



Royal Air Force

AIR POWER REVIEW

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AIR/LAND INTEGRATION SPECIAL

The Air/Land relationship – an historical
perspective 1918-1991

Sebastian Cox

The Royal Air Force and Air/Land Integration in
the 100 Days,
August–November 1918

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Air Cdre Paul Colley

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Foreword

This edition of *Air Power Review* (APR) marks something of a new direction as a 'special edition', themed on the particularly pertinent topic of Air/Land integration. The editorial board intends to produce a regular series of themed editions on an occasional basis; a future 'special' is planned on space, to be published next year to coincide with the 40th anniversary of the moon landing in 1969. As always, papers from prospective contributors on this, and any other air power topic, are welcome. Another new departure is to open up the letters section to include 'viewpoints'; the aim is to provide a forum for those who wish to offer a particular perspective on air power to stimulate debate and discussion, without necessarily producing a paper of academic length. In this edition, Wing Commander Chris Luck leads off with a piece on *Interpreting and misinterpreting air power's strategic potential*. Please feel free to put pen to paper to support – or debate – his view.

Air/Land integration and air power's contribution to the joint campaign are clearly particularly relevant in the current operational environment. In this APR special edition, the history and future of this critical, if contentious area of operations, are critically examined. Sebastian Cox begins by providing a tour d'horizon of army-air cooperation from the First World War to the Gulf War, illustrating the ebb and flow of

interest, understanding and efficiency over time, noting key enduring lessons and setting the scene for the detail to follow. 2008 marks not just the 90th anniversary of the Royal Air Force, but also its participation in one of the most successful, if uncelebrated, passages of arms ever conducted by British forces, the 'Hundred Days Offensive' of 1918, and Dr David Jordan focuses on the detail of how air integration was successfully conducted in the context of total industrial warfare at the dawn of air power. Surprisingly or unsurprisingly, many of the lessons of a campaign that marked the beginning of the transition from Thomas Hammes' static, 'Second Generation Warfare' to mobile 'Third Generation Warfare' are equally relevant across the spectrum of conflict in the networked irregular 'Fourth Generation Warfare' experienced on current operations today. While we should be wary of which historical lessons we learn, as Mark Twain famously said, while history may not repeat itself, 'it sure as hell rhymes'. Maj Andrew Roe then takes up the baton to discuss air policing on the North-West frontier between the wars. Offering a soldier's perspective on the utility of air power, Major Roe's balanced paper acknowledges the efficacy and economy of air power in this role, but also emphasises the necessity for both components to act together to achieve the desired effect, primarily because of air power's characteristic impermanence.

While David Jordan describes the effective level of integration that had been achieved by 1918, inter-component cooperation withered and, to some extent, died in the interwar period. Lt Col Tay looks at the problems of air-land integration through the prism of a theoretical cultural model, a theme taken up by Group Captain Alistair Byford in his analysis of the failure of allied Air/Land integration during the Battle of France in 1940. His conclusion is that people are more important than processes and achieving mutual understanding is key; but there is nothing easy or instinctive about this; understanding cannot be acquired quickly or easily and is highly perishable, so that there must be both collective will and a real imperative to force both parties to engage.

Moving up to date, Flt Lt Mary Hudson analyses a critical, if traditionally unsung area of air-land cooperation by looking at the past, present and future of aeromedical evacuation, before Air Cdre Paul Colley introduces a challenging and provocative essay on current integrated operations. His view is that airmen have failed to express clearly what air power can do in the joint campaign, contending that current doctrine explains how air power works, but not the effect that it can generate, and does this using a less than helpful lexicon. He also challenges the mantra of 'centralised control, decentralised execution' under all circumstances, and particularly with

respect to the specifics of command arrangements for current operations, arguing that for many static, stabilisation-type events, the best balance between retaining the flexibility of air power while delivering assurance to land commanders may require different interpretations of command, control and coordination - it would be surprising if this view does not provoke debate.

The Air/Land theme is continued in the book review section, where Air Commodore Neville Parton takes a fresh look at 'Air Forces and Armies', Sir John Slessor's much quoted (but now, sadly, little read) seminal work on Air/Land cooperation, which established his reputation as a leading air power theorist somewhat at odds with the contemporaneous predilection for the use of air power for coercion through strategic bombing. Gp Capt Ian Shields brings us up to date on current thinking, with a review of David Hall's recent publication 'Strategy for Victory', a very worthwhile analysis of the development of British tactical air power from 1919 to 1943 and a feature on CAS' reading list for 2008. Group Captain Shields's article 'Where are the Air Power Strategists?' (APR Vol 11 No 1) has also prompted a letter from Gp Capt John Alexander who introduces some of the work being done and the thinking generated by the NATO Joint Air Power Competence Centre in related areas.

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The Air/Land relationship – an historical perspective 1918-1991

By Sebastian Cox

Introduction

The Air/Land interface has historically been one that has caused friction and discord. It may truthfully be said that the relationship has been cyclical, or perhaps more accurately conformed to a waveform with highs and lows. It therefore appears sensible to ask what might be the enduring themes in the Air/Land relationship and how the perhaps inevitable frictions and disagreements have been overcome, or at least ameliorated, in the past. Once we have identified enduring themes it is possible to consider in more detail why it is that they are enduring and what help that can offer in any consideration of the issue today.

Even a cursory examination of the history of this subject soon highlights the fact that some of the difficulties of the past, and thus perhaps the present, go deeper than mere process or equipment, but rather have stemmed from the differing military philosophies of the soldier and the airman. The latter has tended to take the view that many of what would be considered air power's core characteristics, such as flexibility, reach, penetration and speed, provide the Commander with a broad spectrum of capabilities, which should be utilised to secure the maximum benefit for the overall campaign plan. From the perspective of the soldier with his feet firmly planted both physically, and he would perhaps claim metaphorically, on the ground, the issues are perceived rather differently. Often the soldier's philosophical outlook is predicated in the need or desire to have organic air on call when and where he thinks he needs it. Yet it is the undoubted and very valuable capability for an aircraft to be attacking Berlin or Baghdad one day and overhead the infantryman in

the Normandy *bocage* or the dust of Um Qasr the next, which has itself been a root cause of air/land friction. Thus a discordant note is struck between the soldiers' voices raised in urgent supplication for visible air support directly to their front, and the airmen's chorus regarding the need to exploit air's flexibility and concentrate air power for decisive effect.

That said, clearly there have been periods when the Air/Land relationship has been better than at others. This leads naturally to the question of when has it been at its best and why? There are those who describe the Air/Land relationship as lurching from unmitigated disaster to unsullied triumph. This view tends to see World War One as very good, particularly at the end; the inter-war period as poor, the early Second World War period as disastrous, the later War period as very good, and the post-war era as a curate's egg, good or bad in parts according to taste. In truth, like all such complex relationships, it is subject to stress and strain even when working well. One of the problems has always been that when things are not going well, and especially though not exclusively when they are not going well on the ground, there has been a regrettable if entirely human tendency to regress into inter-service tribal warfare.

The First World War

In fact some themes and problems are discernible as early as The First World War which still resonate very clearly today, and one of Air/Land's great and real victories, the Battle of Amiens in August 1918, illustrates some of these ongoing issues very well. Amiens was a significant victory, which initiated the terminal decline of the German Army

and led to its eventual defeat three months later. The Air/Land problem during the Battle was related to the Command and Control [C²] structure for the air component and the lack of joint planning; both historically are recurrent themes. Paradoxically this was in part a result of the newly formed RAF's inheriting the command structure of the 'organic' Royal Flying Corps, whereby specific air force brigades were allocated to specific numbered armies. At Amiens 5 Brigade¹ of the RAF under Brigadier Charlton co-operated with General Rawlinson's 4th Army. However, 5 Brigade had oncom of only 17 of the 43 RAF squadrons in the battle. The bulk



RAF DH9As

of these squadrons came under Major General John Salmond, the overall RAF commander in France. In the planning for the battle we also see an early example of a problem which consistently recurs in the air/land relationship and is still recurring today, i.e. apportionment of assets.

Although relations between Rawlinson and the two RAF commanders with whom he dealt were apparently good on a personal level, and although numerous planning conferences were held to develop the plan there were two problems. Firstly, the RAF

commanders, particularly Salmond, did not attend all of them, and secondly none of the commanders committed their thinking to paper in any coherent fashion, which would have allowed both proper co-ordination and focused their own minds and those of their subordinates. As a result, although the arrangements for the initial co-operation of the corps reconnaissance and fighter squadrons of 5 Brigade RAF were laid out in some detail, the orders for the battle made no mention of the fighter-recce or bomber squadrons on which any wider strategic effect would hinge. As Sir John Slessor later pointed out in his seminal study *Air Power and Armies*, apart from 5 Brigade's limited objectives for day one, 'the *object* of the air operations – the effect they were intended to produce, the part they were to play in the plan as a whole – was not clearly defined.'

Brigadier Charlton AOC of 5 Brigade defined the *strategic* objective of the attack as being simply to disengage Amiens and its rail network, i.e. a limited operation. He either knew nothing of, or did not comprehend, the strategic depth of the operation the army commander, Rawlinson, was intending. He therefore could not possibly plan to assist in the deep battle, despite the fact that his forces were those best placed to do so. Major-General Salmond was no better informed or prepared. In the event on day one close air support operations were reasonably successful if costly, but as the battle unfolded on subsequent days the lack of a properly integrated air plan for development of the Battle led to constant re-planning and re-directing of the air effort but without an overall aim and with consequent frequent shifting of focus and hence poor effect. The battle was won, but the fractured air effort made little difference to the outcome after the first day.

Inter-war

In the inter-war years, though much good co-operative work was done in imperial policing operations little was done to build an effective partnership for high intensity warfare. In part the problem was doctrinal and political. The RAF's primary doctrinal focus other than air policing was on strategic bombing and in truth right up until 1939 this reflected the Government's wish since the latter's commitment to engage in high intensity warfare on any scale was half-hearted at best. The Army's struggles to establish even a modest experimental armoured force are well known and the government's determination to avoid continental commitments militated against planning large-scale land warfare. The RAF developed small-scale army co-operation forces in part because the foreseeable army commitment was on a small scale. When the Government of the day performed a *volte face* in March 1939, six months before the outbreak of war, and announced plans for a 55 division army, the RAF's long-term industrial expansion plans were predicated on strategic bomber and fighter aircraft, not the provision of ground attack assets to support a previously tiny field force. Nevertheless, there were both doctrine and squadrons available to support the Army in the field in 1939. However, the former generally stressed reconnaissance and artillery co-operation, and attack on lines of communication, with close air support being conducted only in emergencies.

The Second World War

The lack of any proper joint planning or co-ordination became very evident during the campaign in France and the Low Countries in 1940.

Communications links were also clearly inadequate, and those that were available were predicated on a relatively slow-moving ground war. They proved tenuous and tortuous, often having to be routed via the UK once mobile warfare destroyed fixed communications, and, unsurprisingly, seldom functioned effectively in the fast-moving campaign which developed. The rapid loss of air superiority quickly ensured that much of the RAF's effort was ineffective. Both air and land forces fought with considerable courage and occasionally achieved some local success against individual German units, but, with no effective C³ their efforts were uncoordinated and had little overall effect. In part, also the wrong lessons were learnt, with too much attention being paid to the *Luftwaffe's* use of dive-bombers and too little to its concentration on air superiority and effective, flexible communications and planning.

As a result the development of an effective joint partnership, which first emerged in the Mediterranean theatre, took time. Some Army officers, including the Chief of the Imperial General Staff, General Sir Alan Brooke, argued for dedicated organic air once more: in essence a form of Royal Flying Corps writ large. Initially in the Western Desert the RAF tried to accommodate these concerns and reverted to an RFC model. It re-organised to provide generic air parcelled out at formation level but in the battles of 1941 quickly discovered that this negated two of air power's principal assets, flexibility and reach. This C² model proved defective, as it was ineffective in deploying aircraft to decisive points, and wasteful of assets which too often remained on the ground or were under-utilised.

The answer lay in the development of a system of integrated planning by co-located air and land headquarters, with air contributing to the formulation and preparation of the overall plan as well as its execution. Properly integrated planning by knowledgeable staffs saw air contribute through interdiction, battlefield preparation, and direct close support missions, as well as air superiority and reconnaissance tasks. Efficient communications nodes in the right areas were also deemed essential. Air now had a much better picture of Land's intentions and locations, and Land was better placed to appreciate that the air battle had to be won before air assets could be allocated to the land war.

Air Marshals Tedder and Coningham deliberately set out to create a close working relationship with their Army opposite numbers, initially General Auchinleck and his subordinates and later General Montgomery. This was greatly helped by the fact that Montgomery had developed a real understanding of the functioning of air power and stated that to do so was an essential pre-requisite if an officer was to hold high command. He also stated unequivocally that 'concentrated use of the air striking force is a battle-winning factor ... it follows that control of the available air power must be centralised, and command must be exercised through RAF channels.'

Regrettably, the lessons regarding C², integrated planning and efficient communications proved remarkably difficult to transfer between theatres. Despite the successful model provided by Eighth Army and the Desert Air Force the Allied invasion of NW Africa [Operation TORCH] suffered initially

from all the problems previously identified, and the situation was only improved by the transfer of experienced air commanders from Libya. Even experienced individuals, however, proved capable of repeating mistakes. Despite the oft reiterated lessons from the Western Desert personality clashes amongst the very same team of senior air/land commanders produced some C³ disconnects in NW Europe during Operation Overlord. Thus, the army and air headquarters were no longer co-located and an overly complex air C² structure produced further fault lines in the system.

Personal relations between General Montgomery on the one hand and Air Chief Marshal Tedder and Air Marshal Coningham on the other had sadly deteriorated markedly, and the presence of an additional C² layer in the form of Air Chief Marshal Leigh-Mallory's AEAFF Headquarters further complicated the picture. General Montgomery no longer took the air commanders into his confidence and in contrast to the Western Desert did not keep them accurately informed regarding his intentions and the overall conduct of the campaign. This lack of trust did not contribute to improving or sustaining integrated planning.

Despite these problems air/land co-operation was a cardinal factor in assuring victory in North West Europe, as evinced by General Montgomery's willingness to cancel operations if weather or other factors reduced or grounded the available air effort. The absolute freedom of manoeuvre granted to land by air superiority, and the converse almost total inability of the *Wehrmacht* to manoeuvre by day in the face of Allied air power, were crucial.



RAF Typhoon

On the few occasions that the German forces attempted to operate *en masse* by day, as for example during the Mortain counter-offensive, they suffered severely. Mortain demonstrated the advantages of having air centrally controlled and available to concentrate at the decisive point. In essence all the allied tactical assets, US and British, were withdrawn from other tasks and sent to Mortain as the point of main effort, and to decisive effect. The US fighter-bombers of the IX Tactical Air Force were used to hold off the *Luftwaffe* whilst the Typhoon Wings of the RAF's 2nd TAF concentrated on the German ground forces. In exactly similar fashion during the German Ardennes offensive both 2nd TAF and the US 9th TAF were used to support the US troops, whilst heavy bombers from the UK attacked interdiction targets leading to the battlefield. Speed, reach and flexibility were thus used to apply air power to greatest operational effect within the theatre without regard to the nationality of the supporting or supported forces.

The inherent tensions already identified as stemming from the basic characteristics of air power and their

application are clearly discernable in the OVERLORD campaign of 1944-45. Air Marshal Coningham as AOC 2nd TAF tended to favour using the reach and flexibility of his air assets on armed reconnaissance missions penetrating well behind the Forward Line of Own Troops [FLOT]. The Army Commanders tended to favour Close Air Support missions at the FLOT where they had greater influence on their application and perceived an immediate, direct and visible effect, not least on friendly morale. The soldiers were thus very much in favour of having airborne cab-ranks of tactical aircraft immediately on call adjacent to the frontline. The airmen viewed this as expensive in terms of crew and aircraft fatigue and argued, rightly, that it increased losses to AAA. It was also essentially reactive and thus relatively ineffective in terms of forcing the enemy to conform to the Allied commanders will and not vice-versa. Coningham was convinced that it was air interdiction beyond the immediate battlefield which severely restricted the Germans' overall ability to manoeuvre, and not close air support at the battlefield. Thus, the 2nd TAF generally favoured close air support only for very specific operations such as the opening of a major offensive, as with, for example, the operations in support of XXX Corps' assault towards Arnhem on 17 September 1944, day one of Operation MARKET GARDEN.

Eventually these differing priorities were accommodated when a pre-cursor to the 1991 USAF system known as 'Push-CAS' was introduced in 2nd TAF, with aircraft reporting to cab-ranks before heading to pre-arranged armed reconnaissance areas if no more pressing target was available from the designated forward air controller. More generous

scaling and provision of effective air/land communications also helped to improve matters.

There were also perennial problems regarding the correct identification of targets and the avoidance of 'blue on blue' attacks. The use of 'bomblines' [akin to Fire Support Co-ordination Lines in more modern parlance] did go some way towards ameliorating the problem, but also meant foregoing some opportunities for attack of enemy forces. Bomblines were heavily dependent on accurate reporting of their positions by ground units. Despite such measures reports of 'blue on blue' attacks by tactical air forces were relatively common throughout the campaign, and remain a problem today, and one with a high media profile, as has been demonstrated on a number of occasions during operations in the Middle East from 1991 onwards. Although technical solutions may provide some relief in this regard in the future, they are unlikely to remove it entirely, and there are also recent examples of ground forces, operating under pressure, accepting or suggesting high risk attack profiles without sufficient appreciation of the possible effect of air weapons on friendly forces, thus echoing Second World War experience.

The ground forces in 1944-45 also accepted some element of increased risk when using the strategic assets of Bomber Command and the US 8th Air Force in direct support of operations. The 21st Army Group also routinely requested support from the strategic air assets of Bomber Command for the majority of its major set piece operations from Operation CHARNWOOD on 18 July 1944 onwards. Operations GOODWOOD,

TOTALISE, TRACTABLE, VERITABLE and attacks on Le Havre, Boulogne, Walcheren, the Ardennes, Goch, and the Rhine crossing all received support from Bomber Command. On more than one occasion this did lead to significant numbers of friendly casualties, which despite the prior acceptance of risk by the army commanders did nevertheless cause significant friction after the event, exacerbated by the physical separation of planning staffs.

The post-war era

In the post-war era we again see a cyclical pattern. In the Middle East there was a concerted move towards jointness, with Air/Land co-operation generally good. This was considerably assisted by the long-term deployment of units and headquarters staff on both sides, with concomitant opportunities to develop both techniques and personal relationships. Generally speaking the intensity of operations was also such that the relationship between tasks and resources was not significantly strained. In Malaya the nature of the campaign and the terrain was such that direct air support of troops in contact was rare. Much of the support was therefore principally in the form of air transport and support helicopters and the long term nature of the commitment again provided an opportunity to smooth out differences over time. Nevertheless, one old lesson was re-learned, and Air/Land co-operation improved markedly when the Air Headquarters re-located to be closer to the GHQ and planning thus becomes better integrated.

In Germany post-war the long-term deployment of units and headquarters likewise provided ample opportunity for teamwork and planning to be nurtured and maintained, and it is clear that the



Harrier GR3 aboard HMS Hermes in the South Atlantic

withdrawal of the RAF from Germany marked a downturn in the Air/Land relationship for that very reason. In both the Middle East and Germany the proximity to each other, and the intimate co-operation that developed over time, also nurtured a better understanding of the other environment's methods of working and problems. This had also been present during the Second World War, not least because most senior RAF officers had started their careers in the Army during the First World War. Although Joint staff training helps to ameliorate this, it is not a substitute for day-to-day contact and understanding.

One significant test of Air/Land in an expeditionary operation came during the Falklands Conflict in 1982, with the deployment of No 1 Squadron's Harrier GR3s to HMS *Hermes* in the South Atlantic. Here there is little doubt the Harriers could have been used more effectively than they were. The Squadron operated under Admiral Woodward's OPCON, and the Captain of HMS *Hermes* effectively exercised TACON. The Squadron was

isolated on the carrier where the RN had little or no recent experience in Air/Land operations but provided the communications, tasking and intelligence support to the Harrier's operations. The land campaign, however, was principally the concern of the amphibious warfare and Brigade staffs located aboard HMS *Fearless*. The Squadron had no real operations centre as the carrier was configured for fighting air warfare and ASW battles. There were no separate communications available to *Fearless*, no up to date land picture and no efficient method of joint planning – the result was unsurprisingly less than ideal. These organizational shortcomings were considerably worsened by poor personal relations and as a result the technical expertise of the aircrews was not utilised to best effect. Matters were made worse by the RAF's decision to deploy an experienced Forward Air Controller, but one whose age and fitness did not measure up to the rigours of campaigning in a Falklands winter. Although the Harriers made isolated contributions to the campaign, for example in the final stages of the Battle of Goose Green, the C³ and planning disconnects, coupled with personality issues, meant that their operations were not properly coordinated with the land campaign. In addition the tactical reconnaissance capability of the aircraft was almost entirely neglected.

In the First Gulf War of 1991 the RAF deployed both Tornado GR1s and Jaguar aircraft to theatre. The former were principally employed on Offensive Counter Air and Interdiction missions whilst the latter principally attacked military targets in Kuwait including artillery batteries, missile batteries, and troop concentrations. The operation

was divided into four phases only the last of which involved the commitment of ground forces. The first three phases were all conducted from the air, and lasted six weeks, and the subsequent ground and air phase which ultimately ejected the Iraqi forces from Kuwait lasted four days. The phases themselves were not necessarily consecutive – Phase 1 for example was intended to secure air superiority, but this was conducted simultaneously with a range of other missions directed against strategic targets in Iraq and military targets associated with preparing the battlefield. In the initial six weeks of air operations attacks were directed at targets across the spectrum of strategic, interdiction and fielded military target sets. The attacks did not seek the absolute destruction of particular target sets but were specifically designed as an effects-based approach intended to use air power as an operational rather than a tactical instrument.



General Schwarzkopf inspecting troops during the Gulf War

RAF aircraft did not conduct any true close air support missions during the War, partly because the ground war lasted only 100 hours and did not at any point run into very serious or sustained opposition from Iraqi forces,

some of which were intent on escape. The overall coalition campaign does nevertheless contain some aspects which are worthy of note.

Firstly, there was an interesting twist to the perennial conflict between deploying air to attack strategic targets and those directly related to the Iraqi fielded forces. During the summer and autumn of 1990 when US ground forces were first deployed to Saudi Arabia to deter Iraq, CINCENTCOM, General Schwarzkopf, a soldier, was concerned that his lightly equipped forces, principally the 82ND Airborne, might be overwhelmed, or alternatively subjected to chemical or biological attack for which he would have no viable response option. He was therefore interested in strategic air options that gave him a retaliatory, and therefore also potentially deterrent, capability directly against Saddam's regime. By contrast, General Horner, Commander of CENTAF, an airman and Schwarzkopf's JFACC, resented the efforts of USAF planners in Washington to produce such a strategic plan, because he perceived it as impinging on his authority as the senior airman in theatre. He preferred initially to plan for air assets to provide direct support against an Iraqi move into Saudi Arabia. Paradoxically, therefore, the senior soldier in theatre encouraged the planning of the strategic air campaign, whilst the senior airman was more tactically focused.

Secondly, there were tensions between the US Ground and Air Commanders, which, as in Normandy, partly stemmed from the command structure. General Schwarzkopf never appointed an overall ground commander. There was an Army component Commander, General Yeosock, and a Marine

Component Commander, General Boomer, but no overall land equivalent to General Horner as JFACC. General Schwarzkopf intended to act in this capacity himself, but the many other calls on his time meant that it could not receive his undivided attention and he did not necessarily brief his individual land commanders: nor was land separately represented in discussions between the CINCENTCOM and Horner. Schwarzkopf was particularly intent on deploying air power against the Iraqi strategic and operational reserve in the form of the Republican Guards Forces Command [RGFC] divisions, which as the most potent Iraqi units and the guarantors of Saddam's regime, were perceived as both a strategic and a military target. US Corps commanders, however, did not favour the RGFC as the primary target for air power but rather requested attacks on the Iraqi frontline divisions and their artillery. When the RGFC received, at CINCENTCOM's behest, far more attention than the frontline divisions, the Corps commanders came to believe that their target nominations were simply being ignored by the air forces, whereas in fact, unbeknown to them, the priorities were being set by General Schwarzkopf. As land commanders had initially raised doubts that the original air plan had too little input from ground officers, and been reassured by the USAF that their views would be sought for Phase IV, when this did not happen they perceived this to be the fault of the air forces, not the CINC. These problems never became more than an irritant partly because in the end the massive coalition air resources ensured that few important targets were not attacked. It was not so much a matter of whether to deploy air power against Baghdad or the Iraqi Army, as whether to attack artillery

or tanks. As in NW Europe in 1944-45 air power inflicted significant damage on the Iraqi forces and their logistical support and lines of communications and seriously undermined their morale, as well as imposing severe restraints on the Iraqi ability to manoeuvre, such that the latter's principal interest when the ground war started became surrendering or escaping, not fighting. Overall both the strategic campaign, and the attacks focused on the Iraqi fielded forces, contributed significantly to the successful prosecution of the war. The superfluity of air power assets available meant that tensions over apportionment and targeting, though present, never became a significant issue during the war.

Conclusions

The enduring themes that might be identified from this necessarily brief historical survey are:

1. The necessity for properly integrated planning by knowledgeable, properly authorised, and co-equal staffs, from the outset of operations (i.e. the concept of operations stage).
2. The concomitant need for a properly considered C³ structure to assist rather than hinder this aim. Historically, co-location has often helped in this regard, and the modern trend towards physically remote headquarters may thus be unhelpful.
3. The need for mutual trust between the key elements and commanders and joint study / discussion of operational issues.

Personality has often played a role and here again, although not a panacea, co-location has helped to ameliorate problems.

4. The concomitant need for the proper mutual appreciation and understanding of the philosophical outlook, organisation, combat techniques, methods of working, weapons/sensor effects and characteristics, and particular problems/peculiarities of each environment. This is often difficult to develop and sustain in the face of the competing demands which affect the environments individually and restrict the ability to achieve such understanding.

5. Fratricide has historically been a problem and remains problematic despite signs of a technological fix. Recognition of air assets by land [and indeed naval] forces and vice versa will also remain an issue. This suggests that the development of a proper attitude towards situational awareness, along with appropriate training, technical procedures and equipment is required.

Notes

1 The RAF's more familiar terminology 'Group' had not yet been adopted.

2 Allied Expeditionary Air Force. In theory ACM Leigh-Mallory's Headquarters was in place to co-ordinate the efforts of all the non-strategic air assets of the US and Commonwealth air forces. This was not a happy arrangement, in part because of personality clashes amongst the senior airmen but also because Leigh-Mallory had an unfortunate habit of offering air assets to General Montgomery for which he did not have formal Opcon.

3 In the First Gulf War in 1991 the USAF adopted a system whereby flights of aircraft arrived at the front without waiting for a request from the ground commander, i.e. they were 'pushed' to him. If they were not needed immediately by any of the engaged ground forces they would orbit for a short time, before departing for a pre-planned interdiction target.



The Royal Air Force and Air/Land integration in the 100 Days, August-November 1918

By Dr David Jordan

Introduction

The First World War saw the first use of aircraft in major conflict, but the historical treatment of air power in the period 1914-1918 has been relatively limited. While books abound on the air 'aces' and the human aspects of the war in the air, the way in which air power developed has been rather underplayed. The primitive nature of the aircraft involved – the war had ended shortly before the 15th anniversary of manned flight – coupled with an over-concentration upon air fighting has tended to obscure the fact that most of the key air power roles and missions were established in some form or other by the end of the conflict. Although the warring nations were of necessity developing air power from first principles, with a number of mistakes and false dawns along the way, the first war in the air offers a number of interesting lessons and parallels that are of relevance to air operations today, particularly with regard to Air/Land integration.

The First World War in the air was very much focused on the delivery of a range of effects to support the land component (of which all air forces were a part until the creation of the Royal Air Force (RAF) in April 1918), and the way in which this goal was achieved, with a large degree of success by the British, is worth attention.¹ The dangers of trying to force non-existent links between events of 90 years ago and today abound – it is all too tempting to endeavour to draw some precise lesson that at first sight seems to possess uncanny commonalities with current operations from the events of 1914-1918, when such a course of action involves over-burdening the evidence. However, it is not unreasonable to say that some general trends and,

occasionally, even exact parallels can be drawn from the British experience of the employment of air power in the First World War, particularly from 1918 and the period known as 'The Hundred Days' between the Battle of Amiens on 8 August and the Armistice on 11 November, when the quality and extent of Air/Land coordination reached perhaps a peak of efficiency which the RAF would not attain again until the middle of the Second World War.

The Development of air power

During the period 1914-1917, the RAF's predecessor, the Royal Flying Corps (RFC) had blossomed from a relatively insignificant force made up of five squadrons of just 60 aircraft into a key battlefield asset. Even with the limited technology available in 1914, the RFC had given a clear demonstration that aircraft were vital tools for the gathering of information and the surveillance and targeting of enemy positions, notably artillery batteries. In a static war, dominated by the power of the guns, it was of critical importance to be able to suppress the enemy's artillery while ensuring that one's own weapons could be employed with a minimal amount of counter-battery fire emanating from the other side of the trench lines. The RFC quickly developed simple, yet highly effective tactics and procedures to allow the precise delivery of artillery fire. As the Royal Artillery explored further the science and technology of modern gunnery, the efficacy of British artillery reached an unrivalled peak. However, for all the prowess of the gunners, without aerial observation they were almost totally blind. Only after the Battle of the Somme as sound – ranging and flash spotting equipment appeared in the front line was there an alternative source of information to that provided

by air as to the location of enemy batteries – and only then when they opened fire. The British Expeditionary Force's (BEF) Fourth Army experienced considerable difficulties with its artillery during the Battle of the Somme, balefully noting in its after-action reports that when weather conditions prevented the RFC from flying, it was forced to resort to the wasteful and largely ineffective method of firing twice the number of shells as normal at map coordinates which represented the best estimate of where enemy gun emplacements were located.² Such a blunt approach was discouraged, and when aircraft were unable to fly due to the weather conditions (a frequent occurrence in 1914-1918), the artillery limited operations to take account of the fact that it was literally firing blind and simply wasting ammunition if not firing against pre-registered targets in known locations.

The ability of aircraft to obtain information from well behind the battlefield had been appreciated from the start of the war, and by 1918 this had developed into a well-practised art. Regular photography of German-held territory had permitted the creation of detailed maps, and permitted the issuing of photographs to army units in the front line, giving them a much-enhanced sense of the terrain over which they would be operating during offensive operations. Aerial survey had allowed the creation of accurate maps of France and Belgium, vastly improving the situation at the start of the war when the first RFC reconnaissance flights often lost their way as the result of being forced to rely on outdated maps of a scale that did not provide sufficient detail for navigation.³



The Bristol Fighter was the most successful two-seat fighter of the First World War. Here a gunner demonstrates the Lewis gun on its ring mounting (AHB RAF)

As well as acting as the eyes of the BEF, the RFC and RAF also provided fire support in the form of bombing and ground attack missions. The latter task had developed from the ad hoc, limited assaults on targets of opportunity in 1914 to properly considered and organised operations against key enemy positions, often those that were out of range of the artillery, and against targets which emerged during the ebb and flow of offensives, particularly strongpoints holding up the advance and artillery batteries that had not been located by reconnaissance and which revealed themselves during the course of a battle.⁴ Aircraft were also assigned to the role of detecting the concentration of enemy troops for counter-attacks, the result of growing awareness that the Germans would respond to the loss of ground by putting in a swift counter-thrust before gains could be consolidated, with the aim of driving out recently arrived British and Commonwealth troops. The aircraft assigned this task would call in artillery fire to break up the concentration of the German forces, and where appropriate, launch

attacks themselves with light bombs and machine gun fire with the aim of disrupting the enemy response.⁵

Close support of troops during offensives proved to be a costly business, with some squadrons suffering losses of up to 30 per cent in their attempts to provide effective cooperation.⁶ This led to a dislike of trench-strafting operations which encountered heavy small arms fire, since there was every chance that a lucky shot could bring down an aircraft, no matter how adept the pilot.⁷ In fact, there is evidence that aircraft loss rates on this type of mission were not as extensive as the air force perhaps thought; although casualties were heavy, they did not represent a disproportionate amount of the overall RFC/RAF loss rate. However, the perception that direct support of the troops was a costly business may well have influenced RAF thinking on the role of air power in support of the land battle during the inter-war period.⁸ Attacks on targets behind the battlefield, recognisably part of what would now be perceived as an interdiction campaign grew in number and scope during 1917 and 1918, taking forward the bombing raids carried out against target sets such as railways and enemy ammunition dumps as a precursor to offensive operations, and, when necessary, in a bid to disrupt German preparations for an attack of their own.⁹ Such bombing operations were often ineffectual, thanks to the lack of precision that could be obtained by the aircraft and weapons available at the time, but they held a nuisance value that often helped to disrupt enemy preparations.

All of these operations were enabled by the possession of control of the air. Although the Germans gained

the upper hand at points in 1915 and again between the autumn of 1916 and the so-called 'Bloody April' of 1917 when the RFC suffered considerable losses, the broad result of the policy of conducting continuous offensive patrolling deep over German territory, the army cooperation squadrons of the RFC and RAF were rarely subjected to interference by enemy fighter aircraft, permitting them to go about their business unmolested. The offensive policy itself, laid down in September 1916 by the then General Officer Commanding (GOC) the RFC in France, Brigadier-General Hugh Trenchard, was something of a blunt instrument, with many patrols failing to encounter enemy aircraft and significant losses of British aircraft and their pilots thanks to mechanical failure over enemy lines, but despite this it served the purpose Trenchard intended for it, from 1917 generally succeeding in keeping the German air service from inflicting heavy losses upon the army cooperation aircraft.¹⁰

Trenchard was a reluctant convert to the creation of a separate air service and only briefly served as its first professional head, resigning as Chief of the Air Staff within two weeks of the RAF's formation after a serious disagreement with the Air Minister, Lord Rothermere.¹¹ However, the foundations laid during his tenure as GOC RFC in France between August 1915 and January 1918 (when he returned to London to become Chief of the Air Staff and oversee the creation of the new service) meant that at the time of its creation, the RAF was an extremely proficient service, despite the profound technological limitations of the time, providing effective support to the BEF. This efficiency was not a

one-way process, however; it required the British Army to ensure that there was close understanding between its air component and the ground forces. The potential importance of air power in support of future operations had been appreciated by the army well before the outbreak of the war, although it is a sad fact that most historical accounts of the formation of the RFC perpetuate the idea that much of the army was concerned that aeroplanes would do little other than frighten the horses; in fact, there was serious consideration about the role aircraft could play.¹² Although deep understanding of air power was limited amongst senior officers, by the end of 1914 it is fair to say that the majority of them appreciated that aircraft were a valuable addition to the BEF, and the few sceptics were swiftly converted or, thanks to a broader inability to adapt to the circumstances of the First World War, removed from command.

Air/Land relations

Despite claims that Douglas Haig, the man who would become the most senior British army commander on the Western Front, had expressed profound scepticism about the value of aircraft as late as July 1914, the evidence in favour of his being a firm proponent of the value of air power is extensive.¹³ Haig did not profess to understand air power in detail, but was prepared to allow those in charge of the RFC to go about their business unhindered by interference or obstruction from the few remaining sceptics about air power in the army. His constant support of the RFC and its work, particularly after his appointment as General Officer Commanding-in-Chief of the BEF in late 1915, created an atmosphere in which air-land cooperation might flourish. Perhaps most importantly,



Between 1915 and 1917, the RFC dramatically improved its tactics and procedures, becoming extremely proficient in the provision of effective intelligence, usually through photographic reconnaissance, and in target location

Haig's support allowed the RFC to develop its tactics and procedures with relatively little interference from senior army officers attempting to interfere with the day-to-day running of the air service, not least thanks to the protection afforded by Haig. For all the criticism levelled against him, it is clear that Haig was a supporter of technology he considered to be an important enabler, and he regarded air power in this light. Even more importantly, he did not attempt to second-guess his air component commander as to the apportionment of air assets, preferring instead to believe that air matters were best left in the hands of his senior airman.¹⁴ When criticism of the way in which air power was employed – much of it, to be fair, intended to be constructive – arose from members of the land component, Haig was consistent in his support of his air power expert. This notably included dismissing any suggestion after the battle of the Somme by the commanders of First and

Fourth Armies that the RFC should be placed under the operational control of the senior Royal Artillery officer in each Army Corps, rather than as part of the Army headquarters so as to improve the quality of artillery observation and a robust dismissal of complaints from a number of infantry divisions about the lack of friendly aircraft directly overhead during the opening day of the Third Battle of Ypres in July 1917.¹⁵

The structure of the BEF also did much to facilitate good levels of cooperation. As the BEF had expanded, the RFC had grown with it. By 1916, each of the BEF's Armies had an RFC Brigade attached to it. The RFC Brigades were made up of two, or occasionally three, wings – the first being the so-called 'Corps Wing', which provided squadrons dedicated to short range reconnaissance and artillery observation, while the second formation was the Army Wing, consisting of fighters and fighter – reconnaissance types. Each Brigade commander was located at Army Headquarters, acting as the Army commander's air adviser, while RFC Brigade staff were employed to liaise with lower-level formations. There was one Brigade which did not conform to this pattern, namely IX Brigade, which was under the control of RFC Headquarters, and employed as a rapidly deployable means of reinforcing other Brigades. This gave increased flexibility to these Brigades, which could rely upon rapid reinforcement should the need arise.

