

AIR POWER AT THE BATTLE OF THE SOMME: THE ROYAL FLYING CORPS
AND THE GERMAN AIR SERVICE FROM JULY TO NOVEMBER 1916

THESIS

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CHAPTER I

INTRODUCTION

Throughout the twentieth century, air power served as a vital element in successful military operations--so vital that it often decided the outcome or course of an engagement before the infantry's feet ever touched the ground. The German Blitzkrieg and the United States atomic bombing of Hiroshima and Nagasaki during World War II, the B-52 raids on Hanoi and Hai Phong that brought the North Vietnamese back to the negotiating table in 1972, the work done by Allied warplanes prior to the beginning of operation Desert Storm in 1991, and the U.S. bombing campaign in Afghanistan in 2001 all demonstrated the decisive influence of the airplane in modern military actions.¹ Yet, the role of the airplane was not always as clear-cut. When war broke out in Europe in August of 1914, the airplane had existed for only a few years. Rarely had it been used in combat, and only then in a limited way. Consequently, when hostilities began, most European nations were unsure how to properly utilize the airplane. Most politicians and military men saw the airplane as a reconnaissance tool, used to augment reconnaissance units on the ground.²

¹For further information regarding these events in which air power played a decisive role see: Eduard Mark, Aerial Interdiction: Air Power and the Land Battle in Three American Wars (Washington, D.C.: Center for Air Force History, 1994).

² Regarding the airplane before the war, historian Lee Kennett stated, "Many military leaders

That view quickly changed as ambitious airmen and insightful commanders adapted the airplane to a variety of uses, including bombing, aerial photography, close support of ground troops, cooperation with artillery batteries, and aerial combat with other airplanes. Thus, by 1915, the conceptions regarding the use of the airplane began to change. Nevertheless, not everyone was convinced that the airplane was an essential tool for modern warfare. In July 1916, the Battle of the Somme put all uncertainty to rest

On July 1, the combined forces of Great Britain and France attacked the Imperial German Army at numerous points along the Somme River in the French countryside. At dawn, Allied infantry troops poured over the top of their trenches and resolutely marched toward the German lines. The French, more experienced with the unique difficulties of trench warfare, moved in small “platoon sized units” and carried virtually no packs.³ The British, being relatively unscathed and certainly less experienced with the new realities of the war than the French, adhered to tactics that were useless in trench warfare. When the command whistles blew, the British infantry leapt out of their trenches and marched side by side in rows that were four ranks deep. The result was destruction and death on a scale not seen before in British history.⁴ While the casualty figures of July 1 were not surpassed

were unsure exactly how they could use the new weapons; other probably accepted them against their better judgment.” Kennett does, however, mention that popular support for aviation increased as the First World War closed in. Lee Kennett, A History of Strategic Bombing (New York: Charles Scribner’s Sons, 1982), 16-17.

³ John Mosier, The Myth of the Great War: A New Military History of World War I (New York: Harper Collins Publishers, 2001), 241

⁴ The British casualties for July 1st totaled 498, 054 This figure includes all casualties including men killed, wounded, and missing. *Ibid.*, 241.

during the remainder of the battle, casualties continued to grow. The Allied forces sustained their effort in an attempt to achieve a decisive breakthrough that they hoped would cripple the Germans and hasten the war's end. As a result, Allied troops undertook several more large infantry assaults over the course of the battle.

Above the Somme, airplanes performed every conceivable duty and demonstrated the importance of possessing air supremacy over one's enemy. The goal of this work is to describe the aerial conflict above the Somme, who emerged victorious, and why. In addition, the effect of the battle on the use of air power during the remainder of the war will be discussed. Particular attention will be paid to the struggle for air superiority between Britain's Royal Flying Corps (RFC) and Germany's Imperial German Air Service.⁵

This thesis attempts to answer the preceding questions and begins by examining the employment of the airplane during the first two years of the war. Then, it focuses on the early use of the airplane and the men that foresaw its potential as a tool of war. The theories and ideas of air power pioneers, such as, Gullio Douhet, Sir Hugh Trenchard, Ferdinand Ferber, and William Mitchell, will be discussed in order to provide examples of

⁵ Royal Australian Air Force Vice-Marshal H.N. Wrigley, defined air superiority as "a condition necessary to permit of a comparatively free employment of an air force and as being manifested by the constant ability to maintain the offensive." Wrigley believed it could be obtained by three methods. The first was "fighting in the air and the moral effect of aircraft being brought down." Second, by "bombing of aerodromes." Thirdly, "destruction of means of production. Necessarily a long business and the effect is not apparent immediately. Fighting in the air may be the first step towards it." H.N. Wrigley, The Decisive Factor. Air Power Doctrine, ed. Alan Stephens and Brendan O'Loughlin. (Canberra: Australian Government Publishing Service, 1990), 61-62. The efforts of French pilots, including the American volunteers in the *Lafayette Escadrille*, will be discussed, but to a far lesser degree because for the majority of the battle the French Air Service was fighting to survive at Verdun. Only in October, 1916, when the fighting at Verdun ceased did large numbers of French *Escadrilles* began arriving along the Somme. Therefore, their contribution and impact on the aerial contest at the Somme was less significant.

pre-war and early war thoughts regarding the airplane. It also takes a look at the airplane's use during the first two years of the war, beginning with the buildup of the air forces of Europe's three major powers: Great Britain, France, and Imperial Germany

The focus then shifts to Battle of the Somme and seeks to determine who had air supremacy. More importantly, it aims to discover if air supremacy changed hands during the course of the battle, and if so for what reasons? Did tactics, numerical superiority, aggressiveness, and technical advances in aircraft influence the outcome? If they did, in what way? In addition, this thesis discusses the many duties performed by the RFC during the battle and how those duties changed as the situation required. The German Air Service and its shifting fortunes is also addressed, because its disposition had a major influence on the way in which the RFC conducted itself during the Battle of the Somme.

Finally, this study concludes by assessing the factors that contributed to the outcome of the air campaign over the Somme. It examines how those factors changed as a result of the battle and how they were applied during the remainder of the war. As a result, it discusses the development and refinement of fighter aircraft, tactics, organization, leadership.

The overall goal of this endeavor is to provide a fresh and unique account of the development of the airplane during the First World War using the Battle of the Somme as a focal point. It is based upon primary and secondary sources.⁶ It is also the goal of this author to illuminate the often forgotten first chapter in the story of aerial combat, a story often surpassed by the achievements and importance of air power during the Second

⁶ For an essay of sources regarding the Battle of the Somme, air power during the battle, and air power during the First World War see Chapter II of this work.

World War and beyond.

There have been numerous studies of the influence of weaponry on the First World War. The majority of these are concerned with artillery, the tank, and small-arms-rapid-fire weapons. The few that examine the air war, other than popular histories about aerial aces, tend to stress reconnaissance and artillery coordination. It is the intention of this thesis to examine the development of the fighter airplane and its importance during the Battle of the Somme. It is hoped that this study will explore, more closely, the role of aircraft in war and its rapid development as a tactical and strategic weapon of considerable consequence

CHAPTER II

AN HISTORIOGRAPHICAL INTERPRETATION OF THE INFLUENCE OF WEAPONRY IN THE FIRST WORLD WAR TOGETHER WITH A REEXAMINATION OF THE DEVELOPING ROLE OF AIRCRAFT

The First World War and the new technologies that developed during its course have been studied in great detail. From general histories of the war to specific studies on the use of tanks, airplanes, and artillery, a plethora of information is available to those inclined to learn about the world's first truly global conflict. For this thesis, only a few of the many have been selected. The sources used in this thesis represent the efforts of many excellent scholars, who provided a thorough account of the airplane's use and development at the Battle of the Somme and beyond. In addition, a number of firsthand accounts and recollections of the First World War and the airplane's use during the war are consulted. It is these sources, perhaps more so than any others, that illuminate the experiences of the airmen during the Somme and the war as a whole.

One of the earliest general histories of the war is B.H. Liddell-Hart's The Real War: 1914-1918 (Boston, Toronto:1930). Although not exclusively, the majority of the key battles he discusses were those in which the British played the leading role. Primary among these was the Somme, which Liddell-Hart examines over the course of two chapters. The first chapter focused on the battle itself and the way events played out

during its course, while the second examines the use of tanks at the Somme, which was the first time the new vehicles were used in war. Liddell-Hart believes that the Somme was a waste of time and manpower. In his view, Field Marshal Sir Douglas Haig, commander of the British Expeditionary Force (B.E.F.), should have never undertaken an offensive along the Somme in the first place due to the strong German entrenchments in the area. He characterizes the British commanders of being “over ambitious and unduly optimistic” immediately before the battle. Haig, in particular, thought that a decisive breakthrough was virtually assured if the Allies attacked along the Somme. Once the initial attack failed to achieve the desired results, Liddell-Hart feels that the British commander’s aggressiveness dissipated, being replaced by an over-cautious attitude that inhibited the effectiveness of the infantry during the remainder of the battle. Liddell-Hart also concludes that the casualties suffered by the Allied forces negated the drain their attacks caused on the German Army. In Liddell-Hart’s view, the nearly equal casualties on both sides did not give the Allies an advantage. He points out that the Germans may have had fewer men to fill the depleted ranks, but they did have better-trained reserves that could have been mustered almost immediately. On the other hand, the French manpower was nearly exhausted, and the British had few men equipped to join the fight quickly.

Air power and the airplane are almost entirely absent from Liddell-Hart’s account of the Somme. The RFC’s and German Air Service’s work was only addressed sporadically over the course of the two chapters about the battle. When addressed, he only mentions an airplane or group of airplanes without any specifics or detail. By examining Liddell-Hart’s account leaves the impression that the airplane played virtually

no role during the battle and its use in no way aided either side during the war. The omission of the airplane is typical of most general studies of the First World War due to the immense amount of material that has to be addressed in such a work. Sadly, but understandably, the airplane is often little more than a footnote.

A more recent and more thorough account of the First World War was John Keegan's The First World War (New York: 1999). Written nearly seventy years after Liddel-Hart's work, Keegan's study is more complete because of the work done during those many decades. Primarily, Keegan believes that the British reliance on the preparatory artillery barrage to weaken the Germans was their greatest strategic flaw. Keegan points out that Haig and his subordinates did not have any other plan if the artillery barrage failed to achieve the results they desired; this often resulted in tremendous losses among the British infantry. Overall, Keegan believes that the battle ended in a stalemate, with neither side having achieved anything substantial.

