowdon Hedley	274	13 Aug 12	Brooklands	Henri Farman

At the end of 1911, the War Office committee was considering raising a Territorial Force Air Battalion into which the LBC would be merged. The unit would operate both aircraft and balloons. The proposed establishment would be 13 officers (9 of whom would be in the aeroplane company), 136 other ranks and 8 aircraft. Hendon was considered as a possible location for the unit, particularly if Mr Claude Grahame-White could be persuaded to offer the War Office concessions over its use. However, at the same time, preparations were in hand for the creation of the Royal Flying Corps. In March 1912, a separate committee decided that "no separate military air organisation for the Territorial Force should be formed" and in April, the Army Council approved the disbandment of the LBC. However, disbandment was delayed until an RFC Special Reserve, to which LBC personnel would be able to transfer, had been established. A number of them did so, most notably those who had qualified as pilots following the training at Eastchurch. The LBC was formally disbanded on 31 March 1913, under Army Order 224/1913.

Conclusion

Like any unit, the LBC's greatest asset was its personnel. The unit's special role attracted well-educated, intelligent men able to assimilate the technical knowledge that aviation in the early 20th

century demanded. Although never mobilised to fulfil its war role, the LBC provided the early military training for a number of men who went on to distinguish themselves during the Great War, and beyond. During the War, former LBC members gained at least 2 DSO's, 1 MC, 1 AFC, 5 Mentions in Dispatches and 1 Italian award (Cavalier of the Order of St Maurice and St Lazarus). Two former members became RFC squadron commanders (Victor Barrington-Kennet and Thomas Hubbard) and one an airship pilot with the RNAS (Dudley Barton). William Hedley served as a combat pilot with the Bulgarian

Army during the First Balkan War of 1913. In 1914, a former LBC NCO (Herbert Cutler), who had learned to fly at Eastchurch, discovered the jungle hideout of the German cruiser *Königsberg* in the Rufiji River, German East Africa. Perhaps arguably the most successful of all former LBC members was George Ambrose Lloyd. After a spell as High Commissioner to Egypt and the Sudan, he was created Baron Lloyd of Dolobran and, in 1940, became Secretary of State for the Colonies in Winston Churchill's wartime government.

The subsequent military careers of these men demonstrate the success and wisdom of Holtorp's original criteria for selecting recruits for the LBC: *'well educated men with a keen interest in aviation'*.

Drop Zone Borneo

The RAF Campaign 1963-65: The Most Successful Use of Armed Forces In the Twentieth Century

By Roger Annett

Barnsley, Pen & Sword, 2006

ISBN 1-84415-396-7 (143 Pages, Hardcover, £19.99)

Reviewed by Wing Commander
Nick Hudson, RAF (retired).

Just as Pandora released the woes of the world, the 1939-1945 war let loose huge, interconnected themes that played out in a worldwide arena over at least the next half century and, in some cases, play on. Because these themes are so daunting study and summary of them at a level other than generalisation frequently becomes an exercise in simplification in which one example stands as proxy for a genre of similar themes and events. Thus, in respect of South East Asia the transition to post-colonialism, the emergence of nationalism, the spread of communism and attempts to contain it, and the growing employment of asymmetric warfare are frequently accessed through the single example of Vietnam.

Understandable though this tunnel-vision may be, through the sheer weight of material, the strength of contemporary images, and the impact of the war and its aftermath, it nonetheless has consequences. Not only does this tend to limit understanding

of the US experience itself by a process akin to microscopic analysis in a vacuum, it also sweeps to the margin many almost-forgotten events, policies and campaigns, some of which had significantly different endings. The Korean War, SEATO and CENTO as younger and frailer siblings of NATO, Dutch withdrawal from Indonesia, French defeat in and withdrawal from Vietnam, are but some examples of exclusions that can be forgotten if a world view is polarized to NATO in the north west and Vietnam in the south east. This chapter of discarded histories also includes the lengthy but successful British campaign (1948-1960) against ethnic Chinese guerrillas in the Malayan jungle, which not only etched a template for the conduct of what subsequently became known as low-intensity operations but also preset conditions for the creation of Malaysia. This, in turn, was followed by the brilliant defence of Malaysia's constituent territories (Brunei and, notably, Borneo) between 1962-1966 against incursions by elements of the 330,000 strong Indonesian Army. This defence, accruing 496 gallantry awards including a VC, was mounted by vanishingly small ground forces supported by equally overstretched air transport assets using airdrop and airlanding techniques pioneered in Burma in 1944/45. There are, almost certainly, lessons here of great relevance to counter insurgency, expeditionary operations and the application of the manoeuvrist approach to asymmetric warfare.

This is the territory which Roger Annett explores in *Drop Zone Borneo*, examining with the benefit of personal experience, the overall contribution of the RAF to the Indonesian Confrontation and concentrating particularly on the efforts of No 215 Sqn between 1963-1965.