Relationships between the staffs of RFC Wings, the individual RFC squadrons and the formations they were supporting were invariably good. At a lower level still, army cooperation squadrons sought to foster close links with the units that they were

supporting, and liaison – both formal and informal – was good, although in the early stages of the war, problems arose when squadrons and artillery batteries adopted procedures for cooperation that were unique to them, causing confusion when one or the other formation was posted elsewhere and attempted to use its familiar set of procedures to control artillery fire in its new sector; a problem overcome by the rigorous development and imposition of universal tactics and procedures that would be understood by all those involved in air-artillery cooperation, no matter where on the Western Front (and later other fronts) they might be.¹⁶

Between 1915 and 1917, the RFC dramatically improved its tactics and procedures, becoming extremely proficient in the provision of effective intelligence, usually through photographic reconnaissance, and in target location. Fighting for control of the air, as already suggested, underpinned the level of success that could be achieved in these areas, but after the terrible setbacks during the late autumn of 1916 and spring 1917 which saw the RFC suffer terrible losses as the German air service gained the upper hand in the counter air contest, the advantage swung back towards the RFC as new fighter aircraft entered service in large numbers, along with pilots who were, by and large, far better trained than their predecessors had been thanks to the introduction of an effective training system back in the United Kingdom. Also, the development of the ground attack role had gathered pace during 1916, and although some historians suggest that the RFC was a 'slow learner' in comparison to the German air service, the level of air support provided was generally

effective, not least in terms of delivery of fire power in lieu of artillery. While a formation of fighter bombers of 1917 vintage could not provide the same weight of fire as precisely as a ranged artillery battery, it could achieve effect though suppressing the target rather than through destruction.

The result of these efforts was the development of a high level of air-land integration by 1918. The year's campaigning began with a series of massive German offensives beginning on 21 March, which enjoyed considerable initial success. The rate of the enemy advance was such that British artillery batteries, which had been assigned a critical part in the defensive plans were unable to provide any fire support, instead being forced to fall back. In the absence of artillery, air power was called upon, with the RFC and Royal Naval Air Service (and from April, the RAF) being called upon to launch wide-ranging ground attack operations in support of the hard-pressed units on the ground. On several occasions, attacks by British aircraft made a significant contribution to the disruption of the German advance. Aircraft proved an extremely useful substitute to artillery, breaking up units that were advancing towards the front line and disrupting the flow of supplies; ironically, the clichéd charge that aircraft frightened the horses was demonstrated to be true, with low flying aircraft proving particularly adept at scattering horse-drawn transport as the terrified animals fled from their attacks.¹⁷

However, by June, the Germans had failed in their bid to snatch victory before the United States, which had entered the war in April 1917, was in a position to take to the field. Although

the German thrusts had been blunted, it seemed to many on the Allied side that the war would be won in 1919 when hundreds of thousands of American troops would arrive in France. In fact, the final victory was closer than it appeared to many at the time.

The Hundred Days

The second battle of the Marne brought an end to the German Spring offensives. During their course, the Germans had suffered heavy attrition and had accrued no strategic gain despite their impressive early performance. This made the prospect of a German defeat much more likely, although there was doubt as to when this would come about. Within Britain, opinion at the War Office held that victory could not be achieved until mid-1919 at the earliest, prompting the production of a planning document that outlined British military policy for the next twelve months. It was issued on 25 July 1918, only to receive short shrift from Haig.¹⁸ By the time the document arrived at GHQ, Haig had been studying a proposal for a major offensive by General Sir Henry Rawlinson, GOC of Fourth Army, for a week.¹⁹ Rawlinson, buoyed by the success of the operation at Hamel, had been further convinced that the opportunity for a successful attack existed as the result of a series of trench raids around Amiens. Information brought back from these forays against the German lines suggested that the enemy defences were in poor repair, while German morale was low. On 17 July 1918, he submitted a proposal to Haig outlining the scope of the operation. Grand objectives were not sought, with the plan being for an attack in three phases which would see the capture of the German front line, followed by a line 3,000 yards beyond the first objective, with the

Fokker DVII



Sopwith Dolphin

offensive being completed by a further penetration of 1,000 yards to seize the outer Amiens defence line, while the Canadian Corps seized high ground to the South. The offensive would therefore be relatively limited in scale, and have clear, precise objectives. These objectives were to be consolidated to prevent any successful counterattack, and once this had been achieved, plans for a further attack would be made.²⁰

While Rawlinson was optimistic of success, his commander-in-chief was even more seized with the prospects, and advised Rawlinson that he should be less cautious in his objectives, aiming instead for Ham; as Prior and Wilson note, this extended the scope of the operation from the originally-planned depth of seven miles to 27. That he did this a bare three days before the offensive was to begin hints at the fact that Haig did not see it as a given that the war must go into 1919.²¹ Events from 8 August onwards were to prove him correct, and within 100 days, a series of highly successful offensive operations by the BEF and the French in their area of operations meant that the German army was to all intents and purposes defeated; the final offensives to bring about the

utter defeat of the enemy were not launched, since political circumstances in Berlin brought about an armistice on 11 November 1918.

The Air component

By this point, British air power had reached a high degree of proficiency, putting together the lessons learned from the earlier part of the war. The artillery had reached its highest standard of the war. Experience had illustrated the critical importance of exploiting technology. Flash spotting and sound ranging had increased the ability of the artillery to locate enemy batteries, but aircraft remained the most important tool in the successful prosecution of the artillery war. The preparation for the Amiens offensive was thorough; by 7 August 1918, 24 hours before the attack was to begin, 95 per cent of the German guns had been located.²² While 1915 and 1916 had been beset with problems with both supply and quality of artillery shells, by 1918 these had been eradicated, and the risk of the artillery fireplan falling short of expectations was greatly reduced.²³

By the summer of 1918, the RAF was in the happy position of retaining control of the air, although it was necessary to preserve a healthy respect for the Germans, who still maintained a cadre of skilled pilots and aircraft, which were a match for anything that the Allies flew.

The Fokker DVII generally outclassed the Sopwith Camel, but the SE 5a and Sopwith Dolphin were able to at least hold their own when confronted by the new German fighter.

Planning conferences for the battle took place on 21, 25, 27 and 29 July. The RAF was represented at the last of these conferences by the General Officer Commanding the RAF in France, Major-General John Salmond, but it appears that the meeting did not cover the precise role of the air force in support of the attack.²⁴ This did not mark any concern over the provision of air power; the general principle of what would now be regarded as mission command that Haig had followed was that the GOC of the RAF and, following his direction, the RAF Brigade commanders would apportion air assets appropriately to ensure mission success without interference from the army. Although the separation of the air service from the army had been a bitter disappointment to Haig, it had not affected the close relationships between the airmen and soldiers that had developed over the preceding years.

A further planning conference occurred on 20 July 1918, but although more precise details of the operation were discussed, Brigadier-General Lionel Charlton, GOC of V Brigade RAF, the Brigade supporting Fourth Army, was not present at the conference, and it is not clear from the records that he was represented. The Tank Corps' representatives requested that their units should be supported by low-flying aircraft to attack anti-tank guns, but it seems that this request was not transmitted to V Brigade immediately, even though the danger presented by enemy field guns employed in the direct

fire anti-armour role had been accurately assessed. Much useful experience had been gained at Hamel, when 8 Squadron had been assigned directly to support the tanks, and this led to an increased aspiration for air support within the Tank Corps. The matter was not resolved at the planning meetings, and the Corps was invited to contact the RAF directly to make arrangements. This was done on 3 August, with the request being sent directly to Charlton, who 'took note' of the matter, and resolved to assign another squadron to support the tanks; events were to suggest that more were actually required. Equipped with Sopwith Camels, 73 Squadron was given the job, but only on the day the offensive began, which meant that there had been no opportunity for the squadron to follow the customary pattern of liaising, no matter how briefly, with the land formation it was assigned to support. 73 Squadron was part of IX Brigade rather than V Brigade, and its swift deployment to aid the Tank Corps illustrated the flexibility of the RAF's structure, even if the late timing was not ideal.²⁵

A number of squadrons were tasked for ground attack duties, although most of them were tasked with armed reconnaissance so as to engage targets of opportunity, rather than being given any pre-briefed locations to attack; these targets were the preserve of the bomber squadrons of IX Brigade. The ground attack squadrons' prime duty was to deal with German artillery units that were found to be in action, although it was hoped that there would be few guns operating after the enormous preliminary bombardment, the plans for which had relied heavily upon the work of the RAF's corps squadrons in locating the position of most of the

German artillery strength in the area. The bomber squadrons (using DH4s and DH9s) were to attack railway centres with the aim of disrupting the arrival of German reinforcements. They were also given the task of attacking the bridges over the Somme (which would feature prominently later in the battle) and roads and billeting areas that the enemy were likely to use.²⁶ Finally, Salmond directed a number of IX Brigade's squadrons to attack enemy airfields, with the intent of ensuring that the Germans were unable to conduct artillery observation missions of their own, or to interfere with the ground assault.

8 August 1918

Although the air plan for the battle had been carefully coordinated with the infantry attack, the weather intervened to hamper plans. There was a heavy mist, which meant that number 8 Squadron was unable to locate the advancing tanks when they went forward. Aircraft from number 5 Squadron, unable to carry out their artillery observation task, contented themselves with attacking any German troops they encountered before returning to their airfield. By the time they did so, operations in support of the advance had become severely constrained by the fog, which made it difficult to identify the forward line of friendly troops. Despite the fog, some squadrons were tasked with dropping phosphorus bombs to create smoke screens to shield the advancing infantry and tanks. Once the fog began to lift later in the morning, the ground attack squadrons enjoyed some success in attacking German units, either fixing them in place so that the advancing troops could deal with them, or by forcing them to disperse.²⁷ As had been

feared, the Germans made good use of their field guns against tanks, and the poor visibility meant that numbers 8 and 73 Squadrons found it difficult to locate the enemy positions; the smoke screens laid from the air seem to have been the best counter-measure to the anti-tank weapons.²⁸

Diversion of effort

While the weather caused difficulties for the RAF, the infantry and tanks had far less difficulty; the Germans retreated with great rapidity, falling back towards the River Somme. The reaction of the British High Command was rather confused, since the speed with which the offensive had gained its first objective had been greater than even the most optimistic prediction allowed for. It was at this point that the close relationship between the air and ground components that had been built up over the last four years created a problem. It became apparent that it might be possible to destroy or capture the entire German force to the west of the River Somme if the crossings could be destroyed or passage over them made impossible by incessant air attack. It appears that Salmond was seized with the same enthusiasm as his army colleagues, and at around 1200, he cancelled all extant bombing arrangements and directed that the Somme bridges were to be attacked for as long as the weather and light conditions permitted. No written records survive to explain how this decision was arrived at, but the suspicion must be that Salmond was, to some extent, eager to deliver for the army rather than stepping back and considering the implications of his sudden change of plan. Even if one assumes that the destruction of the bridges was not the intention, and that disrupting or preventing the Germans

from crossing because of the weight of fire being brought down upon them from the air was the desired outcome, the question of whether this diversion of assets on such a scale was appropriate remains.

The bridges over the Somme were far from easy targets. Some were small, narrow constructions that would be difficult to hit, while others were substantial pieces of engineering which needed reasonably large bombs to destroy them. However, many of the aircraft tasked with the attack on the bridges were drawn from the fighter-bomber squadrons, and these aircraft were limited to carrying bombs of 25 pounds in weight. The 25lb bomb was unlikely to inflict much damage upon any of the Somme bridges, even assuming that the far-from easy task of delivering the weapon accurately was achieved successfully. To make matters worse, the need for reasonably precise delivery of the weapons, whether the structures themselves or the troops crossing them were the target, meant that the aircraft had to fly at low level, which brought them into the teeth of German small arms fire. If this were not enough, the German air service had rushed reinforcements to the area, and they began to participate in the air battle over the Somme crossings with some alacrity. The end result was the loss of a considerable number of British aircraft, while the German retreat, while hampered was not rendered impossible as had been hoped.

Had the effort of the afternoon of 8 August been abandoned when the level of losses sustained for relatively little return been appreciated, the diversion of assets would not have been problematic; however, the bridge attacks

continued until 11 August, by which point most of the German troops had fallen back across the river anyway. The Germans had also managed to bring up reinforcements, and it is tempting to speculate – as Marshal of the RAF Sir John Slessor did at some length – that the diversion of bombers away from attacking railheads and roads behind the battle area gave the Germans a far easier time of things than would otherwise have been the case.²⁹ This may be unfair, since attacking railheads had not proved particularly successful during the earlier part of the war. Perhaps of more significance for the attack at Amiens was the way in which the attacks on the bridges diverted ground attack aircraft from direct support of the troops on subsequent days of the offensive.

The rate of the advance had been such that the British artillery, particularly the heavy artillery, could not keep up with the tanks and infantry. Only a relatively small number of guns could be brought forward to support the second day of the attack, and none of them had been pre-registered on specific targets. To compound matters, the tanks, which had played a major role on the first day of the battle, had suffered heavy attrition, falling victim to enemy guns and, more frequently, to their terrible unreliability. On 9 August, of the thirteen brigades for which records are available, five advanced without any artillery support whatsoever, another five received a small amount. And the remaining three were given fire support, but thanks to the lack of pre-registration and communications difficulties, the supporting fires were laid down so far ahead of the advancing infantry it was useless.³⁰ Tank support was even more patchy – less than 50 tanks were available on 9 August, as opposed to 400

the day before. In such circumstances, it is tempting to suggest that detailing more aircraft to provide support to the attacking infantry, rather than the all-out effort against the bridges would have been of greater utility, not least since the infantry reported many problems when confronted with targets such as strongpoints and machine gun posts which had been suppressed from the air with some effect.³¹ By 11 August, the lack of progress saw a temporary suspension to the offensive, it resumed again, but when aerial reconnaissance revealed that the German barbed wire in front of the objective for 15 August had not been cut, Rawlinson recommended that the offensive be called off; Haig agreed.

The end results in terms of Air/Land integration were mixed. Although John Slessor was fiercely critical in Air Power and Armies about the performance of the RAF to the point that he felt that nothing done by air power after 1400 on the first day of the battle had been of any value, he was arguably unfair.³² Air/Land integration worked well in preparing the battlefield, not least in terms of artillery observation and reconnaissance. The British guns dominated the German positions at the outset of the battle, and when the fog lifted, the ground attack squadrons were quite successful in aiding the advance of the infantry. However, there were planning problems which prevented the RAF from delivering fully effective support.

The Fourth Army orders did not contain any specific references to the part played by the RAF, and did not even include mention of the objective of the air operations. As Slessor noted, there was no articulation of the effect that they were intended to deliver.³³ To

compound matters, it would seem that Charlton had not been made fully aware that Haig had persuaded Rawlinson to dramatically extend the scope of the operation, with the result that Charlton's orders to V Brigade issued on 7 August 1918 described the original plan to seize the outer defence line at Amiens as being the intent, rather than the more ambitious scheme that was in place by that point.³⁴

To confuse matters further, it was unclear who was in command of the air effort for the battle. Salmond had been given authority to deal directly with Rawlinson with regard to air matters, while Charlton was responsible for preparing the air plan for his units. The end result was to see Charlton planning for a limited operation which had in fact expanded considerably by the time he issued his orders, while Salmond, when the offensive began on 8 August, was clear that the air effort required would be in support of a scheme rather more expansive than V Brigade had assumed, and, more importantly, made its plans against. Unfortunately, it was too late to tell Charlton. Had the offensive progressed as planned, it is probable that a suitable plan for the following days could have been drawn up – by August 1918, the RAF was adept at producing effective plans for support in a short timeframe. However, the speed of the advance on the first day of the battle was such that the RAF was, in effect, left without an air plan. The end result was that Salmond was, in effect, left with a blank canvas upon which to sketch the subsequent use of air power in the battle, which, it might be suggested, explains why he so readily decided upon bridge bombing – he did not recklessly tear up the plan for air support to the army, he could not, since

there was no plan to tear up.

While it is unreasonable to characterise Amiens as a failure or a severe disappointment from the air perspective given the success of the army cooperation missions and the early air support sorties, the battle gives a stark illustration of what can occur if a single air component commander is not appointed, and the dangers of leaving those responsible for the development of the air plan at the margins of the information chain.

On to victory

The RAF subjected its work to continuous review, and the experiences at Amiens were no exception, although the command and control issue was not addressed in detail in after-action reports. These reports, generated at RAF and RAF Brigade headquarters concentrated upon the army cooperation role. The importance of air observation for the effective employment of artillery was highlighted yet again, with new innovations receiving comment. The number of emergency calls from ground units for artillery fire had increased, and the ability to put an aircraft over the vital spot and call down accurate fire had proven decisive in defeating at least one effort at a counter attack. Also, on two occasions when wireless stations used by artillery batteries to communicate with their spotter aircraft had suffered technical failure, new parts were dropped by parachute, allowing the stations to return to operations after only a short delay.³⁵ The battle had also seen developments in the employment of fighter-bombers against fleeting targets, called in by the use of red Very lights; however, thought turned to developing a network-enabled system of processes to allow for the engagement

of time-critical targets. The need for such a system had become clear when a number of fleeting targets which could have been attacked were left unmolested thanks to the unavailability of artillery (which was all committed to action at the time) and the inability of the army cooperation aircraft to call in air attack as an alternative.

The solution came in the form of Central Wireless Stations, soon renamed Central Information Bureaux (CIB), which had been established in 1916 as a means of coordinating artillery observation missions.³⁶ It was decided to refine the system to allow for the basic coordination of fighter-bomber attacks. Army cooperation machines which encountered suitable ground targets during the course of their patrol would report them to the CIB, which then passed the information on to the nearest RAF advanced landing ground (ALG). These landing grounds had been established as a means of ensuring that aircraft did not have to return to their aerodromes to refuel and rearm during the course of an offensive. Pilots at the ALG would be directed towards the position of the aircraft which had found the target, and once in visual range, the army cooperation machine would attract the fighter-bombers by firing red flares. Once the fighters had reached the position of the army cooperation machine, they would be directly above the intended target and could launch an attack. In addition to ensuring that aircraft could be swiftly despatched to attack enemy targets, the CIB also sent details to the artillery Counter Battery Office (CBO), which could apportion any available artillery that was in range to engage, sometimes before air assets arrived. Pilots of army cooperation machines were also instructed to check

in with the CIB every half hour – if no signal was received, either as the result of equipment failure or a forced landing, the CIB would then signal the airfield or ALG to ensure the despatch of another aircraft to maintain a reasonably persistent level of surveillance.³⁷ Within a matter of weeks, the CIB had become an important mechanism through which coordinated fires from air and artillery could be brought in against targets of opportunity or pockets of unexpectedly strong enemy resistance.³⁸

These refinements in the use of aircraft for ground attack coincided with a gradual reduction in the intensity of air support required in September and October 1918. Part of this was driven by the last great air combat efforts by the Germans in September, when they inflicted heavy, but sustainable losses upon the British (and other Allies), but only at serious cost to themselves in pilots and aircraft, but another factor was the decreasing number of targets available for air attack. In one area, though, the work of aircraft in support of land operations was of considerable importance, namely that of providing support to the Tank Corps, which was an increasingly significant factor in the success of the British advance

It was clear from events at Amiens that the major obstacle to the tank – other than mechanical breakdown – was the anti-tank gun. Although artillery could be brought down on some of the guns that were observed, this was often not sufficient to prevent the Germans from engaging advancing tank formations. The obvious answer was to look for air support to engage enemy field guns before tanks came into their range, which had seen the assignment of 73 Squadron to provide

specific support against anti-tank positions. Although little had been achieved on the first day of the battle of Amiens, in the subsequent battles, the degree of integration between 8 and 73 Squadrons and the tanks developed to an impressive level.

The importance attached by the RAF to ensuring the tanks were protected was shown by a memorandum of 14 August by Lionel Charlton. He noted that the commanders of V Brigade's wings had issued special instructions regarding these weapons, but wished to reinforce the point:

'All experience since the start of the battle goes to prove the controlling action taken by the Anti-Tank [sic] guns of the enemy. Single guns have been responsible for 'knocking out' as many as 8 tanks in succession and thus completely holding up the advance in the sector concerned.

'It is not too much to say that without the anti-tank gun the advance of our line would be irresistible.

*'The importance therefore of offensive action on the part of pilots and observers against these guns becomes of paramount importance and no opportunity should be missed; ground in front of the tank advance should be watched for their appearance and for their flashes, and it will be seldom that the duty in which machines are at the moment engaged will not yield in importance to offensive action at once against the anti-tank gun.'*³⁹

From this point, although 73 Squadron was specifically tasked to target anti-tank weapons, it was aided by other aircraft which would engage such gun positions on sight. The first opportunity for 8 and 73 Squadrons to demonstrate



A Sopwith Camel of 1917, carrying the standard armament of two Vickers .303 machine guns (AHB RAF)

their effectiveness against the threat came at the Battle of Albert. For the opening day, on 21 August, the weather presented problems, once more, with fog making flying operations impossible until the late morning. As a result, the anti-tank guns were able to operate unmolested from the air and inflicted heavy losses.⁴⁰ To make matters more difficult, it became clear that a lack of familiarity with the terrain over which the battle was being fought meant that the aircrews had to rely upon navigating by map, and were forced take frequent glances at these, rather than keeping a look-out for the hard to spot anti-tank guns.⁴¹

As the pilots became more familiar with their area of operations, however, matters improved. On 23 August, the aircrew were able to follow the battle from the start, and accompanied the advance of the tanks. A patrol from 73 Squadron saw guns active west of St Leger and neutralised them with 24 bombs and machine gun fire. Another battery in the same area received 1,500 rounds of machine gun fire shortly after this incident and was silenced. Captain

Toomer and Lieutenant Shirlow of 8 Squadron attacked a gun that was in the open with machine gun fire and six bombs. The bombs straddled the gun and the crew fled. The gun also sustained damage. Later in the day, 73 Squadron discovered batteries setting up at Behagnies. The guns were attacked with 24 bombs and 2,000 rounds of ammunition were fired at them. The pilots were satisfied to see several guns damaged, some limbers overturned and stampeding horses and men fleeing the area.⁴² Tank Corps HQ noted:

'During the fighting on 23 August, the scout aeroplanes...knew the ground and the work better than on 21 August.'

*'Aeroplanes in this way appear to be most effective for counter-battery work.'*⁴³

These attacks became a routine part of the two squadrons' work, and by the end of August, the use of air power against the anti-tank guns was proving a major enabler for the effective employment of British armour. Effective coordination through the use of the CIB to transmit information gained from air observation to tank corps units increased to the point where the Tank Corps began to plan for the use of aircraft operating well in front of the advance, signalling with long-range wireless equipment to the CIB so that enemy strongpoints could be engaged or avoided, and to enable the selection of the most appropriate weapons system to engage these positions – artillery, the tanks themselves (supported by infantry), or air attack.⁴⁴

Although the cooperation with tanks was perhaps the most significant piece of air-land integration during September

1918, the RAF also began to conduct large-scale interdiction operations against German formations advancing towards the front line. Attacks were carried out in squadron strength, and on occasion, entire Army Wings would send their fighters out to attack any targets they could find behind the battlefield and out of the range of the artillery.⁴⁵ On 4 and 5 November, 22 Wing RAF made its last large effort against enemy targets, inflicting considerable damage on Hautmont station and road transport in the vicinity; two pilots from 84 Squadron attacked from a height of ten feet to destroy a small German convoy which had – fruitlessly – taken refuge behind a hedge.⁴⁶ The fighter-bombers were not the only ones who were engaged on this sort of operation by this point; army cooperation machines, increasingly short of targets to range for the artillery, were pressed into the ground attack role. On 10 November, number 46 Squadron carried out a trench-strafting operation against one of the few remaining German pockets of resistance; heavy casualties were inflicted on the Germans. Less than twenty four hours later, the armistice came into effect. The first air war was over.

Summing up

Although air power was very much at a nascent stage in 1918, several important lessons regarding air-land integration had emerged. Perhaps the most important concerned the command and control of air assets, with the confusion caused during the Battle of Amiens highlighting the importance of ensuring that a single commander had control over the air effort. The decentralised planning that occurred between RAF HQ and V Brigade meant that there was no effective plan for the employment of air assets after the outstanding success

of the initial advance. The attacks on the Somme bridges further illustrated the importance of having a carefully considered plan which might have militated against the clear failure to appreciate the limitations of air power in support of the offensive. This failure apart, however, the Hundred Days marked the point at which the BEF was able to carry out effective Air/Land operations.

Control of the air was a critical enabler, allowing the collection of valuable information by reconnaissance aircraft. Air reconnaissance enabled the creation of a clear picture of enemy defensive positions, particularly those that were likely to be an obstacle to a successful advance; these were then targeted by the artillery. The development of cooperation with the Tank Corps proved of considerable importance as well, since the ability to suppress many of the German anti-tank guns during operations in September and October 1918 meant that the tanks could achieve a greater level of effect on the battlefield, although mechanical breakdown was a clear limiting factor. A rudimentary networked system for coordination of fires had evolved, and although basic in the extreme, it allowed for the effective engagement of time-critical targets by appropriate weapons systems; the use of ALG meant that it was possible to add an element – albeit seriously limited – of persistent air coverage over the battlefield.

All of this was underpinned by close communication between the air and land components, aided by the presence of senior air force officers at Army headquarters, although Amiens illustrated the danger of assuming that the RAF Brigade commander

fully understood the plan – ironically, it was the high level of trust between the components that led to this flawed assumption being made. By the end of the First World War, the BEF and the RAF had developed an extremely high degree of cooperation that added considerably to the potency of the BEF as the war drew to a close. Yet within a matter of years, service politics had undermined the many achievements of the First World War in the field of air-land integration, and much hard toil was required between 1939 and 1945 to repeat the level of effectiveness that had been reached by November 1918. Air power may have been at its earliest stage of development at this point, but the importance of effective cooperation and integration between the components had been comprehensively demonstrated. Aircraft were not capable of winning wars by themselves as some theorists were to suggest within a few short years of the Armistice, but the British experience in the Hundred Days campaign illustrated that winning wars without air power would henceforth at best be incredibly difficult, and more likely, impossible.

Notes

- 1 Although imprecise, the term 'Land Component' is used to describe the non-flying elements of the British Expeditionary Force between 1914 and April 1918 throughout this article; the RFC was, of course, part of the Land Component until 1 April 1918.
- 2 The National Archives (hereafter TNA) WO 95/431, Fourth Army War Diaries, Feb – Dec 1916, Memorandum 'Artillery Lessons of the Battle of the Somme'.
- 3 See TNA Air 1/749/204/3/76, Reconnaissance Reports, August 1914.
- 4 HA Jones, *The War in the Air: Being the Story of the Part Played in the Great War by the Royal Air Force* Volume IV (Oxford: Clarendon Press, 1934, pp.230-235; Arthur Gould Lee, *No Parachute: A Fighter Pilot in World War I* (London: Jarrolds, 1968), pp.154-164
- 5 For a description of this work, see Lord Douglas of Kirtleside, *Years of Combat* (London: Collins, 1963), pp.193-194. Douglas was Officer Commanding 43 Squadron in 1917 and OC of 84 Squadron in 1918
- 6 See Gould Lee, *No Parachute*, pp.154-164.
- 7 SF Wise, *Canadian Airmen and the First World War: The Official History of the Royal Canadian Air Force*, Volume I (Toronto: University of Toronto Press, 1980, p.550
- 8 A McCluskey, 'A resounding victory: The Battle of Amiens and the development of British Air-Land battle, 1918-1945.' Unpublished Defence Research Paper, Joint Services Command and Staff College, June 2008
- 9 See, for instance, The National Archives [TNA] Air 1/1347/204/19/37, Operational Record Book, 16 Squadron, entries of 31 January 1918 and 26 February 1918.
- 10 See Gould Lee, *No Parachute*, pp. 217-218 for criticism of the offensive policy.
- 11 Andrew Boyle, *Trenchard* (London: Collins, 1962), p. 260-270 provides a useful, if rather biased summary of the events that led to Trenchard's resignation.
- 12 See Andrew Whitmarsh, 'British Army Manoeuvres and the Development of Military Aviation, 1910-1913' *War in History* Volume 14: 3 (2007) pp. 325-346 and David Jordan and Gary Sheffield, 'The British Army and Air Power' in Peter W Gray (ed) *British Air Power* (London: TSO, 2003), pp.67-89.
- 13 See Sir Frederick Sykes, *From Many Angles* (London: Harrap, 1942), p.105 for some of the alleged comments by Haig on air power and Gary Sheffield and David Jordan, 'Sir Douglas Haig and Air Power' in Peter W Gray and Sebastian Cox (eds) *Air Power Leadership: Theory and Practice* (London: TSO, 2003) pp.264-282 for the discussion of the accuracy of Sykes' claims.
- 14 Jordan and Sheffield, *Haig* (note 13)
- 15 TNA Air 1/524/16/12/26, *Cooperation between aircraft and artillery, 1916-1919*, covers the suggestion by Generals Horne and Rawlinson, while TNA Air 1/524/16/12/20, *Report of RFC*

Operations on [the] Battle Front on 31/7/1917:

Dropping of forms on German Towns, Bombing Reprisals addresses the complaints by infantry formations, despite the slightly misleading document title.

16 See HA Jones, *The War in the Air: Being the Story of the Part Played in the Great War by the Royal Air Force Volume IV* (Oxford: Clarendon Press, 1934), pp.217-218, TNA, Air 1/524/16/12/21 'Aircraft Cooperation with Artillery' November 1914-May 1915 and Air 1/746/204/3/17 '4 Squadron RFC Orders: Cooperation of Aeroplanes with Other Arms', April 1915 for a further outline of attempts to standardise procedure.

17 See for example F M Cutlack, *The Official History of Australia in the War of 1914-1918, Volume VIII* (Sydney: L. Angus and Roberston, 1938) pp. 235-6; TNA Air 1/838/204/5/285, Summary of Operations, I Brigade RFC, 27 March 1918 and Special Summary of Operations, 27 March 1918. There is considerable anecdotal evidence to suggest that a significant number of pilots preferred to scatter the horses rather than bomb and machine gun them, regarding the latter approach as being inhumane; several pilots later recorded their sorrow at being responsible for the death of horses during their attacks on German convoys.

18 Gary Sheffield and John Bourne, *Douglas Haig: War Diaries and Letter 1914-1918* (London: Wiedenfield and Nicholson, 2005), p.434. Haig wrote 'Words! Words! Words! Lots of Words! And very little else' on his copy of the document.

19 Robin Prior and Trevor Wilson, *Command on the Western Front: The Military Career of Sir Henry Rawlinson, 1914-1918* (Oxford: Basil Blackwell, 1992), pp.302-303

20 Ibid.

21 Ibid, p.305

22 Ibid, p. 314-315

23 TNA WO 95/431 (note 2)

24 Wing Commander J C Slessor, *Air Power and Armies* (Oxford: OUP, 1936), p.151.

25 TNA WO95/94, Tank Corps War Diary, 3 August 1918; Slessor, *Air Power*, p.151.

1947), p.83

27 Wise, *Canadian Airmen*, p.526

28 Ibid, p.527.

29 Slessor, *Air Power and Armies*, p.163

30 Prior and Wilson, *Command on the Western Front*, p.327

31 Ibid, p.330.

32 Slessor, *Air Power and Armies*, p.163

33 Ibid, p.165

34 Ibid.

35 TNA Air 1/725/97/2 'Notes on Corps Squadron Work during the Somme Offensive, August 1918'

36 HA Jones, *The War in the Air: Being the Story of the Part Played in the Great War by the Royal Air Force 1914-1918 Volume III* (Oxford: Clarendon Press, 1931), p.311

37 TNA Air 1/725/97/2, 'Notes'

38 Wise, *Canadian Airmen*, p.500

39 H A Jones, *The War in the Air, Being the Story of the Part Played in the Great War by the Royal Air Force, Volume of Appendices* (Oxford: Clarendon Press, 1937), p.123.

40 Tim Travers, *How The War Was Won: Command and Technology in the British Army on the Western Front 1917-1918* (London: Routledge, 1992), p.137.

41 TNA WO 95/94, Tank Corps War Diary

42 TNA Air 1/725/97/10, History of Tank and Aeroplane Cooperation on the Western Front.

43 NAWO 95/94, Tank Corps War Diary.

44 Ibid

45 For example, see TNA Air 1/1811/204/162/9,

22 Wing Summary of Work, October 1918

46 Ibid.

26 Sir James Edmonds, *Military Operations, France and Belgium 1918, Volume IV* (London: HMSO,



A Bristol Fighter of No 20 Squadron over the Khyber Pass, December 1925 (AHB RAF)

Friends in high places: air power on the North-West Frontier of India*

By Maj Andrew Roe

**Prior to 1947 (Independence), the region was known as the North-West Frontier of India. Now the same area is known as the North-West Frontier of Pakistan.*

Introduction

The Afghan conflict that began in the autumn of 2001 again focused the attention of the world on the troublesome North-West Frontier of Pakistan. This precipitous and inaccessible no-man's-land, linking Central and South Central Asia, was one of the most volatile and challenging territories of the British Empire. The area provided a strategic buffer between opposing British and Russian spheres of influence and became a crucial outpost of the British Empire requiring measured security and stability as opposed to social and economic assistance. Comprising an area of 25,000 square miles and containing a population of approximately 3,000,000 predominantly Pathan tribesmen, the North-West Frontier contained five British-administered districts: Peshawar, Kohat, Bannu, Dera Ismail Khan and Hazara. Beyond the districts and roughly north-west of them up to the International Border, known as the Durand Line, were the loosely controlled tribal territories of North and South Waziristan, the Kurram, the Khyber and the Malakand.¹ As India's traditional and well-used invasion route, the North-West Frontier was a constant concern to the Government of India.

While the defence of India remained paramount to the Government, border management and the security of the frontier districts and tribal territories provided an equally complex dilemma. The immediate challenges of tribal control frequently eclipsed the threat of Russian advancements, especially for those charged with 'controlling' tribal territory. With limited resources, 'ascendancy' over the tribesmen was exercised primarily by the distribution of allowances to sympathetic *maliks*

(tribal representatives or elders), and by the employment of locally recruited *kassadar* (tribal policemen) and indigenous forces, known as scouts. Both proved invaluable in maintaining order and relieving regular troops of the expensive work of garrisoning frontier outposts. In the event of a situation escalating out of control, the Army of India was the fallback force on the frontier. This consisted of both the British and Indian armies which, when combined, was a sizable standing force of covering troops.

Tribal territory was routinely controlled and disciplined by a sliding scale of violence: first enticement, rewards and threats, next tribal *kassadars*, then the lightly-armed scouts; only in *extremis*, when outbreaks were too excessive to be contained by the scouts, would the political authorities call on the army to conduct a punitive expedition in order to administer punishment. At this stage, control of the operation, including political control and oversight of the civil armed forces, passed to the military commander. In all cases, a heavily-armed force was deployed into tribal territory to exact retribution. Before the arrival of the aeroplane there was no other method of applying armed force when political initiatives failed. Marshal of the Royal Air Force, Sir John Slessor, recalls: 'These little wars [punitive expeditions] meant fighting battles, some very small affairs but others much more serious, involving heavy casualties to British or native troops. I do not know the cost in casualties of the of the fifty expeditions on the North-West Frontier in the thirty years between 1895 and 1925, but the Waziristan operations of 1919-1920 alone cost us in six months over 1,800 lives, in addition to 3,675 wounded and 40,000 sick casualties.'²

Fortunately for the Government, the arrival of a small number of primitive aircraft offered a ground-breaking means of bringing order to the tribal territories of the North-West Frontier.