Keegan does not discuss the airplane at any length, instead, he places a great deal of emphasis on the first use of the tank in September 1916. Keegan states, "the offensive on the Somme might have been doomed to drift away into an autumn of frustration and a winter of stalemate had it not been for...the tank."¹ The tank, however, neither speed up the end of the battle nor lead to an Allied victory. Keegan, therefore, overstates the significance of the tank and slights the important role airplanes played during the Somme

The most recent general study of the war used was John Mosier's The Myth of the Great War: A New Military History of World War I (New York: 2001). Mosier states

¹ John Keegan, The First World War (New York: Alfred A. Knopf, 1999), 297.

that his goal in writing his work was to reveal “a great deal that has been ignored or suppressed by other historians ” For instance, Mosier points out that previous accounts regarding the Battle of Verdun “misreported” the numbers of French and German casualties. The true casualty figures were much higher than previously reported in the majority of studies on the battle. Mosier also hopes to “introduce the reader to a largely unknown side of the war, to explain how it was that the Germans were almost invariably victorious on the battlefield, and to show how the Allies consistently misinterpreted what was happening.”² His account of the Somme serves as an excellent example of his reinterpretation of the war.

The title Mosier chose for his chapter on the Somme, “1916: Massacre on the Somme,” demonstrates the way in which he views the battle. According to the author, the French were partly responsible for the decision to attack at the Somme. Mosier believes that they knew the area was of little strategic value, but chose to use the large numbers of British in the area to smash against, and hopefully wear down, the German Second Army. Haig reluctantly agreed to accept the demand of General Joseph Joffre, commander of the French Army, to attack in July. From that point forward, the blame for the failure for the offensive could no longer be placed on the French in Mosier’s opinion. Haig and his staff concluded that a swift victory was at hand and chose to unleash a lengthy artillery barrage to soften the German defenses. Mosier thinks that the British artillery was inexperienced and used the wrong type of shells, shells that caused little more than superficial damage. In addition, Mosier deems the tactics used by the British infantry during the Somme as

² Mosier, The Myth of the Great War, XII.

outdated and ineffective. The French and Germans had already changed their tactics for the infantry, sending men in smaller platoon sized groups rather than long waves that stretched across the battlefield and provided easy targets for German machine-gunners. After the failure of the initial infantry attack, Haig and his staff changed their goals for the Somme offensive. The purpose of the battle was no longer to break through the German lines, but rather to wear the German forces down. Mosier concludes that the possibility of wearing the Germans down was highly unlikely due to their greater experience and heavily defended positions. However, at the conclusion of the battle, the British claimed that their strategy of exhausting German manpower had paid off with the deaths of over 600,000 German soldiers. Mosier, on the other hand, suggests that the British estimates of German casualties was exaggerated greatly. According to Mosier's research, the German's losses were on the order of 140,000.

While Liddell-Hart and Keegan briefly mentions the use of airplanes during the battle, airplanes were completely absent from Mosier's work. He focuses on the tank's, not the airplane's, use as a potential surprise that the British hoped would achieve a breakthrough. The British use of the tank was a rude shock to the Germans who had never seen such a vehicle before. The airplane, however, played a far more vital role during the battle and should have been at least mentioned by Mosier.

A number of works that deal solely with the Battle of the Somme were also utilized. The earliest work on the battle used was John Masefield's The Old Front Line (New York: 1918) which focuses almost exclusively on the British Army's experience in preparation for the battle. Masefield's is a skilled writer. He is able to describe the terrain on which the battle was fought in magnificent detail, virtually transporting the reader to

the area around the Somme as it was before the carnage of the battle began. However, Masefield does not go far beyond describing the terrain and the various landmarks that dotted the landscape. The planning of Haig and his staff along with the details of the buildup are only briefly mentioned in what amounts to an excellent guided tour around the Somme battlefield.

Masefield does not discuss the RFC and its contributions in much detail, but he does point out that they played a vital role during the months of preparation for the battle. In particular, Masefield stresses that the RFC's ability to block the German Air Service from photographing British positions kept British pre-battle casualties to a minimum.

The best and most thorough account of the battle is A.H. Farrar-Hockley's The Somme (London, 1966). Unfortunately, the conflict in the air is almost completely absent from Farrar-Hockley's account of the battle. Air Power certainly was not the deciding factor of the battle, however, the assistance it provided the infantry and artillery in particular was substantial and certainly worthy of more attention than Farrar-Hockley gave it. Concerning the battle, Farrar-Hockley believes that the failed September 15th attack should have been the end of the battle. He suggests that after that attack the possibility of an Allied victory was gone. Yet, as he points out, Haig felt that a breakthrough was still possible and, therefore, continued the battle. Haig, however, was not totally to blame according to Farrar-Hockley. Haig was under intense pressure from the French, General Joffre in particular, to continue the fight despite the casualties and slim chance of success. In Farrar-Hockley's final assessment, the Battle of the Somme achieved few lasting results. The one major change was in the British government in which Prime Minister Herbert Asquith was replaced by David Lloyd George. The change was a direct result of

the battle, in particular the tremendous casualties that resulted. The casualties shocked the British public and led to a feeling that the government was complacent and needed to be replaced.

Martin Middlebrook's The First Day on the Somme (New York, 1972) is another excellent study of the battle. As the title suggests, Middlebrook's work deals predominantly with the events leading up to the attack on July 1 and the attack itself. In fact, over 240 of almost 400 pages focus on the preparations for and the events of July 1. Out of the remaining 140 pages, 63 consist of the appendix, bibliography, and index. Consequently, Middlebrook's book is arguably the most thorough account of the preparations for the Battle of the Somme and the events of July 1st yet written.

Middlebrook views the battle as a tremendously costly one for the Allies, particularly the British. The British lost several million men during the battle. Most of the casualties were well-trained men, who had gained a good deal of experience during the first two years of the war. Many of them were part of the initial group of recruits that had joined the British Army following the outbreak of hostilities. According to Middlebrook, these men formed tight-knit units that were both capable and experienced. Their loss, in his opinion, forced the British Army to rely on less-trained and less-experienced troops which hindered British efforts for months following the battle.

Similar to Farrar-Hockley's description of the battle, the airplane is mentioned only briefly in Middlebrook's study. Occasionally, Middlebrook mentions that a telegram was dropped or an airplane bombed a specific target. For the most part, however, the airplane was not a factor in the battle according to Middlebrook; this is unfortunate considering the work the RFC performed in preparation for the battle.

Several works by the various commanders involved are highly useful in gaining an accurate recounting of the Somme because few people were privy to the happenings at the various army headquarters. These men had been directly involved in the decisions that ultimately cost several million lives, and their recollections of those decisions, mixed with some regret and pondering, help one understand why certain decisions were made.

For the British perspective, Field Marshall Sir Douglas Haig's The Private Papers of Douglas Haig, 1914-1919 (London: 1952.) is essential. Haig was the commander of the B.E.F., having replaced Sir John French several months prior to the Somme. He was also the man ultimately responsible for the B.E.F.'s fate as he could have either rejected or accepted the plans of the French High Command headed by General Joffre. Haig, believing the area around the Somme to be a suitable area for the battle and spoiling for a fight, agreed to attack in the area in order to try to draw some of the German Army away from Verdun.

The work is essentially an edited collection of Haig's diary entries. As such, the day-to-day happenings within the B.E.F. high command are available for close examination. From late February to June 1916, Haig and his subordinates busied themselves preparing for the battle which is evident throughout the pages devoted to that endeavor. The initial infantry attack and the many that followed are discussed by Haig, but never in great detail. Regardless of the brief nature of the entries, however, Haig's opinions and insight are present and provide some explanation as to why he chose to continue fighting along the Somme after the failure of the July 1st infantry attack and the artillery bombardment that preceded it.

For the German commanders' view of the battle, several works are rather useful.

Among these are General Erich von Falkenhayn's The German General Staff and its Decisions, 1914-1916 (New York: 1919), General Paul von Hindenburg's Out of my Life (London, Toronto, Sydney, Melbourne 1933), General Erich von Ludendorff's Ludendorff's Own Story, August 1914-November 1918 (New York, London: 1919), and The General's Staff and its Problems (London 1920).

General Erich von Falkenhayn's The German General Staff and Its Problems examines the first two years of the war during which he served as the Chief of the German General Staff (*Chef des Generalstabs*) As a result, he briefly discusses virtually all the important battles and developments from 1914 until his removal toward the end of the Somme offensive. Falkenhayn believes that the Somme was an Allied disaster that had "little influence on the rest of the war" and left the Allied armies incapable of launching a major offensive in the winter of 1917.³ In his view, the Allied armies would have been completely exhausted at the Somme had it not been for American aid, which he detested.

Regarding air power at the Somme, Chief of the German General Staff, General Erich von Falkenhayn, states that the German Army's operations on the Eastern Front kept badly needed German Air Service airplanes away from the Western Front at the start of the battle. Overall, however, Falkenhayn's study does neither cover the Somme in much detail nor really addresses the German Air Service and their contributions directly.

General Paul von Hindenburg's Out of My Life, spans the entire war and his service on both the Eastern and Western Front. As with Falkenhayn's account of the situation at German General Headquarters (*Oberste Heeresleitung*, OHL), Hindenburg

³ Erich von Falkenhayn, The German General's Staff and Its Decisions, 1914-1916, trans. Die Oberste Heeresleitung (New York. Books for Libraries Press, 1919), 304.

provides unique insight into the decision makers behind Germany's war machine.

Hindenburg also briefly examines the Somme. He believes that the German Army was strained on the Western Front by fighting at both Verdun and the Somme. Consequently, he asked Kaiser Wilhelm II to end the fighting at Verdun, which was accomplished around the same time that Hindenburg took Falkenhayn's place as Chief of the German General Staff. Once Verdun had ended, Hindenburg still believed that the Somme ate up too many German resources and needed to end because a favorable outcome for the German forces was unlikely. Hindenburg addresses the use of air power at the battle of the Somme, but not at great length. The only substantial mention of the German Air Service Hindenburg includes concerns its lack of aircraft throughout the battle.

