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 battlefront 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-strafing 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 battlefront, 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,

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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

Sopwith Dolphin

Fokker DVII

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 machne 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 battlefront 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-strafing 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 (SydneyL 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.

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