Royal Aircraft
Factory BE2c



Air power was seen as an inexpensive and effective means to observe and punish rebellious tribal behaviour

The role of air power on the frontier

Air power made its first appearance on the frontier in 1916. A year later, a small number of slow-moving Royal Aircraft Factory BE2c bi-planes, working from Tank, cooperated with ground troops during the Waziristan campaign of 1917. Aircraft were used again during the Third Afghan War; notably, a single elderly Handly Page V-1500, piloted by Captain 'Jock' Halley, bombed Kabul³ on 24 May 1919, which was credited with playing a key role in the Afghan King's decision to sue for peace.⁴ It was not until the 1919-20 campaign in Waziristan that air power emerged as an indispensable component of all future operations. Such was the physical and psychological impact of aircraft on the frontier in the early days that ground operations were postponed when weather conditions prohibited aerial support. With the advent of

better aircraft and improved relations between the Air Staff and General Staff, air power was seen as an inexpensive and effective means to observe and punish rebellious tribal behaviour.⁵ It also permitted an almost instantaneous response to tribal transgressions, laying aside the slow method of persuasion and negating the laborious preliminary measures necessary for a military expedition.⁶ In contrast with traditional expeditions, the employment of air power made Government forces relatively inaccessible to the tribesmen.⁷ Sir Edgar Ludlow-Hewitt posits: 'The effect on the tribesman of depriving him of all the happy possibilities offered by an invading column of troops must be something similar to the feeling of the matadors in a bull-fight if the bull were removed from the arena – no sport, no honour, no prizes, nothing to do but go home.'⁸ Air power also afforded additional benefits. Even the most isolated tribes could now be reached with relative ease. Likewise, aerial actions were also out of reach of war correspondents.

By the 1930s, air power was employed on the frontier in two ways: in cooperation with other arms and services and 'as a new weapon.' In the case of the former, aircraft undertook reconnaissance, artillery observation, offensive action (bombing and machine gun raids), re-supply of ammunition and supplies, delivery, demonstrations to deter rebellion, convoy protection, casualty evacuation, protection and messaging duties.⁹ They also conducted daily 'reassurance' visits to isolated scouts' posts. Although offensive action, like punitive expeditions, was criticised by some senior British officials in India as being brutal and indiscriminate, Slessor argued that its routine

employment was carefully controlled and more restricted than other forms of punishment.

It was considered perfectly legitimate to shell [with mountain artillery] a tribal village without warning, but even in an area when troops were in actual contact with a tribal enemy, villages were not allowed by the regulations to be bombed without special permission and the usual [twenty-four hour] period of warning.¹⁰

Therefore, despite poor levels of literacy, tribes were warned of an impending operation by a coloured leaflet, written in *Pushtu*. White leaflets were dropped a number of days prior to the bombing, followed by red leaflets twenty-four hours before the attack. Both set out the reason and nature of the action. They also articulated the Government terms and directed the tribe to evacuate their village or a prescribed zone by a specified time.¹¹

Whereas lashkars have collected to attack Gandab and are to this end concentrated in your villages and lands, you are hereby warned that the area lying between Khapak-Nahakki line and the line Mullah Killi-Sam Chakai will be bombed on the morning of [date] beginning at 7 a.m. and daily until further notice.

You are hereby warned to remove all persons from all the villages named and from the area lying between them and the Khapak and Nahakki Passes and not return till further written notice is sent to you.

Any person who returns before receiving such further written notice will do so at his own risk.

Signed Griffith-Governor, dated 4th September 1933.¹²

These advanced notices allowed the tribesmen to relocate their families and as much of their movables, valuables and livestock to a place of safety in order to avoid casualties.¹³ Regrettably, leaflets were not always dropped on the correct villages in time. Moreover, a number of tribesmen remained to protect their property, for fear of being robbed by their fellow countrymen.

Tribes generally took shelter in surrounding caves, which 'were flea-infested and extremely uncomfortable' or became unwelcome guests in neighbouring villages.¹⁴ *Pushtunwali*, a strict Pathan code of honour, ensured that requests for food and shelter were approved, but should any fighting occur with Government forces, receiving villagers ran a considerable risk of being mistaken for the errant tribesmen. Colonel F. S. Keen in his '1922-23 Gold Medal Prize Essay' cautions: 'By driving the inhabitants of the bombarded area from their homes in a state of exasperation, dispersing them among neighbouring clans and tribes with hatred in their hearts at what they consider 'unfair' methods of warfare, bring about the exact political results which it is so important in our own interests to avoid, viz., the permanent embitterment and alienation of the frontier tribes.'¹⁵ Moreover, in providing a detailed warning, the element of surprise was lost and many tribesmen chose to join their families in refuge rather than endure an aerial bombardment; many of which lasted both day and night for a number of consecutive days. Whilst the physical impact of aerial attack was far from decisive, the moral effect of an aerial assault could be considerable. However, the net result was that attacks against villages soon began to have little or

no long-term effect on the tribesmen. Continuous operations against a nomadic enemy, with limited possessions, at best achieved a transitory effect. To counter this, many called for raids to occur without prior warning. Although the proposal was rejected, British aircraft, on rare occasions, bombed tribes on the frontier without notice.¹⁶

Of particular significance, the bombing of villages (often viewed as the stronghold and headquarters of the tribal forces), which lay at the heart of air power doctrine, was rarely politically practical or justifiable. 'The *ultima ratio* of reprisals on a raiding *lashkar* [armed tribal force], that of bombing to pieces the village whence it set out, is, in theory, our trump card. In practice, it is not only difficult but – as we are beginning to realize – inadvisable.'¹⁷ Referring to the use of air power on the frontier in 1930, Major General Sir Charles W. Gwynn, an officer with a particular interest in the techniques of imperial policing, highlights the challenges associated with its use: 'During these operations it was seldom either politically expedient or justifiable to adopt the usual tactics of bombing villages from which the hostile elements came. Under the prevailing conditions, the hostile bodies were often made up of men drawn from wide areas and from villages which contained many opposed to their conduct.'¹⁸ To avoid these complexities, aerial raids were frequently diverted from village communities to strafing attacks against herds of sheep and cattle or small groups of personnel. In response, the tribesmen divided their animals into small groupings in order to reduce the size of a potential target. In reply, standing crops were often set alight with 'jerry can' petrol bombs.

In the RAF's defence, Slessor is quick to point out that: 'In point of fact bombing was never indiscriminate; even with the relatively primitive equipment of the nineteen twenties and early thirties it was surprisingly accurate.'¹⁹ Thanks to vertical and oblique aerial photography, it was theoretically possible for pilots to identify not only each village and hamlet but also an individual dwelling for attack. This was achieved by combining aerial photographs into a large montage on which almost every group of houses was identifiable by grid references and named with the help of informers. To cite a case in point, during an operation in March 1932, the Political Agent deemed it necessary to destroy the house of the Haji of Turangzai, a religious firebrand. Slessor recalls:

*It was a particularly difficult target, lying as it did at the foot of a very steep hill, and it was essential not to damage the tomb of a specially holy Mullah [priest] situated in the same small village. Selected crews dived down the hill-side and bombed from about a hundred feet, the gunners firing the while to keep down the heads of enemy sharp-shooters. Eighteen 230-lb. bombs were dropped scoring ten direct hits on the Haji's house, and no other damage was done.'*²⁰

Such an example was an exception. An experienced aircrew, in perfect conditions, could hit a point target with a relative degree of accuracy. However, such a crew and conditions rarely existed.²¹ More usually, bombs fell wide of their target causing collateral damage. Even routine air supply, out of contact, was challenging. Recounting an aerial re-supply of rations by parachute in 1937, M. F. Kemmis Betty recalls: 'Great accuracy had not been achieved and loads dropped everywhere, but luckily no one was hurt.'²²

Inexperienced pilots, overeager to take action and often under considerable pressure, were to blame for some inaccuracies. As the tactics of air-to-ground attack were still in their infancy, aircraft effectiveness also left much to be desired. David Omissi notes that of the 182 bombs dropped on frontier tribesmen in November 1928, 102 completely missed the target villages.²³ Only low-level attacks increased accuracy. Moreover, many attacks missed their targets altogether. Despite improved mapping, aerial navigation on the frontier was difficult and it was often awkward to distinguish between villages at seven thousand feet. It is unsurprising, therefore, that a number of villages were bombed in error. The tribesmen knew through experience they had little to fear from a retaliatory air attack. However, the use of air power in conjunction with ground forces was a different matter. Combined action often forced a strong-willed tribe to submit to Government terms. As Air Chief Marshal Sir Glenn Torpy posits: 'Success was most effectively delivered by an integrated use of air and land forces, with the lead in individual operations going to whichever Service was best placed to do so, depending on the circumstances particular to an individual operation.'²⁴ Air cover was also vital in suppressing tribesmen and negating their movement by daylight. Even aircraft that had run out of ammunition and bombs could repress hostile tribesmen by conducting mock attacks.

Despite the challenges associated with bombing villages, air power was particularly useful when employed in support of a force or post engaged with hostile tribesmen, although 'levels of support' were often driven

by personalities. *The London Gazette* of 29 October 1937 notes: 'The close and cordial relations which were maintained between the Royal Air Force and the Land Forces [during operations in Waziristan from 25 November 1936 to 16 January 1937] were a marked feature of these operations. This satisfactory result was due, in great measure, to the high example and ready co-operation of Group Captain N. R. Bottomley, C.I.E., A.F.C., under whose direction the units of the Royal Air Force played a prominent part in bringing the operations to a successful conclusion.'²⁵

Air power was also effective in helping to disperse hostile *lashkars* by bombing raids, ground strafing and the dropping of flares.²⁶ Air Commodore H. le Brock recounts that whilst attacking *lashkars* around Sorarogha and in the Tank Zam, one bomb was reported to have killed twenty tribesmen and wounded nineteen.²⁷ But this was not always the case. 'Mauser' posits: 'As a matter of cold fact, six thousand pounds of air bombs have utterly failed, in recent days, to prevent or even seriously to delay the advance on Peshawar of the Afridis, who have shown their contempt for modern mechanical inventions by practically besieging our cantonments at short range. The power of our air-arm against the only target that matters – the armed man himself – is, frankly, derisory.'²⁸ The dispersion of hostile tribesmen by air power added to the difficulties of the ground troops and made less effective the assistance which aircraft could provide in locating and fixing the enemy.²⁹ Moreover, some observers criticised its employment in the attack as 'a misuse of aircraft' and turning 'valuable reconnaissance aeroplanes into mobile machine-guns.'³⁰ However, the value of aerial

reconnaissance was not lost on the British. Scouting sorties were used to locate and monitor hostile *lashkars*. Information from these patrols enabled column commanders to site protective piquets and to direct long-range artillery fire. It also assisted in recognising forming-up places and lines of departure for an attack.



The Hawker Hart served as an effective light bomber with the RAF in India

Air power was also used as a 'new weapon' to compel submission and enforce discipline via an air blockade. The term referred to depriving an aberrant tribe of their customary means of livelihood to such an extent that a continuance of hostilities became unendurable. This approach included: preventing the watering of livestock; thwarting the ploughing or harvesting of cultivatable crops; and denying the tribesmen any form of compensation which other forms of punishment might offer. Air Commodore H. le M. Brock notes: 'We are not aiming at infliction of casualties, but to cause intolerable inconvenience for an indefinite time by excluding the tribesmen from their villages [including their fields], and, of course, to punish them by causing

material damage.'³¹ Sir Stuart Pears, Chief Commissioner of the North-West Frontier 1930-1, confirms Brock's position. He suggests the object of such operations is 'to make the normal life of offending sections so disorganised that they are compelled to comply with our just and lenient demands.'³²

Frontier realities

The employment of air power in cooperation with other Arms and Services and 'as a new weapon' had its limitations, challenges and dangers. To be effective, air power relied on accurate intelligence and speed of employment; any delays in action were increasingly viewed by the tribes as weakness. The main source of intelligence came via the political chain and various informers who were keen to sell their information.³³ The former depended mainly on personal contacts and tribal knowledge, supported by the *kassadars*, scouts and tribal structures. This hierarchy provided a regular supply of actionable intelligence. But informers were prone to informing both ways and were adept at misleading Government forces.³⁴ Likewise, it was not easy to gain 'timely' information in such a xenophobic environment.³⁵ The RAF also possessed its own intelligence officers who linked into the regional intelligence networks.³⁶ In contrast, British and Indian battalions often failed to develop effective intelligence structures. The same was true also at brigade level. Geoffrey Moore, a platoon commander and part-time brigade intelligence officer of the Razmak Brigade in 1936, recalls: 'I was soon to find that my grandiose title of Brigade Intelligence Officer masked the old-fashioned role of Brigadier's Orderly Officer. As my platoon was remarked later when someone asked the meaning of my B.I.O. armband,

"Brigade Ignorance Officer, I expect." He really had hit the nail on the head.³⁷

Once a report had been verified, triggering aircraft in a timely manner was vital. The aim was to isolate any outbreak of violence before it could spread. Air Commodore H. le M. Brock recalls: 'It is as with a fire brigade – one engine can deal with a small outbreak, but if there is much delay in attending to it the fire becomes a big conflagration.'³⁸ As the mere threat of air power could cause a tribe to reappraise its position, the speed of response was essential. Field Marshal Sir Philip Chetwode recalls: 'In many cases, by taking swift action in a few hours instead of the weeks that it might have taken ground troops, aeroplanes have crushed our incipient trouble which, had it spread, would have involved a serious campaign.'³⁹ This relied on the efficient working of the administrative machinery to obtain political and Government decisions. It also called for effective communications and a duty pilot at a high state of readiness to support a patrol in trouble.

Despite the remoteness of the region, both line and wireless communications networks were becoming increasingly mature. An official report of the 1936-37 operations notes: 'Communications continued to be very good throughout the year, a great deal of the efficiency obtained was, no doubt, due to the fact that for the first time all L. of C. [Lines of Communication] in Waziristan were linked up by L/T [line telegraphy].'⁴⁰ To guard against tribal damage, consideration was given to procuring a 'few converters capable of giving one ampere at 4000 to 5000 volts when run off the normal power supply.'⁴¹ Such a voltage would prove lethal

to anyone touching the wires and, it was suggested, would act as a strong deterrent to sabotage. In the event of the tribesmen cutting the line, W/T (wireless telegraphy) was the alternative means of communication. This proved relatively satisfactory despite the age of the equipment and mountain atmospherics. It allowed deployed officers to remain in contact with the air staff headquarters and political authorities. It also facilitated discourse, which cleared up any misunderstanding. However, range remained a limiting factor and they could only work effectively if operated from the summit of a local hill; high ridges often interfered with radio transmissions. Communication from air to ground was either by pack R/T (radio telegraphy) or message dropping by hand.

Mule-pack sets accompanying deployed columns formed the basis of routine communications, but experience proved that for close support duties, the quickest and most effective means of communication were message dropping and the employment of Popham Panels⁴² and ground strip codes.⁴³ Should wireless telegraphy fail, the country was well-suited to the use of visual signalling (both semaphore and heliograph), although this had significant restrictions. Although signallers were trained to send messages by coloured flags, shutter lamps and heliograph, all three required visual contact between sender and receiver. This was not always possible to achieve. Equally, flags were unable to be interpreted over long distances and it was difficult to establish a heliograph link. Moreover, once contact was established, the heliograph tripod could not be moved by 'so much as a quarter inch until the message has been sent and acknowledged.'⁴⁴ Flag, lamp

and heliograph all took time and could be unreliable. To compensate, carrier-pigeons were also employed on the frontier and were viewed as the only sure link in trouble. Every scout patrol carried with it a basket of four. These were always sent off in pairs, each with the same message, due to the threat of falcons or a lucky shot. Charles Trench, an experienced frontier hand, recalls: 'So efficient were communications – a carrier pigeon from *gasht* [patrol] to fort, thence by telephone or radio to Miranshah – that within half an hour of calling for help a *gasht* could expect a plane overhead.'⁴⁵

Limited funding had an impact on close air support. The Government was averse to allocating sufficient capital to the RAF to assist with routine maintenance. As a result, aircraft serviceability proved to be difficult.⁴⁶ This enabled the army to question the availability of close air support. Moreover, once deployed, aircraft were 'cribbed, cabin'd and confined' by a range of out-of-date instructions on the height aircraft must fly, when, how and against what target a pilot might use his weapons.⁴⁷ The region's extreme weather also posed significant problems. High temperatures, resulting in strong convectional air currents, made flying conditions hazardous. On several days in the year, aircraft were prevented from operating in the mountains by heavy clouds, mists or sandstorms. Few pilots possessed experience of such an unforgiving environment, especially as flying over tribal territory was strictly controlled by the political authorities. Likewise, flying in narrow steep-sided valleys was also dangerous. A moment's lapse in concentration could result in catastrophic damage to a wing tip.

There were other risks associated with flying in the mountains. Although the tribesmen possessed no recognisable anti-aircraft defence, low-flying aircraft conducting 'close approaches' were not immune from ground fire. 'It may be said, in fact, that the Pathan will make good shooting against aeroplanes flying as high as 2,500 feet above his head.'⁴⁸ Even at higher altitudes aircraft were not immune from tribal fire. Lieutenant Colonel C. H. T. MacFetridge notes that during large-scale operations in 1935, a Mahsud tribesman shot down, 'with a brilliant shot,' a Royal Air Force reconnaissance aircraft flying over Makin. He recalls: 'It plummeted in sickening fashion to the ground.'⁴⁹ Despite the dangers, pilots had no option but to drop to lower altitudes during an attack. To mitigate tribal fire on these occasions, the air gunner fired his Lewis gun to dissuade tribesmen who routinely engaged aircraft.⁵⁰ This proved effective, but bullet holes were found repeatedly in aircraft returning from low-flying missions. During operations against the *Fakir of Ipi*, a notorious religious firebrand, *The Times* reported:

*A Hart aircraft of No. 11 (Bomber) Squadron was fired at near Chaprai and the air gunner was wounded in the leg. This is the first time during the past two years of operations in Waziristan that any member of the crew of an aircraft has been wounded by rifle fire. Operational flying times during the period under review totalled about 27,000 hours.'*⁵¹

Should a pilot get into difficulty through enemy fire or engine failure, there were few suitable forward landing sites for aircraft carrying ordnance. If available, pilots tried to land on the straightest section of Government-constructed road nearby.⁵² A small number of aircrews

were killed during crash landings in rugged terrain. On rare occasions, aircraft were disabled and crash landed in tribal territory. To help aid his release, each pilot carried a document promising a reward for the safe return of the bearer, known as a 'blood chit.' The exact amount varied according to the condition in which they returned. Although routinely held for ransom, there are only a small number of reports of pilots being killed or gravely tortured. Roger Chapman recalls a more usual outcome: 'One of the RAF men, Lieutenant Howe had previously served with the battalion [Green Howards] and had to make a forced landing in enemy territory. He was returned to Landi-Kotal after two weeks; probably in exchange for a 10,000 rupee award.'⁵³

Furthermore, tribesmen became adept at camouflaging themselves from the air behind large boulders and in deep ravines, reducing the value of air reconnaissance. Visual reconnaissance proved less effective than expected, due to challenging flying conditions and broken terrain, and often turned out to be a matter of luck. Lieutenant Colonel H. de Watterville suggested why: 'The enemy's force, moreover, are numerically insignificant, they adopt no very definite formation; they are composed of individual combatants who are, one and all, experts in taking cover both from sight and against bullet, and, consequently, are never exceedingly visible.'⁵⁴ This included the employment of rudimentary slit trenches for shelter and concealment.

It was also extremely difficult to distinguish between hostile and peaceful villagers as well as government forces. 'Their targets are tribesmen, who, clothed to assimilate to the exact colour

of their background, and scattered in shapeless groups which have no clear outline either when halted or on the move, are all but indistinguishable at ground-level and quite invisible from a height,' recalls 'Mouse.'⁵⁵ Reciting an incident whilst fighting in the village of Bui Khel, Frank Leeson, a British officer serving with the *kassadars*, highlights the realities of a mistaken identity: 'This time, diving steeply over us, the Tempest [aircraft] strafed the road just as our last section was crossing it. The pilot had evidently mistaken the Scouts for pursuing tribesmen.'⁵⁶ Fortunately, there were no casualties on this occasion.



An impressive line of RAF Hawker Audaxes

More often than not, pilots had to rely on the ground commander, who was often being shot at, to tell him roughly where the enemy was. Despite the limited employment of ground-to-air radios, Popham panels or improvised visual target indication were the primary means of communication. In the case of the latter, a number of linen strips, forming an arrow head visible from the air, pointed in the direction of the attack. A system of linen bars across the tail of the arrow provided an approximation of distance. This provided only the most basic information and was slow to erect.

This method was replaced by the 'X V T Close Support Code' in 1936. Like the Popham panels, the Close Support Code relied on a number of strips of white material weighted down by stones. These were used to create an 'X', a 'V' or a 'T' to inform the pilot of friendly and enemy positions.⁵⁷ The advantage of this method was its speed and simplicity.

But even this method faced practical challenges. It was not always possible to display a character to the circling aircraft above. Moreover, letters were often masked by shadows and bushes. A common mistake was pointing the 'V' in the wrong direction. Such a rudimentary system was incapable of dealing with dynamic situations or of expressing a commander's intent.⁵⁸ Pilots could drop written messages during an over-flight, but these were often lost, misunderstood or placed the 'retriever' in unnecessary danger. On rare occasions, Political Agents guided bombing raids. Such was the importance of striking the right target that during operations in 1919-20 'Parsons [Major 'Buch' Parsons], Political Agent, South Waziristan, guided, navigated and identified targets for the bombers.'⁵⁹ Parsons was subsequently awarded the Distinguished Service Order for his actions. More routinely, scout officers flew as observers.

Despite its considerable contribution to frontier management, air power faced repeated criticism because its effects were transitory, failing to put a lasting stop to the activities of the tribesmen. Punishment alone could not control the tribesmen. The ability to manage and pacify tribal territory, 'to get into close personal touch with the people, to make roads and to develop the country,' could only be achieved with the aid of ground troops.⁶⁰ This was a position echoed

by Captain M. C. T. Gompertz, Indian Army, when he wrote: 'Our enemy lives on the earth, not in the air, and his mode of life offers few objectives; he lives in difficult country for warfare, and though the machine, in its multiple forms, may give us the power of swift motion and heavy fire effect, yet it is man who must finally bring him to book.'⁶¹ This commonly held opinion proved to be a misconception over the wider utility of air assets.

Conclusion

Despite political restrictions, air power developed into a key component of the British approach to tribal control on the North-West Frontier. It helped shape tribal behaviour, revolutionised reconnaissance work, enabled freedom of movement, assisted in reducing raids and permitted an almost instantaneous response to tribal transgressions. It also achieved results that would have traditionally required a force on the ground of a size that the Government could ill afford and made every corner of the frontier accessible, denying the enemy sanctuary. Slessor, who remained supremely confident of the use of air power in policing the frontier, recalls: 'It had been proved on the frontier itself that tribal disorder could be dealt with by a few aeroplanes slipping off unobtrusively into the blue from their peace stations, returning unnoticed to slip off again the next morning.'⁶² However, the primacy of the Army of India in frontier operations and the political dependency on civilising influences, requiring security through physical presence, barred the universal use of air power. Moreover, experience proved that air power alone could not manage the region. Personal contact, via the political authorities, was essential to controlling the tribesmen, who respected

a man-to-man approach. Therefore, while air power played a central role in tribal management it was only one part of a truly joint and escalatory approach to the complexities of the North-West Frontier.

Notes

1 A.G. Boycott, *The Elements of Imperial Defence* (Aldershot, Gale & Polden, Ltd, 1936), 260.

2 John Slessor, *The Central Blue* (London: Cassell and Coy Ltd, 1956), 54.

3 Bombs hit the palace, an armaments factory and Amir Abdur Rashman's tomb.

4 'There is little doubt that this raid was an important factor in producing a desire for peace at the Headquarters of the Afghan Government.' Source: Despatch by His Excellency General Sir Charles Carmichael Monro on the Third Afghan War, 1 November 1919 (Simla, 1919).

5 B2690, RAF Museum, Salmond Papers, Report by Air-Marshal Sir John Salmond K.C.B., C.M.G., C.V.O., D.S.O. on the Royal Air Force in India, dated August 1922.

6 C. F. Andrews, *The Challenge of the North-West Frontier* (London: George Allen and Unwin Ltd, 1937), 115.

7 H. le M Brock, 'Air Operations on the NWF 1930,' in *Journal of the Royal Central Asian Society*, Vol. 19 (1932), 42.

8 Quoted in: Slessor, *The Central Blue*, 61.

9 Air Staff (India) Memorandum No. 1, April 1935, *Tactical Methods of Conducting Air Operations against Tribes on the North-West Frontier of India*, B22, Royal Air Force Museum, Hendon.

10 Slessor, *The Central Blue*, 66.

11 WO 106/5446. Tribal Disturbances in Waziristan (25th November, 1936 – 14th June, 1937), 6.

12 Akbar S. Ahmed, 'An Aspect of the Colonial Encounter in the North-West Frontier Province,' in *Asian Affairs*, Vol. 65 (1978), 324.

13 But not all tribesmen could relocate. Captain Munford recalls: 'Air-bombing of villages strikes hardest at the poor – the weak, the aged, the sick – who stay at home. It hits the innocent and spares the guilty.' Source: Andrews, *The Challenge of the North-West Frontier*, 124.

14 Charles Trench, *Viceroy's Agent* (London: Jonathan Cape, 1987), 41.

15 F. S. Keen, 'To what extent would the use of the latest scientific and mechanical methods of warfare affect operations on the North-West Frontier of India?', in *Journal of the United Service Institution of India*, Vol. 53/233 (1923), 400.

16 David Omissi, *Air Power and Colonial Control: The Royal Air Force, 1919-1939* (Manchester: Manchester University Press, 1990), 155.

17 'Mauser,' 'A Forgotten Frontier Force,' in *English Review*, No. 52 (1931), 71-2.

18 C. W Gwynn, *Imperial Policing* (London: Macmillan and Co Ltd, 1934), 280.

19 Slessor, *The Central Blue*, 66.

20 Ibid, 66-7.

21 Andrews, *The Challenge of the North-West Frontier*, 120-1.

22 C. H. T. MacFetridge and J. P. Warren (Eds.), *Tales of the Mountain Gunners* (Edinburgh: William Blackwood, 1973), 118.

23 Omissi, *Air Power and Colonial Control*, 166.

24 Glen Torpy, 'Counter-Insurgency Echoes from the Past,' in *Journal of The Royal United Services Institute*, Vol. 152, No. 5 (October 2007), 20-21.

25 Supplement to *The London Gazette*, No. 34449, 29 October 1937.

26 H. R. C Pettigrew, *Frontier Scouts*, (privately printed from Highcliff, Clayton Road, Selsey, Sussex, 1964), 84.

27 Brock, 'Air Operations on the NWF 1930,' 33.

28 'Mauser,' 'A Forgotten Frontier Force,' 71.

29 Gwynn, *Imperial Policing*, 296.

30 A.I.L.O., 'Close Support by Aircraft on the North-West Frontier,' in *Journal of the United Service Institution of India*, Vol. 74/16 (1944), 15.

31 Brock, 'Air Operations on the NWF 1930,' 25.

32 Quoted in: Slessor, *The Central Blue*, 54.

33 This provided a regular flow of information on internal politics, tribal groups, rivalries and personalities.

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

35 H. L. Davies, 'Military Intelligence in Tribal Warfare on The North-West Frontier of India,' in *Journal of the United Services Institution of India*, Vol. LXIII, No. 272 (July 1933), 289-291.

- 36 J. B. Glubb, *War in the Desert: An R.A.F. Frontier Campaign* (London: Hodder and Stoughton, 1960), 51-66
- 37 Geoffrey Moore, *Just As Good As The Rest* (Bedford: Jaycopy Ltd, 1979), 23.
- 38 Brock, 'Air Operations on the NWF 1930,' 25.
- 39 Philip Chetwode, 'The Indian Army,' in *The Journal of the Royal United Service Institution*, Vol. LXXXII, No. 525 (1937), 12.
- 40 915 Comments on Inter-Communication Waziristan Operations 1936-37, Waziristan District Signals, Historical Record, 1938/39 (Royal School of Signals Museum).
- 41 Report of Intercommunications – Waziristan Operations 1937 (Royal School of Signals Museum).
- 42 Popham panels were made of wood and cloth, with movable panels. A canvas screen would be spread on the ground and black and white strips arranged in patterns to convey a message.
- 43 A.I.L.O., 'Close Support by Aircraft on the North-West Frontier,' 21.
- 44 Charles Trench, *The Frontier Scouts* (London: Jonathan Cape, 1985), 109.
- 45 *Ibid*, 132-3.
- 46 Brian Robinson, *Crisis on the Frontier* (Staplehurst: Spellmount Ltd, 2004), p. 260.
- 47 Slessor, *The Central Blue*, 121.
- 48 H. de Watteville, *Waziristan, 1919-1920* (London: Constable and Co Ltd, 1925), 195.
- 49 MacFetridge and Warren (Eds.), *Tales of the Mountain Gunners*, 126.
- 50 A.I.L.O., 'Close Support by Aircraft on the North-West Frontier,' 19.
- 51 'Royal Air Force,' *The Times*, 10 April 1939.
- 52 Pettigrew, *Frontier Scouts*, 89.
- 53 'Afghanistan and the North-West Frontier,' *The Friends of the Green Howards Regimental Museum Newsletter* (UK: Great Northern Publishing, September 2002), 7.
- 54 de Watteville, *Waziristan, 1919-1920*, 194-5.
- 55 'Mauser,' 'A Forgotten Frontier Force,' 71.
- 56 Frank Leeson, *Frontier Legion* (Ferring: Selwood Printing Ltd, 2003), 195.
- 57 'X' indicated the position of the picquet or troops nearest the enemy; 'V' signified that the enemy was in the direction in which the apex of the V is pointing; and 'T' was the S.O.S. signal.

This was a call for help when a picquet was likely to be overwhelmed or a sign that the enemy was following up a withdrawal so closely that it was impossible to get away. 'X' was only used in extremis.

58 Robson, *Crisis on the Frontier*, 260.

59 Trench, *Viceroy's Agent*, 41.

60 Keen, 'To what extent would the use of the latest scientific and mechanical methods of warfare affect operations on the North-West Frontier of India?', 400.

61 M. C. T. Gompertz, 'The Application of Science to Indian Frontier Warfare,' in *Army Quarterly*, Vol. 10 (1925), 122.

62 Slessor, *The Central Blue*, 69.



'Sitting in silos just cannot
compare to flying bombers'

To what extent is organisational culture an impediment to, or driver of, change within the Armed Forces?

By Lt Col Gek Peng Tay
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Introduction

Every organisation has a culture.¹ Organisational culture can be broadly defined as a persistent pattern of socially transmitted assumptions, attitudes, ideas, beliefs, traditions and preferred methods of operations specific to an organisation. Culture is to an organisation 'what personality is to an individual'.² It shapes the way an organisation interacts with its external environment and manages its internal affairs, including changes. It does so by providing context to the organisation's cognitive process as it interprets its external environment and determines its preferred response. That is to say organisational culture is characterised here as the context that shapes organisational behaviour in response to forces of change, rather than determining change.³

This essay examines the extent to which organisational culture affects change within the Armed Forces. Most Armed Forces and their individual services are well known for their deeply institutionalised culture as reflected in their tradition, which constitutes a plethora of symbols, rituals and practices unique to the military.⁴ The influence of organisational culture on change in the large organisations such as the Armed Forces is complex.

The essay consists of three main sections. The first considers one organisational culture within the military organisation. Using this simple model, it first explains the concept of acculturated will to change. The concept is a hypothesis that the Armed Forces drive or resist change with a will directly proportional to the extent in which the change is perceived to be compatible to the organisational culture. The second section attempts

to explain the multi-faceted nature of organisational culture and its effect on change within different Armed Forces and different parts of the Armed Forces. Cultural diversity among Armed Forces suggests that different Armed Forces have different organisational cultures. Hence, depending on the organisational culture, some Armed Forces may be enthusiastic about a change, while others resist the same change. The complexity of cultural multiplicity, this time within individual Armed Forces, posits that most Armed Forces have a set of organisation cultures and subcultures. This implies that one part of the Armed Forces can be driver of a change, whereas a different part can be impediment of the same change.

The third section examines the organisational culture as the context through which the Armed Forces' cognitive process perceives forces of change and shapes the will to impede or drive internal changes in response to these forces. Before concluding, this section also highlights the situation in which organisational culture also becomes a subject of change, while providing the context at the same time.

Throughout the essay, two continuous strands of examples will be used to illustrate the nature in which organisational culture affects the Armed Forces' will to change. Both examples will be from the United States military, where buzz words such as 'military transformation', 'revolution in military affairs' and 'force modernization' were popularised. The first example is the cultural preference of the U.S. Army for the big, conventional war paradigm. The second strand is the strategic bombardment culture embraced by the U.S. Air Force (USAF). Both examples

will start off as simple and perhaps even incomplete, because they are used to illustrate only one layer of complexity at a time. However, they will continue to be built up as each layer of complexity is added. When threaded together, these two strands of examples will demonstrate the complex nature through which organisational culture influences change within the Armed Forces.

THEORY OF ACCULTURATED WILL TO CHANGE

Organisational culture shapes the way the Armed Forces contextualise and prioritise changes, resulting in an acculturated will to change. This means that the Armed Forces' will to drive or resist change is directly proportional to the extent in which the change is perceived to respectively uphold or threaten the organisational culture.⁵ The will to change is acculturated because the perception mentioned above is biased by a pattern of socially transmitted assumptions, attitudes, ideas, beliefs, traditions and preferred methods of operations. It is shaped by organisational culture. Hence, whether the change is minor or major; or whether it is evolutionary or revolutionary may matter, but not as much as whether the change is perceived to be compatible with the organisational culture. Three reasons are offered.

Information processing leads to acculturated will to change

First, organisational culture leads to acculturated will to change because it influences the Armed Forces' perceptions when they process information as an organisation.⁶ Information is usually processed, not objectively, but with cultural preconception. Environmental data and facts are more readily accepted

if they reinforce the organisation's cultural preconception. Information that contradicts cultural preconceptions is usually discounted as insignificant, or even inaccurate. Hypotheses and ideas not compatible with the organisational culture are relatively ignored.⁷ The result is that the Armed Forces tend to drive or resist changes based on the degree of compatibility between the environmental information and organisational culture, rather than on objective merits of such information.

For example, the US Army's cultural preference for the big, conventional-war paradigm has shaped the way it processed its Vietnam War experience for lesson learning. The Army's first comprehensive examination of the Vietnam War criticised, among others, its conventional and inappropriate approach to the nature of war in Vietnam. The study, published in June 1980 by BDM Corporation for the Army War College also concluded that the Army 'still did not know how to conduct low-intensity conflict because the strategic lesson the United States learned from Vietnam was that intervention was to be avoided.'⁸ The College also engaged Colonel (Ret.) Harry G. Summers to write a book on Vietnam using the BDM Corporation Study. However, Summers arrived at a conclusion totally different from that of the BDM report. He argued that the Army failed in Vietnam because it departed from its big, conventional-war paradigm. His book, *On Strategy: A Critical Analysis of the Vietnam War*, was readily accepted by the Army's culture.⁹ The BDM report, however, was shunted in favour of an assessment that reinforced the Army's cultural preconception of war.¹⁰ After Vietnam, the Army continued to discount as



By rejecting information that contradicted its cultural preconception of war, the US Army had failed to implement changes to respond effectively to threats posed by irregular enemies

aberrations its limited war experiences in Panama (1989), Somalia (1992-1995), Bosnia (1992-1995) and Haiti (1994).¹¹ By rejecting information that contradicted its cultural preconception of war, the Army had failed to implement changes to respond effectively to threats posed by irregular enemies.