General Erich Ludendorff's Ludendorff's Own Story and The German General Staff and Its Problems both focus on the entire war and the difficulties he experienced firsthand at Hindenburg's side. As the German Army's First Quartermaster General (*Generalquartiermeister die Oberste Heeresleitung*) during most of the First World War, Ludendorff's recollections on Germany's supply problems are priceless. In particular, Ludendorff's recollections of the supply problems during the Somme are essential to understanding the situation facing the German Army and German Air Service.

In both Ludendorff's Own Story and The German General Staff and Its Problems, Ludendorff mentions the airplane on several occasions. For insight into Germany's prewar buildup of its air force, The German General Staff is the most useful of the two books because Ludendorff discusses the effort to increase the size of the German Air Service prior to the war and the views of aviation held by Moltke, Hindenburg, and others within the German High Command. On the other hand, Ludendorff's Own Story is useful

for information about the effect of the German Air Service's lack of air superiority on German infantry troops during the early months of the battle. Ludendorff, however, only briefly mentions the Somme and does not discuss the efforts he and others made to increase the strength of the German Air Service in the fall of 1916. Despite the flaws, both of Ludendorff's books are rather useful for gaining some insight into the behind-the-scenes activities of the German Air Service and German aircraft industry.

As this work deals primarily with air power and the use of the airplane during the First World War, a few general histories of the air war during the conflict are extremely helpful. Eric and Jane Lawson's The First Air Campaign: August 1914-November 1918 (Pennsylvania: 1996) is an excellent survey of the World War I air conflict. The authors state "winning the world's first air campaign involved a complex mixture of many factors." They then proceed to address the "many factors" in an easy to comprehend manner by laying their work out in chapters that focused on specific years. The book begins by examining the first few months of the war beginning with August of 1914 when the first airplanes flew hostile missions in the skies of Europe. The following chapters follow similar lines and address the airmen involved, the development of aircraft technology, the growing acceptance of the airplane among various military leaders, and the numerous battles in which airplanes played a role.

Regarding the Somme, the authors conclude that no clear victor emerged. They came to this conclusion because, as they state, "the year 1916 opened and closed with Germany wielding tactical superiority while the middle months witnessed the greatest

Allied aerial dominance of the war.”⁴ They believe, therefore, that at the battle of the Somme air supremacy was split between the German Air Service and the RFC during the battle and neither side could claim to have dominance over the other. The Lawsons do not seem to accept the argument that the RFC had air superiority because they were consistently able to undertake offensive action. The Lawsons judged that the German airmen’s accomplishments, combined with RFC losses in the fall of 1916, demonstrated the fact that the RFC did not have control of the air during the entire battle. According to the authors, who won the battle was less important than the lessons the belligerent air forces learned as a result of having participated in it. In their view, the most significant result of the battle was the realization that the fighter plane and the squadron were the primary assets of a successful air force. They point to the arrival of the Albatros and the success of the Jagdstaffel as proof for their argument.⁵

Perhaps the most detailed and thorough single-volume work dedicated to air power in the First World War is John H. Morrow’s The Great War in the Air: Military Aviation from 1909 to 1921 (Washington and London: 1993). Morrow looks at the very early development of the airplane and the individuals responsible. Similar to the Lawsons, Morrow moves chronologically through the war discussing each year and the important advancements during that year. Morrow, however, goes beyond simply discussing developments at the front. A large part of his work is devoted to the state of the aviation industries and the air force command structures of Germany, France, and Britain.

⁴ Eric and Jane Lawson, The First Air Campaign: August 1914-November 1918 (Pennsylvania: Combined Books, 1996), 99.

⁵ *Ibid.*, 97-99.

Morrow's inclusion of the situation "behind the scenes" allows the reader to better understand why the German Air Service had to fight a defensive war.

Morrow sees the Somme, as well as Verdun, as "the true beginning of aerial warfare" He points out that airplanes were involved in both battles to a much greater extent than in any previous battle. In addition, the aircraft industries of the Britain, France, and Germany all increased output and production during 1916. Therefore, Morrow believes that Verdun, and the Somme in particular, contributed to the shape of the belligerent air forces and their actions for the remainder of the war. Like the Lawsons, Morrow addresses the growing importance of the fighter in the fall of 1916. However, he suggests that the airplanes were not as important as the means to manufacture and properly employ them in battle.⁶

Another excellent survey of the air war can be found in Alan Clark's Aces High: The War in the Air over the Western Front, 1914-1918 (London: 1999). Clark's work focuses primarily on the RFC and their experiences during the First World War. He provides information on the German and French air forces, but only a fraction compared to his treatment of the RFC. Clark's decision to center his examination on the RFC does not inhibit its value, however. This was because Clark includes the important events in which the Germans and French were involved, particularly the period of German aerial dominance in the spring of 1917 ("Bloody April")

Clark devotes only a few pages to the Battle of the Somme. As is common throughout the book, most of the focus in these pages is on the RFC and its most

⁶ John H. Morrow, Jr., The Great War in the Air: Military Aviation from 1909 to 1921 (Washington and London: Smithsonian Institution Press, 1993), 195-196

accomplished ace, Major Lanoe Hawker. Hawker's exploits during the Somme are well-documented by Clark, but the result is a lack of material on Boelcke or any other aces active during the battle. Clark also discusses the airplanes used at the battle and the effect various models had on the outcome of the aerial battle. Yet, he underscored the importance of the Albatros D models and devotes most of his attention to the RFC's DH2. Consequently, Clark's work is of minimal value to the study of the air campaign over the Somme due to the fleeting manner in which it deals with the battle

Ezra Bowen's *Knight's of the Air* (Alexandria, 1981) is another good survey of the first air campaign. Part of the excellent *The Epic of Flight* series published by Time-Life books, Bowen's work provides a great view of the First World War in the air. Adding to the book's effectiveness is a number of photographs, illustrations, and diagrams.

Bowen integrates his brief examination of the Somme into two chapters that focus on the rise of Allied air supremacy in early 1916 and the growing German dominance that began late in the year. Bowen believes that the Allies air superiority during the early months of the battle kept Allied ground force casualty figures lower than they otherwise might have been. Bowen, however, does not discuss the battle in depth. Instead, he focuses on a few of the personalities involved, such as RFC Captain Albert Ball and Boelcke. Overall, Bowen does not evaluate the battle, nor describe its importance. Rather, he simply describes the outcome of the air war over the Somme.

Aaron Norman's *The Great Air War* (New York: 1968) is yet another strong work on air power during the First World War. Norman's account includes a great deal of information on the air services of the all major powers including Russia and Austria-

Hungary, although most of the focus was on the RFC and the German Air Service. As with many other histories of the air war, a great deal of attention is paid by Norman to the various aces involved.

Norman devotes a rather small portion of his work to the battle of the Somme and its importance to the remainder of the air war. The majority of the pages on the Somme focus on the German Air Service and the impact the arrival of the Albatros DI and Jagdstaffel 2 had on the outcome of the battle. In Norman's opinion, the German Air Service seized air superiority from the Allies in the fall of 1916 due primarily to the DI. Unfortunately, Norman does not provide an adequate account of the RFC's work during the same period to back up his thesis, leaving the reader with a sense that part of the story was missing. Norman's work is, therefore, useful only in that it provided some important details on the German Air Service during the latter half of the Battle of the Somme.

Arguably, the best and most comprehensive study of the First World War in the air is the seven volume The War in the Air: Being the Story of the part played in the Great War by the Royal Air Force (Oxford: 1922, 1937) by Walter Raleigh and H.A. Jones.⁷ Each volume is full of information the authors gathered from a variety of sources including many personal accounts from leading air service and army commanders from Britain, France, and Germany. To their credit, both Raleigh and Jones include a rather sizeable amount of information from those intimately involved in the day-to-day operations of the German Air Service such as Ernst von Hoeppner, Hermann von der Leith-Thomsen,

⁷ The first volume of The War in the Air: Being the Story of the part played in the Great War by the Royal Air Force, was written by Sir Walter Alexander Raleigh and published in 1922. The remaining volumes were completed and published in 1937 by H.A. Jones who took over the task of finishing the saga of the R.A.F. after Raleigh's death. Consequently, while Jones' name appears on the 1937 edition of volume 1, the work is nearly identical to Raleigh's work, of which he added minimal changes.

Oswald Boelcke, and Manfred von Richthofen. As a result, while most of the focus is on the RFC, the perspective of their enemy is thoroughly represented as well. Each battle in which the RFC was involved is discussed in sufficient detail.

For the Somme, volumes one and two are the most useful as they discuss the early development of the airplane and its use during the battle. Jones, who wrote volumes two through seven, stresses the importance of the battle to the RFC and includes a general description of each day's aerial activity. In Jones's view, the RFC was successful during the battle due to two primary factors: good airplanes and aggressive leadership. The airplanes flown by the RFC were, at the beginning of the battle, better than any airplanes the German Air Service could muster.⁸ In addition, the Allies had a far greater number of these airplanes available to fight as the battle began. An equally strong weapon, in Jones's view was RFC commander General Hugh Montague Trenchard who instituted his plans for a "direct offensive" against the German Air Service during the battle. One of the most important consequences of Trenchard's strategy, according to Jones, was the fact that "bombing planes were able to complete their tasks because of escort planes and the offensive tactics advocated by Trenchard."⁹ In other words, German targets could be successfully engaged with minimal danger due to aggressiveness of RFC fighter airplanes.

While Jones emphasizes the boost the arrival of the Albatros fighters had on the German Air Service's effectiveness, he does not conclude their arrival significantly

⁸ By the spring of 1916, the "Fokker Scourge" had ended as the Fokker's had become outdated as several new Allied fighters entered the fray. These included the DH2, FE2 b, and Nieuport Scout. 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 2 (Oxford: Clarendon Press, 1937), 155-161.