The main body of the book is very much a period piece and highly successful as a memoir of a young man's personal introduction to conflict and its pressures. This was an age when Southeast Asia was still eurocentrically known as 'The Far East' and the RAF was still large enough for its in-theatre forces, resplendent in starched khaki and white sharkskin mess dress, to be identified as the 'Far East Air Force'. Roger Annett takes us, inter alia, to the Temple Hill Officers' Mess at Changi, to

Book Reviews

the tailors and fast-food stores of Changi Village, Singapore itself, and on furlough in up-country Malaya. He also ushers us into ringside leather seats on the flight-deck of the idiosyncratic but entirely British-built Argosy as he and his colourful 215 Sqn colleagues battle, generally successfully, with a series of uncomfortably tight drop zones, irascible Army liaison personnel with an obsession about waste disposal and often-legendary incidents, such as the Argosy with the dinghy wrapped around its tailplane. This is a wonderful snapshot of a pre-C130 Air Transport fleet plying its trade skilfully with a motley selection of aircraft that included not only the Argosy but also the Hastings, Twin and Single Pioneers, Beverley, and the Belvedere. Unsurprisingly, the book rather neglects analysis of the campaign's context and conduct. It is extremely difficult to write history simultaneously on two different levels and the somewhat thin

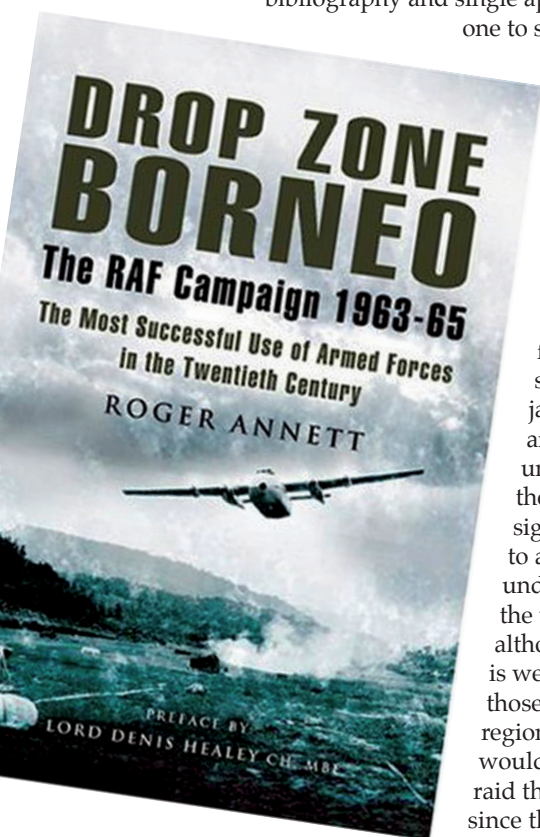
bibliography and single appendix, lead

one to suspect that it

was never the author's intention to do so. Readers unfamiliar with the background would be well-advised not only to read the final chapter first, but also to study the dust jacket, Foreword and Preface with unusual care, since these all contribute significantly to an overall understanding of the whole. Equally, although the book is well-illustrated, those not aware of the regional geography would be advised to raid the map store, since the reproductions

of aeronautical charts that are provided add verisimilitude but little enlightenment. It is also, perhaps, unfortunate that the description of the 'RAF Campaign' as 'The Most Successful Use of Armed Forces in the Twentieth Century' is picked out of Lord Healey's authoritative preface and elevated to the front cover. The claim is justified simply by assertion and no substantive argument is produced in the text of appendix to justify it or argue its merits in contrast to other candidates. A similar dissonance occurs within the dust-cover, where comparability is suggested with Burma, north-west Europe and the Berlin Airlift. The last of these is predictable, since all subsequent airlift operations have studied (and often mangled) the statistics in order to prove superiority to Berlin. Again, however, the information on which the claim could be judged is not reproduced within the book.

Overall, given these criticisms, it would be all too easy to write off *Drop Zone Borneo* as a rather pretentious study of air power that failed to live up to the ambitious self-advertisement in its 'blurb'. This would be unkind and largely untrue, since it would be based on an unfortunate mismatch between the author's text and intentions, and the surrounding editing and production. At its heart, the book is worthwhile as a brilliant and charming little cameo of the men of No 215 Sqn 'doing their bit' during the 'Indian Summer' of Far Eastern colonialism that lasted from Suez to Healey's 1969 Defence Review and lingered on, in the RAF's Air Transport Force, until Sir Andrew Humphrey dismantled its strategic assets in 1975. It should be read as such, by those who were there and also by those who weren't. It should not, however, be regarded as a definitive and considered campaign history since it lacks the necessary depth and breadth. It should be viewed as an aperitif or illustration for a campaign that urgently requires renewed examination and as a successful and salutary reminder that air transport, even at the 'sharp end' may be less than totally enthralling but that if you cannot get there, cannot supply yourself when you are there and cannot subsequently get back, the prudent course is not to go.



Notes

Notes