On the other hand, the same cultural preference led the Army to place strong emphasis, during the Cold War especially, on intelligence pertaining to the Soviet's order of battle and technologies, so that it could respond effectively to the perceived threats posed by its large conventional enemy. The Army's preoccupation with such information encouraged its own technological advances. It also drove developments in conventional techniques and doctrines, such as Air/Land Battle, that exploited new technologies.¹² The Army's cultural preference explained why it embraced information that would drive developments in conventional warfare, and rejected those that would drive developments in unconventional

warfare. Organisational culture leads to acculturated will to change because it influences the Armed Forces' perceptions when they process information as an organisation.

Social, education and reward systems leads to acculturated will to change

Secondly, acculturated will to change occurs also because established organisational culture tends to be persistent and pervasive within the organisation's social, education and reward systems in cultivating cognitive uniformity. Individual members begin a process of socialisation with the organisational culture the moment they join the organisation. Those who adhere to the culture usually advance in the organisation and become the culture's new protectors.¹³ Since most Armed Forces tend to promote from within instead of hiring their top leaders from without, organisational culture is even more persistent and pervasive in the military social, education and reward systems. It is hence difficult for members of the Armed Forces to be enthusiastic about driving changes that do not support the organisational culture.¹⁴

Continuing with the example of lesson learning from the Vietnam War, Summers's assessment of the Vietnam War was accepted into the U.S. Army education system since it reinforces the Army's cultural preference for big, conventional-war paradigm. *On Strategy* has been on 'the reading lists of the Command and General Staff College ... and the Army War College and on the official Army professional reading list.'¹⁵ The Army's professional journal, *Military Review* provides a glimpse of the effect its education system has on its intellectual interest. A survey that examined the 1,400 articles published

by the journal between 1975 and 1989 discovered only 43, or 3 per cent, of the articles dedicated to low-intensity conflicts.¹⁶ Interests, let alone changes, in areas that do not support organisational culture are usually sparse, because organisational culture shapes the Armed Force's social, education and reward systems, which cultivate cognitive uniformity.

On occasions when individual members do drive changes perceived to threaten the organisational culture, they will be met with strong internal resistance.¹⁷ For example, both Brigadier-General 'Billy' Mitchell and General Giulio Douhet caused huge frictions within their respective land-centric armies, as they extolled, often tactlessly, the virtues of strategic air power.¹⁸ Both were court-martialled for insubordination.¹⁹ Both did not live to see their visions of independent air service realised. Both are the rare 'renegade'²⁰ and 'radical'²¹, as their adversaries, who perceived them as threats to their organisational cultures, respectively labelled them. However, they also represent the even rarer mavericks who managed to break into prominence even though driving changes that run against the grain of their own organisational cultures. Their struggles demonstrate how the Armed Forces' social and reward systems present strong internal resistance against individual members who drive changes perceived to threaten the organisational culture. Acculturated will to change occurs because organisational culture shapes the Armed Force's social, education and reward systems in cultivating cognitive uniformity.

Resource allocation reinforces acculturated will to change

Thirdly, an acculturated will to change



**Brigadier-General
'Billy' Mitchell**



General Giulio Douhet

Brigadier-General 'Billy' Mitchell and General Giulio Douhet caused huge frictions within their respective land-centric armies, as they extolled, often tactlessly, the virtues of strategic air power

exists because organisational culture influences the prioritisation of changes in the Armed Forces through resource allocation. Organisations tend to channel more resources to changes suited to their culture. These changes 'subsequently appear more feasible than those deprived of funding and attention because they are incompatible.' Thus, organisational culture influences the allocation of resources more towards changes that tend to reinforce the viability of its culture, regardless of the merit of change.²²

Mitchell's vision of independent air power founded on strategic bombers became the primary expression of the USAF's culture since its inception as a separate service.²³ The strategic bombardment culture in the USAF was inextricably tied to its fight for autonomy and legitimacy as an independent service.²⁴ As the Deputy Assistant Secretary of Defense in the 1960s, Dr. Morton Halperin

observed that the USAF's resource allocation priority reflected its strategic bombardment culture. He noted that USAF's cultural devotion to strategic bombardment resulted in its initial bitter resistance to resource allocation for the development of inter-continental ballistic missile (ICBM) capability in the late 1950s. Instead, the USAF campaigned strongly for funds to be allocated to the technological development of a nuclear airplane, the B-70 inter-continental bomber, and the B-1 to replace the B-52.²⁵ As Halperin put it, '[s]itting in silos just cannot compare to flying bombers.'²⁶

Halperin also cited an earlier 'classic decision' made in 1949 in response to severe cuts in budget:

The Senior Officers Board of the Air Force ... recommended to the Secretary of the Air Force ... that the procurement of medium bombers (B-45, RB-49), troop transports (C-125), and a new version of the F-86 jet fighter (F-93) be cut back and the money thus saved transferred to purchasing B-36's and B-50's [strategic bombers].²⁷

These two decisions, made a decade apart, further demonstrate the persistence of organisational culture and its influence over decisions like resource allocation, which have significant implication on the type of changes the Armed Forces drive or resist. An acculturated will to change exists because organisational culture influences the prioritisation of changes in the Armed Forces through resource allocation.

In concluding this section and the first layer of analysis, organisational culture influences the Armed Forces to drive or

resist change with an acculturated will to change. It does so through shaping the Armed Forces' preconceptions as the organisation processes information, through its persistence and pervasiveness within the Armed Forces' social, educational and reward systems, and through influencing the Armed Forces' resource allocation decisions.

COMPLEX NATURE OF ORGANISATIONAL CULTURE

The following section gradually builds a more representative model of organisational culture. It discusses the diverse organisational cultures among different Armed Forces, multiple cultures and subcultures within individual Armed Forces, and internal interactions among the cultures.

Cultural diversity among different armed forces

Different Armed Forces have different organisational cultures.²⁸ Hence, depending on the organisational culture, some Armed Forces may be enthusiastic about a certain change, while others resist the same change.

While the American cultural preference for a big, conventional-war paradigm has impeded its capacity to adapt to irregular threats, the regimental system embedded in the British Army culture is one that favours adapting to small wars. The regimental culture facilitates decentralisation of command and control. Regiments often operate as small, autonomous units in isolated and far away lands for colonial policing, intrastate security and a series of 'Brushfire Wars' during the devolution of the British Empire.²⁹ Hence, the regimental culture has shaped the British Army's mindset to be adaptable to internal security operations, civil-

military cooperation and working with indigenous populations in foreign environments.³⁰ On the other hand, the British Army's regimental system had also been an impediment to its preparedness for conventional conflicts in continental Europe, the very nature of war that the U.S. Army has been most well-prepared for.³¹

As a second example, the quotation below from then Major General Paul Kagame in 1999 illustrates a huge mismatch between the Rwandan military culture and the USAF's preoccupation with technological advances to its bombers.

'We [Rwandans] are used to fighting wars in a very cheap way without being very expensive. ... we don't have any aircraft's. They don't fight with fighter aircrafts. People move on foot. They eat very little food. We are able to go like that for many years without a problem.'

In this statement, Kagame was not saying that Rwandans were too poor to pursue a military culture of technological reliance. He was saying that historically, there had been a cultural mismatch between Rwandans' and western societies' understanding of warfare. These two examples show that the extent to which organisational culture drives or impedes change within the military varies from Armed Forces to Armed Forces, due to cultural diversity among them.

Cultural multiplicity within the armed forces

Most Armed Forces have a set of organisational cultures instead of a single organisational culture.³² One source of multiple cultures within the Armed Forces is the sub-cultures within



'We [Rwandans] are used to fighting wars in a very cheap way without being very expensive. ... we don't have any aircraft's. They don't fight with fighter aircrafts. People move on foot. They eat very little food. We are able to go like that for many years without a problem.'

different services and specialisations that cannot easily be fused into a shared organisational culture.³³ The culture of the U.S. Navy is very different depending on whether culture is assigned to submariners, aircraft carriers, or battleships.³⁴ Since different cultures exist in different part of the Armed Forces, it is hence reasonable to expect one part of the Armed Forces to drive the same change which another part is resistant to.

While the U.S. military culture has generally embraced the big, conventional-war paradigm and fundamentally eschewed unconventional warfare for most of the twentieth century, the same cannot be said of the U.S. Marine Corps, which has shown its adaptability to different operating environments and a wide spectrum of warfare, from regular to irregular. Between 1828 and late 1940s, the U.S. Marine Corps had survived six serious attempts, and more minor attempts, to disband it, emasculate it or fold it, into one or another of the other US services.³⁵ This caused the Marine Corps' to develop a culture of

organisational paranoia,³⁶ which had strongly influenced its adaptability to changing situations in order to maintain its uniqueness. While the Army seemed to learn anew for every counterinsurgency, the Marines codified their experience in the 1940 *Small War Manual*.³⁷ During the Vietnam War, the Marines assigned to the Army's I Corps sought to demonstrate that they could carry out counterinsurgency operations more effectively than their Army counterparts.³⁸ The Marines' culture of organisational paranoia drove the Corps' adaptability to a wide spectrum of conflicts while the Army's cultural preference for big wars impeded its adaptability to small wars. Even within the U.S. Army, the Special Operating Forces, whose operating norm is in prosecuting irregular warfare, do not have a cultural preference for big, conventional war paradigm.³⁹

Moving to the USAF, the Air Force is said to worship at the altar of technology since its independence. The airplane not only gave birth to independent air forces, it has also been an expression of the miracles of technology.⁴⁰ Hence, the Air Force has always been ready to embrace technological changes and innovations. On the other hand, the US Army has 'historically taken greater pride in the basic skills of soldiering than in their equipment. Until the last few decades, the Army was notorious for its reluctance to embrace new technologies or methods.'⁴¹ Differences in organisational cultures within the USAF and the U.S. Army led to the services perceiving technological changes differently. Using an infantry weapon as an example, the Army took great pride in the marksman's rifle (M-14) whereas the Air Force quickly



The Marines' culture of organisational paranoia drove the Corps' adaptability to a wide spectrum of conflicts while the Army's cultural preference for big wars impeded its adaptability to small wars

embraced the high-technology, volume-of-fire approach embodied in the Stoner AR-15 (or M-16) rifle.⁴²

Individual services and specialisations within the Armed Forces bring with them different subcultures, and hence multiplicity into the military culture. Thus, the extent to which organisational culture affects changes within the Armed Forces is uneven among the services and specialisations. It depends on the subcultures within the services and specialisations.

Interactions among cultures within armed forces

The existence of subcultures is not the only explanation for cultural multiplicity within the Armed Forces. Just like an individual having different aspects to his personality, a military organisation as a whole is also characterised by several cultures which gives it a multifaceted character.⁴³ These cultures and subcultures can be contradictory and hence compete for dominance. They can also be cooperative and mutually reinforcing. The interactions among these cultures and subcultures give

rise to a fourth layer of complexity in analysing the effect of organisational culture on change within the Armed Forces. If a change is perceived to advance or threaten these cultures, they will cooperate and reinforce one another in driving or resisting the change respectively. If a change is perceived to present contradicting effects on different cultures within the organisation, the cultures will compete for dominance to influence the way the organisation prioritises the change.⁴⁴

For example, the USAF's strategic bombardment culture alone, does not fully explain the huge technological leaps in its bomber fleets. The F-117 'Nighthawk' and B-2 'Spirit' of the 1980s are simply unrecognisable from the B-29 'Superfortress' of the 1940s. The USAF's ever-willingness to seek technological overmatch as the prescription for security reinforces its strategic bombardment culture that resulted in these technological innovations.⁴⁵ The fact that its strategic airlift fleet had not undergone a similar magnitude of technological development during the same period is an evidence of a clear result in the competition for dominance among the USAF's subcultures. Its strategic airlift culture has never prevailed over its strategic bombardment culture because it has not been able to support USAF's independent status as strongly as the latter has.

Recalling the USAF's initial bitter resistance to the ICBMs, the perceived threat to its bomber culture was on this occasion overridden by the USAF's cultural insecurity about its independence. Hence, rather than preserving its bomber culture at the cost of letting the other services have what



B-2 Spirit

may turn out to be the weapon of the century, the USAF finally accommodated the new missile technology. It also absorbed a fledgling culture well enough to become a strong advocate of building more advanced ICBMs as existing ones become outmoded.⁴⁶

The two examples demonstrate that organisational cultures and subcultures within the military do not contextualise changes within the Armed Forces independently. They can either reinforce or undermine one another, and hence, affect the way the Armed Forces contextualise and prioritise changes within the military.

In summary, organisational cultures and subcultures within the Armed Forces interact with one another to provide a resultant context, which explains why the Armed Forces accord an acculturated will to different types of changes. The resultant context, and hence response to the same change is diverse among different Armed Forces, and even within different parts of the same Armed Forces. This explains why the same change driven in one military institution is resisted in a different military organisation, while a third establishment expresses indifference to it.

Organisational culture as context to forces of change

The forces of change include political and societal factors, perceived threats and technology. Like multiple cultures within each organisation, they can also mutually reinforce or undermine the effect of one another in driving or impeding changes within the Armed Forces. However, they do not include organisational culture. Rather than being a force of change in itself, organisational culture provides context to the Armed Forces' cognitive process as they interpret these forces of change and determine their preferred response to them.

The roles that different cultures in the U.S. Army and U.S. Marines played in the way the two military institutions contextualised the same forces of change illustrate this relationship between organisational culture and forces of change. The Army's cultural predilection for big wars led to emphasis on conventional doctrines by the U.S. Mission providing military assistance to the South Vietnamese military forces in Saigon during the 1950s. By late 1950s however, insurgencies from the Vietcong were challenging the effectiveness of the American way of war.⁴⁷ However, blinded by its cultural preference, the Army ignored the threats posed by the Vietcong and continued to employ conventional warfare. The massive Soviet conventional force, rather than the irregular Vietcong forces, remained as the threat that counted. The defence of Western Europe against Soviet attacks remained its principal commitment. Technological advances in mobility and firepower only reaffirmed the Army's conventional mindset.⁴⁸ Another force of change presented itself in the form of President John F. Kennedy, who came into office in

1961 fascinated with unconventional warfare.⁴⁹ Again, the same culture led to the Army implementing the President's instructions to focus on counterinsurgency only haltingly and grudgingly.⁵⁰ It is not clear if the assassination of President Kennedy in 1963 had removed a force of change that might have broken the Army's cultural resistance against counterinsurgency. However, it was clear that by mid-1960s, the late President's edict to focus on unconventional warfare had ceased to receive much attention beyond lip-service in Vietnam.⁵¹ By and large, the Army was able to resist major changes to its preferred way of war despite the forces of change during the Vietnam War.⁵²

The Marines' organisational paranoia, on the other hand, accounted for the difference in the way they perceived the same battlefield experience in Vietnam. The Marines' sense of the need to be adaptable for its institutional survival resulted in the Corps learning from their past small war experiences and adapting them to meet the threats in Vietnam. In fact, their experience in leading Nicaraguan Guardia Nacional indigenous patrols in counterinsurgency operations against Sandino's guerrillas in the 1920s served as the basis from which they pioneered the successful Combined Action Program (CAP) in Vietnam. CAP greatly improved the U.S. military's capacity to secure local population and to acquire better tactical intelligence with modest investment of U.S. forces, because it coupled a Marine rifle squad to a platoon of indigenous forces.⁵³ This innovation was a result of a different organisational culture providing a different context to the same force of change, hence driving changes instead of impeding it. It came without



The massive Soviet conventional force, rather than the irregular Vietcong forces, remained as the threat that counted

surprise that the Army was unwilling to adopt CAP.⁵⁴ The Marines' culture also shaped a different response to President Kennedy's call for emphasis on counterinsurgency. Always keen to maintain its relevance, which was crucial to its institutional survival, the Marines did not resist huge reduction to their traditional amphibious mission training in order to focus on counterinsurgency training.⁵⁵ The U.S. Army's insistence on conventional warfare had further sustained, albeit unintentionally, the Marines' drive towards counterinsurgency roles because it had allowed the Marines to carve out these unique roles for the corps.

Because the U.S. Army and the U.S. Marines had different organisational cultures, they contextualised the same forces of change during the Vietnam War differently. This resulted in the Army resisting the forces of change and maintaining a largely conventional approach in Vietnam, while the Marines reacted to the same forces of change with a shift in operational focus from amphibious to counterinsurgency missions. This comparative example

illustrates the role of organisational culture, not as a force of change, but as the context that surrounds the Armed Forces' cognitive process as they interpret forces of change and determine their preferred response to them.

Organisational culture as subject of change

Finally, organisational culture is not only the context, but also a subject of change within the Armed Forces at the same time. Applying the theory of acculturated will to change, the Armed Forces would strongly resist the forces attempting to change the organisational culture, because the change threatens the very existence of the organisational culture. At the same time however, the different organisational cultures and subcultures within the Armed Forces are also interacting internally to form the context through which the organisation responds to these forces threatening its culture. The resultant context could lead to a dominant organisational culture being eroded by forces of change and a new dominant culture emerging.

The competition between the bomber and fighter cultures within the USAF since its independence is a good example. The strategic bombardment culture in the USAF was further cemented in mid-1950s by the new national strategy of massive retaliation. The strategy was to deter prospective aggressors from invading the United States and its allies by convincing them that they will be subjected to unacceptable retaliatory blows.⁵⁶ The long range heavy bombers, with their capability for nuclear delivery, became the national strategic assets for executing massive retaliation. Since the new national strategy was perceived to strengthen its independence and

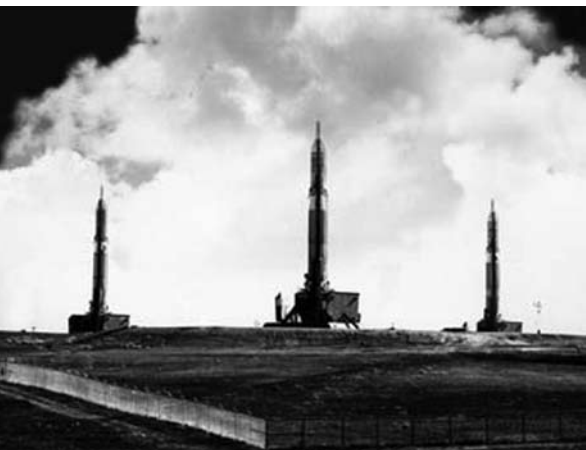
dominant culture, the USAF welcomed this force of change with fervour. The bomber culture flourished even further, and the USAF rode on the national momentum for further reliance on nuclear deterrence to build up a huge inventory of long range bombers by the late 1950s.⁵⁷

However, the next two decades saw an accumulation of successive forces of change eroding the bomber culture and advancing the fighter culture. The role of technology as a force of change was significant. First, air-to-air refuelling closed the gap between fighters and bombers. It enabled the fighters to fly longer missions, carry a greater bomb payload, spend more time on target, and use more diversified tactics.⁵⁸ Secondly, technological improvements in speed, accuracy, survivability, manoeuvrability, air-to-air and air-to-ground missiles, and bomb payload capacity have all made the fighters increasingly capable of a wider range of bombing missions.⁵⁹ Finally, the maturity of missile technology led to the ICBMs and sea launched ballistic missiles (SLBMs) achieving nuclear payload capability and operational status in the early 1960s. The heavy bombers lost their status as the sole national strategic platforms for delivering nuclear bombs.⁶⁰

The acceleration of development in missile technology within the United States was largely fuelled by the Soviet's ability to send Sputnik I into orbit in space on 4 October 1957, the first for an artificial satellite. It led to the nation's presupposition of a Soviet lead in nuclear delivery capability through ICBMs.⁶¹ This missile-gap scare was finally dispelled by end 1961, but development in ICBMs and SLBMs continued to gather momentum

as the new Kennedy administration pursued a counterforce strategy for nuclear deterrence, known later as assured destruction strategy.⁶² It involved the capability to deter attack upon the United States by maintaining the capability to inflict unacceptable damage upon the aggressor, even after absorbing a surprise first strike.⁶³ ICBMs and SLBMs were the preferred primary weapons for assured destruction missions. They were less vulnerable to enemy attack, before and after launch, hence the ability to survive the enemy's first strike and then execute a retaliatory strike. The heavy bombers' role in the national nuclear deterrence strategy was thus relegated to that of a supplementary one. As explained earlier, the USAF had to accept the missile culture to protect its autonomy as an independent service.

As the dominance of the bomber culture weakened, the fighter culture gained dominance while the missile culture within the USAF was still being established. The technological advances mentioned above were not the only factors leading to an emerging fighter culture. The Kennedy administration's concepts of 'flexible response' and 'usable military power', which stressed on a wide range of conventional and unconventional military capabilities on top of nuclear deterrence, also brought about greater importance in the fighters' roles.⁶⁴ The impact of the Vietnam War should not be underestimated as well. The air war in Vietnam started badly with Operation Rolling Thunder, but ended on an optimistic note with the Linebacker operations, a vindication of conventional airpower doctrine.⁶⁵ More significantly, because the fighters carried most of the burden of the air war in Vietnam, they gained the majority of



Three Titan I intercontinental ballistic missiles, iconic of the Cold War, stand ready for launch at a western US base. ICBMs and SLBMs were the preferred primary weapons for assured destruction missions

combat experience and the confidence of their political leadership to conduct conventional strategic missions in future conflicts.⁶⁶ The fighter culture flourished after its experience in Vietnam also because the Strategic Air Command controlling the bombers was so fixated on its nuclear missions that it was not keen to engage in conventional operations.⁶⁷

The shift in the USAF culture continued beyond Vietnam, but the above example that outlines this shift throughout the first three decades of the Air Force's history has sufficiently demonstrated how organisational culture can a subject of change while at the same time competing with other cultures to form the context through which the Armed Forces respond to forces of change. Hence, organisational culture not only provides the context to influence changes within the Armed Forces, it can also be the subject of change at the same time.

CONCLUSION

This essay characterises organisational culture as the context through which the Armed Forces perceive forces of change and hence shapes its responses to them, resulting in an acculturated will to drive or impede change. The context formed is different for different Armed Forces. It is also a resultant of the interactions among different cultures within the same Armed Forces. The Armed Forces' will to change determines their behaviour, which could either lead to internal change, including cultural change, or resistance to change by attempting to influence the external environment, including forces of change. While examples to illustrate the arguments are mainly from a single country for the purpose of providing a continuous flow in the case studies, this approach can be applied generally to all armed forces as well. Hence, it may provide a useful framework for future analyses of the effects of organisational culture on changes within the Armed Forces.

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Ju-87 Stuka aircraft during the Blitzkrieg

The Battle of France, May 1940: Enduring, combined and joint lessons

By Gp Capt Alistair Byford

*For the RAF the Meuse that day was an unimaginable hell, a real Valley of Death from which few returned.*¹

Introduction

Although Horne was describing the RAF's experiences over the Meuse bridgehead on 14 May 1940, he neatly captures the dislocation, shock and confusion felt by the Allied armies and air forces throughout the Battle of France. That this was a 'hell' is indisputable, the RAF losing 44 aircraft from 72 sorties on that day alone, a loss rate of 62%.² But that this was 'unimaginable' implies that either the German combined arms offensive represented an approach to operations that was so revolutionary that it was unforeseeable, or that the Allies simply did not prepare for a method of warfare that prudent analysis would have led them to expect. It will be argued that far from being unimaginable, the hell of what became known as *blitzkrieg* was essentially evolutionary, and therefore entirely predictable. That the Allies did not formulate appropriate strategies to deal with it indicates that it was their failures, rather than their opponent's acumen, that led to German tactical and operational success.

This paper will begin by analysing the development of the strategies and plans of the combatants. It will be demonstrated that in contrast to Germany's incremental development of a flexible, pragmatic 'way of war', context and culture pushed both Allies towards rigid, single-service, doctrines that they were unwilling to revise, despite the evidence offered by events such as the Spanish Civil War. The result was that the German military was able to fight a coordinated and integrated joint campaign, while

the Allies' intellectual and conceptual failings, coupled to a complex and sclerotic command structure, set the conditions for their defeat. Next, a brief campaign narrative will be used to consider the execution of joint and combined operations in practice, particularly with reference to the decisive act at the river Meuse in mid-May. Finally, the contemporaneous analysis of the campaign will be critically assessed and enduring lessons suggested. The shattering defeat inflicted by a German military on Allied forces that were broadly comparable in size and quality of equipment indicates that achieving successful combined and joint effect was problematic in 1940; recent experience suggests that this remains the case in current operations.³ Consequently, it will be argued that as a coalition campaign involving significant air-land integration, the Battle of France left a legacy of lessons that still have resonance today.

France

The traumatic effects on French politics and society of the pyrrhic victory of 1918 have been well documented.⁴ A key consequence was the declining birth-rate, stemming from disproportionately high wartime losses and resulting in the 'hollow classes', so that whereas Germany had 464,000 men available for conscription from the class of 1915, France had just 184,000.⁵ Recognising their relative weakness, French politicians attempted to deter the threat of a resurgent Germany by establishing a system of alliances, but this policy had failed by the late thirties. Negotiations with the Soviet Union were unsuccessful, and the 'Little Entente', composed of the central and eastern European states established at Versailles, disintegrated in the face of aggressive German revisionism.

While her grand strategy was ultimately a failure, in parallel France had also sought to develop a military strategy to meet the two overriding priorities of husbanding her limited manpower and keeping French soil sacred, to avoid any repetition of the devastation of the Great War. To meet these aims, the Maginot Line system of fortifications was constructed to establish a defensible eastern frontier. This shaped French force structure and dominated military thought, codifying a linear doctrine of the 'continuous front', with little conception of defence in depth and, because of the financial strain it imposed, leaving few resources available to modernise elsewhere, so 'the Army tended to rest content with the techniques and equipment of 1918'.⁶ For example, despite the availability of radios and the proven vulnerability of land-lines, the telephone was retained as the prime means of communication, and mechanised warfare was not enthusiastically embraced. The few available mobile forces were largely employed as 'interval troops' guarding gaps in the Line, so there was no strategic reserve or *masse de manoeuvre*, and it was this that was the critical shortcoming of the Maginot Line, rather than its capabilities *per se*. Tactically, it was to stand up well to assault in 1940, but it was not a *place des armées*,⁷ so could be easily outflanked and therefore rendered irrelevant operationally. More importantly, it engendered a 'Maginot mentality', a defensive and reactive military mindset that surrendered the initiative, in expectation that war in 1940 would follow the same pattern, at the same tempo, as war in 1914-1918.

The Line stopped at the Belgium border, primarily as it was deemed politically unacceptable to build a defensive

position that excluded a then close ally, but also because funds had begun to run out and the boggy terrain was unsuitable for construction of deep fortification. Instead, a coordinated defence was planned with the Belgian Army, in the expectation that the ensuing stalemate would buy time to establish the Allied economies on a proper war footing, for strategic bombing of Germany to take effect and for potential allies, particularly the USA, to be rallied to the cause. However, this strategy was undermined by Belgium's declaration of strict neutrality in 1936, which meant a forward defence could not be prepared in advance. Gamelin, the French Commander, was 'simply old, and what was worse, tired by age'.⁸ Lacking the flexibility of mind to adapt to changing circumstances, he was guilty of 'perseveration,' the inclination not to revise earlier judgements in the light of later events,⁹ by continuing to plan an advance into Belgium in the event of hostilities, even though this now risked both an encounter battle, for which the French army was ill-prepared, and the prior committal of the majority of his very limited manoeuvre reserves at the northern extremity of the theatre of operations, limiting his ability to respond to events elsewhere.

The flaws in French grand and military strategy were compounded by the adoption of a Byzantine command structure, which as Horne notes, was 'anomalous and hardly satisfactory'.¹⁰ The limits of responsibility were opaque, with three tiers of command above army group level, established in geographically separate headquarters. Gamelin had to go through his deputy, Georges, when issuing orders to the North-East Front, while GHQ Allied Land Forces, under Doumenec, acted

as an intermediary. Effective command and control was further hampered by the poor relations between commanders, with the mutual antipathy between Gamelin and Georges creating a particularly toxic atmosphere. Gamelin refused to use radio, so command communications were dependent on land-lines, motorcycle couriers or personal visits and thus peculiarly vulnerable to delay and dislocation. Coalition command arrangements were also vague. Although Gort's British Expeditionary Force (BEF) was included in the Northern Army Group, he took his orders not from Bilotte, the Army Group Commander, but direct from Gamelin through Georges. Furthermore, he had the right to appeal to the British Government 'before executing any order likely to imperil the Field Force',¹¹ so national 'red cards', caveats on the use of forces in coalition warfare, are by no means a new phenomenon.

This complexity was reflected in joint command arrangements. Under General Vuillemin, 'an elderly bomber pilot not over-endowed with dynamism',¹² Têtu, the chief of Air Cooperation Forces, coordinated air activity on the North-East Front, but his responsibilities overlapped those of the zone commanders, such as d'Astier, who paralleled the army groups. Although *L'Armée de l'Air* had achieved independence in 1933, it remained a junior partner of the Army, with an emphasis on reconnaissance and the screening of ground forces. The requirement for local air superiority over the battlefield had been recognised, and an expanded fighter-force was the main objective of the 'Plan V' re-equipment programme, but this was still incomplete in 1940. The doctrinal immaturity of *L'Armée de l'Air*'s concept of operations

was apparent in the way 'penny packets' of aircraft were parcelled out amongst army formations to provide localised air cover across the front. In practice, this meant that individual army group commanders were unable to obtain a concentration of air power where and when they wanted. Borne out of the mutual distrust between air and land components in the interwar period, air force doctrine and command and control led to a fragmented approach that proved fatal in the face of the *Luftwaffe*'s concentrated employment of air power.¹³

Britain

The British response to the Great War was the policy of 'limited liability',¹⁴ so that as late as May 1938, the Chief of Imperial Staff could write: 'Never again shall we even contemplate a Force for a foreign country. Our contribution is to be the Navy and the RAF.'¹⁵ The RAF had formulated a doctrine of strategic bombing to ensure its independence as a separate service in an environment of inter-service rivalry and financial stringency, validated by its experiences of air control and colonial policing. The Air Staff maintained that a future war would be decided by air strikes before ground operations became necessary, bombing being widely perceived as a potentially quicker and more humane method of waging war than a return to the industrialised total warfare of 1914-18. Consequently, few resources were allocated to army cooperation, which became marginalised as a discipline and disregarded as a specialisation by ambitious officers in both services. Indicatively, the Army's 'Notes on Lessons of the Great War' were not published until 1934, and contained only one sentence on the subject of close air support (CAS), commenting unenthusiastically that 'low

flying assault fighters as maintained by some foreign countries may be worth consideration'.¹⁶ The RAF's views regarding CAS had been coloured by the high attrition rates suffered in the closing months of 1918 and Newall, the incoming Chief of Air Staff, stated in 1937: 'close-support tactics were a gross misuse of air forces'.¹⁷ Both the RAF and the Army had cultural traditions of anti-intellectualism that were so entrenched that they had become almost institutionalised,¹⁸ so it is hardly surprising that the value of air support was not reassessed in the light of the Spanish Civil War or the Polish campaign.¹⁹ Where the evidence was considered at all, it was used selectively to reinforce existing preconceptions, so the devastation of Guernica was seen as validating 'morale bombing' as the prime means for attacking an enemy's will to fight, while the effectiveness of the German air-land technique was disregarded.

Following Germany's invasion of Czechoslovakia in 1939, the British government reluctantly accepted the inevitability of sending a land force to France. The War Office pressed for the BEF to be supported by a large army-cooperation element, but the Air Staff rejected this on the basis that the ground battle could best be influenced by bombing German industry in the Ruhr, speculating that this would also draw German air assets away from the battlefield. Accordingly, the allocation of dedicated air support to the BEF was very modest, the Air Component comprising just thirteen squadrons of fighters and reconnaissance aircraft. The Advanced Air Striking Force (AASF) was also deployed to France, but as an outpost of Bomber Command rather than to support the army,²⁰ primarily so its short range bombers could reach

targets in Germany. Eventually, a British Air Forces in France Command was formed to coordinate the activities of the two RAF elements, but as neither was a balanced, composite force, the Air Component had to rely on the AASF for bombing support and the AASF on *L'Armée de l'Air* for the fighter escort that could have been provided by the Air Component, had the two RAF elements been properly integrated. Events were to prove that the fragile support arrangement with the French was unreliable, and the organisational structure meant that the only working air-land interface was in Whitehall, rather than at a joint headquarters in theatre. Consequently, army staff officers often had to telephone London to request air support²¹ and the twin pillars of effective air-land integration, timeliness and assurance, were both compromised. For example, the RAF was requested to attack armoured columns approaching the Canal du Nord on 20 May, but the Germans had long since crossed when the aircraft arrived on scene four hours later.²²

Germany

Following their defeat, the Germans studied the lessons of the First World War rigorously, developing armoured tactics in the interwar years that were a conscious adaptation to technology of the conceptual framework established in 1917-18. This was based on a combined-arms battle, including airpower and resting on fire and manoeuvre, decentralised decision-making and relentless exploitation. Thus 'for French and British officers in summer 1940, the Germans had clearly developed a revolutionary style of war, but to German officers the secret of success was the careful evolutionary development of concepts that had their origins in the

battles of the First World War'.²³ This flexible approach was shared by the high quality army officers who had transferred into the nascent *Luftwaffe* and were established in command by the outbreak of war. Spared the bitter inter-service fight for survival endured by the RAF in Britain, which had bred mutual distrust and enmity, the common roots and staff education of *Wehrmacht* and *Luftwaffe* senior ranks provided a shared understanding of the operational method.

The *Luftwaffe* has been characterised as a purely tactical air arm, but this is something of a myth. As an independent air force, the *Luftwaffe* had always aspired to act strategically, but cost constraints and limited industrial capacity led to it being equipped with short and medium range bombers,²⁴ and the death of General Wever in a flying accident robbed it of its greatest advocate of bombing for strategic effect. Accordingly, it balanced ends, ways and means by pragmatically accepting the need to temper its ambition, establishing a concept of support for joint operations that could be delivered within the limited means available. In contrast, the RAF doggedly held true to its vision of independent strategic action, even when it patently lacked the means to achieve it. While the *Luftwaffe's* flexible approach was critical in delivering short-term success up to the operational level, its lack of long-term planning meant that it failed strategically, while the RAF, and later the US Army Air Forces, were ultimately able to contribute decisively. In its misconception that the sum of operational efficacy would somehow inevitably equal strategic success, the *Luftwaffe* was entirely symptomatic of the weaknesses of wider German military thought.

Luftwaffe doctrine was enshrined in the 'Operational Air War', published in 1935.²⁵ With Clausewitzian focus, it postulated that an enemy state could best be defeated by the destruction of its armed forces, and emphasised the necessity for the three services to work together to achieve this. However, while the army and navy would be supported as necessary, direct action would still be taken against the centres of an enemy's power when possible. In practice, this resulted in a broad-ranging and fluid concept of operations that was refined continuously in the light of empirical experience. In the Spanish Civil War, the *Condor Legion* established the requirements for effective direct air support: the best possible air-ground communications; the necessity for *Fliegerverbindungs-offiziere* or specialist liaison officers; the provision of suitable aircraft and weaponry; dedicated training in CAS bombing and targeting techniques; and the crucial and overriding requirement for the closest and most cordial inter-service cooperation. However, the Chief of Staff, Jeschonnek, emphasised the vulnerability of CAS aircraft and was concerned about the attrition rates that could be expected, particularly if air superiority was not assured. He ordered that CAS was only to be undertaken where there was likely to be a high pay-off, so despite the popular perception of the *Luftwaffe* being used as aerial artillery, direct air support for ground forces was a comparative rarity in the Polish campaign, and this remained the case in France.²⁶

The campaign

The original German campaign-plan for the attack on the West, *Fall Gelb*, was 'manifestly a bad plan',²⁷ reflecting the lack of enthusiasm felt by a General



The campaign started with a massive strike by 3,500 Luftwaffe aircraft on 10 May, which not only emasculated the Dutch and Belgian Air Forces, but also supported the land assault through the innovative use of transport aircraft and gliders to conduct airborne assaults on key airfields, fortifications and river crossings

Staff concerned that Germany's own preparations were incomplete. However, delays to the start date permitted the plan to be recast, and Manstein's proposal, the '*Sichelschnitt*' or sickle-cut, was adopted. Recognising the strength of the Maginot Line in the south and realising that the Allies would probably anticipate a main effort in Belgium, a 'matador's cloak' deception was employed to reinforce this expectation, while the sword thrust was delivered through the supposedly impassable Ardennes into the weakly held French centre at Sedan. This was the *schwerpunkt*, where Guderian's 'Army Group A' massed seven of Germany's ten *Panzer* divisions. After rupturing the French line, the Germans were to race to the coast, splitting the

Allied forces in two before defeating them in detail in the second phase of the campaign.