⁹ *Ibid.*, 259.

interfered with the work of the RFC. The many instances of aerial combat between Jagdstaffel 2 and other German Squadrons with the RFC are well documented by Jones. However, he believes that these did little more than cause increased casualties among British pilots as German attacks on targets behind Allied lines remained infrequent and ineffective. Jones also thinks much the same about the reorganization of the German Air Service in October. He concludes that while its increased autonomy allowed it to increase the number of German fighter aircraft at the Somme, the increase was not sufficient enough to effectively regain air superiority from the Allies¹⁰

Overall, Jones believes that the Somme taught the RFC that it must sustain offensive operations in order to successfully deal with the German Air Service. Jones also concludes that the battle demonstrated the importance of possessing good airplanes capable of meeting or exceeding the capabilities of the enemy's airplanes. For evidence of this, Jones points to the fact that the RFC had almost complete air superiority during the majority of the Somme precisely because of their superior aircraft. He then shows that the RFC sustained greater losses following the arrival of superior Albatros fighters in the fall. The airplane seemed to be the key

Two other excellent works on the air war were Quentin J. Reynold's They Fought for the Sky (New York, Toronto: 1957) and Alexander McKee's The Friendless Sky (New York: 1964). While neither author has chapters devoted to specific years, both generally follow the practice of moving chronologically forward which they deem the

¹⁰ By mid October, the German Air Service had 333 airplanes at the Somme and a total of 451 airplanes along the entire Western Front. During the same period, the RFC 563 airplanes along the Western Front, the majority of which were in action above the Somme. The RFC was also supported by the increasing numbers of French Air Service airplanes, including the American volunteers in the *Lafayette Escadrille*. Jones, The War in the Air: Being the Story, Volume 2, 305-306.

easiest way to show the development of the airplane's use during the First World War

Alexander McKee devotes two chapters of his study to the air war over the Somme. Although short, McKee's coverage of the battle provides an adequate picture of the happenings. The first chapter focuses on the first half of the battle and the RFC's success during that period. The second examines the rise of the German Air Service during the latter half of the battle with most of the attention focused on Jagdstaffel 2. Yet, over the course of the two chapters, McKee does little more than explain the events as they occurred and offers little in the way of analysis.

Reynold's chapter on the Somme is all too brief and doesn't go into great detail on any matter other than Boelcke's death on October 28, 1916. The RFC is only mentioned sporadically in the chapter with no more than two pages at a time devoted to their exploits. The German Air Service's increasing strength and power in the fall of 1916 certainly dominates the chapter which, like McKee's, does not include any analysis. Consequently, Reynolds work is a fine supplement, but can not stand on its own as a proper and thorough examination of the Somme.

Several works that specifically deal with the German Air Service are used in researching this study. One of the best works on the German Air Service is John H. Morrow, Jr's German Air Power in World War I (Lincoln and London: 1982). Like his later work, The Great War in the Air, German Air Power is a very detailed and well-written account of the German Air Service's exploits in World War I. While Morrow discusses the events at the Western Front and the major battles in which the German Air Service was involved, his major focus is on the command of the German Air Service and the German aircraft industry. Often neglected by other authors, the competition that

existed between the aircraft factories in Prussia and Bavaria that hurt the German Air Service during the first two and-a-half years of the war is one of the main points discussed by Morrow.¹¹ The pages devoted to this competition demonstrate that the German Air Service had more to deal with than the French and British air forces. In addition, Morrow discusses the Hindenburg and *Amerika* programs that boosted the output of the German aircraft industry beginning in the spring of 1917.¹² Both programs were the direct result of the Somme which had demonstrated the importance of having both superior airplanes and the ability to continue to produce such products.

The German Air Service command structure is an equally important element Morrow deals with. Particularly, Morrow clearly points out that the increased authority given to von Hoepfner and Leith-Thomsen in October 1916 during the Somme was the turning point for the German Air Service.¹³ Overall, Morrow's work is the most thorough account of the German Air Service in World War I yet written and, therefore, is essential to the study of the first air campaign and the Somme in particular.

Similar in detail and thoroughness is Morrow's earlier work on the development of the German Air Service, Building German Airpower, 1909-1914 (Knoxville: 1976). In Building German Airpower, Morrow focuses on the development and expansion of the German Air Service and German aircraft industry during the pre-war years. Consequently,

¹¹ This competition between the two dominant regions within Germany led to supply problems and other difficulties from August of 1914 to roughly October 1916. For instance, the Bavarian Army received preferential treatment from the Bavarian aircraft companies, including what became the Bavarian Motor Works (BMW). John H. Morrow, Jr., German Air Power in World War I (Lincoln University of Nebraska Press, 1982), 15-55.

¹² *Ibid.*, 73-120.

¹³ *Ibid.*, 73

the early battles between supporters and opponents of the airplane in Germany are discussed at length. Morrow also examines the relationship between the Prussian Army and North German aircraft manufacturers which was often tenuous at best. The pages on the competition between army and industry are highly valuable to understanding why the German Air Service experienced supply and unity difficulties during the first two years of the war. Morrow also examines the “growth and mobilization of the German air force from 1912 to 1914. In doing so, Morrow clearly shows how the German Air Service was able to enter the war with the strength that it had. While Morrow does not address the Somme in Building German Airpower, the book is essential to understanding how the German Air Service reached the point it had by the beginning of the battle and how it managed to overcome its shortfalls.

Ernst von Hoeppner’s Deutschlands Krieg in der Luft (Leipzig: 1921) is the best first-hand account of the German Air Service during the Somme. During the second half of the war, Hoeppner was the German Air Service’s commander; therefore, his insight was invaluable. In his recollections of the war, Hoeppner discusses the struggles the German Air Service went through during the war. Fortunately, Hoeppner begins by examining the development of air power in Germany prior to the war and the role he played in that development.

The Somme is given considerable attention by Hoeppner, who sees it as the turning point of the war for the German Air Service because of the increased autonomy it enjoyed beginning in October, 1916. Prior to the creation of the *Luftstreitkräfte* on October 8, Hoeppner believes the German Air Service was incapable of fully utilizing the airplanes at its disposal because it lacked proper control. In Hoeppner’s opinion, if the

German Air Service had not been given more independence it would not have been so successful in the spring of 1917. Unfortunately, Hoepfner does not discuss the impact of the arrival of the Albatros DIs and DIIs in the fall of 1916 nor the exploits of Jagdstaffel 2 at any length.

In Knight of Germany: Oswald Boelcke, German Ace, professor Johannes Werner examines the life of the German Air Service's second most well-known airman, Captain Oswald Boelcke.¹⁴ Werner's book looks at Boelcke's endeavors from the beginning of his army career to his death at the Somme in October of 1916. Consequently, Werner discusses the German Air Service's activities at Verdun and the Somme a great deal. Boelcke was heavily involved in both battles and, at the time, was Germany's most successful pilot. Interspersed throughout the book, Boelcke's diary entries to his mother detail his daily experiences during both battles. Of particular interest are Boelcke's letters regarding the Fokker E III fighter and his relationship with the airplane designer, A.H.G. Fokker. The relationship between the two men led to better fighter aircraft as Boelcke offered advice on ways to improve German fighter aircraft. In addition, Boelcke's recollections of the Battle of the Somme are very useful to this paper. Precisely, his recollections on the formation of Jagdstaffel 2, which was the initial step toward German fighter domination, were important to the understanding of the German Air Service's state of affairs at the Somme. Throughout the book, Werner's voice is never lost, nor is it dominant. Werner seamlessly integrates Boelcke's letters with his own research, creating a superb account of Boelcke's deeds and the evolution of the German Air Service from

¹⁴ The best-known German airman of the war is Manfred von Richthofen, known as the "Red Baron."

the fall of 1915 to the fall of 1916 without assessing the importance of those changes.

An excellent source on the rise on German Air Service power in the fall of 1916 is Manfred von Richthofen's The Red Air Fighter (London: 1990). Richthofen discusses his early career, but the most interesting portion of the book is from the Somme forward. Especially important are Richthofen's recollections of the formation of Jagdstaffel 2 in early September 1916. Richthofen joined the Jagdstaffel in August during his inspection tour of the Eastern Front. From that point forward, he quickly rose to prominence within the Jagdstaffel, eventually becoming its commander following Boelcke's death in October. Richthofen's recollections of the Jagdstaffel's work at the Somme are highly valuable to this paper as they provide the unique insight of the most well-known ace of the First World War.

A complimentary work to Richthofen's is Floyd Gibbons' The Red Knight of Germany: The Story of Baron von Richthofen (New York: 1959). The Red Knight is a highly detailed account of Richthofen's life and career as an airmen. Gibbons wisely uses many passages from Richthofen's The Red Air Fighter throughout the book. Those passages, along with Gibbons commentary, provides a superb account of the "Red Baron's" achievements during the First World War. Gibbons, thankfully, compiles a list of Richthofen's victories and final defeat using the "Red Baron's" records as well as numerous German documents that were able in the decade following the war.¹⁵ These records allow one to compare the German records of Richthofen's victories with British records. Often a particular RFC pilot was shot down by an unknown German airplane.

¹⁵ The first edition of The Red Knight of Germany, was published in 1927. Floyd Gibbons, The Red Knight of Germany: The Story of Baron von Richthofen (New York: Bantam Books, 1959)

Using the records of Richthofen's success and British records, one can determine, with a large degree of certainty, that the "Red Baron" was the man responsible for defeating a certain RFC pilot on a specific day.¹⁶ The Somme is given sufficient coverage by Gibbons as it was the first battle in which Richthofen flew as a fighter pilot. Consequently, Gibbons begins by discussing the Somme in September when Jagdstaffel 2 arrived at the Western Front. His discussion, therefore, doesn't adequately explain the German Air Service's situation during the first half of the battle. Fortunately, however, his thorough coverage of Richthofen and Jagdstaffel 2 during the latter half of the battle make up for the material he left out.

For German aircraft development, particularly fighter development, A.H.G. Fokker and Bruce Gould's The Flying Dutchman: The Life of Anthony Fokker (New York: 1972) is an excellent resource. Arguably, Fokker was the greatest designer of the First World War. In his work, first published in 1932, Fokker examines his role during the war and the unique problems he faced. Fokker's discussions of the development of aircraft are the most exciting aspects of the book. All his models and their development, including the E.III, DVII, and Dr.I, were detailed. Fokker's reminiscences on the supply problems he faced due to his decision to maintain his Dutch citizenship are equally intriguing. These pages show that politics played a role in the German industry during the war and often interfered with the development of new airplanes.¹⁷ Consequently, one can see why Fokker's airplanes were not used by the German Air Service during the Somme and how

¹⁶ This information was very helpful in ascertaining von Richthofen's wins at the Somme

¹⁷ In the winter of 1916, Fokker was denied the new 160hp Mercedes engines due to his refusal to become a German citizen. A.H.G. Fokker and Bruce Gould, The Flying Dutchman (New York: Holt, Rinehart, and Winston, 1931), 155-157.

his designs once again rose to prominence following the battle. On the whole, Fokker's work provides a brilliant view into the German war industry and the progress of the fighter plane, both of which affected and were affected by the Battle of the Somme.

One of the best works that pertained to the RFC is Andrew Boyle's Trenchard: Man of Vision (London 1962) Boyle's biography of General Trenchard is best described as exhaustive. Beginning with his youth, the book follows the endeavors of Trenchard during both World Wars. Boyle incorporates many British government documents, as well as numerous other primary sources into his account. Among these are numerous excerpts from Trenchard's writings and letters to various persons of importance in the British government. The Somme is sufficiently covered, although not too intensely. The pages devoted to the Somme primarily focus on the tremendous losses suffered by the RFC during the battle. Boyle discusses Trenchard's strategy and tactics at length and believes the RFC commander was correct in the stance he took during the battle. While Trenchard's critics accused him of complacency with regard to the airmen under his command due to the large casualties the RFC suffered during the Somme, Boyle points out that Trenchard was far from uncaring. In Boyle's view, Trenchard took the only avenue that he felt was available. Trenchard's objective was to keep the German Air Service from striking targets behind Allied lines. To achieve this objective, Trenchard chose to undertake the offensive in order to meet German airplanes over their own lines before they could cross no-man's-land. The result of this stance was a large number of casualties. According to Boyle, Trenchard was well aware of that fact but felt that doing otherwise would lead to significant casualties without inflicting as much damage on the German Air Service.

Cecil Lewis's Sagittarius Rising (New York: 1936) is another excellent work pertaining to the RFC. Lewis's work is an superb first-hand account of the experiences of a British airman during the First World War. In his book, Lewis describes how he became a member of the RFC, his training, and experiences in several monumental battles. One of these battles was the Somme. Lewis first flew above the Somme in June 1916, as preparations for the July 1st infantry assault were underway. On the 1st, Lewis undertook a "Contact Patrol" mission in which he was charged with reporting the position of ground troops. Lewis's description of the failure of the infantry to send the proper signals during the attack is perhaps the best description of the good and bad points of the Contact Patrol to be found. Photography was another task that Lewis performed and described in detail. His account of the difficulties of taking photographs really illuminates the problems caused by the cumbersome equipment used at the time. It is Lewis's descriptions of the duties of the average RFC flier that make the work essential in the study of the Battle of the Somme.

Works that specifically examined the air campaign above the Somme are few. The most recent, and only book on the air war during the battle used in this paper is Peter Hart's Somme Success: The Royal Flying Corps and the Battle of the Somme, 1916 (South Yorkshire: 2001). Hart provides an excellent account of the RFC's accomplishments and trials during the battle using a number of airmen's accounts of the action as well as several excellent secondary sources.¹⁸ While the RFC's work is well documented by Hart, the German Air Service's is not as thoroughly examined. The

¹⁸ These accounts were taken from tapes made after the war with RFC airmen that fought during the Battle of the Somme

German Air Service does not appreciably enter Hart's account until he begins discussing the appointment of Hindenburg and Ludendorff in August of 1916. By leaving the German Air Service out of his focus until August, Hart neglects many important events that occurred during the early months of the Somme. Once he does begin including the German Air Service, however, his account of the battle balances out and became less one-sided. For September, October, and November, both the German Air Service and RFC are given the nearly equal attention they merit. As for Hart's assessment of the battle, he believes that the RFC won the air war over the Somme. His reasoning for his belief is that the RFC was able to conduct offensive operations during the entire battle. Meaning, they were not deterred when the power of the German Air Service began to rise in September 1916. The RFC did in fact continue to be on the offensive throughout the Battle of the Somme despite increasing German resistance. While the RFC had air supremacy during the entire battle, Hart does not adequately portray the significance of the German Air Service's accomplishments in the fall of 1916. The German Air Service may not have been able to fly over Allied lines nor engage every Allied airplane that flew over their lines. In part, that was due to the RFC's tenacity and aggressiveness. In addition, for a large part of the battle, the German Air Service was numerically inferior to its opponents. The numerical disadvantage slowly dissolved beginning in August, but it undoubtedly had an effect on the conduct of the German Air Service. With fewer airplanes, the German Air Service realized that it could not undertake the type of offensive actions that the RFC did. Hart does not sufficiently address that aspect of the air battle over the Somme in his study. Furthermore, Hart does not discuss the events that occurred following the battle. He makes no mention of the fact that, in months immediately following the Somme, the

German Air Service overwhelmingly dominated the Allied air forces. The seeds for this domination were sown during the Somme. Consequently, by not discussing the German Air Service's achievements in the winter of 1916/1917, Hart doesn't adequately explain the significance the Somme had for the German Air Service or for that matter the remainder of the air war. Nonetheless, as an examination of the air conflict above the Somme, Hart's work is an excellent account.

A more detailed work on the air battle over the Somme is the Royal Flying Corps Royal Flying Corps Communiqués, 1915-1916 (London, 1990), edited by Christopher Cole. Communiqués is, as the title suggests, a book that contains the RFC's communiqués from July of 1915 through December of 1916. As such, the work includes a day-by-day list of the communiqués sent by the RFC. The communiqués provide information on the casualties, combats, as well as mission successes and failures, and the airmen involved in those actions. As the editor Cole interjects at the beginning of each chapter, sometimes each entry, providing clarification on some elements within the communiqués which may not have been clear. However, Cole never includes his own opinions on the various matters he covers, leaving the reader to form his own opinion of the events encapsulated within each communiqué. For the study of the Battle of the Somme, Communiqués is a priceless asset that sheds light on the daily work of the RFC.

While the preceding works are invaluable to the study of the world's first air war, much work remains to be done in order to fully understand the significance of the airplane's use during the First World War. As no study, including this one, can be all inclusive, some significant factors and events are necessarily omitted. It is the purpose of this thesis to reexamine the use of the airplane during the first two years of the war,

attempt to fill in a few of the gaps that remain, and foreshadow the airplane's impact on subsequent air battles and wars. Of paramount consideration will be the Somme and the important role air power played over the course of the fighting. The Somme was neither the largest nor the most costly battle in which warring air forces participated, but it was arguably the most important engagement in the development of air power.

CHAPTER III

EARLY SUPPORTERS OF AIR POWER AND THE USE OF THE AIRPLANE DURING 1914 AND 1915

The airplane's beginnings were not as auspicious as they would seem, given their importance over the last century. The Wright brothers proved that manned flight was possible, yet many saw the airplane as a mere novelty, the effect of which would be limited. Many military leaders held the same belief. A few forward thinking men such as Italy's Giulio Douhet, Great Britain's Sir Hugh Trenchard and Bertram Dickson, Germany's Erich von Ludendorff and Helmuth von Moltke, France's Ferdinand Ferber, and the United States' William "Billy" Mitchell foresaw the ways in which airplanes could be useful, particularly in warfare. These men petitioned the governments of their respective nations prior to the war to either adopt the new technology or suffer the inevitable consequences that not doing so might entail.¹

Italian officer, Giulio Douhet, was one of the earliest military figures to grasp the potential of the airplane. Born in 1869 to wealthy parents, Douhet entered the Italian military as an officer. With an eye toward the future and a love for new technologies,

¹ For examples of the writings and ideas of these early supporters of airpower see Eugene M. Emme, The Impact of Air Power: National Security and World Politics (Princeton: Van Nostrand, 1959).

Douhet advocated the use of the airplane as a weapon of war as early as 1909.² He predicted that the airplane would be the decisive weapon in future wars. To many career officers, the idea that the airplane could be an important military weapon was close to unthinkable. After all, the airplane had existed for barely six years

In the eyes of the majority of military leaders, the only aerial weapon with any prospects for success was the dirigible³ Dirigibles could carry an exponentially greater munitions load than the fragile airplanes that existed. Few airplanes could carry more than two people with the pilot's and observer's view of the ground often obstructed by the wings. The dirigible, on the other hand, did not suffer such handicaps. The one handicap that the dirigible had was extreme; filled with highly-flammable hydrogen gas, the slightest mishap could ignite the fuel and send the craft plummeting to the earth.⁴

Douhet stuck by the airplane despite the ambivalence of many of his contemporaries. For Douhet, the primary strength of the airplane was its ability to quickly and easily strike at the enemy.⁵ Douhet stated "The airplane has complete freedom of action and direction; it can fly to and from any point of the compass in the shortest time in a straight line by any route deemed expedient." Furthermore, Douhet pointed out, "All the influences which have conditioned and characterized warfare from the beginning are

² David Nevin, Architects of Air Power (Alexandria: Time-Life Books, 1981), 17

³ Bernard Fitzsimmons, Warplanes and Air Battles of World War I (London: BPC Publishing Ltd., 1973), 6.

⁴ Despite the dangers, dirigible accidents were rare and, therefore, seldom worried about.

⁵ Unlike airplanes, dirigibles require large ground crews to maintain and ready it prior to takeoff. Consequently, an airplane could be deployed much faster and with far less effort than a dirigible. Dirigibles are also much larger and, therefore, harder to conceal and house in a hanger or similar facility.

powerless to the effect of aerial action”⁶

In 1911 Douhet’s concepts proved to have merit. In the Fall of that year, Italy went to war with Turkey.⁷ On October 23, 1911, two days after hostilities began, Italian Captain Carlo Piazza observed Turkish troops on the ground. Piazza’s flight marked the first time an airplane was used for reconnaissance. A few days later, on November 1, the first bombs were dropped from an airplane by Italian Lieutenant Giulio Gavotti.⁸ While the bombs Gavotti used weighed slightly over four pounds and did not have much effect, his flight proved that bombs could be successfully dropped from an airplane. Soon after the aerial achievements of the Italian pilots in Tripoli proved Douhet’s ideas feasible, he was promoted to commander of his nation’s Air Battalion.

Douhet’s excitement and desire to continue to prove his ideas quickly led to trouble with his superiors. In 1914, Douhet was court martialed and imprisoned for building an experimental bomber without going through the proper channels and for criticizing Italy’s lack of preparedness for aerial warfare.⁹ Douhet built the bomber to prove that the airplane could be a strategic weapon par excellence. He foresaw the airplane, specifically the large aerial bomber, as the weapon that could resolve a conflict by itself. In Douhet’s view, bombs delivered to the heart of the enemy’s country could have

⁶ Giulio Douhet, Command of the Air (New York: Arno Press, 1972), 9.