The Battle of France was characterised by the *Wehrmacht* and *Luftwaffe*'s ability to use effective joint tactical doctrine to concentrate force, whereas the Allies' unwieldy command structure and single-service concept of operations meant that their response was piecemeal, reactive and rarely timely. The Germans recognised that air influence on ground operations was not confined to direct air support and used careful, unified planning to shape the battlefield. For example, the campaign started with a massive strike by 3,500 *Luftwaffe* aircraft on 10 May,²⁸ which not only emasculated the Dutch and Belgian air forces, but also supported the land assault through the innovative use of transport aircraft and gliders to conduct airborne assaults on key airfields, fortifications and river crossings.

This unprecedented concentration of effort proved to be psychologically devastating, allowing the Germans to seize and hold the initiative, and move around Boyd's 'Observe-Orientate-Decision-Act' command cycle²⁹ far more quickly than the Allies throughout the rest of the battle.

In every campaign, there is a point where one side irrevocably starts to win and the other starts to lose. In the battle for France, the decisive act, when the Allies began to lose the physical capability and will to resist,³⁰ took place between 13 and 15 May, when Guderian's *XIX Panzerkorps* pierced the 'continuous front' by crossing the Meuse at Sedan, and was then able to break-out into open country after defeating a French counterattack at Stonne. With few further Allied mobile reserves



A German pontoon bridge across the river Meuse at Sedan

available, the Germans were able to thrust towards the coast, isolating the Allied manoeuvre forces, their centre of gravity, in the north, and making their ultimate defeat inevitable.³¹

In an example of 'mirror-imaging',³² Huntziger, the commander of the French 2nd Army, had assumed that the Germans would not be ready to cross the river until at least 18 May, as this is when the French would have been able to mount the operation, but Guderian unhinged the defence by attacking as early as 13 May. The German bridgehead was established by a deliberate joint operation, which used three *panzer* divisions and the whole of VII *Fliegerkorps*. In accordance with doctrine, direct air support was used only sparingly in the campaign, but it was focused at critical points to provide a crucial edge,³³ and the *Luftwaffe's* shared culture with the *Wehrmacht* meant that the concept of *schwerpunkt* was instinctively understood and effort massed when required. In contrast, Huntziger could not obtain any fighter cover, so the *Luftwaffe* was able to attack in relays, providing continuous support and maximising the effect on the morale of the reservists in the two,

poor quality, 'B-class' divisions defending Sedan.

The psychological value of air strikes had long been recognised by the *Luftwaffe*, which had fitted its *Stuka* dive-bombers with a screaming air siren. An officer described the result of an attack that inflicted little physical damage: the soldiers 'were absolutely shattered... on this first occasion the effect was truly fantastic'.³⁴ The *Stukas* continued to make threatening passes after they had dropped their bombs, and the demoralized defenders panicked and broke when rumours of a tank attack circulated, even though Guderain had been unable to ferry any heavy equipment over the river at that stage. The morale effect of air attack has continued to be highly significant. An Irish Guards war diary from 1944 noted how German troops surrendered due to 'shock and demoralization,' when dummy attacks were flown by *Typhoon* fighter-bombers, which had used all their weapons in earlier strikes,³⁵ and a clear parallel can be drawn with non-kinetic 'shows of force', which have proved effective in current operations in Afghanistan and Iraq.

In contrast to the unity of German air-land operations, uncoordinated attacks by the RAF and *L'Armée de l'Air* against the bridgehead resulted in catastrophic losses, the 'real Valley of Death'³⁶ that effectively knocked both the French bomber force and the AASF out of the battle. These were caused by the dense network of 200 anti-aircraft guns that had been quickly deployed around the pontoon-bridges and to *Luftwaffe* fighters, 250 Allied sorties being overwhelmed by 814 German sorties and demonstrating how, once again, the Germans were able to concentrate their forces at the decisive point.³⁷



250 Allied sorties were overwhelmed by 814 German sorties demonstrating how, once again, the Germans were able to concentrate their forces at the decisive point

Contemporaneous lessons

Following the campaign, the War Office and Air Staff undertook reviews of army-air cooperation, although characteristically, these were conducted entirely separately and without representation from the other service. General Bartholomew, an officer who 'had been renowned in the interwar period for his undisguised hatred of the RAF',³⁸ began his investigation with the premise that Army organisation and doctrine had been sound and it was the RAF that had failed,³⁹ a myopic view that illustrates the cultural and institutional context that shaped joint operations in 1940. His committee recommended that air support be provided along what was thought to be the *Luftwaffe* model, with the creation of a tactical air force under army command, to be sub-allocated to divisional and corps commanders. However, this was a fundamental misunderstanding of German technique, where air power was never controlled directly by the *Wehrmacht*, but instead concentrated under centralised control for specific missions as part of an integrated air-land battle plan. Bartholomew also

endorsed a requirement for specialised dive-bombers to act as airborne artillery, reflecting the iconic status that the *Stuka* had attained, if not an appreciation of its vulnerabilities and limitations.⁴⁰ The Army's enduring predilection for air power it could actually see in action was understandable, but misconceived. What had delivered success for the Germans was primarily indirect air support – isolating the battlefield and cutting communications – following the achievement of air superiority, but both of these effects were invisible to the soldier on the battlefield and consequently, not well understood. According to Buckley, only 15 per cent of the *Luftwaffe's* effort was dedicated to direct army support, and this figure includes all *Stuka* sorties, most of which were not tasked for CAS.⁴¹ These figures may be open to question, but the point remains that the perception created by the effectiveness of German CAS when it was used – because it was tangible – was out of all proportion to the relatively minor effort actually expended on it by the *Luftwaffe* in 1940.



The British Army wanted dive-bombers to act as aerial artillery, but did not understand that this had been a minor role for the *Stuka* in 1940

Unsurprisingly, the Air Staff drew different conclusions to the War Office. It considered that the Army had failed to recognise an approach to war where dislocation was more important than wholesale physical destruction, and indirect support had been most effective in influencing ground operations. It emphasised the criticality of air superiority as a prerequisite for army-air cooperation, arguing that if this could be achieved, then the whole of available air power could be used to meet Army needs, negating the requirement for specialist cooperation aircraft or dive-bombers. This assessment was supported by the evidence; on 12 May, a squadron of *Stukas* lost 16 aircraft to just five French fighters when it was caught without its fighter escort,⁴² and later wartime experience demonstrated that fighter-bombers were far less vulnerable to *flak* and fighters than either the *Luftwaffe's Stukas* or the AASF's light bombers and the Air Component's specialist cooperation aircraft in providing direct support. The Air Staff's analysis was essentially accurate, and in comparing the two reports, it is difficult to contest Hall's conclusion that 'Britain's most senior soldiers were very slow and reluctant learners'.⁴³

Willingness still existed to break the impasse, and the War Office and Air Ministry sanctioned joint trials that led to the 'Wann-Woodall Report'. This identified the fundamental weakness of the British air-support method as insufficient contact between Army and RAF staffs, exacerbated by the physical separation of headquarters and the lack of a reliable communications network. As a result, mobile communication links with forward troops were developed, and a joint RAF/Army control centre created, where unified planning could

be conducted. However, support for the Army was still not regarded as a core task by the RAF, especially as the prospect of invasion receded, so these lessons were not codified as doctrine and Army Cooperation Command, established in December 1940, fell into abeyance. Consequently, Tedder had to develop an air support mechanism from first principles in the Middle East. Although largely based on empirical practice, this was eventually fused with elements of the Wann-Woodall system in time for the Gazala battles in 1942, where the Desert Air Force, the RAF's first tactical air force, was able to reduce the average response time from dispatch of air request to aircraft arriving over the target – the key measure of effectiveness – to thirty minutes. Although a British air support system had been established which remained essentially the same throughout the rest of the war,⁴⁴ the highly perishable nature of effective joint cooperation is indicated by the difficulties that were experienced in transplanting Tedder's method between theatres; it took a considerable period of time following D-Day before the level of efficiency achieved in the Western Desert was replicated in North-West Europe.

Enduring lessons

The Allies' most crucial failing was their lack of unity of purpose. They were never able to recognise the point of decision, and then coordinate their efforts in time and space to mass combat power there, exemplified by the piecemeal and indecisive response to the German bridgehead at the Meuse. This stemmed from the complex and stove-piped command structure, which hampered decision-making and was extremely vulnerable to dislocation. In the Great War, it had taken four years

of conflict, and near disaster in 1918, before the Allies acknowledged the requirement for a supreme commander, but in 1940, Gamelin did not have Foch's authority as a *generalissimo*, and with the battle effectively lost after just five days with the German break-out from the Meuse, there was no time for the Allies to adapt their organisational structure and establish proper unity of command. The British did relearn the lesson that coalition operations require a joint commander, reflected in the appointment of Eisenhower for Operation Torch in 1942 and thereafter, but the present labyrinthine command arrangements for the International Stability Assistance Force in Afghanistan, with interwoven layers of national and coalition structures, indicate that in limited wars, where there is no existential threat, political imperatives may well take priority over military efficiency.

Personalities and relationships can overcome process and ameliorate inadequate structures or, to some extent, the lack of shared doctrine or training. But in 1940, the character of the commanders militated against this. There was little personal empathy, staff talks were not held until March 1939, and the breathing space provided by 'the phoney war' was largely squandered. The British had no confidence in the French, and the French were always wary of British motives. Gort was very conscious of his responsibility for Britain's only field army, while the RAF's overriding priorities were to maintain a viable fighter-force to defend Great Britain while directing Bomber Command's main effort against the Ruhr, putting it 'in the uncomfortable posture of a man looking over both shoulders at

once'.⁴⁵ A lack of understanding was equally evident in joint operations, where interwar rivalries had resulted in doctrinal development proceeding on essentially single service lines. With no common culture, the Army did not know how to ask for help and, despite the bravery of its aircrew, the RAF did not know what help to provide.⁴⁶ The fundamental lesson of 1940 is that there is nothing simple, or instinctive, about the successful execution of combined or joint operations, and attaining the common understanding required demands a significant level of effort and engagement to break down strong, single service or national cultures. This cannot be achieved overnight, and may not happen at all without the impetus provided by operations.

Conclusion

The performance of the German military in 1940 was by no means flawless and, in numbers and technology, it had few advantages over the British and French. However, its practical and realistic joint doctrine masked its weaknesses⁴⁷ and, wedded to a culture that demanded the 'joy of responsibility',⁴⁸ produced a series of small tactical advantages that were leveraged by swift decision-making into the shattering operational success that completely unhinged the Allies in what became the 'unimaginable hell' of mid-May. The British and French were complicit in what was an essentially moral and intellectual, rather than physical defeat, because they failed to understand, in Clausewitz's words, 'the kind of war on which they [were] embarking'.⁴⁹ Lacking the tradition of ruthless analysis and incremental innovation that served the Germans so well, the strategic context and their own institutional cultures limited their ability to recognise or implement the

lessons offered by the combined-arms offensives of 1918, the Spanish Civil War, or the Polish campaign, and they held firm to the belief that a war in the west would be low-tempo, linear and single-service in the manner of 1914-17. It was this failure of expectation, rather than anything revolutionary about *blitzkrieg* itself, that made it unimaginable to the Allies as a way of war. Subsequently, they were simply not allowed the time to adapt, even had they been predisposed to do so.

The conduct of Allied combined and joint operations in 1940 throw the enduring requirements necessary for success into sharp relief: first, there must be a real willingness to cooperate; second, headquarters should ideally be collocated, allowing the formulation of unified plans; third, a shared language or lexicon should be used; and finally, an understanding of the other component or nationality is essential to build trust. Developing this sort of common culture is not quick or easy, and while lessons are hard learned, they are highly perishable and easily forgotten. It is striking, in the joint arena, how air-land integration follows a cyclic pattern, with armies and air forces being forced together by exposure to operations, but springing apart to revert to single-service type when removed from the crucible of war. Just as the RAF and Army diverged in 1918, so they drifted steadily apart again during the Cold War. It took an acknowledgement of the problems in air support experienced during Operation TELIC in 2003 to renew British interest in air-land cooperation, leading to initiatives such as the Coningham-Keyes project and the formation of the Joint Air Land Organisation.⁵⁰

If conducting unilateral joint operations is difficult, then achieving effective joint and combined practice is even more problematic, especially if an inter-agency element adds another layer of complexity to the mix, and current operations in Afghanistan indicate, *inter alia*, that the requirements for collocated headquarters and unified planning have been either forgotten or disregarded. The final word may be left to General Ismay, the Chief of Churchill's personal staff and a senior soldier deeply versed in inter-service politics. He understood that in joint and combined operations, friction is never attributable to one party alone:

*It almost seemed as if the Air Staff would prefer to have their forces under Beelzebub rather than anyone connected with the Army, but when one recalls the views which were then held by the General Staff on the employment of air power, one can scarcely blame them.*⁵¹

Notes

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An early example of casevac:
a wounded soldier is placed
aboard a specially converted
DH9, 1919

A History of military Aeromedical Evacuation

By Flt Lt Mary Hudson

*'I am becoming increasingly alarmed by the air-mindedness of the RAMC and their tendency to usurp RAF functions or make extravagant demands upon our resources'*¹
RAF DGMS 17 November 1960

'Our primary casualty retrieval is excessively slow. A simple casevac request has to go to too much 'middle-management' before a flight decision is made. In Vietnam, wounded soldiers arrived in hospital within twenty five minutes of injury. In Iraq in 2005, that figure is over one hundred and ten minutes. We use support or anti-tank helicopters that are re-rolled on an ad hoc basis for the critical care and transport of our sickest patients. We still do not have a dedicated all-weather military helicopter evacuation fleet...'
Lt Col P Parker RAMC June 2007²

In June 2007 an article in the Journal of the Royal Army Medical Corps was seized upon by the worldwide media and lawyers representing wounded soldiers as evidence that lives of British casualties in Iraq and Afghanistan were at risk because of inadequate helicopter casualty evacuation (casevac) arrangements.³ The issue of dedicated casevac helicopters was raised again. A Sunday Times article in November 2007 claimed that German casevac helicopters had refused to fly at night, hampering Operation DESERT EAGLE and leaving Norwegian and Afghan forces, which they were covering, unsupported.⁴ This article results from an interest sparked by the renewed debate and looks at the development, provision and use of aeromedical aircraft, focusing on the development and resourcing of air evacuation. It does not consider the development of associated medical techniques.

Post-war, a clear divide developed between casevac (the emergency evacuation of a casualty from (or near)

the point of wounding to adequate medical care) and medevac (the transfer of patients, already under medical care, to another medical facility). Just to confuse the issue US forces have different definitions and a different approach to casevac. They opt for a 'scoop and run' approach focusing on the speed of transfer and opting for inflight stabilization of the casualty. British casevac are primarily from a Role 1 or Regimental Aid Post to a Role 2 hospital but in Iraq and Afghanistan there has been an increasing demand for US-style 'scoop and run'. US military air ambulances do not carry doctors but rely on highly experienced Emergency Medical Technicians (EMTs). The US military have dedicated air ambulances for tactical air evacuation but use convertible transport aircraft for strategic aeromedical evacuation.

The UK has no dedicated air ambulances but does include doctors on casevac sorties. British aeromedical policy has traditionally been based on back-load, 'supplies up casualties back', but, in recent conflicts, aircraft have been allocated tactical casevac as a primary task or designated an aeromedical flight such as the VC10 flights from Montevideo to UK during the Falklands War. These different approaches have evolved from the same beginnings.

Early Days

'We shall revolutionize war surgery if the aeroplane can be adopted as a means of transport for the wounded.' French Officer Oct 1913.⁵

Legend states that the first aeromedical evacuation was by hot air balloon during the Siege of Paris in 1870.

Although the claim appears to have its origins in a mistranslation of French documents, the benefits of moving the injured by air were recognised at a very early stage in aviation history. In 1909 two American officers built a military air ambulance using their own money. This aircraft flew in January 1910, but crashed soon after⁶ and military attempts to persuade the US Secretary of State for War to invest in aircraft for medical evacuation failed. His decision appears to have been influenced by an editorial in the *Baltimore Sun* which declared 'the hazard of being severely wounded was sufficient without the additional hazard of transportation by aircraft.'⁷ The French military were quick to recognise the possibilities of the use of aircraft for medical purposes. During a French Army exercise in 1912 an aircraft was used to find casualties and relay their location to search parties crawling slowly over the ground. Casualty 'spotting' was the first medical role identified for aircraft.⁸

First World War

During the 1915 Serbian retreat in Albania the French made the first known wartime aeromedical flights, evacuating Serbian casualties using unmodified fighter aircraft.⁹ The next year the French government were persuaded to permit the conversion of some Dorland AR II fighters into air ambulances capable of carrying two stretchers internally. Six aircraft were converted, some of which were used, in 1917, to evacuate wounded from battlefields at Amiens.¹⁰ The first recorded British aeromedical flight took place on 19 September 1917 when a soldier with the Imperial Camel Corps was flown out of the Sinai Desert on a DH4. The forty five minute flight saved the trooper an uncomfortable three

day journey by camel litter.¹¹ In Egypt a DH6, modified to a design produced by the RAF Medical Officer, was used for aeromedical flights from August to December 1918.¹² However, the major development in medical evacuation during the First World War was the emergence of the motor ambulance not aeromedical aircraft.¹³

Interwar

Civil and military aeromedical aircraft were becoming widely accepted, especially when long distances or difficult terrain were involved. In May 1929 the first International Congress on Sanitary Aviation was held in Paris to which the Air Ministry sent an RAF Medical Officer.¹⁴ On the civil side, faced by vast distances needing cover, the Australian Flying Doctor Service began in 1928. It used a DH50 biplane seconded from the Queensland and Northern Territory Airline Service, now known as QANTAS.¹⁵ Distance also prompted the Americans to take a serious interest in aeromedical evacuation. In February 1918 the US Air Service converted a JN-4 aircraft into the first US air ambulance capable of carrying a patient internally.¹⁶ By the end of 1918 other aircraft had been converted and the aeromedical transfer of patients from airfields to general hospitals by air was promoted.¹⁷ The US Army produced a DH-4 conversion capable of carrying a pilot, two litter patients and, significantly, a medical orderly. Several of these of aircraft were used on the Mexican Border in 1920.¹⁸ The first US contract for military air ambulances was let in 1924.¹⁹ Although the military recognised the advantages of aeromedical evacuation, the War Department was less convinced. It ruled that aeromedical flights were unjustified whilst safer methods of transport

existed.²⁰ As if to reinforce this view the US Army's prize air ambulance, which could carry four litter patients and six sitting patients, crashed in a severe electrical storm in May 1928, killing all seven onboard.²¹ However, the same year, the US Marines successfully used aeromedical evacuation in Nicaragua, lifting patients from isolated jungle posts to general hospitals. These air ambulances were 'front-loaded' with medical supplies, the first time an air ambulance was utilized on both the inward and outward flights.²²

Although US development of aeromedical evacuation using fixed wing aircraft slowed as the result of the crash,²³ the US Army had also begun to experiment with autogyros, receiving its first one from France in 1928.²⁴ By 1933 a US manufacturer had already designed an autogyro ambulance to carry a pilot and three patients, two in wire baskets and one sitting.²⁵ Three years later the US Medical Field Service School tested the casevac capabilities of autogyros but lack of funds prevented the formation of a planned autogyro casevac unit.²⁶ Meanwhile, a recommendation was made that the US Army should have two types of air ambulance, a heavy transport for medevac, and a smaller lighter aircraft capable of landing and taking off on small emergency strips for casevac.²⁷ This recommendation was adopted for the Second World War.

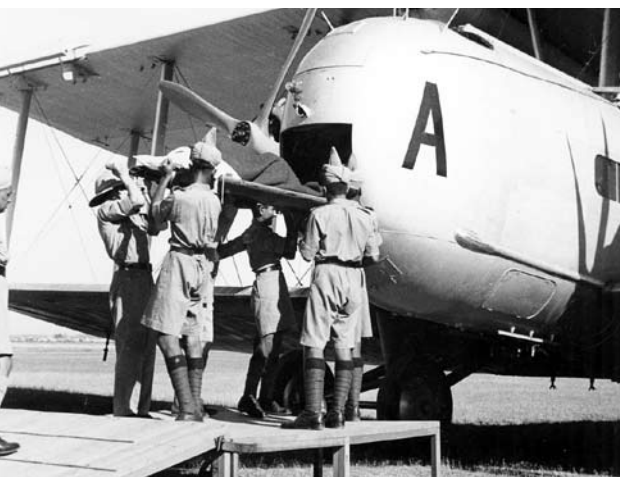
The interwar period saw the growth in the military use of aircraft for aeromedical flights during a variety of colonial skirmishes. The French and British developed both the techniques involved and the aircraft used. During their colonial war in Morocco the French demonstrated the potential of aeromedical evacuations in remote and

rugged areas. In 1922-23, using six air ambulances capable of carrying two or three litter patients, they evacuated more than 2,200 patients from forward airstrips near the Atlas Mountains to hospitals in base areas.²⁸ These flights were made in a few hours as opposed to days, in considerably more comfort and without accident. A French doctor declared 'by rapidly removing the wounded from the fighting zone, the medical aeroplane has, in a remarkable manner relieved the convoys, economized the fighting troops and hastened the advance of the attacking columns'. He predicted 'in the future, hours will replace days in calculating the duration of wounded transport.'²⁹

The British also used aeromedical evacuation in expeditionary wars. The RAF element, Z Force, of the 1920 campaign in British Somaliland included a DH9 air ambulance with Red Cross markings which could carry three stretcher patients.³⁰ The RAF's first aeromedical service was provided by a Vimy of 216 Squadron which, between 1920-1922, was allocated for emergency aeromedical evacuation from isolated areas in the Middle East.³¹ This aircraft had Red Cross markings but carried non-medical passengers and was not a dedicated air ambulance. The markings were later removed because of the limitations they imposed on the use of the aircraft.

In 1923 troop transport aircraft of 45 and 70 Squadrons evacuated 359 Army patients during operations in Kurdistan by 'back-loading', ie aircraft bringing forward men and supplies took back casualties.³² At home the RAF had experimented with a dedicated air ambulance service based at RAF Halton. However, this was short-

lived, lasting only from 1925-27 as it was more economical to use troop carriers than dedicated specialized aircraft. Today air ambulances in the UK are operated by civil authorities or voluntary organisations with the occasional assistance of military assets or Coastguard SAR helicopters.



The Valentia had a square opening in the nose to allow for stretchers to be loaded

Waziristan 1937

Waziristan operations showed how valuable aeromedical evacuation could be in the rugged terrain of the North West Frontier. The Army Medical Service (AMS) requested aircraft for aeromedical evacuation of casualties from Waziristan to base hospitals in what is now Pakistan. The RAF agreed to the back-loading of casualties on Valentia Bomber Transport (BT) aircraft bringing in troops and supplies. The Valentia had a square opening in the nose to allow for stretchers to be loaded and carried four stretcher cases and five sitting patients together with one attendant and medical equipment. The aircraft came from the Indian BT Flight, later supplemented with a detachment from 70 Squadron in

Iraq. This aeromedical evacuation relied solely on the 'opportune back-loading of BT aircraft of the Force'.³³

The importance of patient selection was appreciated by the Army medics and strict guidelines established for selection of stretcher cases for evacuation. Patients requiring immediate specialist and nursing skills, the lack of which would result in fatal complications or a serious degree of permanent disability, were selected. Sitting cases were chosen from suitable patients available at the time the aircraft was due to leave. No hard and fast rules were followed for the selection of these. The aeromedical flight reduced a hazardous two day journey to less than five hours; casualties who would not have survived a gruelling journey by road and train reached better medical facilities safely. This successful evacuation, based on backloading, was seen by the AMS as 'a pointer to what might have been achieved with aircraft specifically allotted to the Medical Service'. In all some ninety-three casualties were evacuated by air.³⁴

At the request of HQ RAF India the AMS produced a report which recommended that air evacuation should be accepted as a recognised medical evacuation method in all future operations and should be 'utilized to the fullest extent within the available resources of aircraft'. Significantly it also recommended that 'aircraft be primarily allotted to the Medical Services for the specific purpose of the transport of sick and wounded'. It noted that the terrain of the North West Frontier together with its climatic conditions made aeromedical evacuation the best option and stated that 'our aim should be, at least, to provide sufficient aircraft to transport all serious cases to base hospitals, thereby

increasing their chance of recovery, and concomitantly improving the general morale of troops'. The General Officer Commanding-in-Chief, Northern Command, forwarded the report to Chief of the General Staff HQ India with the comment that 'Air transport is an invaluable adjunct to the normal means of evacuating sick and wounded. During the present operations in Waziristan it has been possible to utilize this method of transport for evacuation of wounded as there have been troop carrying aircraft which could be made available for this role.' His comments on allotment of aircraft were more pragmatic than that of his medics: 'The number of BT aircraft in India, however, is limited and therefore, it is not possible to allot them primarily to the Medical services. Medical requirements can only be met if the circumstances permit'.³⁵

The clash between demand and resources had begun, evinced by Army agitation for allotted/dedicated aeromedical aircraft and the Air Ministry's well-founded resistance. The British Red Cross conducted air ambulance trials in 1936 which led to an approach to the Army Medical Directorate (AMD) by aircraft manufacturers for input to the design and construction of specialized air ambulances.³⁶ As if fired by this the Director-General Army Medical Services (DGAMS) drew the Army Council's attention to the failure to incorporate aeromedical evacuation in the Army's plans for war, pointing out that this might prove to be an indispensable method of transport where lines of communication were poor.³⁷ With the RAF deeply engaged in their pre-war expansion programme DGAMS was informed that they could not be asked to provide special ambulance aircraft.

He was assured that, if circumstances warranted aeromedical evacuation, both civil and military aircraft would be adapted for the purpose.³⁸

Overseas British commanders were seizing on the concept of aeromedical evacuation and evinced high expectations of it. In January 1937 Commander-in-Chief Egypt told the War Office that aeromedical was the only acceptable form of medical evacuation in the desert, emphasising the difficulties of casevac from a mobile military force resulting from the need to locate such units and the nature of the terrain and climate. Casualties faced long, arduous and highly uncomfortable journeys in motor ambulances. The aircraft he demanded were not forthcoming and it was suggested that provisional arrangements should be made to requisition civil aircraft for wartime air ambulances. The C-in-C reiterated his demand in 1939 suggesting that some obsolete bombers, due to be scrapped by the RAF, should be converted to air ambulances operated either by the RAF or the Egyptian Government. This proposal gained no support in the Air Ministry and the question of dedicated air ambulances was temporarily overtaken by events as Britain geared up for the imminent war.³⁹

The Air Ministry acknowledged the value of aeromedical evacuation, but was forced to be economical in its use of limited resources, thus it followed a policy of provision through back-loading aircraft. With the absence of conflict in northern Europe this approach was entirely confined to the colonies in the inter-war period. Between the end of the First World War and the last years of rearmament severe constraints on the military budget ensured that aircraft

resources were very thinly spread across both home and overseas commitments. Post 1919, Trenchard was compelled to sacrifice many front-line squadrons in favour of a training system designed to allow the RAF to expand rapidly in time of need. This policy left little scope for the creation of a dedicated air transport force, such transport aircraft as the RAF ordered predominantly took the form of dual-role 'bomber-transport' – a more economical solution than the procurement of two entirely separate designs. When rearmament began in the mid-1930s, the RAF's attention focused on metropolitan requirements, primarily involving the creation of strategic bomber and fighter forces. Transport aircraft did not feature prominently in their planning because the Army made few demands for air transport in Britain, and a commitment to send anything more than a Field Force to France was only accepted by Chamberlain's government in the spring of 1939.

In contrast Germany was evolving a military aeromedical capability. The rearmament restrictions imposed by the Treaty of Versailles meant German civil aircraft production kept military requirements very much in mind. Lufthansa was not only the training ground of the Luftwaffe pilots, but also operated the aircraft on which the German air transport fleet was based. This fleet gave the Germans the ability to plan for aeromedical evacuation and to trial their ideas prior to the Second World War. The Spanish Civil War (1936-38) provided the Germans with a proving ground for several of their ideas on the use of air power, including aeromedical evacuation. Amongst the assets of the German Condor Legion in Spain were Junkers 52 (Ju-52) transport aircraft, readily convertible to air

ambulances capable of carrying up to 10 stretcher cases and eight sitting casualties together with doctors and/or medical orderlies. The Luftwaffe evacuated some 500 patients from Spain to Germany; and pioneered both long distance and altitude aeromedical evacuation. Flights of over 1500 miles were made reaching altitudes of 18,000 feet over the Alps; the Ju-52s carried medical supplies, including oxygen, for medical intervention in flight. These flights took ten hours instead of seven days by train and boat.⁴⁰ The Russians also used air evacuation during their war against Finland (1939-40) moving casualties from divisional to base hospitals. These aircraft carried surgeons and medical supplies, including oxygen.⁴¹

Second World War

Lessons learnt in Spain enabled the Germans to incorporate aeromedical evacuation in plans for the invasion of Poland. During the first few weeks of the campaign they evacuated 2,500 patients to hospitals in Germany by air. Only four deaths occurred in flight, all on aircraft not carrying medical staff or oxygen.⁴² In 1940 the Head of the German Army Medical Air Services declared that the German experiences in Spain and Poland showed 'specialized air ambulances were not necessary, stating that 'the surgical [air ambulance] airplanes which have been exhibited [by manufacturers] with great pride, I consider misconceived playthings, which present an entirely erroneous conception'. He dismissed them as 'fair weather butterflies'⁴³ and advocated the conversion of suitable transport aircraft with standard stretcher racks stored on the aircraft. Soon after the beginning of the War the Germans established Luftwaffe aeromedical units equipped with Junkers transports and Storch STOL



Soon after the beginning of the War, the Germans established Luftwaffe aeromedical units equipped with Junkers Ju-52 transports

aircraft. These units included flying, medical and maintenance personnel, all commanded by a flight surgeon. Facilities, manned by the units' medical personnel, were established at airheads enabling patients to be held overnight. The small Storch aircraft and ground ambulances brought in casualties. Aircraft belonging to these aeromedical units were initially painted white and displayed Red Crosses. This livery was readily spotted and gave away positions of advance airfields. Camouflage was adopted but with the Red Crosses retained in white circles. Attacks on well marked Junkers aircraft on the Eastern Front and in the Mediterranean led to the removal of the Red Cross and the aeromedical aircraft flew with troop transports or with fighter escorts. They were equipped with guns for self-defence. In addition to the dedicated aeromedical Junkers, other troop carriers including Condor transports were used. The troop carriers carried about 80% of patients leaving the aeromedical Junkers to concentrate on the seriously injured casualties. By May 1945 some 2.5 million patients were reported to have been evacuated by air.⁴⁴

After the outbreak of war the onset of hostilities in France and the Low Countries quickly demonstrated the utility of transport aircraft, and the demand for air lift grew rapidly. The British Air Ministry was in a very difficult position. In 1940 the RAF possessed no standard air transport design equivalent to the Luftwaffe's Ju-52 and experience suggested that at least five years would be required to bring a new aircraft from the drawing board into front-line service. Hence there was little prospect of obtaining a British design in the short-to-medium term. The Air Ministry was used to having to prioritise to meet its commitments at home and abroad. This influenced its thinking: needs demonstrated by colonial experiences were ignored as the demands of home defence grew. With the need to obtain the most economical use of aircraft resources with multi-role as a favoured option the dual-rolled BT aircraft remained the RAF's solution to the transport shortage.

Civilian sources could not mitigate the lack of transport aircraft.⁴⁵ British civil aviation had lagged behind other countries; long distance routes were served by flying boats, short haul by biplanes. Development of a civil monoplane was slow; no easily adaptable British manufactured civil aircraft were available. America also faced acute shortages and many demands on resources.⁴⁶ The C-47 transport workhorse was developed from the DC3 civil airliner which first flew in 1935, but the military version did not reach the USAAF until October 1941 and not in any numbers until 1942. The British order for these aircraft lacked priority, although eventually 1,900 Dakotas were supplied under

Lend Lease, the first did not arrive until March 1943.⁴⁷

Inevitably, world war provided the catalyst for development of aeromedical evacuation. In September 1939 the RAF had no viable plan for this. Vague assumptions had been made that military aircraft would be converted or civilian aircraft requisitioned for this role, but there were too many demands on too few aircraft. Aeromedical evacuation provision joined the long queue of other demands made on a very limited transport capability and vied with them for priority. Yet, within weeks, the Air Ministry was under pressure from its own Advanced Air Striking Force (AASF) to provide aircraft for aeromedical evacuation from France. An ad hoc arrangement was cobbled together by adding casualties to the backloads of Air Transportation Service (ATS) aircraft chartered from civil companies. The Air Ministry informed Air Vice-Marshal Playfair, Air Officer Commanding (AOC) AASF that it 'agreed in principle' that the AASF and the RAF Component of the BEF could add casualties to the already back-loaded returned stores, mail and passengers on the Maintenance Command ATS civil aircraft which had flown in urgent supplies. The Ministry also agreed that aircraft carrying casualties could divert to RAF Benson, the airfield closest to RAF Hospital, Halton. However, the Ministry stipulated that 'when the evacuation of casualties cannot be effected without interference with the normal duties of Maintenance Command civil aircraft, they must be evacuated by the normal [surface] methods already arranged.'⁴⁸ The system did not run smoothly. In mid November Playfair, at the behest of his Principal Medical Officer (PMO),

wrote to the Under Secretary of State (USoS) for Air requesting a dedicated air ambulance to take casualties to England and, in France, to transfer selected cases from the forward fighting units to medical facilities. Playfair knew his request was against Air Ministry policy but he believed it should be reconsidered. He cited an incident where a civil ATS aircraft left France with a casualty and, despite instructions, landed at Shoreham instead of RAF Benson. The pilot told the accompanying medical orderly that he would not go beyond Shoreham and did not know where Benson was.⁴⁹ The requested air ambulance was not forthcoming and, when ATS routes closed on 9 December 1939, medical evacuation from France reverted to surface methods. Although unsatisfactory, backloading ATS civil aircraft enabled 93 patients to be evacuated back to the UK between September and early December 1939.⁵⁰

Returning from a Middle East tour in 1940 the Secretary of State (SoS) for War (Eden) raised again the subject of air ambulances. Following a negative response from the Air Ministry, he sent a cable to the Foreign Secretary requesting America be asked to provide air ambulances through their Red Cross. An approach was made through the British Red Cross but no aircraft were available and neither British nor American supply organizations would give the request priority.⁵¹ The clash between demand (War Office) and resources (Air Ministry) began in earnest. The War Office badgered the Air Ministry with unrealistic demands for dedicated aircraft; Eden made a direct demand to the SoS for Air (Sinclair) for at least twelve air ambulances for the Middle East. The reply was unequivocal; no aircraft were available for allocation

as air ambulances.⁵² Pressure also came from below; a medical officer in North Africa reported that 'There is a general feeling amongst senior officers and men, which is increasing as time goes on, that after two years of war, air evacuation of casualties should be available, and I am constantly being asked when it will be possible and what is being done about it'.⁵³ It was well known that the Germans were using aeromedical evacuation. Eden even made veiled threats to Sinclair warning of severe criticism in Parliament and the Press if it became known that there were no dedicated British air ambulances.⁵⁴ However, in June 1941, when these demands were being made, a specialized RAF air ambulance unit was formed to serve the sick and wounded in the UK. It comprised seven dedicated aircraft specifically equipped for the air ambulance role, staffed by RAF medical personnel.⁵⁵ Several of the aircraft were 'presentation aircraft' ie paid for by public subscription. There is no evidence that this unit was considered for deployment overseas.