⁷ The conflict was over quickly, lasting less than a year. The war began on October 21, 1911 and concluded August 25, 1912. Tony Mason, Air Vice Marshal, Airpower: A Centennial Appraisal (London and Washington: Brassey’s Press, 1994), 11.

⁸ The bombs used weighed only 4.4 pounds. Robin Higham, Air Power: A Concise History (New York: St. Martin’s Press, 1972), 21. The day after Gavotti’s bombing, the headline in the Italian newspaper Gazzeta del Popolo read, “Aviator Lt Gavotti Throws Bomb on Enemy Camp. Terrorized Turks Scatter Upon Unexpected Celestial Assault.” Kennett, A History of Strategic Bombing, 13

⁹ Nevin, Architects of Air Power, 18-19.

such a great effect that the use of ground forces would not be required. He stated, “air power is a weapon superlatively adapted to offensive operations, because it strikes suddenly and gives the enemy no time to parry the blow by calling up reinforcements.”¹⁰ As part of offensive warfare, Douhet stressed that the nation on the offensive must have aerial superiority or “command of the air.” Douhet warned that the alternative was grim. He said, “To be defeated in the air... is to finally be defeated and to be at the mercy of the enemy.”¹¹ Yet, Douhet’s advice was ignored by all but a few men in the world at the time.¹²

One man that supported many of Douhet’s concepts was Great Britain’s Sir Hugh Montague Trenchard who, more than Douhet, influenced the use of air power during the First World War.¹³ Trenchard’s interest in aviation began around the same time that Douhet began formulating his theories on air power. In 1909, the first successful airplane flight across the English Channel took place when on July 25, Frenchman Louis Bleriot took off from Les Barraques near Calais. Shortly afterwards he landed at Dover along the coast of England.¹⁴ For Trenchard, Bleriot’s flight was an enlightening and exciting event

¹⁰ Douhet, Command of the Air, 16.

¹¹ *Ibid.*, 23.

¹² Douhet spent one year in prison before rejoining the Italian military. He resigned eight months after rejoining the service. After his resignation Douhet began his writing career during which time he wrote extensively on the possibilities the airplane possessed. Douhet’s ideas were largely ignored during the First World War and did not spread much beyond Italy until the publication of his book Command of the Air in 1921. Nevin, Architects of Air Power, 19.

¹³ The main reason for this was the simple fact that Douhet played no significant role during the First World War while Trenchard played a very important role during his tenure as commander of the RFC. Eugene M. Emme, “Technical Change and Western Military Thought--1914-1945” in Military Affairs, Volume 24, Issue 1 (Spring, 1960), 10.

¹⁴ John Goldstrom, A Narrative History of Aviation (New York: The Macmillan Company,

that led to his immediate realization that the airplane had tremendous untapped possibilities.

Three years later in 1912, the nearly forty-year-old Trenchard joined the recently created Royal Flying Corps (RFC).¹⁵ In less than two weeks of training, he received his pilot's certificate. After certification, Trenchard went to Salisbury plain near the famous Stonehenge monument where the RFC's Central Flying School (CFS) was located. Trenchard's age and experience led to an adjutant position on the Flying School's staff during which time he administered the examinations of new recruits.¹⁶

During his tenure at the CFS, he began to develop his theories on air power, many of which paralleled Douhet's. One incident in particular demonstrated the airplane's potential to Trenchard. During maneuvers in the fall of 1912, Trenchard flew in the observer's seat of one of the RFC's planes. Interestingly, Trenchard was on the side of the mock-enemy, which faced forces commanded by Sir Douglas Haig. Upon reaching reconnaissance altitude, Trenchard spotted some of Haig's ground forces "advancing where they were least expected." Trenchard hurried to the headquarters area and arrived in time to have the general opposing Haig send his cavalry to charge and successfully block Haig's infantry forces.¹⁷ The training exercise proved to Trenchard that the airplane was the weapon for future warfare. After all, one airplane had done what no soldier on

1942), 66-69.

¹⁵ The Royal Flying Corps came into being on May 13, 1912. The RFC was headed by Sir David Henderson. Andrew Boyle, Trenchard: Man of Vision (London and Glasgow: Collins Clear-Type Press, 1962), 96.

¹⁶ *Ibid.*, 99.

¹⁷ *Ibid.*, 103-104.

the ground could hope to do: bring back vital intelligence of a large section of the field quickly and with fewer risks.

As the First World War approached, Trenchard openly expressed his plans for the airplane's use. As Douhet had, he envisioned the airplane as a superb offensive weapon. In Trenchard's view, there were four main principles for the use of air power. First, an air force's goal was "to obtain mastery of the air, and to keep it, which means continuously fighting for it." The second goal was "to destroy the enemy's means of production and his communications in his own country, that is, by strategic bombing force."¹⁸ The third goal was "to maintain the battle without any interference by the enemy, which means to enable the commanders to build up colossal supplies and reinforcements necessary for the battle." The final goal was "to prevent the enemy being able to maintain the battle, that is, to prevent him being able to build up adequate supplies for his armies or navies or air forces."¹⁹

All four of Trenchard's principles required offensive tactics and showed the emphasis he placed on them. Trenchard's conversations with American air power advocate Colonel William (Billy) Mitchell provided further insight into his preference for offensive warfare. On one occasion, Trenchard told Mitchell that taking the offensive was particularly important because it caused fear among the enemy, particularly troops on the

¹⁸ Trenchard's theories were put into practice toward the end of the war and had a tremendous impact on the Royal Air Force's overall strategy during World War II. Philip S. Meilinger, "Trenchard and 'Morale Bombing': The Evolution of Royal Air Force Doctrine Before World War II" in *The Journal of Military History*, Volume 60, Issue 2 (April, 1996), 243-270.

¹⁹ Viscount Sir Hugh Montague Trenchard. "Air Power and National Security" in Emme, The Impact of Air Power, 193.

ground.²⁰ Trenchard explained that

The mere presence of a hostile machine in the air inspires those on the ground with exaggerated forebodings with regard to what the machine is capable of doing.... The sound policy, then, which should guide all warfare in the air would seem to be this: to exploit the moral effect of the airplane on the enemy, but not to let him exploit it on ourselves. Now this can only be done by attacking and continuing to attack.²¹

By August of 1914, Trenchard had ample opportunity to demonstrate the validity of his ideas.

Another early British supporter of air power was Royal Field Artillery Captain Bertram Dickson who was the first British officer to leave the earth in an airplane. In fact, Dickson was so interested in airplanes that he purchased his own bi-plane from French aircraft maker Henri Farman.²² In early 1911, Dickson worked to convince British authorities that the airplane was essential for modern warfare. Dickson wrote to the Committee of Imperial Defense stressing the important role he saw the airplane assuming in upcoming conflicts. Dickson stated that belligerent nations would “be equipped with large corps of aeroplanes, each trying to obtain information from the other, and to hide its own movements.” Dickson speculated that such activities would “lead to the inevitable

²⁰ It must be noted that Trenchard was far from the first commander to favor offensive warfare. Most commanders and theorists throughout history have favored the offensive because it allowed them to determine when and where contact with the enemy will occur. For more on offensive warfare and its merits see: Roots of Strategy: The 5 Greatest Military Classics of All Time (Harrisburg: Stackpole Books, 1985), ed. Thomas R. Phillips, Politics and War: European Conflict from Philip II to Hitler (Cambridge and London: Harvard University Press, 2000) by David Kaiser, and The American Way of War: A History of the United States Military Strategy and Policy (Bloomington: Indiana University Press, 1977) by Russel F. Weigley.

²¹ William Mitchell, Memoirs of World War I. “From Start to Finish of Our Greatest War.” (New York: Random House, 1960), 106-107.

²² Lawson and Lawson, The First Air Campaign, 22.

result of war in the air, for the supremacy of the air, by armed aeroplanes against each other ” He concluded that “this fight for supremacy of the air in future wars will be of the first and greatest importance.”²³

Captain Dickson’s memorandum achieved the desired effect. In February of 1911, the British War Office created the Air Battalion of the Royal Engineers with Captain J.D.B. Fulton in command.²⁴ At the time of its creation, the Air Battalion had only five aircraft each manufactured by a different firm. The five planes included one made by Bleriot, another built by the Wright brothers’ company, a third put together by Maurice Farman’s workshop, a fourth by British manufacturer de Havilland. The final plane was a Paulhan biplane.²⁵ While Dickson helped form the basis for the RFC, his influence proved not to be as lasting as Trenchard’s.

In Imperial Germany the strongest supporters of air power were two members of the German General Staff (*Große Generalstab*). For Captain Erich Ludendorff and Chief of the German General Staff (*Chef des Generalstabs*) Count Helmuth von Moltke, the airplane was an essential element in building Germany’s military might; consequently, beginning in 1908, the two men took steps to introduce airplanes into the German military. At their request, the German General Staff placed Captain Hermann von der Lieth-Thomsen in command of a technical section of the German Army. The technical section’s

²³ Walter A. Raleigh, The War in the Air: Being the story of the part played in the Great War by the Royal Air Force, Volume 1 (Oxford: The Clarendon Press, 1922), 175-176

²⁴ Fitzsimmons, Warplanes and Air Battles of World War I, 8

²⁵ Out of the five planes, the Wright had been built in America, the de Havilland in Britain, and the remaining three in France which manufactured the most aircraft in the world at that time. Lawson Lawson, The First Air Campaign, 22

task was to observe and report on the rapid progress then underway in aviation.²⁶

Thomsen's group reported directly to Captain Ludendorff who headed the German Army's mobilization department. In those capacities, Thomsen and Ludendorff guided the development of the then virtually non-existent German Air Service²⁷

By January 1913, Ludendorff and Thomsen's efforts to build up the German Air Service were well on their way.²⁸ That same year, Ludendorff provided the War Ministry with projected figures for the size of the German Air Service. By April of 1914, he projected that the Air Service would have 528 airplanes. Ludendorff also calculated that by the beginning of 1916 the Air Service would have a strength of 1,796 airplanes, if manufacturing could keep pace.²⁹ Of course, he had yet to grasp the severity of the strains the war would place on the various German aircraft companies; however, because of his and Thomsen's foresight, the German Air Service entered the First World War as one of the world's strongest air forces

Equally significant in the development of the German Air Service was Chief of the

²⁶ Morrow, German Air Power in World War I, 5.