Discussions between the Air Ministry and the War Office continued throughout 1941; whilst funding was not an issue suitable aircraft were unobtainable⁵⁶. Air ambulances could only be made available through diverting resources from production of much needed operational aircraft⁵⁷. By mid-year Sinclair agreed to the conversion of transport aircraft in the Middle East when required stipulating they were not to carry the Red Cross which would prevent their use as military transports.⁵⁸ The Army was not satisfied; in 1942 the Adjutant General stated in post visit report on the Middle East 'An important point in morale is the removal of the wounded. It is

unbelievable that, at this stage of the war, the United Kingdom has not one single air ambulance. Although much use was made of returning transport aircraft, it meant that the wounded were taken to the aircraft and not the aircraft to the wounded'.⁵⁹ He believed it was essential to provide RAF air ambulances to supplement the dedicated three RAAF DH86 and one SAAF Lodestar air ambulance already in the region. These were already supplemented, when available, by Bombay aircraft of 216 (BT) Squadron. Together they were known as the 'Forward Shuttle Flight'.⁶⁰ In 1943 the Army Council informed the Air Council that back-loading transport aircraft was insufficient and dedicated air ambulances were required as well. They also demanded two types of aircraft for medical evacuation; light aircraft for use in forward areas and larger aircraft for evacuation to hospitals in rear areas; a two stage lift. In response the Air Council refused to restrict AOCs in their use of transport aircraft but agreed casualty evacuation would be made a priority task. They firmly rejected a two stage lift.⁶¹ Lack of aircraft was only part of the problem; the RAF was well aware that a considerable support element would be needed if a dedicated air ambulance force was established. Experience with airborne and special duties forces showed that demands for expansion followed the creation of limited size forces.

After much pressure, in March 1944, the Air Ministry finally agreed in principle to the allocation of one flight of six aircraft to each main theatre. Their primary role was aeromedical evacuation of serious casualties when other transport aircraft could not use the most advanced airfields. These aircraft could also be used take supplies and

reinforcements forward but priority would be given to medical personnel and stores.⁶² The Army Council seized on this and, to the Air Ministry's dismay, immediately informed their CinCs that these aircraft were coming.⁶³ With their hand forced the Air Ministry sent the aircraft however, Army Medical Staff Officers in theatre continued to make unrealistic demands. The Director Medical Services (DMS) of Allied Forces HQ (AFHQ) stated 'it is the contention of this Directorate that of any transport aircraft provided for the theatre, the medical services are entitled to an allotment proportionate to their needs' based on 'the acceptance by London and Washington of the necessity for air transportation of casualties'. The provision of such aircraft was 'not contingent on the existence of a superfluity of aircraft'.⁶⁴ In 1944 it was also suggested that HQ Mediterranean Allied Air Forces (HQMAAF) be ordered to make aircraft available.⁶⁵ HQMAAF upheld the principle of operational requirements first and felt that 'AAI [Allied Army Italy] do not understand this principle, and they do in fact regard the provision of aircraft as a right, to deal with the normal and therefore readily foreseen daily evacuation of sick and wound'.⁶⁶ Aeromedical evacuation continued to tax the Allied air transport capability in all theatres.

After December 1941 the British relied heavily on US resources for aeromedical evacuation. The European war prompted the formation of US Medical Air Evacuation Squadrons (MEAS), authorized in November 1941 just days before Pearl Harbour. Units comprising four squadrons with allocated aircraft were planned; the first squadron stood up in May 1942 and was assigned aircraft. By late 1942,

the acute need for aircraft of all types forestalled dedicated air ambulances; Troop Carrier (TC) and Air Transport (AT) units were allocated aeromedical evacuation as a secondary task. MEAS were renamed Medical Air Evacuation Transport Squadrons (MAETS) and were comprised entirely of medical personnel. MAETS were assigned to TC and AT units in theatre.⁶⁷ The US formed a School of Air Evacuation to train medical personnel in aeromedical duties. Although the Americans had units termed 'evacuation squadrons' their role was primarily that of transport and they were frequently assigned short notice transport flights which resulted in a lack of aircraft for aeromedical tasks.⁶⁸ The misconception that the Americans operated dedicated air ambulance aircraft results from the change of plan and consequent renaming. Even at the time there was confusion; records show there was no clear understanding of whether MAETS had their own aircraft or not.⁶⁹ The C-47 (Dakota) was the main aeromedical transport but the Americans also had a small single-engined aircraft, the L5, in accordance with the pre-war recommendation. These could carry one stretcher or one sitting patient and proved invaluable in the Far East campaigns, especially Burma, for casevac from jungle clearings.

The first large scale aeromedical evacuation occurred in 1942 during the British retreat in Burma when ten USAAF transport aircraft evacuated some 1,900 casualties from Myitkyina. Later that year 13,000 Allied casualties were flown out of New Guinea⁷⁰. In the Far East campaigns mountainous jungle terrain often made air evacuation the only realistic solution. Even so many casualties only reached the airstrips after tortuous journeys,

carried by comrades, local natives or on vehicles which slipped and slid over almost impassable roads.⁷¹ A major development in aeromedical evacuation resulted from the need to evacuate wounded Chindits from the jungles of Burma. Wingate's Chindits, long range penetration forces sent to attack Japanese lines of communication, relied on air drops for supplies but had no provision for casevac. They were forced to carry casualties with them or abandon them; for most of their sick and injured the prospects were bleak. In a rare exception a Dakota took out seventeen casualties, landing and taking off from a jungle clearing which was 400 yards short of the minimum designated 1,200 yards.⁷² Lack of casevac provision had an adverse impact on the morale of the Chindits (and similarly the US 'Merrill's Marauders'); abandoning sick and wounded put a strain on them, especially the decision making commanders.⁷³ Wingate recommended the provision of air ambulances and the 1943 Quebec Conference agreed that casualties suffered by the 2nd Chindit expedition would be evacuated using USAAF L5s and Dakotas.⁷⁴ During the Chindits' advance to the Chindwin some 700 casualties were casevaced by L5s.⁷⁵ RAF radio operators with the Chindits called in the aircraft which landed on emergency strips cut in jungle clearings. Gliders inserting Chindits into jungle clearings also took out early casualties; Dakotas snatched up the gliders without landing.⁷⁶ In January 1945 the US L5s were supplemented by an RAF Casualty Evacuation Flight (also equipped with L5s) attached to 194 Squadron.⁷⁷ The division between casevac and medevac had begun. Thanks to light aircraft, casualties could now be in hospital four to six hours of being wounded.⁷⁸

The US light aircraft, although attached to British Corps, remained under American control. In forward areas they were under direction of the DDMS of the British Corps. A British report dated 1945 indicates conflicts in priorities; 'Both the [US] squadron commanders and the medical branch at Corps assumed that casualty evacuation was the first task, but there was no authority for this from a higher formation and the view was not held throughout the Corps'. There is evidence that major clashes took place; the report states (with underlining) that secondary tasks had not interfered with casevac only 'because the commanders, coming ultimately under the command of the USAAF were in a strong position to act on their own view (and that of the Corps medical branch) of their chief duty'.⁷⁹ The report accepted that spare capacity could be used provided this did not interfere with casevac. Secondary tasks flown by the light aircraft included 'front-loading' supplies on casevac sorties, reinforcements, communications flights for general officers, artillery spotting, reconnaissance flights, and picking up messages. Tasks which could not be combined with a casevac were flown only when there were spare aircraft. Some 7,705 casualties were evacuated by light aircraft in Burma prompting the report to recommend the provision of thirty two light aircraft (with casevac as a clearly defined primary task) for each Corps of three Divisions. No other tasking was acceptable if it interfered with the primary task. The report did not, however, suggest where these aircraft were to come from.

Flying boats also undertook aeromedical evacuations.⁸⁰ The Chindits' freedom of action was hampered by their casualties who could not be evacuated because of

monsoon induced ground conditions. Three 230 Squadron Sunderlands were detached from Ceylon to Dibrugarh on the Brahmaputra River. Chindit casualties, brought to Lake Indawgyi in Burma on mules or carried by their fellows, were then collected from the Lake by Sunderland. Rapid turnarounds under threat of attack took place; supplies brought in were unloaded and the casualties taken on board. These sorties were very dangerous; the aircraft faced atrocious weather conditions which prevented fighter escort and made flying in mountainous terrain extremely hazardous. The Sunderland's low 'ceiling' forced pilots to fly through cloud filled gaps in the mountains separating India and Burma.⁸¹

The battles of Imphal and Kohima produced significant developments; large scale movement of troops and casualties by air began. During Imphal an average of a thousand casualties a week were evacuated.⁸² As the battle intensified entire Base medical units were flown out. Mass casualty evacuations soon gave way to a continuous flow to hospitals around Comilla and Agartala airfields from which supplies went up to Imphal but 'the ideal of concentrating hospitals and bringing all casualties by air to Dacca could not be achieved, owing to the acute shortage of aircraft, and to the fact that the medical authorities had no ambulance aircraft which could be diverted at will. Throughout the battle for Imphal, one squadron of Dakota ambulance aircraft could have covered the evacuation of all the wounded into Dacca'. The writer accepted the principle of back-loading the transport aircraft but suggested that it be reversed with aeromedical aircraft bring back supplies from Dacca airfields. He believed this

would provide the medics greater control over the aircraft.⁸³

In South East Asia Command (SEAC) the speed of casevac, especially of urgent cases, was greatly increased by air evacuation. Transfer from forward medical facilities to base hospitals (in India) fell from weeks in 1942 to days in 1943 and hours in 1944-45.⁸⁴ Another major development in this theatre was the first use of helicopter casevac. In January 1945 a US Sikorsky YR-4 collected a wounded soldier from the Naga Hills. It had been sent to Burma for Combat Search and Rescue (CSAR) duties with the Air Jungle Rescue Unit (AJRU) and was the first helicopter dedicated to this role. Since the pilot had no knowledge of jungle flying and lacked a radio he was escorted by two L5 aircraft from AJRU during this casevac sortie. American CSAR helicopters were also used for casevac in Luzon coming under ground fire for the first time but evacuating some 70 wounded.⁸⁵ These helicopters were a presage of things to come.

During the Second World War aeromedical evacuation was used to great effect. American aeromedical planning evolved from the Tunisia experience, developed further in Italy and was refined for the invasion of Europe. During the latter 350,000 sick and wounded were flown from mobile fronts to general hospitals in England and France⁸⁶. Eisenhower told a press conference on 18 June 1945 that 'We evacuated almost everyone from our forward hospitals by air, and it has unquestionably saved hundreds of lives – thousands of lives'.⁸⁷ Aeromedical evacuation was now a long way from being viewed as inherently dangerous. Before 1942 the British had struggled

with the provision of an aeromedical capability but with the entry of American into the War the Allies came to rely heavily on American resources for this, especially for air casevac. Lacking sufficient air transport resources to fulfil all demands let alone, despite much Army pressure, to provide dedicated air ambulances, Air Ministry policy remained that of 'back-loading' casualties. They firmly refused to restrict the role of any transport aircraft to aeromedical. Nevertheless, the RAF moved thousands of casualties (some 300,000 in 1944 alone⁸⁸) in theatres throughout the world, especially North West Europe and South East Asia. Although conflicting demands on resources throughout the War prevented either the US and UK from providing dedicated air ambulances, evacuation by air was the outstanding medical evacuation development of the war and air casevac, largely a terrain induced requirement, began to emerge as a distinct entity.

Post war

Post-war, the British Army continued to demand allocated aircraft, primarily light aircraft for casevac, but RAF resources remained very limited. The 1947 'Statement of Army Policy for Land / Air Warfare' incorporated a requirement for a specific allotment of aircraft for aeromedical duties.⁸⁹ This document did acknowledge that allocation was dependant on resources but gave air ambulances a high priority. DGAMS wanted dedicated specialized air ambulances with Red Cross markings rather than converted transport aircraft and was unhappy when this was rejected as being uneconomical.⁹⁰ The Air Ministry and RAF continued to resist Army pressure for dedicated casevac aircraft

throughout the post war years. In 1963 DGMS(RAF) wrote that he had 'some experience of this type of thing, the last being at an exercise some years ago at which an Army Colonel got up and explained how much better he could do casualty air evacuation if he had his own aircraft which he could order back and forth as he chose. As the particular circumstances of the exercise we were discussing were that we were outnumbered three to one in the air I had little difficulty in pointing out the error of his assumptions, though I doubt he was convinced. No doubt the same balderdash is still present, I do not know, I have not been invited since'.⁹¹ Feelings ran high. Converted RAF transport aircraft remain the RAF's chosen option for medevac today. A variety of aircraft have been used in this role, most recently RAF Tristars and C17s. The RAF medevac provision is appropriately roled transport aircraft staffed with RAF medical teams drawn from the RAF's Tactical Medical Wing.

Early medevac flights brought the sick and wounded back to the UK through a string of staging posts across the world.⁹² A significant UK development was the 1956 arrival in service of the Comet, the RAF's first jet transport aircraft flown by 216 Squadron who had also provided the first RAF aeromedical service in the 1920s. The Comets provided a much faster service, reducing the need for staging.⁹³ In America the USAF introduced a specifically designed medevac aircraft, the C-9 'Nightingale', in 1971. Its usage was not confined to the military and they found that reliance on the C-9s caused delays because they flew fixed schedules and operated separately from the rest of the air mobility assets. This segregation reduced the availability of C-9s.⁹⁴ The last C-9 was withdrawn in



A significant UK development was the 1956 arrival in service of the Comet, the RAF's first jet transport aircraft flown by 216 Squadron

2005 and has not been replaced,⁹⁵ instead designated transport aircraft are used for strategic medevac; an option facilitated by new medevac technology, primarily patient support pallets.⁹⁶ Casevac is seen as a role for helicopters.

Advent of the casevac helicopter

An important post war development has been the emergence of the helicopter. The British Army identified casevac as a possible role for the nascent helicopter in their 1945 study on roles for helicopters.⁹⁷ A further paper on the Load Carrying Helicopter justified the Army's need for such aircraft: 'The load carrying helicopter, which must be regarded as a flying three-tonner and not as conventional aircraft, cannot wholly replace MT but by its speed, mobility and capacity for heavy loads, and by its small requirements in men it can reduce the MT required in the field thereby easing congestion on the roads and administrative overheads.'⁹⁸ This paper also identified a casevac role. The DGMS raised the use of helicopters with the

Air Ministry in November 1948; the Air Ministry agreed the need for a helicopter for medical/rescue work but said that this could not be afforded at the present time.⁹⁹ The Air Ministry, responsible for the provision of aircraft for Army use, was only prepared to fund a small helicopter being developed for Air Observation Post (AOP) squadrons.¹⁰⁰ It was another Far East operation, the counter insurgency campaign in Malaya, which was to provide the incentive for the introduction of helicopters to the role and to signal the way ahead for casevac.

Malaya

In 1948 it had been suggested to DGAMS during a tour of the Far East that a helicopter would be invaluable for casevac in Malaya.¹⁰¹ On his return the Army Medical Directorate (AMD) approached the Americans on the matter,¹⁰² but the catalyst for helicopter casevac was a signal dated 8 March 1949 from the C-in-C Far East Land Forces (FARELF) to the Commanders-in-Chief Committee in London requesting helicopters for casevac.¹⁰³ Helicopters were in their infancy and a scarce commodity. After much difficulty and some Ministerial pressure¹⁰⁴ helicopters for casevac in Malaya were resourced. The helicopters sent, Sikorsky S51s (designated Dragonfly by the RAF), were very much a second choice having originally been turned down as unsuitable by C-in-C FARELF.¹⁰⁵

From the beginning power-to-lift ratios have limited helicopters and the Dragonfly was severely underpowered. At sea level it could reach 150 feet from a jump take off (providing there was no wind) with an all up weight of 5,200lb but this decreased to 40-50 feet with the addition of only another 200lb.¹⁰⁶ The RAF Casualty Evacuation Flight (CEF)



Wounded being loaded onto a Dragonfly

formed at Kuala Lumpur on 1 May 1950 with two Dragonflies and proceeded to demonstrate the Dragonfly's casevac capabilities to senior officers.¹⁰⁷ It is clear that the RAF viewed CEF as an experimental unit conducting trials on the use of helicopters for casevac role¹⁰⁸. The first casevac sortie was made on 14 June 1950 and, by year's end, twenty nine casevacs had been completed. The original concept of carrying casualties externally in panniers was amended by local production of a coffin shaped woven basket which fitted inside the helicopter.¹⁰⁹ Gradually the CEF developed the art of landing in primary jungle clearings but was heavily reliant on the ground force who requested a casevac correctly preparing a landing site in the thick teak jungle. Requests for helicopter casevac were received by Advanced Air HQ (AAHQ) who decided on the feasibility. The decision was based on the clearing to be used, the weight to be lifted, the helicopter's performance and refuelling facilities available on route. All jungle evacuation sorties were hazardous; if the proposed landing site was unknown an AOP Auster checked it first. Sometimes a

touchdown was impossible and the casualty had to be bundled aboard. The Dragonflies had no navigation aids were accompanied by Austers on cross country flights, which then stood by at the location during casevac pickups. The helicopter pilots were given the option of dispensing with this escort but only if the filed flight plan was strictly adhered to.¹¹⁰

From the start ground forces had misplaced expectations, seeing the helicopter as the answer to all their casevac difficulties. Popular conception had helicopters landing on any terrain, operating at night, flying in all weathers, locating patrols anywhere, carrying kit as well as passengers, and needing no space for take off. Dragonflies had low lift limitations, low endurance, lacked instrumentation thereby limiting flying to visual conditions and needed landing sites of a minimum size identified by correct coordinates!¹¹¹ Ground forces required educating about the helicopter. However, despite their limitations, CEF helicopters provided a vital service. Lives were saved by their ability to make pickups from thick jungle clearings and the casualties were thus saved several days of painful journey.¹¹² Despite dangerous conditions and the embryonic nature of helicopter operations CEF only suffered two accidents, sadly one of them was fatal.¹¹³ Although casevac was their primary task, following Air Ministry policy CEF aircraft did not display the Red Cross.

Senior Army officers were quick to grasp the potential of the helicopter in Malaya, a country which geographically and climatically hampered movement making the counter insurgency campaign much harder. Conflicting views were held on the role of the CEF;

the medical view was that CEF existed solely for casevac duties as that was why they had been requested;¹¹⁴ Assistant Chief of Air Staff Plans (ACOS(P)) thought that whilst Air CinC Far East Air Force (FEAF) would be asked to 'limit flying to casualty operations and minimum essential training and test flying we must expect a certain amount of other flying for experimental and communication purpose'.¹¹⁵ In December 1950 the Senior Air Staff Officer (SASO) HQ FEAF reported to ACOS(Operations) that 'although they [Dragonflies] were sent out mainly for operational trials they have met 90% of the calls made for casualty evacuation and the Army has grown to rely on them'.¹¹⁶ The CEF was tasked by HQ FEAF through and was an allocated unit not a dedicated one. It was soon used for other roles including communications, riot control, aerial survey work, transporting captured terrorists, SAR and even crop spraying.¹¹⁷ The CEF developed a particularly close working relationship with the Special Forces: in addition to casevac sorties, supply and reconnaissance flights were made for them.¹¹⁸ The success of the CEF, aroused the interest of other nations. In October 1950 CEF was visited by the PMO of the French Air Force in Indo-China (Vietnam);¹¹⁹ the French went on to order nine Dragonflies for casevac duties in their campaign there.¹²⁰ By the end of 1953 they were operating eighteen casevac helicopters.¹²¹ The USAAF also visited the CEF whose helicopter operations they considered to be the most difficult in the world.¹²² As a result of this visit the USAAF requested a report from CEF on their casevac operations for study by the American authorities. In 1953 the RAF, realising the CEF was too small to meet the variety of operational tasks placed on it, reformed 194 Squadron, equipped



The first systematic use of helicopters for casevac from the battlefield occurred in the Korean War

with helicopters, which subsumed CEF.¹²³ Casevac remained a task but was no longer the primary one. After this short experiment with allotted casevac helicopters, as in the Second World War and despite pressure for dedicated aircraft,¹²⁴ the Air Ministry choose to reaffirm its policy of economical approach to the use of aircraft.

KOREA

The CEF was the first unit allocated to operational helicopter casevac. The Americans had used CSAR helicopters for casevac in 1945 and now began to develop a dedicated casevac capability. The first systematic use of helicopters for casevac from the battlefield occurred in the Korean War. The clatter of rotors in the opening sequence of the TV programme 'MASH' has become synonymous with helicopter casevac but this method of medical evacuation evolved out of circumstance, not planning. The 3rd Air Rescue Squadron of the recently formed United States Air Force (USAF) started to receive occasional requests to provided casevac for the Army from difficult forward

locations.¹²⁵ Terrain and insecure lines of communication influenced the choice of air evacuation and now helicopters were more readily available. Korea, unlike Malaya, had no thick jungles and the helicopter ambulances rarely flew over hostile territory.¹²⁶ This made their use somewhat easier.

The birth of the USAF in 1948 stripped the US Army of all except light aircraft and helicopters designed to provide support to ground combat troops in forward areas. This support role included casevac from the front.¹²⁷ The USAF was tasked to provide medevac to rear facilities but, at the outset of the war, the Army had no helicopter air ambulance units. By early 1951 the Army were able to provide helicopter air ambulances (Bell H-13 Sioux).¹²⁸ These were deployed in three detachments of four Sioux. Four detachments deployed but the first to arrive was seized by senior commanders for non-medical tasks.¹²⁹ By the end of the war there were six detachments, each placed with a Mobile Army Surgical Hospital (MASH).¹³⁰ These were positioned close to the frontlines therefore the helicopters did not have to fly far or for long periods with casualties. The air ambulances were under the operational control of the Eighth US Army Korea (EUSAK) Surgeon. Casevac requests were passed from Casualty Clearing Stations (CCS) to the Divisional Surgeon, on to the Corps Surgeon and finally to the EUSAK Surgeon, approvals passed back through the same chain.¹³¹ All communication between each stage in the chain was either by unreliable radio or telephone which could cause delays of several hours, a sometimes fatal occurrence for the casualty. Eventually the EUSAK Surgeon delegated approval authority to Corps Surgeons who had

direct communications with the MASH helicopter bases, but he stipulated that helicopters be used only for very serious casualties unable to withstand ground evacuation.¹³²

As in Malaya ground forces needed to be prevented from being over optimistic and recognise the limitations of helicopters. The vulnerability of helicopters to ground fire through lack of speed and low flight altitudes was not appreciated.¹³³ Unable to glide and liable to control problems, almost any battle damage incurred by helicopters proved fatal.¹³⁴ Although carrying Red Cross markings there were instances when medevac helicopters carried ammunition up to the front.¹³⁵ The authorities imposed restrictions on casevac pick-ups under fire but the pilots often ignored these; during the first six months of 1951 alone 1,985 patients were casevaced.¹³⁶ The Sioux carried casualties on stretchers in pods fitted externally. This was not ideal; it was reported that 'some men have to be strapped down before they will stay there. One pilot reported that on three occasions patients had attempted to break out of the litter in flight'.¹³⁷

On 28 October 1952 the US Department of the Army announced that helicopter ambulance units for the casevac of critically wounded soldiers from forward areas had been authorized as an integral part of the Army Medical Services in theatre. The aircraft would be flown by Medical Service Corps (MSC) lieutenants and the units would have MSC commanders.¹³⁸ Previously the pilots had been line officers from the Artillery, Infantry, Engineers or Signals.¹³⁹ On 29 August 1953 the first five MSC pilots joined the 1st Helicopter Ambulance Company in Korea and

forward helicopter evacuation was established as the role of the Army Medical Service.¹⁴⁰ This did not preclude use of non-medical helicopters when required, especially those of the Army Transportation Corps (US ATC) who used the first transport helicopter (H-19 Chickasaw) for casevac.¹⁴¹ In the last months of the war Chickasaws evacuated over 3,000 casualties. However, helicopter casevac only counted for a small percentage of the total number of casualties evacuated. The EUSAK Surgeon reported that over 50% of those casevaced by helicopter would have died if ground transport had been used¹⁴² but helicopters supplemented not replaced normal ground evacuation methods.¹⁴³

Casevac helicopters were vulnerable to ground fire and the occasional attack by enemy aircraft but the latter could usually be minimised by fighter escort.¹⁴⁴ Other dangers faced were power lines, freezing winters, summer dust and pilot fatigue caused by the physical nature of early helicopter flying.¹⁴⁵ The greatest problem was the need for constant repairs; the American aviation industry was no more geared-up for helicopter production in 1950 than it had been for meeting the demand for aircraft generated by the 2nd World War. When production finally increased there were problems with delivery and the supply of spares, fuel and new aircraft. Air ambulances competed with about 635 operationally tasked helicopters for what was available¹⁴⁶. One detachment lost a third of potential flying days in three months because of spares shortages.¹⁴⁷ Despite their problems the Americans made air ambulances available to the UN multinational force¹⁴⁸ and the British relied on the Americans for the casevac capability. An appeal for UK casevac

helicopters for the Commonwealth Division had been rejected.¹⁴⁹ Between January 1951 and 27 July 1953 US air ambulances evacuated some 17,690 patients and saved countless lives. 'Few technical innovations were equal in importance to the growing use of the helicopter for medical evacuations. Costly, experimental and cranky, the helicopter could be justified only on the grounds that those it carried, almost to a man, would have died without it'.¹⁵⁰ By the end of the Korean War helicopter medical evacuation was well established. The US Army decided that helicopter air ambulances should have a permanent organization, accepting the Surgeon General's recommendation that 'all aircraft designed, developed, or accepted for the Army (regardless of intended primary use) be chosen with a view toward potential use as air ambulances'.¹⁵¹

VIETNAM

The Korean War established the operational roles of the military helicopter, and underlined their potential as air ambulances. In Vietnam the helicopter came into its own, especially the UH-1A Iroquois better known as the Huey. Although still suffering limitations Hueys had twice the speed and endurance of the Sioux, being capable of 120mph, and with an endurance of three hours although the combat troops were never more than 35 miles from a hospital.¹⁵² Hueys carried casualties internally allowing medical treatment in flight, they could fly at night and in most weathers. New models which came into service had improved lift and instrumentation which extended the load carrying and bad weather/night flying capabilities¹⁵³. Dedicated air ambulance units arrived in early 1962, initially in support of

US Military Advisors and the South Vietnamese Army.¹⁵⁴ Flown by MSC pilots with first aid training, Huey air ambulances came to be known as 'Dust-Off', the call sign of the first air ambulance unit in Vietnam which derived from the amount of dust kicked up by their rotors.¹⁵⁵ This name remains in use today.

From May 1962 to March 1973 air ambulances carried over 850,000 patients, both allied military personnel and Vietnamese civilians.¹⁵⁶ Hueys could carry six stretcher patients or nine sitting plus four crew members. The crew comprised two pilots, a crew chief and a medical corpsman; today's Dust-Off Blackhawks have the same crew composition. Hueys were fitted with a special internal rescue winch (hoist) enabling casualties to be lifted through the jungle canopy at the hover.¹⁵⁷ During major offensives or when heavy casualties were taken Dust-Off Hueys were supplemented by transport helicopters back-loading. These normally transported non-emergency cases as they carried no medical corpsmen to provide medical aid in flight.

Although the Hueys carried Red Cross markings they frequently came under fire. Whilst the Geneva Conventions do not permit transport displaying the Red Cross to carry non-medical supplies or personnel or have assault weapons systems, at times Hueys with Red Cross markings carried ammunition, non-medical supplies or non medical personnel. Crews carried side arms for personal protection but other weaponry, M16 rifles and sometimes M79 grenade launchers, was carried to provide suppressive fire. The Air Ambulance Platoons of the 1st

Cavalry and 101st Airborne Divisions also mounted M60 machine guns on their Hueys and carried a gunner as a fifth crewmember.¹⁵⁸ When available, helicopter gunships escorted the air ambulances. Some air ambulance pilots were uncomfortable with these arrangements and refused to carry more than a side arm or have a gunship escort.¹⁵⁹ The air ambulance units came under pressure from commanders to remove the Red Cross on several occasions, not because of concerns about the Geneva Conventions, but out of a desire to extend the role of the aircraft to non-medical tasks. This was successfully resisted by the Medical Services. There seems to have been no formal questions raised as to the appropriateness of displaying the Red Cross whilst carrying suppressive fire weapons, especially a machine gun and gunner.

In addition to hostile fire air ambulance pilots had to contend with jungle, mountains and poor weather. Casevac helicopter loss rates were higher than those of other helicopter sorties, 3.3 times higher in terms of losses to ground fire.¹⁶⁰ Hoist missions were the most hazardous, involving hovering, often under fire, close to the top of the jungle canopy with nowhere to land if things went wrong. When other helicopters were grounded by weather or night the casevac crews would fly in response to urgent callouts, performing some incredible pick-ups from 'hot' landing sites in appalling weather. Some 1,400 air ambulance pilots served in Vietnam; forty were lost to enemy action with another hundred and eighty injured. A further forty eight were killed and two hundred injured in accidents caused by weather, night flying etc.

Air ambulance units (except Air

Ambulance Platoons) came under the command of the Army Medical Service. The Air Ambulance Platoons, although flown by MSC pilots were under the command of their combat assault division. Most Dust-Off units worked in cellular detachments providing either area support to allied forces in a defined area, or direct dedicated support to a particular combat unit in a particular operation. Requests for casevac were normally made by medical corpsmen with ground forces directly to the supporting air ambulance unit by radio. Three levels of casualty classification were used – *urgent*, where the patient was in immediate danger of losing life or limb; *priority*, where the patient was seriously but not critically wounded and could wait a while for casevac; and *routine*. Later a fourth classification was added, *tactically urgent*, where staying with the casualty was endangering the lives of others. In practice casualties were often over-classified, a continuing problem.

Dust-Off helicopters kept combat units within half an hours flying time of an allied base. Air ambulances aimed to launch within three minutes of a callout, in urgent cases a Dust-Off already airborne for another casevac would divert to pick up the casualty. Casualties were flown directly to the facility which offered the most appropriate not necessarily the closest care. The aim was to get the casualty to definitive trauma treatment within the hour, a target known as 'Golden Hour' which significantly affects chances of survival. In many cases initial basic first aid (the same level of treatment available at battalion or divisional aid posts) was given on board by the crew medical corpsman. During flight the pilot passed information on his estimated

time of arrival, the number of casualties and type of wounds. This enabled the hospital to be at full readiness for the incoming casualties. The casevac potential of helicopters, first trialled in Malaya, was being realised.

The influence of Vietnam

The work of the helicopter ambulances in the Vietnam War has shaped casualty evacuation ever since. News footage and films about Vietnam ensured the Huey casevac helicopters worldwide recognition. Expectations of helicopter casevac, high from the beginning, were raised by the achievements of Dust-Off crews, not just amongst the military but, significantly, the media and civilians. Vietnam provides the yardstick against which many measure helicopter casevac today. Post Vietnam helicopters are firmly established as a battlefield prime mover, and ground forces in the line of fire and emotionally involved with the wounded, have come to view helicopter casevac as a right rather than an asset which needs to be husbanded and prioritised. Even with the considerable numbers of Dust-Off air ambulances and supplementary helicopters in Vietnam, the Americans had to prioritise callouts and contend with casualty over-classification; this remains a problem for US and UK forces today. The practice of providing in-flight medical intervention on the way to more advanced treatment, developed in Vietnam by the USAMS, also continues. Since Korea the US military has maintained dedicated air ambulances, currently Blackhawk helicopters which combine speed and range with high tech improvements including clinical cabin facilities, communications and a 'glass' cockpit providing night and bad weather capabilities. In 2004 the US Army planned to allocate 24% of



Vietnam provides the yardstick against which many measure helicopter casevac today

its new and refurbished Blackhawks as 'dedicated lifesavers'.¹⁶¹ They have made a considerable investment of high tech equipment in casevac and CSAR which, in addition to the aircraft themselves, includes a Medical Suite Trainer with a fully functional medical cabin and ancillaries. The US Army Medical Department maintains the principal of 'presence with the soldier'; during Operation Enduring Freedom Dustoff crews accompanied troop carrying Chinooks and Blackhawks in the first wave of air assaults. Staying a few flying minutes back from the fighting they were able to retrieve wounded swiftly. Several crews were awarded medals for pick-ups under fire. The Blackhawk provides improved in-flight medical intervention but has the same crew constitution as the Huey. Doctors are

not included as regular crew members, instead highly experienced Emergency Medical Technicians (EMT), often mobilized civilians, are carried.

Whilst the US policy remains 'scoop and run' (lift from the site of injury) British policy is to helicopter medics, including a doctor (anaesthetist or GP with trauma experience) to the casualty to ensure stabilization before flight. Helicopter casevac is an expensive option and ideals cannot always be met; the UK approach is not to dedicate but to allocate helicopters. In both the Falklands and the Balkans Royal Navy Sea Kings provided casevac coverage. In Bosnia a Sea King from 845 Naval Aviation Squadron was on permanent standby for aeromedical evacuation together with a medical team of an anaesthetist and paramedic. All requests for casevac were passed to the medical operations desk at HQ of Multinational Division (SW). The Medical Desk made the decision to scramble or not based on information from non-medical personnel at the casevac site. The UK experience in Bosnia showed helicopters were often sent when a ground ambulance would have sufficed and a study showed that 78% of patients had not benefited from air evacuation.¹⁶²

Allocation of aircraft was the basis for UK casevac planning in both Gulf Wars. During Op Granby nineteen Pumas and twelve Sea Kings were allocated to transfer casualties from ambulance collection points to dressing stations and on to damage control surgery facilities/field hospitals. The helicopters carried RAF Medical Assistants to provide any required first aid in flight but ambulance crews on the ground were expected to have stabilized the patient for flight. This is the closest that the UK has come

to mirroring the American system of using medical corpsmen in the air ambulances. RAF Medical Assistants have some limited trauma training but their non-deployed duties are largely administrative. The Op GRANBY experience led to the inclusion of a GP in the medical team carried despite the limitations on medical intervention imposed by the helicopter environment. In Op TELIC all UK helicopter assets were available for casevac missions, but the casevac plan for 1(UK) Armoured Division relied on the traditional policy of backloading from forward medical facilities to field hospitals. Three Blackhawk air ambulances were initially provided by the US; when these moved north two UK Pumas were allocated for casevac. Previously, during Op GRANBY, American Blackhawks had also provided casevac support for 7th (UK) Brigade.


The decision to backload does not appear to have been accompanied by any definitive statement of priority (as recommended in 1945) for casevac taskings. Much depended on the willingness of the commander of the Joint Helicopter Force (JHF) to give it a high priority. The JHF commander agreed that a casevac sortie should include the collection of the casualty, delivery to the appropriate medical facility, and the recovery of the medical team and equipment back to their starting base. This avoid problems encountered in 1939 when medics accompanying patients back to UK found it nearly impossible to return their duties in France. Requests for casevac were passed to the Patient Evacuation Team (PET), manned by RAF flight nurses, at HQ 1(UK) Armoured Division. Working closely with the helicopter tasking desk PET made the



Heat and altitude still seriously hamper helicopter performance and make the powerful Chinook much in demand

decision to scramble. A medical officer advised HQ 1(UK) Armoured Division medical cell on bed availability which influenced the casevac destination. The average response time of the UK allocated helicopters was twenty two minutes, almost exactly the same as the dedicated US Blackhawks.¹⁶³

Despite technical advances helicopters remain limited by the power-to-weight quandary. The last major improvement in this area was the change from piston propulsion to gas turbine engines which occurred with the Huey. As in Malaya heat and altitude still seriously hamper helicopter performance and make the powerful Chinook much in demand. In Afghanistan, where the base altitude is 5,000 feet, the US operated casevac Blackhawk HH60Ls stripped of litter carousals for extra lift.¹⁶⁴ Lift capacity remains an area in which real improvement is still awaited. Helicopters also remain highly vulnerable to attack; air attack can be minimised by gaining air superiority but the ground fire problem remains. As shown in Somalia, ground fire does not need to be sophisticated to have a



serious effect.¹⁶⁵ In Afghanistan and Iraq the small arms threat covers the whole country and the threat environment has to be factored in. Terrain, topography and climate continue to influence the demand for helicopter, rather than ground, casevac despite the low medical benefit of indiscriminate use of helicopter evacuation even for trauma patients. Thus selectivity of use remains a problem and, despite much guidance, remains subjective. The renewal of expeditionary warfare in inhospitable terrain has caused a growth in reliance on helicopter casevac to the apparent exclusion or even consideration of alternative methods. This approach fails to take into account high costs and limited resources, a failing with an historic background. Ground troops, the media and the public are beginning to view helicopters as the only method of casevac where previously aeromedical evacuation was seen as an adjunct, albeit a very welcome one, to normal ground methods. There are renewed calls in the UK for dedicated casevac helicopters and much talk about the 'Golden Hour'. Criticism based on failures to meet this target abounds¹⁶⁶ and unfavourable comparisons are made with Vietnam, but the distances covered in Afghanistan are much greater. Casualty transfer times achieved by Dust-off Hueys focussed attention on the principle which appeared to be readily achievable but in many ways this was a false dawn. Problems continue to exist in communications and other areas influencing the speed of response. During Op GRANBY a badly injured British casualty took 12 hours to reach hospital despite being the sole casualty at the time.¹⁶⁷ Casevac support had been allocated over 30 helicopters but the weather was terrible and the battlefield chaotic.