²⁷ In the winter of 1908-1909, the first aircraft companies began to form in Germany. At the end of 1908, the German military did not have a single airplane at its disposal. Without Thomsen and Ludendorff, the development of the German Air Service would likely have been severely hindered prior to World War I. Ludendorff's official title was "chief of the Second Department of the General Staff." In that capacity, Ludendorff advised the Chief of the German General Staff, Moltke, on "military equipment." John H. Morrow, Jr., Building German Airpower, 1909-1914 (Knoxville: University of Tennessee Press, 1976), 6.

²⁸ The Imperial German Air Service was made an official branch of the German military in January of 1913, three years after the French established the French Air Service and one year after the RFC began. Trevor Dupuy, The War in the Air (New York: Franklin Watts, Inc., 1967), 7.

²⁹ Erich von Ludendorff, The General Staff and its Problems: Volume I, trans. F.A. Holt (London: Hutchinson and Company, 1920), 50.

German General Staff Moltke.³⁰ On March 9, 1912, Moltke wrote to the Inspector General of Military Transport regarding airplanes. Moltke wanted the Inspector General to explain the possible ways airplanes could be used. He hoped to determine where they might fit in with the General Staff's war plans. In particular, Moltke inquired as to the size of bomb loads airplanes could carry stating, "I attach the greatest importance to an immediate estimate of the heaviest weights which can be thrown from aeroplanes of different types without danger to the machine."³¹ The primary targets von Moltke envisioned the airplane attacking were dirigibles.³²

One month later, Moltke sent a memorandum to the War Ministry discussing the organization of the French Air Service. Moltke felt that many within the War Ministry mistakenly believed that the French Air Service "exists only on paper." He believed that this had led to a complacent attitude toward the development of the German Air Service. An attitude that, if left uncorrected, would place Germany in a severe disadvantage in the advent of hostilities between the two nations. As a result, Moltke stressed that the German military "should proceed as systematically with the development of our air service as with the organization of all other formations of the army."³³

By November of 1912, Moltke had laid out a plan for "The Organization of Military Aviation." The primary role of the airplane according to von Moltke's plan was

³⁰ Chief of the General Staff, Moltke, was named after his uncle, the legendary Prussian Field Marshall Helmuth von Moltke. Stephan Pope and Elizabeth-Anne Wheal, The Macmillan Dictionary of the First World War (London: Macmillan, 1995).

³¹ Ludendorff, The General Staff and its Problems, 33-34.

³² Morrow, German Air Power in World War I, 21.

³³ Ludendorff, The General Staff and its Problems, 35.

reconnaissance. He suggested that two to three units (flights) and an aerodrome be allotted for German Army Headquarters. In addition, each army corps would be given one flight. Each cavalry corps would also have one flight and each fortress would have one flight.³⁴ Moltke then suggested that “If. . . experiments with aeroplanes for the purpose of directing artillery fire show that special flying squadrons will become necessary, to this list must be added: Artillery squadrons for the army corps.”³⁵

The prospect of using airplanes to direct artillery fire was very new and only theoretical until mid-1912. On November 8, the Inspector-General of Foot Artillery reported to Moltke that,

Experiments with airplanes show plainly that officers controlling artillery fire will be very materially assisted by spotting and observation from aircraft. Indeed, in the case of fire against concealed targets, no other arrangements can be a substitute.

Moltke responded to the success of the tests by reporting to the War Ministry that “this shows how absolutely vital it is for us to assign machines permanently to the artillery.”³⁶ Nonetheless, like many of their peers, Moltke and the General Staff placed the greatest importance on the airplane as a reconnaissance tool. In later years and only after the pace of the fighting slowed and trench warfare developed, did artillery coordination become as

³⁴ Ludendorff, The General Staff and its Problems, 38.

³⁵ *Ibid.*, 38.

³⁶ Von Moltke informed the War Ministry that the Inspector of Field Artillery felt the French “advantage in the employment of aircraft for artillery purposes” was “to a certain extent compensation for the present inferiority of the French in heavy artillery. Von Moltke explained that the advantage airplanes gave the French artillery “shows how absolutely vital it is for us to assign machines permanently to the artillery, first for experiments and finally as a substantive part of its organization.” *Ibid.*, 47-48

important as reconnaissance.³⁷

In France, aviation was a popular sport among many citizens. In fact, the French were the first to buy an airplane built by the Wright brothers. The purchase of the airplane spurred the development of France's aircraft industry which was the largest and most varied in Europe by the outbreak of the war.³⁸

The most prominent French aviation supporter at this time was Ferdinand Ferber, an artillery commander in the French Army. As early as 1899, Ferber built his own gliders that he tested in the French countryside with a minimal degree of success.³⁹ In 1901, Ferber began his friendship with French-born American airplane pioneer Octave Chanute and the Wright Brothers. This small group of men traded ideas during 1901 and early 1902, culminating in Ferber's construction of a bi-plane glider well before any other European aircraft designer.⁴⁰

While unsuccessful, Ferber's tests and writings influenced others in France to become involved in aero-nautical development.⁴¹ Historian Charles Gibbs-Smith assessed Ferber's importance stating, "It was through him that the Wright Brothers' influence first

³⁷ Historian John Morrow also shares the view that the German high command saw reconnaissance as the airplanes primary job. He states, "the General Staff intended to use aircraft primarily for reconnaissance and secondarily for communications and artillery spotting." Morrow, German Air Power in World War I, 8.

³⁸ The same thing occurred in Germany where the Wright's visited during their excursion to Europe in 1908. Lawson and Lawson, The First Air Campaign, 15-16.

³⁹ William H. Longyard, Who's Who in Aviation History (Novato, California: Presidio Press, 1994), 34.

⁴⁰ Ferber's biplane was the Ferber VII-B built in 1905. Charles H. Gibbs-Smith, The Invention of the Aeroplane, 1799-1909 (London: Faber and Faber Limited, 1966), 75-76.

⁴¹ These included Ernest Archdeacon, Louis Bleriot, and Gabriel Voisin among others. Curtis Prendergast, The First Aviators (Alexandria: Time-Life Books, 1981), 18-19.

reached Europe.” More importantly, “It was also Ferber who was the first wisely to modify the Wright configuration in the direction of inherent stability by adding a fixed tailplane, and giving dihedral to the wings”⁴² By doing so, Ferber’s planes were much easier to fly and less dangerous than those built by the Wrights. His experiments continued so that by 1905, Ferber built a motor-powered plane, a feat that caused the French War Office to send him to America to confer with the Wright Brothers.⁴³

Ferber’s direct influence on French aviation ended with his untimely death on September 22, 1909. At the time, he was participating in a week long aviation festival in Boulogne. Following a brief flying demonstration, Ferber came in for a landing. Very near the ground his plane struck a mound of dirt and overturned, pinning him under the engine.⁴⁴

In America, the birthplace of the airplane, enthusiasm for the Wrights’ success was short-lived; however, a few men were intrigued enough to pursue their interest further. One man was United States Army Signal Corps officer William “Billy” Mitchell. As early as 1906, Mitchell predicted that aerial warfare and submarine warfare would play

⁴² The term “inherent stability” refers to the basic flight characteristics of Ferber’s airplanes. The airplanes built by the Wright Brothers were “inherently unstable,” meaning that far more skill had to be used when piloting them as there was little room for error. Gibbs-Smith, The Invention of the Aeroplane, 61. By “giving dihedral to the wings,” Ferber tilted them at slight angles toward the center. The wings were thus at a Longitudinal Dihedral Angle in which “the lifting surface of an aeroplane is...inclined upward towards its wing-tips. H. Barber, The Aeroplane Speaks (New York: Robert M. McBride and Company, 1917), 134.

⁴³ Gibbs-Smith, The Invention of the Aeroplane, 220.

⁴⁴ E. Charles Vivian, A History of Aeronautics: The First Years of Conquest (New York: Arno Press, 1992), 77. Ferber was not the only pilot to die during the airplane’s early years. By July 1, 1912, 155 people had died in aviation crashes. Many were the result of experimental equipment flown by inadequately trained pilots. Henry T. Wallhauser, Pioneers of Flight (Hammond Incorporated, 1969), 27.

dominant roles in future conflicts. By 1908 Mitchell met and conversed with Orville Wright when the pioneer aviator and aircraft builder was at Fort Meyer, Virginia, to demonstrate the capabilities of he and his brother Wilbur's most recent airplane design⁴⁵ The meeting with Wright soon led to Mitchell's ever-growing fascination with the airplane.

Shortly after the First World War began, Mitchell joined the Signal Corps Aviation Section headed by Henry H. "Hap" Arnold.⁴⁶ During his tenure at the school, Mitchell continually sought to persuade others of the vital importance of a strong, well-armed air force. When the First World War began, Mitchell publicly wondered why the U.S. was behind the Europeans in aircraft development and useage He recalled after the war that "in spite of the fact that the foreigners were ordering a great number of aircraft in this country and taking many of the best young men into their services, we still sat by and did practically nothing."⁴⁷ Proof of the U.S.'s lack of preparedness could be seen as late as July, 1917, when the United States Air Service had only one plane in Europe. The plane was Mitchell's own Nieuport 17 which he purchased from the French Air Service.⁴⁸

⁴⁵ Nevin, Architects of Air Power, 15-16.

⁴⁶ The Signal Corps Aviation Section was established near Washington, D.C. in 1907. However, the Aviation Section did not receive its first airplane until 1909. The plane was purchased from the Wright Brothers. By 1911 the Aviation Section had a total of six planes, far behind the French, German and British. Mitchell joined in early 1915 Robert T Finney, "Early Training and Tactics" in *Military Affairs*, Volume 20, Issue 3 (Autumn, 1956), 155.

⁴⁷ Mitchell, Memoirs of World War I, 11.