Provision of aeromedical transport and, in particular helicopter casevac, has always been costly and, within the UK military, makes demands on very limited resources. Historically both the US and the UK have chosen to use converted transport aircraft for strategic aeromedical evacuation. The US military, after a brief period with the C-9, moved back from dedicated medical airlift to designated¹⁶⁸ and the UK has moved from a back-loading policy to one of allocation. Air evacuation of casualties, especially more recently helicopter casevac, has been an emotive subject since its inception. It is an area in which strongly held conflicting views have existed within the military and one in which public opinion has been easily influenced by the media. The history of military aeromedical evacuation shows that cost and aircraft resources have had to be balanced against the desire to provide the best medical care. It is a highly expensive option in terms of assets and resources hence it has been and always will be an area of compromise.

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**Soldiers are from Mars and
airmen are from Venus:
Does air power do
what it says on the tin?**

By Air Cdre Paul Colley

In a speech to the RUSI Air Power Conference in May 2008, Lieutenant General Graham Lamb¹ made an amusing observation about the planetary origins of soldiers and airmen. It preceded a serious point; that diverse cultures, ethos and perspectives are a source of both strength and friction. No serious soldier would deny the value of mobility and lift or surveillance and reconnaissance, but the wider utility of air power in irregular warfare is less obviously clear. The current air power expression of characteristics and roles work well enough for conventional operations, but says too much about *how air power works* and has lost the clarity of *what air power actually does*. This paper outlines the philosophy behind doctrine emerging from the Development, Concepts and Doctrine Centre for air-land operations. It proposes a new definition for and expression of air power, articulates a theory of coercion and develops principles for air-land operations.

THE SHIFTING BALANCE OF CONVENTIONAL COMBAT POWER

The character of warfare is changing, due in part to the overwhelming conventional combat power developed by Western nations in general and the US in particular. Adversaries respond with irregular warfare, including insurgency, disorder, criminal activity and terrorism. They also use irregular and conventional tactics to create hybrid warfare, like that used by Hezbollah in 2006. Tactical engagements are often among populations and increasingly in the urban environment, where situational *awareness* is no longer enough to support complex operations. Commander of the Field Army believes that we need situational *understanding*. The motivations and fears of all actors

are as important in irregular warfare as awareness of enemy force dispositions and intentions.



The Israeli Air Force successfully completed its tasks in the 2006 war and with considerable tactical skill, but failed to deliver the anticipated operational or strategic success through an air campaign

The historic role of land forces has been to close with and engage the enemy and to take and hold ground. For maximum effectiveness of land forces in major combat operations, land commanders have traditionally demanded expansive areas of operation. In post-Cold War combat operations, there has been a shift in the relative roles of ground and air combat power. In conventional operations, all-weather precision air attack can now decisively shape the operational level of warfare. Land power exploits air power's operational effects and dominates at the tactical level because, despite huge improvements in intelligence, surveillance and reconnaissance, uncertainty reigns in close combat. Even with advances in sensor technology and improvements in command and control for time sensitive targeting, the majority of air systems are not optimised to find, track and engage fleeting targets amongst wider populations. In 2006, Hezbollah inflicted

an unprecedented strategic failure on Israel. The Israeli Air Force successfully completed its tasks in the 2006 war and with considerable tactical skill, but failed to deliver the anticipated operational or strategic success through an air campaign. When combined with political indecision, it led to strategic failure.

As the levels of warfare blur, so too have the air power roles. Many targets formerly associated only with the tactical level of warfare now have direct links to the strategic level. For example, precision air attack in Iraq and Afghanistan in 2008 is confined to well-controlled tactical battle space and against very limited target sets. Yet its significant tactical effects strongly resonate – for better or worse – within local populations, which are invariably strategic centres of gravity that are highly sensitive to the asymmetric application of force. Air power promises direct attack of strategic targets and low risk of friendly casualties, but stand-off through technology can be perceived as a blunt instrument for a hearts and minds campaign. Although there is a place for discrete air attack of strategic targets, air capabilities will be over-sold and underemployed if the difference in air power utility for conventional combat operations and irregular warfare is misunderstood.

Land power will normally determine the enduring outcome of conflict, even where air or sea power is the decisive instrument. Armies' traditional strengths have been the ability, by threat, force or occupation, to gain, sustain and exploit control over land, resources and people. Fixed wing air power is more flexible than long-range precision artillery or attack helicopters, because airmen can switch between targets at

relatively short notice across an entire theatre of operations. However, with relatively small numbers of aircraft now serving multiple theatres of operation, some land commanders have concerns about the assured delivery of air effects. Much contemporary land warfare is relatively static, especially in urban areas. With organic accurate direct and indirect fire support, some soldiers question the relevance of using heavy air weapons in towns and cities. Even where ground commanders need air power, it can be resource-intensive to coordinate. Yet organic indirect fire support is relatively inflexible where the theatre of operations is expansive and the density of friendly forces low. Attack helicopters are also vulnerable to small arms. However, there is capability still to be unlocked at the seam between air and land power, not through technical and tactical interoperability, where we are investing well in equipment and training, but by better understanding how air power might achieve or support decisive conditions, particularly in irregular and hybrid warfare. The real advantage of surface capability enhanced by air power (and vice versa) is more profound than a simplistic supported or supporting relationship.

A LITTLE BIT OF HOW AIR POWER WORKS

It is worth reflecting briefly on some aspects of how air power works, starting with air strategy. A combined air operations centre is optimised for high volume tasking and large scale mechanical integration of plans. In conventional operations, a strategic air planning process drives it, but current warfare is dominated by constant requests for tactical air support from multiple theatres of operation.

This makes strategy difficult, because

adversaries are adapting their tactics so quickly in theatre that only a local headquarters has the ability to sense and respond in context. There may be unifying themes across multiple theatres of operation, for example international terrorism. However, there can be no meaningful unified air strategy to address operations as disparate as those in Iraq, Afghanistan and the Horn of Africa. Air strategies are in reality being driven from within the specific theatres of operations.

History has consistently demonstrated the value of collocated headquarters. The Montgomery-Tedder combination in the North African campaign is widely referenced as a strong catalyst for enduring doctrine. Collocation resolves tension, exploits the strengths of different perspectives and better overcomes the naturally dissimilar tempos of air and land planning cycles. Commanders should position land and air component headquarters together or within easy reach *wherever possible*. The doctrine needs judgement in its application. Where headquarters cannot be collocated, the planning effort must be, using mobile planning teams for *deliberate planning*. Embedding expert and well-trained detachments of land and air staffs in counterpart headquarters is vital when headquarters are geographically separated. The air staffs in land headquarters enable *rapid planning*. The commanders who donate liaison officers to other headquarters must make clear to what extent their charges are empowered to commit resources and take decisions. The structures and processes to achieve this are within current air doctrine.

The UK philosophy of command promotes decentralisation for speed

of action and initiative. Commanders ensure that subordinates understand intent and then exercise a minimum of control over them, commensurate with experience and ability. Upholding the philosophy is difficult for an air commander in widely dispersed coalition operations, yet the imperative for decentralisation was rarely greater than now. The cardinal air control principle of *centralised control and decentralised execution* is valid. However, in irregular warfare or even conventional operations unfolding at pace, commanders who fail to emphasise the primacy of *decentralised execution* – and to adapt structure and process accordingly – risk inviting adversaries to operate inside coalition decision cycles. Decentralisation is the only way to achieve responsiveness compatible with the character of dispersed operations and irregular warfare. Some scarce high value air assets, such as intelligence platforms and air refuelling aircraft must be centrally controlled, because demand will always outstrip supply. But if airmen do not sensibly interpret the air command and control mantra, ground forces will lack the assurance that they seek and naturally argue for organic air support. The paper now articulates the essentials of air power in a contemporary context, so that airmen can more safely ‘under-promise and over-deliver’ and so that soldiers can better appreciate how to integrate air operations into planning at all levels.

THE UTILITY OF AIR POWER

All military strategies except total destruction seek to influence the behaviour of people. Influence is invariably an ultimate goal at the strategic level of warfare, but it also has utility at the tactical level

of all contemporary warfare. An understanding of coercion is therefore vital, because without mastery of coercion, there is no mastery of warfare; coercion is central to the threat or use of all military force and crucial for developing contemporary air power strategies. To coerce is to *'persuade an unwilling person to do something by using force or threats'*² and it is closely linked to deterrence. Air power's current definition may be outdated. The new one proposed below embraces the primacy of influence in air strategy and the paper subsequently describes a theory of coercion.

Air power is the ability to project power from the air in order to influence the behaviour of people or the course of events.

Airmen are well versed in air power characteristics and the Future Air and Space Operational Concept describes Core Air and Space Power Roles. These remain useful, but tend to say as much about *how air power works as what it can do*. This paper will express what air power can do, cast as four fundamental roles within the Joint Action doctrinal framework. The framework helps visualise the proper relationship between manoeuvre, fires and influence, which is central to coercive strategy. Joint Action is *the deliberate use and orchestration of the full range of available military capabilities and activities to realise effects*.³

Air power achieves influence in many ways, from promoting international relations to managing crises. When engaged in combat, shattering an opponent's cohesion and breaking his will have their roots in doctrine for conventional combat operations, where they remain valid. However,

the emphasis in irregular warfare is more often on discrete application of force to support a broader influence campaign. The evolution of planning at the strategic and operational levels of warfare (and recent experience at the tactical level) supports a shift away from pure destruction of an enemy's fighting power. Where information operations once supported combat operations, influence can dominate the contemporary approach and it requires a more subtle and nuanced application of fires, influence and manoeuvre. Air power delivers most fires through precision attack. However, it also has non-lethal capabilities. When properly integrated and synchronised into an overall scheme of manoeuvre, fires achieve influence and the bridge between the two is most often achieved by understanding the theory and practise of coercion.

Fast jets are well suited to rapid manoeuvre and surprise. Helicopters and larger fixed wing aircraft also move at pace and significantly enhance ground manoeuvre. However, air power's greatest contribution to freedom of air and ground manoeuvre is through control of the air. Two air power capabilities are crucial for Joint operations, but not proposed as air power roles, because they are enablers and not outputs. Those capabilities are position, navigation and timing, and air command and control. Both enable battle space management. The US Global Positioning System invariably provides position, navigation and timing and, although vital for many battle space functions, including the synchronisation of communication networks, it is transparent to most users. Air command and control has a major bearing on the effectiveness of air power

and is complex, particularly in coalition operations. It is therefore described later in the paper. However, what air power actually does can be boiled down to four fundamental roles: Control of the Air; Rapid Mobility and Lift; Intelligence and Situational Awareness; and Coercion.

ROLE 1: CONTROL OF THE AIR

If we lose the war in the air, we lose the war, and we lose it very quickly.⁴

Without control of the air, operational success is fatally compromised. Control of the Air enables freedom of air and surface manoeuvre and therefore the ability of commanders to retain the initiative. Control of the skies above Northern and Southern Iraq for a period of 11 years denied Iraq much freedom of surface manoeuvre by containing air threats and an integrated air defence system. It also paved the way for lower risk major combat operations in 2003. As a result, coalition soldiers did not look up at the sky in dread in the way that those who they fought did. Even where air threats are largely absent as a result of successful air control operations, control still allows the successful integration of military and civil air into Joint, multinational and inter-agency plans. The active control of military airspace above Fallujah in 2004, to enable high tempo air support to ground urban combat operations, and of the airspace above Baghdad and Basra in 2008, to integrate military and civil air operations, was underpinned by air control capabilities. It is rarely possible to achieve complete control of the air; although fixed wing aircraft may often enjoy considerable freedom from most threats after successful counter-air operations, adversaries invariably contest the lower airspace with man-portable missiles and small arms.

Rotary and large fixed wing aircraft are particularly vulnerable to such threats. Air control operations are highly specialised and tactical doctrine best describes how it is done. Operational level Joint doctrine simply makes the point that air control is an absolute pre-requisite for Joint operations.

ROLE 2: RAPID MOBILITY AND LIFT

Air mobility and lift enable the global, regional and local deployment of people and materiel. With acknowledged limitations in payload compared with surface lift, it is nevertheless a fast way to deploy and sustain forces. Like air control, mobility and lift is a fundamental enabler of surface manoeuvre. It has particular utility for light and special forces and is vital for casualty evacuation from austere locations. Where risks to life in combat are high, intra- and inter-theatre air mobility strongly underpins the moral component of fighting power; it is often the only way to get wounded soldiers to specialist medical support quickly. In 2007, there were over 40,000 tactical airlift sorties flown in Iraq. In Afghanistan, there were over 10,000 tactical airlift sorties and more than 500 air drops. Air lift can be used for discrete disaster relief operations, but has also successfully been used to achieve other positive influence within local populations, for example by supporting development projects and evacuating local casualties to medical facilities.

Large fixed wing aircraft like the C-17A Globemaster and C-130J Hercules are capable of both inter- and intra-theatre lift. A C17A can deploy from the UK to areas of operation in days or even hours. A C130J can reach from its forward

operating bases to typical areas of operation in hours or even minutes. Whilst operations in and out of main



Helicopters such as the Chinook HC2 and Merlin HC3 are the tactical mobility workhorses. Typically operating at lower heights and speeds than fixed wing aircraft, they nevertheless enable rapid tactical movement of people and materiel

operating bases allow maximum effectiveness for handling large numbers of people and high volumes of materiel, even the largest fixed wing transport aircraft can operate independently of main operating bases where the need is urgent and the ground threat manageable. All air transport aircraft are vulnerable to ground fire, including small arms, particularly when at lower speeds and operating close to or on the ground. Where threats to surface movement are high, for example through improvised explosive devices, tactical fixed wing aircraft can re-supply ground forces at lower risk than ground convoys by using precision air drop.

Precision air drop

In 2007, RAF C-130Js in Afghanistan conducted low altitude night missions to re-supply forward operating bases using an air dropped container delivery system. Between May and December 2007, crews delivered nearly 1000 containers containing 800 tons

of food, water, ammunition, fuel, generators and even power plants for CVRT fighting vehicles. The C-130J will soon be capable of precision air drop from even greater height, further improving its survivability and utility by allowing precision daylight delivery of materiel over hostile areas.

Helicopters like the Chinook HC2 and Merlin HC3 are the tactical mobility workhorses. Typically operating at lower heights and speeds than fixed wing aircraft, they nevertheless enable rapid tactical movement of people and materiel. They are fundamental enablers of ground manoeuvre and surprise, allowing troops to circumvent difficult terrain and to bypass ground threats to troop movement and re-supply. Helicopters are invariably in great demand and often in short supply.

Rotary wing aircraft – tactical workhorses

In June 2007, the crew of a Merlin HC3 extracted a seriously wounded soldier from Basra at night under sustained small arms fire. It was assessed that, without the rapid insertion of the Immediate Response Team, the soldier would have died within 15 minutes.

In one month early in 2008, Joint Helicopter Force (Afghanistan) helicopters flew 293,000kg of cargo and over 6000 troops within its Area of Operations. Helicopters supported Immediate Response Teams and High Readiness Forces 24hrs a day and were on standby for casualty evacuation and the Quick Reaction Force to support Troops in Contact.

ROLE 3: INTELLIGENCE AND SITUATIONAL AWARENESS

Contemporary operations place an ever-increasing emphasis on the weight of effort dedicated to the find

function. Even with a good capability to direct, collect, process and disseminate information, there are limitations to what air and space systems can *find*. However, air power contributes enormously and, with current systems, including long endurance unmanned air vehicles, provides an almost *unblinking eye*, albeit sometimes with high resolution and narrow fields of view. Video and other forms of air-derived information have proved to be crucial enablers for irregular warfare. However, staff at all levels must integrate air and surface inputs to promote situational *understanding*. Because much information is time sensitive, a cardinal principle is to integrate information at the lowest practical level of command. The finest granularity and texture of information often comes from the ground; this is what tends to unlock the pathways from awareness of something happening to understanding what it means.

The airman's vantage allows sensors to provide an almost unhindered view across the electromagnetic spectrum. Air and space sensors can detect and identify innumerable objects, including individual people. They can map terrain, infrastructure and even patterns of behaviour, routinely penetrating poor weather and overcoming concealment techniques. Sensors also intercept other signals, which help build the intelligence picture. However, it is difficult to plumb the depths of strategic nuance and tactical complexity from the air. Finding some things is quite simply a job for boots on the ground rather than eyes in the sky, because the best sensor is often the person familiar with the physical and social terrain. Otherwise, imagery and signals create an illusion that you understand

what is going on. Air intelligence, surveillance and reconnaissance provide situational awareness, whether for operational level commanders taking a theatre-wide perspective or individual soldiers exploiting live intelligence feeds. Because land warfare remains fundamentally uncertain due to the human, psychological, political and cultural dimensions of conflict, air technology will not lift the fog of warfare. Nevertheless, several thousands of intelligence, surveillance and reconnaissance sorties flown in Iraq and Afghanistan indicate the priority that commanders are now placing on the *find* function of contemporary warfare; and on the part that air power plays. The essence of good surveillance is to provide both broad context and detailed information. Airmen can provide a measure of both, but land and air sources must be closely integrated to build understanding from awareness.

The limitations of surveillance – Operation ANACONDA

In 2002, commanders in Afghanistan planned an attack against a concentration of Taliban in the Shah-i-Kot valley. Intelligence preparation was extensive and focused considerable surveillance effort (most of it from air and space) on a relatively small target area. Yet US infantry made the initial assault by air almost directly on top of undetected enemy positions. Soldiers came under immediate fire from small arms, mortars, rocket-propelled grenades and machine guns as their helicopters landed. Attack helicopters providing direct fire support were hit and rendered inoperable. Units were pinned down by enemy fire and many of the wounded could not be extracted until the following night. As the fight developed, it became clear that a large number of the enemy positions and hundreds of al-Qaeda fighters had gone undetected.

ROLE 4: COERCION

Air power's reach is measured in hundreds or even thousands of miles and responsive precision attack at range is one of air power's greatest strengths. It provides an ability to coerce an adversary by holding him at continuous risk. The capability to attack at will supports the credibility of diplomatic warning and military signalling, including operational and tactical non-kinetic shows of force. If force is used, it too can be graduated and the ability to escalate is an important part of coercive strategies. Commanders can use precision attack to deter opponents and if necessary destroy capabilities, punish adversaries or deny courses of action. However, the ultimate goal at the strategic level of warfare is invariably to influence somebody, therefore precision attack is a means to an end.

Coercion underpinned by precision attack can be used at the strategic, operational or tactical levels of warfare, but it no longer helps to define air roles associated only with one level of warfare. Air platforms are extremely flexible and the levels of warfare are so blurred in contemporary operations that artificial boundaries undermine the essential clarity of air power's coercive capability; the notion that particular aircraft have only strategic or tactical roles inhibits creative thinking. For example, large fixed wing bombers designed for strategic attack are equally capable of tactical close air support if integrated with surface forces. Conversely, short range tactical aircraft are capable of achieving strategic effect; it is the context in which they are used and how that matters. It is therefore better to accept that coercion is almost unlimited in its flexibility, because aircraft can attack an enormous range of

mobile and static targets across multiple theatres of operation.

Precision air attack is so effective against conventional forces that it can be used in preference to land force-on-force engagements. In 2003, of nearly 20,000 targets hit during combat operations in Iraq, over 15,000 in the close battle were by air power. The percentage of air sorties flown in support of land increased from 55% in the first Gulf War to 78% in the second. Direct attack of land forces by air reduces friendly casualties. Because attack helicopters in general and land-based tactical missile systems in particular have not proven as effective as fixed-wing aircraft in conducting deep operations, air component commanders should be *supported* where there are opportunities to attack lucrative conventional target sets. In these circumstances, Joint commanders can use land forces to manoeuvre against and fix enemy ground forces (and provide targeting support) so that air power can attack before land forces close to contact. This idea tends to draw a familiar response from advocates of traditional land warfare, but if we do not grip this idea, we will miss future opportunities to shatter an opponent's cohesion in conventional warfare. It needs a change of mind set and a more serious progression of the old debate about which commanders control fire support coordination lines and where they are placed. It may also need some decent investment in friendly force tracking capabilities.

Planners should exploit air power's speed and reach to create an emphasis on deep attack and interdiction wherever possible, attacking and disrupting enemy forces before they

can engage in close combat. These are typically *denial* strategies, seeking to physically reduce the enemy's ability to continue successfully or making his ultimate objectives unachievable. However, adversaries sometimes deliberately seek to engage in direct combat in order to create casualties and undermine political or public will. In the event that a land battle unfolds, land forces can of course exploit air power in the close battle by using traditional counter-land procedures, such as air interdiction and close air support.

In irregular warfare, particularly when an adversary chooses to fight in the urban environment, collateral damage and unintended effects are more likely. The more precise our weapons become, the higher the expectation of no collateral damage. Air power can execute so-called 'surgical strikes', but even a surgeon's knife lets blood and creates scars. Proportionate air attacks are too often perceived as delivering brute force. Absent the means to defend against or respond to air attack, adversaries will use information strategies to project an image that asymmetry is a cruel overmatch. Although our adversaries create unhelpful media profiles when air weapons cause casualties, airmen are creating a small proportion of civilian casualties in contemporary warfare. This is arguably due to two factors: firstly, the standards of precision now possible; and secondly, the depth of education and training required to operate a combat aircraft. Like soldiers, aircrews are subject to considerable pressure in combat, but airmen often have a *useful detachment* from the intensity of ground combat and can more easily exercise discretion of weapon release. This is not to

suggest that soldiers exercise less discretion, but the pressures and perspectives are very different; height and speed buy fast jet crews thinking time and they can be relied upon in contemporary operations for deliberate *no drop* decisions as much as their ability to hit the right targets. Therefore, air weapons have undoubted utility for irregular warfare, but planners and operators should not underestimate the potential for unintended psychological effects on the population, whose trust we seek to maintain when targets are in and among the local population. Technology may deliver ever-greater precision and control of direct effects, but the expectation of no collateral damage will increase in direct proportion to any new standards set. Nevertheless, coercion through precision air attack will continue to be one of the greatest asymmetric capabilities for surface commanders to exploit.

Urban and human terrain are vital ground in irregular warfare and the majority view is that there are fundamental differences between flying urban missions and those flown in other environments. The use of air power in urban operations is a big challenge, even where there are limited enemy air defences and no enemy aircraft. High density of friendly aircraft over an area of interest, such as operations over Fallujah in November 2004, requires intensive planning and coordination.

It can be hard for an inbound attack pilot to build situational awareness and there can be a drastic difference in perspective between those on the ground and those in the air.

The speed, operating height and turning circles of fast jets make it harder for aircrews to provide



‘Some of the 1 PWRR’s soldiers undoubtedly owe their lives to the ability of Spectre crews to understand the ground battle and weigh in with super-accurate fire at midnight in a burning town’

actionable information to ground units in urban operations; even with the most capable targeting pods, crews can struggle to assist in the pursuit of some mobile targets. One pilot in Iraq described tracking non-distinct vehicles in urban areas as the hardest thing he had ever done. However, a soldier sometimes needs to know only what is on the other side of a wall or round the next block and aerial surveillance can be invaluable. Helicopters have excellent observation and tracking capabilities, but are vulnerable to small arms, particularly in daylight, as operations over Mogadishu, Iraq and Afghanistan have all demonstrated. However, attack helicopters have sensors and weapons that allow increased standoff and can increase survivability by operating from higher altitudes. The US AC-130 gunship can provide excellent close air support

capabilities and often operates at night to increase its survivability.

The Spectre AC-130 Gunship

In the history of the 1st Battalion, Princess of Wales’s Royal Regiment (PWRR) in Maysan province in Iraq, Richard Holmes noted that: ‘[The AC-130] effect on morale was palpable...some of the 1 PWRR’s soldiers undoubtedly owe their lives to the ability of Spectre crews to understand the ground battle and weigh in with super-accurate fire at midnight in a burning town’.⁵

Fast jet close air support in urban operations is feasible, but demanding, therefore crews must be well trained and familiar with the local urban terrain. The principles are thorough training and planning, common reference systems and execution at the lowest practical level of command. Weapons can be used with discretion to support troops in contact and aircraft can generate useful psychological effects.

Air/Land coordination in urban operations

Even with perfect procedures, the vast number of potential targets in urban areas makes air-land coordination of urban air attacks difficult. There were 800 building reference points for Fallujah in 2004, including separate designations for the four corners of some structures. This exceeded aircraft automated capacities for some aircraft, whose pilots had to use manual directories of designation codes.

There are non-lethal means for coercion, but techniques are classified and beyond the scope of this paper. However, air power’s established reputation for reliable precision attack can be used to generate psychological effects. It can be

used for *shows of presence* and *shows of force*.

*'Air power was of great value. One night we were [grabbing a suspect] and the streets cleared as we were driving out, which meant something was about to happen. I had two F-16s fly low right down the street [which created] a tremendous noise, and we had no problems'.*⁶

Although there are limitations sustaining psychological effect, there is little doubt about the immediate impact. Similar effects have been noted from attack helicopters in all current theatres of operation. In one example, Apaches flew deliberately across a compound, imposing an instant ceasefire. They circled for forty minutes and when they broke away to refuel, firing began again almost immediately. There was a concurrent reassurance to the friendly soldier on the ground:

*'So accustomed was I now to the sound of that aircraft and the implied power of its presence that I noticed instantly when it flew away. As so often during this confrontation, we were engaged almost immediately afterwards by machine-guns.'*⁷

The reader may at this stage be slightly clearer about what air power can do. Nesting the capabilities in a Joint Action framework helps forge the essential link between fires and influence. An essential tool for air strategists to achieve that link is the theory and practise of coercion.

THE THEORY AND PRACTICE OF COERCION⁸

Coercion is defined earlier in this paper and closely linked to deterrence. Deterrence seeks to *'discourage someone from doing something by instilling the fear of the consequences'*.⁹ Thus, to

coerce involves deterring people from or compelling them to do something. It depends not just on making an adversary's intended behaviour appear unappealing. It should also make what you *want* an adversary to do look more attractive. Rewards can work as well as threats. The two forms of coercion (deter and compel) resemble each other more than they differ, but a good strategist should pay attention to both and this requires an understanding of personal motivations. Coercion works at many levels and can include, for example, integrated sanctions and other political pressures. It involves graduated pressure and multiple approaches, therefore a comprehensive approach and the ability to escalate is important.

Air power can provide an impressive asymmetry of force and it is attractive in a low stakes contest, because it allows an attacker to escalate at small political cost, with lower risk of mass casualties and the possibility of avoiding ground invasion. Global reach and precise weapons endow air power with the potential to hold an adversary at continuous risk, and it is an unusually seductive form of military strength. Unfortunately, air power is not an omnipotent coercive instrument and the history of air power theory includes strategies built on flawed coercive mechanisms. In the past 20 years, nations have tried to decapitate or coerce rogue leaders with air power, but it was ineffective or backfired in many cases.¹⁰ Decapitation of rogue leaders is one approach and can be a successful part of wider coercive strategies.¹¹ However, leaders can be replaced and martyrdom or revenge has consequences. Therefore, air power is best confined to 3 broad coercive strategies: destruction; punishment; and denial.

Destruction is a simple concept, but can be difficult if the goal is too ambitious, like completely eliminating an adversary's ability to fight. Coercion seeks to change the behaviour of an adversary and differs from force that is employed solely to destroy a target. At the tactical level of conventional warfare, force can predominate and the objective of attack is usually to destroy or incapacitate an enemy force. The link to changed behaviour is the contrast with typical strategic level objectives, where destruction is rarely the ultimate goal of armed force. There are exceptions to this, such as the 1981 Israeli Air Force attack against the Osirak nuclear reactor, but they are rare. When a state or coalition seeks to make an enemy surrender, it is engaged in coercion, because the goal is to compel the enemy to make a choice. Wars in which no surrender will be accepted do occur, but the military, political and social costs can be very high. Therefore, coercion usually seeks concessions well short of national surrender. However, where destruction is part of an overall coercive strategy, the role of precision air attack is clear. Destruction also has its place in irregular and hybrid warfare. However, what might be justified as acceptable collateral damage for military objectives in conventional warfare might have higher risk of alienating populations in irregular warfare, which could undermine strategic objectives.

Israeli destruction of nuclear capabilities

In 1981, 8 Israeli F-16 fighter-bombers and 2 F-15 fighters took off from a base in Egypt's Sinai Desert, which was occupied at the time by Israel. Their target was the Osirak nuclear reactor in Iraq. The mission flew unchallenged at low level through Jordanian,

Saudi and Iraqi airspace. At 20Km from the target, the F-16 pilots climbed to height for the attack and released pairs of 1,000kg bombs at the target. The reactor was destroyed before it received its first load of nuclear fuel and never entered operational service. By dusk, all 10 aircraft returned unscathed.

In 2007, Israel launched a similar attack against what was believed to be a nuclear reactor under construction in Syria.

At the opposite end of the coercive spectrum lies punishment, the use of force to change an adversary's policy choice, but without affecting absolute capabilities. Examples include the US punitive air raids in 1986 against Libya and Israel's frequent retaliatory attacks against targets in Lebanon. Such attacks have no significant effect on the adversary's absolute capability to persist in their chosen courses of action, but if the punishment demonstrates political will and the coercer has the ability to escalate, punitive attacks can affect the enemy's will to persist. Where punishment strategies are used in irregular and hybrid warfare, they must be well integrated with information operations if the target audience is to understand both the message being sent and the required change of behaviour.

Punishment of Libya – Operation EL DORADO CANYON

In 1986, US Naval and Air Forces launched an operation to punish Libya for terrorist attacks. The raid was also designed to deter future behaviour. Targets included: barracks and terrorist headquarters in Tripoli and Benghazi; a naval commando school in Tripoli, where terrorists had trained; terrorist support facilities at Tripoli's main airport; and an airfield near Benghazi, which was a direct military threat to the operation.

Targets were attacked with a large air package, including USAF aircraft flown from the UK. The attack lasted less than 12 minutes, during which time aircraft dropped 60 tons of weapons and narrowly missed the Libyan leader. It may have precipitated the subsequent terrorist bombing of Pan Am Flight 103. However, the credible threat of follow-on attacks could have helped the subsequent international strategy that eventually changed Libya's behaviour.

Between the coercive extremes of destruction and punishment lies denial. Denial involves changing an adversary's behaviour by making the undesired course of action appear pointless, either through physically reducing the enemy's ability to continue successfully, or by persuading the enemy that it cannot succeed. It seeks to reduce options to a choice between submitting now or surrendering later. Denial has much in common with destruction; both seek to make the enemy's objectives unachievable. However, denial is coercive, for it targets the adversary's beliefs about the future and calls upon him to make a choice. The attacks mounted in a denial strategy may resemble those contained in destruction, since the best way to convince someone that defeat is inevitable is usually to make it so. However, a strategy to make an adversary surrender is likely to have significant differences from one to destroy an enemy outright. In conventional *and* irregular warfare against highly motivated and determined adversaries, air power has an asymmetric advantage. Where control of the air is assured, there can be few effective replies to air delivered weapons; insurgents cannot directly fight precision bombs. It is not the fear of death that removes the will to fight in such cases, but the feeling of

helplessness about the inevitability of it.

A good coercive strategy is one in which the target has no reasonable choice but to succumb, because it would be contrary to practical reason. Successful strategies are generally built on 3 principles or *the three Cs*: credibility; capability; and communication.

A threat will only carry weight to the extent that the adversary believes the coercer will carry it out. Whether the adversary's perception is correct is irrelevant; what matters is whether the threat is believed. Even small chances that a coercer will follow through a threat may be sufficient in some cases to carry considerable coercive weight. Severe threats are often more expensive to carry out, and thus can be less credible than milder ones. Because credibility is so central to coercion, but can often be quite difficult to establish, it demands considerable thought on the part of strategists.

Capability is an often-neglected part of coercion. If the adversary does not believe that the coercer has the ability to carry out a threat, it is worthless, even if the coercer's will to try is not in doubt. Although linked with credibility, capability can draw less attention in coercive strategies where asymmetry of force exists in favour of the attacker. However, capability can be problematic, even for powerful nations. Israel, the most powerful military nation in the Middle East, arguably had to recover both its capability (for conventional land operations) and its credibility (for coercion of irregular and hybrid threats) after the 2006 war in Lebanon.

Threats must be communicated to be effective, which is challenging if

the messages are complex. This is particularly so if the coercer wishes to send threats through actions rather than words, for example by demonstrations of force. Even words can be difficult where there are cultural barriers, including language, to overcome. We often judge actions and words from our own cultural perspective and may take it for granted that what we *mean* to convey is easily translated. This can be mitigated by education, training and cultural empathy, but never eliminated. It is equally critical to communicate what will happen if the adversary *does* accede to the coercer's demands. Threats of harm must be communicated as conditional on the target's behaviour, if they are to encourage compliance. There is evidence that non-lethal posturing of attack aircraft can communicate intent and influence behaviour (see the psychological effects of air power above). However, there is no substitute for the effectiveness of face-to-face communication with all of its non-verbal subtleties.

Coercion theory assumes some rationality in behaviour. Behaviour can fall short of rational for many reasons, for example tribal or ethnic interest groups pursuing parochial instead of national interests, inefficient government bureaucracies and imperfect communication, which can make coercion more difficult. However, truly irrational behaviour, which should not be confused with people rationally pursuing objectives that seem senseless to others, is rare. A factor that profoundly shapes the success and failure of coercion is the interests at stake. Almost nothing will persuade most states to sacrifice their sovereignty or national survival, yet even very limited pressure may be

enough to coerce an adversary to give up something trivial. Some insurgents in Iraq had lost power and privileges to the extent that the stakes for them had become incredibly high.

Air strategists should not be seduced by a quest for critical or panacea target sets, the destruction of which they believe will unhinge the adversary's will or ability to resist. Opportunities do exist to achieve physical and coercive effects that are out of proportion to the modest effort required for attacks, but identifying these requires a depth of analysis that may not be possible in the time available. Moreover, coercive mechanisms usually include assumptions about follow-on effects, but despite efforts to achieve strategic insight, strategists will rarely fully appreciate how an adversary makes policy decisions, or how an economy, society or individual and collective psychology of enemy leaders and citizens works. Trying to understand an adversary is right, but trying to scientifically model behaviour and the effects of air power applied against key nodes is folly. An effects based approach can be applied, but it can only be taken so far. *A good strategy is agile*, where the best assessment is made in the time available, where people are willing learn and where strategies are built on anticipated first and second order effects only. The ability to sense and respond to what then unfolds becomes crucial. Only then can coercive strategists adapt, learn, gain deeper insights into their adversaries, and retain the initiative. It is a question of balance; failing to inflict the damage called for by the initial strategy, or abandoning a sound strategy before it has time to work are problems that an astute strategist considers.

'Select and maintain the aim' will always

be apposite, but allegiances shift, centres of gravity change and desired end states must sometimes morph.

Coercion is usually competitive. It is the party with the greater will to win relative to the pressure being applied against it that should prevail. The logic of coercion indicates that success is most likely when: the expected net costs of resistance are high; when the costs of compliance appear low; and when there is little or no prospect that resisting will lead to a result that would be better than complying. In each case, the effectiveness of communication and the perception of the coerced party is vital ground. Strategists should focus not on the targets to be attacked, but on the coercive mechanism that they expect will lead to the objective. A coercive target set is only as important as the chain of events that attacking it will trigger, so what to attack should be decided only after the strategist knows why to attack it. Many states (and non-state actors) have an underestimated capacity for adaptation. As a rule of thumb, coercion has a good chance of succeeding if the coercer can bring about four related conditions. First, the enemy should believe that victory is impossible, because even a slim hope of eventual success may be sufficient motivation to hold out against great coercive pressure. Second, if the stakes are high, the enemy should be further convinced that continued resistance offers no hope of leading to any result better than complying. Even when victory appears out of reach, the enemy is likely to grasp at straws such as the prospect of forcing a negotiated compromise. Third, early surrender should appear to be a better deal than later surrender, either because resistance is costly, or because the terms demanded are likely to become more

severe as time passes. Otherwise, even futile resistance will be attractive. Clear communication of the 'better deal' is vital. An ability to escalate the pressure will strengthen a strategist's hand. Finally, complying must be acceptable in absolute terms, for if compliance looks too awful to contemplate, then any alternative is likely to appear preferable, no matter how unpleasant, hopeless, or desperate. Strategists should not undermine cultural aspects including the concept of honour. Coercion may succeed without achieving all of these conditions, particularly if the demands are not great. However, failure to fulfil any of them may be sufficient to make a strategy fail.

CONCLUSION

The differences in Service culture, ethos and perspective are sources of both strength and friction. It seems intuitive that Joint education might overcome some friction, but the Armed Forces have limited quantities of that most precious resource of time to squeeze too much more into their programmes without undermining single Service competencies. What helps is for each Service to articulate its strengths in a way that others comprehend. It also helps if we are more brutally honest about single Service limitations and I hope that this paper helps to expose what air power cannot do as much as what it can. If soldiers reading this air power message get it, integration and trust might more easily follow. I doubt if the paper is written in perfect Martian, but if General Lamb's green men reading it remember that air power has only four fundamental outputs, we will have some useful oil for the Joint machinery. This is the label that the author would put on his air power tin:

Air power allows *control of the air*, which provides freedom of air and surface manoeuvre. It enables *rapid mobility and lift*, which gets people and materiel quickly to and around the battle space. It also provides *intelligence and situational awareness* to help commanders develop a deeper understanding of the battle space. Air power allows airmen to fight an enemy before anybody else has to and it can use a credible threat of precision attack for *coercion*. Air weapons are now accurate enough to be exploited throughout the battle space and the presence of an aircraft can sometimes be enough to shape behaviour. The integration and synchronisation of air and land operations will only be achieved by placing sufficient emphasis on decentralisation of some air planning. This will enable air effects to be planned in sufficient detail for accurate final execution; in a way that will reassure and not alienate the people amongst whom we currently fight.

Notes

1 Commander of the (British) Field Army.

2 Concise Oxford English Dictionary.

3 DCDC Joint Doctrine Note 1/07 Joint Action.

4 Montgomery.

5 Richard Holmes, *Dusty Warriors* (in *Countering Counterinsurgency Challenges* 2006).

6 Major St. John Coughlan, interview with Russell W. Glenn (RAND), 26 March 2006.

7 Mark Etherington, interview with Russell W. Glenn (RAND), 22 March 2006.

8 The theory is an ongoing DCDC adaptation of work by Dr Karl Mueller and others, including Daniel Byman, Matthew Waxman and Jeremy Shapiro.

9 Oxford English Dictionary.

10 Qaddafi (Libya 1986), al-Musawi (Lebanon 1992), Dudayev (1996 Chechnya), Milosevic (1999 Serbia), Muhammad Omar (2001 Afghanistan) and Hussein (Iraq 1990, 1998, 2003).

11 For example, the killing of Zarqawi in 2006 Iraq (seen in the context of the wider Sunni awakening) or the longer-term impact of the 1986 US attack on Libya, when seen in the context of post-Lockerbie diplomatic and economic pressures.

Where are the air power strategists?

I very much enjoyed reading Gp Capt Ian Shield's thought provoking article 'Where are the Air Power Strategists?' in the Spring Edition of the *Air Power Review*, and note your challenge for letters on this subject. In his article Gp Capt Shields asked what was the 'art' of air power, and where were the air power strategists to compare with Corbett and Mahan, and Jomini and Clausewitz as maritime and land warfare strategists? He neatly categorises the development of air power into three eras: a 'strategic effect' era up until the end of the Second World War, a 'lines on maps' era from 1945 to the 1991 Gulf War, and a 'third age' era, still underway, of agile air power, characterised by space and networked enabled capability. He suggests four reasons why we have yet to capture the art of air power: our age, our military origins, technology, and the uniquely joint nature of air. Gp Capt Shields argues that it is necessary to 'capture the very essence of air power' and 'as air power proponents we risk becoming mired in tactical effect, wedded to today's battle.' He goes on to say 'if the third dimension is not to be regarded as merely an adjunct to the efforts of the other Services, where is air power's unique and compelling voice?'

I suggest Gp Capt Shields very nearly answers his own questions. His 'third age' provides the opportunity to 'capture the very essence of air power' achieving effect at the strategic, operational and tactical levels, and co-ordinated with joint and component command as appropriate. Hence, the era of separate strategists for each

environment has been and gone, though a 'lines on maps' mindset still limits co-ordination.

The direct equivalents of Corbett, Mahan, Clausewitz and Jomini were the air power theorists of Gp Capt Shield's 'strategic effect' era, such as Douhet and Trenchard. They viewed their own environments as separate and dominant in that environment. Clausewitz considered the nature of war and the relationship between politics and war, but as a Prussian student of Napoleon he focused on land warfare and ignored maritime and economic warfare. Mahan on the other hand believed controlling sea-borne commerce was critical to domination in war. Douhet sought victory through coercive, morale bombing enabled by Command of the Air – which would now be judged indiscriminate and therefore illegitimate unless in supreme emergency. Warden is perhaps best viewed as a descendent of this 'strategic effect' era, and not from the 'lines on maps' era as suggested. As Gp Capt Shields's points out, it is air power that has enabled environments to project power in other environments. Clausewitz and Mahan predate this and so we should not look for contemporary comparisons.

The contemporary 'art' of air power is therefore exploiting air power within a joint context. Yet the 'lines on maps' era is not yet over. For example Johnson's *Learning Large Lessons* explores contemporary friction between the US Army and Air Force in joint war-fighting.¹ His analysis of post-Cold War conflicts suggests a shift in the relative war-fighting roles of land and air power, most apparent in Operation IRAQI FREEDOM. Air power

dominates the strategic and operational levels of war fighting against large, conventional enemy forces, whereas exploitation at the tactical level is the domain of land power. However land commanders demand large areas of operations, pushing out the fire support co-ordination line, in order to mount deep, shaping attacks with their own long-range missile fire and attack helicopters, when air power would be more effective, and indeed these 'lines on maps' make air power less effective. Johnson maintains that the authority to establish fire support coordination measures that affect the theatre campaign plan should be withheld by the joint force commander.

NATO's Joint Air Power Competence Centre (JAPCC) has tried to capture what Gp Capt Shields's describes as the enduring 'essence of air power' in our recent NATO Future Joint Air and Space Power concept.² We describe the enduring nature of air and space power in three levels or categories of activity – Deep Persistent Operations, Control of the Air (and Space), and Joint Enabling activities. All three are critical to any joint operation across the spectrum of conflict, including contemporary operations countering irregular activity.

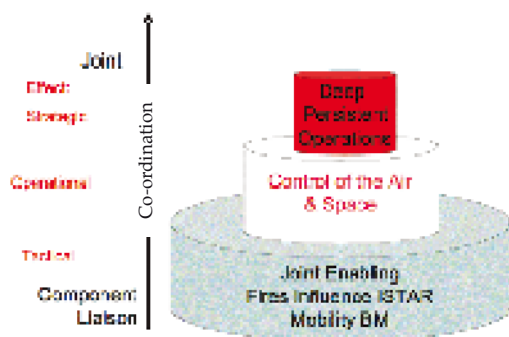


Figure 1 – The nature of air and space power

The relationship between these categories, the degree to which the manoeuvre is co-ordinated between components and the strategic, operational and tactical focus for each category is shown below.

Essentially air power conducts deep persistent operations co-ordinated by the joint force commander. Air is the supported component for delivering control of the air and space, co-ordinated at the operational-level, and supports maritime and land with tactical-level joint enabling activities. Plainly our categories of air power are not dissimilar to the explanation of the core capabilities of air power found in AP3000, but the key is to put them in context of level of warfare and degree of co-ordination required. This in turn allows a model to be constructed to provide the required command, information and intelligence, battlespace management, liaison and co-ordination, and exploit network enabling, and so on.

The term 'air power strategist' is obsolete, for the reasons I have argued, as it is wedded to the 'strategic effect' era. Instead, the focus is on air power within the joint context, such as the JAPCC thoughts outlined above and by the work I know Gp Capt Shields is doing at the DCDC, that 'captures the very essence of air power'. This is not 'wedded to today's battle', but is enduring – not merely an adjunct to the efforts of other Services – and reflects air power's unique contribution.

*Gp Capt John Alexander,
NATO JAPCC, Kalkar, Germany*

Notes

1 David E. Johnson, *Learning Large Lessons: The Evolving Roles of Ground Power and Air Power in the Post-Cold War Era* (RAND Corporation, 2007) at <http://www.rand.org/pubs/monographs/MG405.1/> accessed 15 July 2008

2 See <http://www.japcc.de/projects.html>

Dir Def S (RAF)

Comment

Group Captain Alexander makes some very interesting points in his response to Group Captain Shields's excellent paper. It is worth reading his comments in conjunction with Air Commodore Colley's article in this edition of *Air Power Review*. Both Group Captain Alexander and Air Commodore Colley highlight the primacy of air power at the strategic and operational levels and particularly in 'Third Generation Warfare',¹ where air is being increasingly used as a substitute for more traditional methods of firepower support.

This was acknowledged at the RUSI conference in June, where the Chief of the General Staff, Sir Richard Dannatt, explained the reorganisation of the British Army into a uniform brigade structure, accepting that the heavier firepower elements – tanks, infantry fighting vehicles and self-propelled artillery – would now be spread more thinly across the brigades on the basis of 'our increased confidence of delivery of effect from the air'.² However, the effective application of air power at the tactical level in largely static, Phase 4-type stabilisation operations in current 'Fourth Generation Warfare' is more problematic, and therefore more contentious.

Clearly, there are strong parallels between the model that NATO's Joint Air Power Competence Centre has developed to explain the utility of air power in a joint context and Air Commodore Colley's proposal to use the 'joint action' model as a framework. *Air Power Review* would welcome alternative views or interventions into this critical debate for the future of the delivery of air power effect.

Notes

1 Thomas Hammes categorises warfare in 4 epochs: 'Third Generation Warfare' is the conventional, mechanised and mobile, all arms warfare developed since 1918, whereas 'Fourth Generation Warfare' is Rupert Smith's 'war amongst the people', the net-worked, irregular and asymmetric warfare experienced on current operations. Hammes, Thomas X., *The Sling and the Stone*, (Zenith Imprint: New York, 2006).

2 Quoted in 'British Army proposes to revamp brigade structure', *Jane's Defence Weekly*, Vol. 45, Issue 28, 9 July 2008, p. 4.

Historic Book Review

AIR POWER AND ARMIES

By Wg Cdr J C Slessor

Oxford University Press, London 1936

Reviewed by Air Cdre Neville Parton

‘It is no longer a matter of the soldier making his plan for battle on the ground and then turning to see how the air can help him. Land and air operations must be deliberately planned to get the best out of each other, and the plan of campaign on the ground, whether in attack or defence, may be profoundly influenced by the air factor.’

Sir John Slessor’s masterpiece on air-land relationships is definitely one of those publications that should be more widely recognised than it actually is. Although some aspects of it are relatively well known – such as the opening quote above – much of the analysis and underpinning theory is not. Given that this was produced by an individual who would go on to have a highly distinguished career, ending as Chief of the Air Staff from 1950 to 1952, this is perhaps surprising. However what is perhaps even more remarkable was that Slessor should not only have been a published author but also then been successful in his RAF career, given the distinct lack of enthusiasm in the early RAF for writing for public consumption. In fact there was a distinct antagonism in some senior quarters to this effect, and it could certainly have an adverse impact on an individual’s career – as has been noted in previous articles in this series – for instance in the case of Squadron Leader Burge and his *Basic Principles of Air Warfare*.

What of Slessor himself? He was

certainly unusual amongst his contemporaries in being a keen, and gifted, writer – although there was nothing in his early life that indicated a strength in this particular direction. Born in India in 1897, and educated at Haileybury School, he contracted polio whilst a child, and when the resulting lameness prompted a medical rejection by the Army, managed to talk himself into a commission with the Royal Flying Corps in 1915. His wartime service was not without incident, winning an MC in the Sudan, and following repatriation after being wounded went on to complete two squadron tours in France. After the war he attended the 3rd RAF Staff College course at Andover, serving under another noted Haileyburian in the shape of the Commandant, Air Commodore Brooke-Popham. As Slessor later observed the course produced from amongst the 28 staff and students no less than 17 air officers – seven of whom reached air chief marshal. He also famously struck up a close relationship with Trenchard whilst in the Plans Branch of the Air Staff, where he came to fill the role one of the ‘English merchants’, able to translate the great man’s ideas into readable English. However it was his four-year stint at the Army Staff College at Camberley, as a member of the directing staff, which provided the material that would form the basis of *Air Power and Armies*. His wartime career saw him moving in rapid succession from being the Air Member of the Joint Planning Committee at the

start of the war to AOC 5 Group in Bomber Command from Apr 1941 to March 1942. This was followed by a spell as ACAS (Policy), where he helped to shape the bombing directive which issued from the Casablanca conference in 1943, before taking over as C in C Coastal Command from February 1943 – January 1944. His last war appointment was as the RAF C in C for the Mediterranean and Middle East. This was followed by the highly challenging post of Air Member for Personnel in the immediate post-war period, and then Commandant of the Imperial Defence College from 1948 until taking up post as CAS. His autobiography, *The Central Blue*, still stands as probably the best (if not only!) book written by a former CAS, and he continued to be involved in the defence debate right up until his death in 1979. Having thus established the length and breadth of his illustrious career, we can turn to the first publication that would bring him to public knowledge – and establish him as a highly prescient analyst, as has been observed elsewhere: ‘... much that he said stood the test of battle and campaign in the Second World War.’

Slessor’s introduction begins by making a very pointed observation on the purpose of military history as he understands it:

‘... the really important function of any kind of military history is not primarily to serve as interesting material for the general reader, but to enable commanders and staff officers of the future to be wise before the event, and to learn not only from the successes but from the failures of their predecessors.’

This approach lies at the heart of *Air Power and Armies*, as it is categorically not a publication that simply attempts

to analyse what worked during the First World War, and hold this up as an exemplar to be emulated. Instead, after considerable analysis relating to the role of air power, a highly accurate, but critical, mirror is held up to allow re-examination of one of the high points of the British armed forces during the War – the battle of Amiens in 1918 – and as will become clear, this is then used to assist in producing some highly logical deductions regarding air-land interaction.

The book is based upon his lecture series at Camberley, and is specifically constrained to a particular strategic subset of operations, namely those that would require a joint (in modern parlance) expedition to an overseas theatre – thereby neatly avoiding any of the controversy at that time which still dogged the question of the main wartime aim of the RAF. It is organised in four parts, covering air superiority, the selection of objectives, an examination of the battle of Amiens in 1918 in some detail, followed by a set of wide-ranging conclusions. Some detailed appendices are included, giving details of force ratios and usage of air forces on both sides during the battle of Amiens, as well as maps providing context for both the battle and wider use of air power during the First World War. So much for the outline – what of the content?

The first section attempts to define, in considerable detail, what is actually meant by the term ‘air superiority’, and how this relates to the main offensive in any given conflict. Here, in concert with other air power writers of this era, the concept of a variable degree of air superiority is introduced, along with a considerable exposition on the part that ‘vital centres’ (cf centre of gravity) have to play in modern war. In a very vivid illustration, Slessor points out that

a vital centre does not necessarily have to be destroyed to produce the desired effect, but that dislocation for a period of time may be sufficient. The importance of the offensive is also stressed, not only because of its importance in maintaining the initiative (and reflecting its importance in the RAF War Manual), but also as this is seen as the most effective way of neutralising or destroying the enemy's air force. He is also very clear that obtaining air superiority is not an end in its own right, but an enabler – or to use his phraseology, air power is '... the Method, not the Intention.' No overall deductions are produced at the end of this section, although the difficulty of achieving absolute air superiority is again stressed through observation of the contemporary 'fleet in being' concept.

The part relating to the selection of objectives reflects a particular belief of Slessor's, clearly refined during his time at two staff colleges, that in fact the principles of war should be reduced to three rules – namely concentration, offensive action and security – and that air power had a considerable part to play in enabling all three. Whilst he does not shy away from the role that an air force can have in attacking the enemy's supply base, or in other words the industrial capacity that enables warfare, he clearly believes that at the right time the use of 'independent air' against a tactical target set (i.e. supply lines) can have a much greater impact. With regard to close air support, he saw three clearly defined potential tasks, namely action in aid of an initial assault, action to turn a retreat into a rout, and action to prevent an enemy attack from breaking through. Careful consideration is also given to the part that air power

can play in dislocating supply lines, with a thoughtful analysis of the merits of attacking roads and railways, including the 'superficial' attractiveness of attacks against bridges. What he does see is that all of these lines of communication (LOCs) produce bottlenecks of men and material which air power is ideally placed to attack, and in so doing, to generate a far greater impact on the course of battle.

Analysis of the 1918 Battle of Amiens forms the penultimate component, and in particular an examination of the part that the RAF played. The reason for looking at this particular encounter is best summed up in Slessor's own words:

'... it is impossible to assert with any confidence that the result of the battle ... would have been materially different, or that the ultimate line reached and held by our forward troops ... would have been materially short of where it in fact was, if not a bomb had been dropped or a round fired by aircraft against ground objectives. If this be so it is a damaging admission, in view of the fact that this battle saw the greatest concentration of air strength of any battle of the war ...'

What follows is a methodical examination of the plan of attack, followed by a reconstruction of the actual course of events. This brings out certain key factors, such as the lack of involvement of the senior air force commander in the army planning conferences, the arrangements for air co-operation being almost entirely ad-hoc in nature, and the lack of thought given to the roles that the air could play in the follow-on activities after the initial assault. Indeed the point is stressed that no trace of a formal air appreciation

can be found – which certainly showed itself during the process of weapon to target matching later on. So whilst the planning for the involvement of the RAF in the very early stages of the attack (the first 6 hours) was detailed, very little consideration was given to the role that could be played in enabling both the maintenance of the ground taken and exploitation of the breakthrough.

The final element contains Slessor's conclusions regarding the future, ten in number, which form the smallest part of the book, but still manage to present the author's main thesis – which begins with a belief that the conquest of the air formed a new revolution in military activity. To try and summarise: Slessor saw that in modern warfare with massed armies the margin of safety on LOCs was poor in the face of air power, and therefore no army should rely on a single LOC if it was within bombing range of the enemy – which in turn meant that staffs would have to think more broadly ("...use larger maps" was his phrase) when campaign planning. However he did recognise the limitations of air power, in that the initial concentration of man power was not likely to be stopped in countries well served with railways, although it could be probably delayed. Whilst the delaying of the forward movement of armies was possible, the greatest opportunity arose when they were operating with long LOCs that were few in number, which in turn would necessitate a need to rethink the general approach to battle – for instance to use the defensive land operations to canalise enemy movement on the ground to increase their vulnerability to attack from the air. This meant that, particularly from a European

perspective, railways would no longer be regarded as an instrument of major tactics, and the primary task of an air force engaged in a land battle would be to isolate the attacked area from reinforcement and supply. And of course in turn this required a truly joint plan of campaign – and hence the opening quote of this article. In fact his last conclusion is supported by reference to some words of Churchill from 1917: "For our air offensive to attain its full effect it is necessary that our ground offensive should be of a character to throw the greatest possible strain upon the enemy's communications." Slessor does not leave his reader in any doubt with regard to his views on the part that air power will play in the future of warfare, which is that whilst it will not decide the 'next great war' alone, it will be a decisive factor – and one which favours any army that is highly mobile, hard-hitting, armoured and above all mechanized. His observations can also be seen as supporting the case for thinking very carefully about how air power is best employed in support of an army, or more importantly, how not. Whilst not directly stated, there is a clearly inferred belief that whilst what we would now term close air support may be justified in certain circumstances, by and large air interdiction of forces at choke points further back is where the greatest effect can be created for the least cost.

In Slessor's case, he was able to attempt to put some of his ideas into practice, as these were translated into the plans for the Advanced Air Striking Force during the period that he spent as Director of Planning at the Air Ministry in the late 1930s, having taken over from Arthur Harris in that role. He also won the Royal United Service Institution (RUSI)

Gold Medal competition in 1936, with a paper examining the influence of the internal combustion engine on the British Army, which contained many of the same ideas as well as an examination of the way in which a truly mechanised army might cope with the threat posed by a modern air force. However, like one of his Army contemporaries – J F C Fuller – his prophetic words were not sufficient to galvanise the defence establishment into a radical re-evaluation of the requirements for contemporary warfare. Certainly Slessor's vision appears to identify many of the elements that made blitzkrieg such an effective approach only a few years later.

Where does that leave us in terms of Slessor's analysis and its relevance to the RAF in the 21st century? His ideas regarding the principles of war, and those that are the most important, can still act as a remarkable stimulus to thought. But it is his observations on the nature of the interaction between air forces and land forces that perhaps still carry the most weight, if only because they are still so remarkably accurate – at least from an airman's perspective. If there were an air power library Hall of Fame, irrespective of the author's background, *Air Power and Armies* would have rightly won a place on the shelves. But Slessor's background, undoubted command ability and strategic analytical skills demand a more respectful approach – this is one of those books which will repay careful reading.

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Notes

1 See *Air Power Review* Volume 10 Number 2 (Summer 2007). Slessor's success at combining writing and a career may have had something to do with publishing after Trenchard had retired from his post as CAS!

2 Sir John Slessor, *The Central Blue* (London: Cassell & Co. Ltd, 1956), 47.

3 Air Commodore Henry Probert, *High Commanders of the Royal Air Force* (London: HMSO, 1991), 41.

4 Robin Higham, *The Military Intellectuals in Britain: 1918-1939* (New Brunswick: Rutgers University Press, 1966), 217.

5 J C Slessor, *Air Power and Armies* (London: Oxford University Press, 1936), vii.

6 'Note that actual material destruction of a vital centre is not essential in order to be fatal. Thus a man's windpipe is a vital centre; yet it is not necessary to cut it, but only temporarily to stop air getting through it order to kill that man. One or more essential railway junctions may be vital centres of an army in the field; yet it is not necessary absolutely to demolish those junctions, but only to prevent railway trains passing through them for a sufficient length of time, to be fatal to that army.' *Ibid.*, 16.

7 *Ibid.*, 5.

8 *Ibid.*, 164.9 The First World War equivalent of an air estimate.

10 In fact the chapter is entitled 'The Third Revolution', with gunpowder and the machine gun having been identified by Slessor as the first two revolutions.¹¹ Slessor, *Air Power and Armies*, 212.

12 'Tactical and Administrative Implications of the Introduction of the Internal Combustion Engine into the British Army, in Relation to Its Capacity to Overcome Modern Defences and Counter the Threat of Air Action.' to give its full title!

Strategy for Victory: The Development of British Tactical Air Power 1919-1943

By David Ian Hall

**Dr Hall has done
air power
practitioners
a great service
in this book, and
I unhesitatingly
recommend it.**

Praeger Security International,
London, 2008)

ISBN: 978 0 275 97767 2

Reviewed by Gp Capt Ian Shields

The British Army's lack of air support during the opening campaigns of the Second World War stands out as one of the great ironies of that conflict. The British, after all, perfected air support during the great War, and, in 1918, possessed what many at the time believed was the finest tactical air force in the world. Yet, by 1939, co-operation between the Army and the Royal Air Force was minimal at best.

So begins the Preface to this excellent book by Dr David Hall, one of the air power lecturers at the Joint Services Command and Staff College (and therefore someone probably well-known to many of the readers). This immaculately researched volume, based (as he acknowledges) on one of his academic theses, is very well written, easy to read and insightful throughout. The pace is good but this is not a long book: the main body is only just over 150 pages although the extensive notes, superb bibliography (if only I had the time to read them all!) and good index occupy another 90 pages. So what has Dr Hall to say?

He sets the scene well in the Introduction, looking at the rapid development of air power and of Air/Land co-operation in particular. He highlights the dysfunctional early approach the British adopted but how, once the First World War gathered pace, a more 'combined-arms' (rather than fully integrated, or Joint, as we would recognise it today) approach was adopted, with air power playing an increasingly valuable role, particularly in the Battle of Amiens in August 1918 and the subsequent final 100 days of the War. By the end the Great War, air power had developed all the roles that

we still recognise today, but of most note airmen had come to recognise the benefits of centralised command and control while their Army colleagues not surprisingly, disagreed with their 'upstart air force colleagues.' They wanted to retain 'their' military support aviation, and they were not inclined to pursue the development of its wider application'. The Armistice denied the opportunity to address this key command and control issue, and this growing divergence of opinion sowed the seeds for the bitter inter-War rivalry that, largely financial driven, was conspicuous for the intensity and vehemence with which the two Services attacked each other.

And it is this rivalry that Dr Hall traces through the first half of his book. The very survival of the independent air arm through the 1920s and into the 1930s is well documented elsewhere, and he rightly does not concentrate on this issue, instead drawing (correctly, in my opinion) the implications for Air/Land co-operation. The rivalry was bitter and prolonged, and in part forced the Air Ministry's hand into writing (some very good) doctrine. This doctrine stressed the strategic value of air power and against the writing of the early air power proponents (Douhet, Mitchell, et al) it is not surprising that the Air Force's emphasis was on bombing. However, Army Co-Operation was being addressed, not least by Slessor, initially at the RAF Staff College but latterly in the Air Ministry. But the period was, as Dr Hall skilfully draws out, dominated by a seemingly determined bid by the Army to regain control of the fledgling RAF and equally determined efforts by the CAS to retain its independence. The great sadness, as Dr Hall points

out on page 37, was that the 2 sides were just starting to meet to address the shortcomings when the Second World War broke out.

The initial days of the War are addressed succinctly and with little emotion, before the book goes on to examine in some detail the analysis of the causes of the failure in France. Dr Hall examines in depth the findings of the Bartholomew Committee which looked at the campaign that led to the fall of France and the Dunkirk evacuation, and its insistence that the Army needed its own air force including dive-bombers, because that was what the Luftwaffe had offered the German Army. This, of course, completely missed the point and, as Dr Hall highlights: '...Recent war experience, noted the airmen, confirmed that success on the ground depended on superiority in the air'. The inevitable tussle followed, but (perhaps fortuitously for the RAF) resource reality came to the fore and it was admitted that the Army could not raise and train its own force: compromise was required. The result was an agreement to form, in November 1940, an Army Co-operation Command though whether this would work was unclear, and Britain did not have the luxury of time at this point in the war.

The first half of this book ends with a look at the preliminary campaigns in North Africa. By contrast with France, there was some good news to be had here in terms of co-operation. While, as Dr Hall highlights, the severe shortage of assets for both the Army and the RAF, but particularly for the latter, required a pragmatic approach and, bolstered undoubtedly by the fortuitous combination of characters on

both sides, great results were achieved. Indeed, many of the later successes and templates for co-operation have their roots in this period: the attachment of a Senior Air Staff Officer to the GOC's HQ; the creation of (army) Air Intelligence Liaison Cells to front-line squadrons; the discovery (when they arrived in theatre) of the robustness and flexibility of the Hurricane; and, above all, the decision to establish the Operational-level HQs for both the Army and RAF on contiguous sites ahead of Operation Compass in 1940. Great things were achieved against the Italians, but both the diversion to support Greece (and in particular the disastrous involvement in Crete) and the arrival of Rommel soon undid much of the good work and in the aftermath recriminations again flew. This time, though, the RAF received the support from above and with the removal of Wavell as GOC and the arrival of Auchinleck and Tedder, the stage was set for the success that follows. Here though, I have one minor criticism of Dr Hall's analysis: he pays insufficient attention, perhaps, to the relatively long and successful relationship between the two Services in the Middle East during the Empire Policing period when discussing the situation in 1939/1940, but this is but a minor omission in otherwise excellent coverage and consideration.

The somewhat shorter second half of this volume looks at how a system (arguably THE system) of air support was subsequently organised. In looking first at the shortcomings and then dwelling less on the success, Dr Hall could be charged with dwelling on failure; this is emphatically not the case as it is only by setting out the much less well-known shortcomings that he

is able to explain as clearly as he does the subsequent successes in the Western Desert. But first, he reviews the ongoing attempts at solving the problems of co-operation back in the UK. Personality, entrenched views and blatant mistrust still abounded at the upper levels and undermined the real progress being made lower down. Things started to come to a head in the middle of 1941 when the Army identified the need for 3,888 aircraft for Army Co-operation duties of various sorts (still including dive bombers); the entire front-line strength of the RAF at that point was some 300 aircraft less than that figure. As Dr Hall highlights, there continued a lack of understanding of how and why the Germans achieved so much success: the Air Staff thought in terms of creating favourable air situations while the Army hankered after direct command and control. There were faults on both sides, and Dr Hall carefully guides the reader through the trials and tribulations that involved the Prime Minister himself, and rightly points out that Britain was, throughout 1941 and much of 1942, doing all she could just to survive; there was little realistic chance of the RAF supporting the Army's training for a (non-existent) European campaign when fighting the Battle of the Atlantic and providing air defence of the UK homeland!

But this book then moves onto a happier upland: the overall success story that was the Western Desert. Again, Dr Hall shows his strength of analysis by resisting the temptation to leap into a discourse on that theatre of operations alone, instead he concentrates on the rise of the Command and Control apparatus, the parallel improvements both in the desert and back in Whitehall and the

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timely and decisive involvement by Churchill in September 1941. That, combined with some very successful trials and exercises in Egypt, led to the significant advances against Rommel that culminated in El Alamein.

In his next chapter, Dr Hall highlights one final spat back in London between General Sir Alan Brooke, CIGS, and Portal. CIGS kicked off by renewing the demand for immediate and dedicated Army support, but now amounting to 4,101 aircraft(!). Portal's rejection of the accusations of lack of co-operation centred on practicalities: the War Office confused 'lack of co-operation with a lack of means to co-operate'. Brooke does not come out well from Dr Hall's consideration of the awkward year of 1942, although Brooke's position could have been due to his own personal experiences of the Dunkirk retreat; however, a combination of Churchill's firm direction, the logic of Portal's position and the demonstrable successes in Egypt swayed the argument. What came out of this argument was, though, a great success: it set the stage for the victory in the Western Desert but more importantly, as Dr Hall emphasises, through the Slessor report set the model for what was to follow in 1944 in Normandy and through to Berlin: the Second Allied Tactical Airforce with its Command and Control arrangements and emphasis on the favourable air situation above the troops.

The final chapters take an almost triumphant gallop across the (initial defeats then) victories in North Africa and what was to follow with the Second Allied Tactical Air Force in France and Germany. The lessons were, finally, learned and air power became a critical

tool in land campaigns. Much of what emerged by the end of 1943 is still recognisable as best practice today, a point that Dr Hall could perhaps have emphasised more in his conclusion.

This is a very good book and addresses in excellent manner the previous lack of consideration of how British tactical air power doctrine developed from the Armistice to the end of 1943. It seems almost petty to criticise, but I have three minor irritations: first, the photographs and maps are sparse and the former would have benefited from being produced on glossy paper; however, that is more the fault of the publisher than of the author. Which brings me to my second point: an academic, not mainstream, imprint has published this book and consequently it would be very expensive to buy: Amazon is presently quoting £66.50 (and that is at a discount!). This is a great shame because this book deserves to be widely read. Finally, in criticising Army high command so freely (and with much justification based both on his research and hindsight) Dr Hall perhaps takes the pro-RAF view just a fraction too far, which will cause the hackles of some readers, particularly of a 'green' persuasion to rise. This would be a great shame because they should read this, if only to offset the 'utterly, utterly useless' school of thought. Dr Hall has done air power practitioners a great service in this book, and I unhesitatingly recommend it.

Interpreting and misinterpreting air power's strategic potential – overcoming the Sisyphean Labor

By Wg Cdr Chris Luck

Air power has never been so valuable or criticized as it is today. Its 'surgical precision' is the stuff of politicians' dreams, while air force leaders trumpet the ability to leverage accuracy with rapidly delivered and devastating firepower with global reach. Yet, as in Lebanon in 2006 and today in the Middle East, air power critics accuse air power of failing to win wars independently and, de facto, of failing. The idea persists among airmen that the application of the air trinity of accuracy, destructive power and reach can win wars with the Army and Navy largely as auxiliaries. But to be labeled as 'failing' in today's budget fights is a sure way to do just that.

A closer examination of why air power stands so accused despite its tactical brilliance draws an uncomfortable truth; airmen are the authors of their own misery. By misinterpreting the promise of air power, or maintaining an unempirical faith in it, airmen have made a rod for their own backs. Unlike land and naval warfare, air power's genesis and evolution is not lost in the mists of time. The Great War was a primeval soup for air power evolution. The scale and existential nature of the conflict meant that air power rapidly evolved from flimsy aircraft to giants such as the Germans' Gotha bombers and fast lethal fighters such as the

Sopwith Camel. Roles proliferated from that of reconnaissance and communication in 1914 to include most of today's acknowledged air power roles by 1918. Yet the uncomfortable reality remains that the war did more for aviation than aviation did for the war.

Despite the heroism of aviators who died in droves in a 3-D version of the Somme, air power could not win the war. A perception arose, however, from the German bombing of Britain that to strike at the heart of the enemy rather than his military forces was the key to victory. The proposition that 'strategic bombardment' would deliver victory was never proved and yet it became the bedrock of the Royal Air Force's interwar thinking. Independent action became irrevocably synonymous with things strategic. This is meaningless. This begs further explication. There is no such thing as strategic platforms, weapons, ranges, targets or anything else for that matter. Instead, all action is inherently tactical and aimed towards achieving a strategic effect that adds to the strategic performance required. Tactical action either adds to achieving the political end state required or it does not. With this understanding, the best 'strategic' application of tactical air power action may be on the battlefield or on independent action, or indeed on both. The task of air power strategists is

to understand were and how air power may best be applied for strategic effect and therefore performance.

This dynamic played out during the Great War. Air power thinkers clashed on how air power was best applied for strategic effect. Generals Sir Douglas Haig and Hugh Trenchard believed in battlefield action as the best strategic application of air power, while Prime Minister Lloyd George and General Frederick Sykes believed in independent action. The argument came to a head in 1917 after three years of almost unimaginable sacrifice without victory. Lloyd George appointed the South African general and statesman Jan Christiaan Smuts to advise on the way forward. The result was the Smuts Report which famously outlined an independent striking force to directly attack the enemy's infrastructure and morale.

It was this vision for victory that airmen have clung to as justification for an independent air force. It was a narrow reading and interpretation of Smuts' report. Smuts emphasized that the primary objective of reorganisation was to produce a single body of air-minded experts to ensure a coordinated approach to air organization, resource management, policy and doctrine rather than the adversarial competition between the Royal Flying Corps and the Royal Naval Air Service that blighted any coherent development and exercise of air power. This was Smuts's crowning glory and great insight, not independent war-winning bombardment. From this would flow the efficient defense of the homeland, followed by auxiliary aviation support of the Army and the Navy. Last, independent action was to

be an important consequence of spare capability. Airmen's misinterpretation of air power in the Great War has resulted in a constant, stultifying, distracting and ultimately pointless argument as to whether air power can win wars independently. As one historian succinctly pointed out, "the standard of victory through air power alone is fallacious by inspection and has all too frequently created false expectations in the minds of Airmen, politicians, and those who otherwise might pass for knowledgeable military analysts."¹

The reality and the evidence so far is that air power might, if the context and strategic performance require, favor the sole application of the air weapon. In the Great War the most strategic of air power roles was reconnaissance; in the Middle East today it is lift – fixed-wing and rotary; who knows what tomorrow brings. The challenge for today's air strategists is to move beyond the Sisyphean and arid argument of whether air power can win wars independently. Airmen should instead think and articulate clearly how air power organization, training, equipment and doctrine can be best focused and balanced to meet future contexts and not let doctrine become strategy. Only then will air power maximize its potential and therefore utility; only this will justify its budget share and independence.

Note:

1. Harold R. Winton in email exchange to author Monday 04/06/2007 22:22.

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