⁴⁸ Part of the reason for the U.S.'s lack of readiness when it entered the war was the result of many Americans desire to remain neutral during the conflict. During his campaign for president, one of Woodrow's Wilson's pledges was to keep America out of the war in Europe. There was a lobby to ready the U.S. for war that gained significant support, but the buildup was very slow In April 1917, the U.S. Army had a rather small force of 133,111 men. An additional 185,000 men were in the National Guard along with 17,000 men in one of the various reserves set up by the National Defense Act of 1916. Allan

Verbal support for air power was the most Mitchell could provide until the then neutral United States became involved in the war in 1917. Shortly before U.S. entry into the war, Mitchell went to France as a military observer for aviation.⁴⁹ He spent time among the French Air Service but found the RFC more appealing. Mitchell was particularly impressed by General Trenchard and the offensive tactics he employed. Mitchell commented that under Trenchard's "impulsion, the British air service grew from a few second-class planes to a great force, with more than two-thousand airplanes on the line."⁵⁰

Mitchell's time among the RFC reinforced his concepts for the use of air power. As Trenchard had, Mitchell saw the airplane as a primarily offensive weapon. He stated that using the airplane for defensive operations "could never be successful in the end. Aircraft had to act on the offensive."⁵¹ Also like Trenchard and Douhet, Mitchell pondered the use of airplanes to bomb enemy targets well beyond the front lines.⁵² The war, however, would end before he was able to implement his ideas. Had the war continued into 1919, large scale bombing of German cities would have occurred. Nevertheless, Mitchell's efforts in Europe prior to the U.S.'s entry into the war were vital. His work allowed the American Air Service to achieve substantial results during the brief

R. Millett and Peter Maslowski, For the Common Defense: A Military History of the United States of America (New York: The Free Press, 1994)

⁴⁹ Mitchell, Memoirs of World War I, 11.

⁵⁰ *Ibid.*, 104.

⁵¹ *Ibid.*, 81.

⁵² *Ibid.*, 131

time it spent in the fray ⁵³

Despite the vigorous efforts of these men before the First World War, most military leaders were slow to accept the airplane. General Ferdinand Foch, who was the Allied Supreme Commander when the war broke out, stated in early 1914, "Aviation is fine as sport. I even wish officers would practice the sport, as it accustoms them to risk. But, as an instrument of war, it is worthless."⁵⁴ As a result of such views, many nations lacked sufficient numbers of airmen and airplanes at the outbreak of the First World War. The problem was compounded by the fact that the majority of the citizens, the governments, and the armed forces of the belligerent nations believed the conflict would be decided in a matter of days or perhaps a couple months. Even when it became apparent that the war would not end rapidly, many military leaders still favored the use of cavalry, infantry, and artillery, rather than adopt a new tool such as the airplane. They believed that the airplane had yet to prove its worth. The outbreak of the First World War soon provided it the opportunity to do so.

On June 28, 1914, Austrian Archduke Ferdinand was assassinated in Sarajevo by Serbian student Gavrillo Princip.⁵⁵ The assassination increased existing tensions between

⁵³ Mitchell on American success: "My figure showed that from the time American air units entered the combat (March 1918) to the 11th of November, 1918, our men shot down and received official confirmation for 927 enemy airplanes or balloons, and during the same time we lost, due to operations of the enemy, 316 of our airplanes or balloons. This ratio of three to one was remarkable and much greater in proportion than the victories achieved by any of our Allies." Mitchell, Memoirs of World War I, 292.

⁵⁴ Lawson and Lawson, The First Air Campaign, 31. Despite his poor opinion of the airplane prior to the war, Foch began to see its value. Shortly after the end of the First World War, Foch predicted that "One of the great factors in the next war will be aircraft," particularly bombing airplanes. P.R.C. Groves, Behind the Smoke Screen (London: Faber and Faber, 1934) Quoted in Kennett, A History of Strategic Bombing, 40.

⁵⁵ G.V. Carey and H.S. Scott, An Outline History of the Great War (Cambridge. At the

Austria and Serbia, and two days later, Austria declared war on Serbia. Serbia, a nation of Slavic people, was promised support by Russia which mobilized its four southern armies. Germany then mobilized on August 1, after its demands on Russia went unanswered. In response, France, Russia's ally, proceeded to do the same and declared war on Germany. Great Britain quickly followed suit after the German Army marched into Belgium.⁵⁶ Thus, a complex series of obligations and alliances led to the outbreak of the First World War.

The speed with which the war began strained the resources of all the nations involved. Men and supplies had to be gathered and plans of action had to be put into effect. Consequently, national economies and civilian industries had to adapt to the increased needs of the military which had an effect on the air forces of the belligerent nations and the support they could provide to the armies in the field. Not surprisingly, some were better equipped to begin the war than others.

In August 1914, the strength of the assorted air forces varied greatly. Arguably, the air forces of France and Germany were the most well-prepared at the beginning of the war. The preparedness of the French and German air forces was due to the popularity of aviation in the two nations prior to the war. In addition, the French well aware that Germany had been increasing its military power in recent years. Accordingly, the buildup of the French Air Service corresponded to the increasing sizes of its field armies which was also the case in Germany.⁵⁷

University Press, 1928), 2-3.

⁵⁶ Keegan, The First World War, 48-70. See also. Robert B. Asprey, The German High Command at War (New York: William Morrow and Company, Inc), 17-23

⁵⁷ Raleigh, The War in the Air: Being the Story, Volume I, 5-26

Germany entered the First World War with largest air service thanks in no small part to the efforts of Ludendorff and Moltke. At the beginning of August, the German Air Service consisted of 246 airplanes, seven Zeppelins, as well as 525 officers and other personnel.⁵⁸ The majority of the airplanes in service were Taube monoplanes which had wings that resembled those of a bird.⁵⁹ The airplanes were grouped into flight sections (*Fliegerabteilungen*) that had six planes each. Thirty-four field flight sections (*Feldfliegerabteilungen*) were assigned to army field commanders who used them as they saw fit. Seven more sections were assigned to fortress protection.⁶⁰ The control of the men and equipment of the flight sections fell upon the Inspectorate of Flying Troops (*Inspektion der Fliegertruppen* or *Idflieg*) headed by Colonel Walther von Eberhardt and Major Wilhelm Siegert. Both men were instrumental in building the German Air Service into an efficient fighting force during the early months of the war.⁶¹

The French Air Service (*Aviation Militaire*) trailed slightly behind the German Air Service. When the war began, it had 160 airplanes and 15 airships ready for frontline

⁵⁸ For airplane production totals prior to the war see: Morrow, *Building German Airpower, 1909-1914*, 87. For personnel numbers and the structure of the German Air Service see: Morrow, *German Air Power in World War I*, 12.

⁵⁹ The Etrich Taube monoplane was an Austrian/German collaboration and was used extensively by the air forces of both nations due to its "inherent stability." Between 500 and 1,000 Taube's were built by early 1915. David B. Thurston, *The World's Most Significant and Magnificent Aircraft: Evolution of the Modern Airplane* (Warrendale: Society of Automotive Engineers, Inc.), 73-75.

⁶⁰ The flight sections used to protect the fortresses (*Festungsfliegerabteilungen*) consisted of four planes rather than the six allocated to the each section used by the field army. Clark, *Aces High*, 21.

⁶¹ Eberhardt and Siegert's first goal was to standardize the airplanes being sent to frontline units. Eberhardt also sought to create the position of Chief of the Air Services to coordinate activities at the front. Morrow, *German Air Power in World War I*, 16

service.⁶² The French called their flight sections *Escadrilles*. *Escadrilles* equipped with two-seaters had six airplanes each while those with single-seaters had four airplanes. The single-seater *Escadrilles* had two fewer airplanes because their perceived role was different from the two-seaters.⁶³ The single-seat “scouts,” later referred to as fighters, were to protect the two-seaters which performed the bulk of the observation and reconnaissance missions. After all, Ferber’s view that the airplane would be used as an offensive fighter plane had not yet been widely adopted. Very few men in France perceived the airplane as such. Consequently, at the beginning of the war, scout airplanes were purely for defense of reconnaissance and bombing airplanes.

The French began the war with a far greater variety of airplanes than the Germans. The Germans relied primarily on the Taube. The French, however, flew airplanes manufactured by nine different companies. Included were those made by the Bleriot, Voisin, Morane, Saulnier, Farman, Caudron, Nieuport, REP, and Deperdussin companies. All the planes employed similar materials and were very light-weight, especially compared to the heavier German airplanes of the period.⁶⁴

The German Inspectorate of Flying Corps’ counterpart in France was the Directorate of Aeronautics. Part of the French High Command, the Directorate was

⁶² The French airships and German Zeppelins differed considerably. The Zeppelins were dirigible that utilized rigid frames for the body of the craft. The airships, on the other hand, were merely balloons that had a bullet-like shape.

⁶³ Clark, *Aces High*, 22.

⁶⁴ Phillip Flammer, *The Vivid Air. The Lafayette Escadrille* (Athens: The University of Georgia Press, 1981), 33

headed by General Bernard who was quickly replaced by Commandant Joseph Bares⁶⁵ With Bares's guidance, the French Air Service was able to grow exponentially and compete with the German's already powerful organization.

Britain's Royal Flying Corps was in the worst shape of all at the beginning of the war. In August 1914, the RFC had just 113 planes and 6 airships.⁶⁶ The RFC flew several types of airplanes. Some of the planes were built in Britain, but the majority of the RFC's were purchased from French manufacturers. The airplanes made in Britain were the Geoffrey de Havilland designed BE2 and the Avro 504 built by A.V. Roe.⁶⁷ Of the two, the BE2 had the longest lifespan, with updated versions in continual use well into 1916. The French-built airplanes used by RFC fliers were various types of Maurice Farman airplanes as well as the Bleriot XI.⁶⁸

The RFC's main airplane unit was the squadron which was composed of three flights. Every flight had four airplanes assigned to it.⁶⁹ Only sixty-three, barely half, of the

⁶⁵ Anticipating a quick war, Bernard closed down the French aviation schools and did not order any planes to replace those lost at the front. In October, Bares was chosen by General Joffre to take over following the Battle of the Marne. Morrow, The Great War in the Air, 60-64.

⁶⁶ Clark, Aces High, 24.

⁶⁷ Francis K. Mason, The British Fighter Since 1912 (London. Conway Maritime Press, Ltd., 1992), 29-31, for the BE2 and 23 for the Avro 504. Alliot Verdon Roe and Geoffrey de Havilland became involved with airplane design in Britain shortly after the Wright's flight at Kitty Hawk, North Carolina in December of 1903. As a result, their aircraft manufacturing firms were the largest and most experienced in Britain at the beginning of the war. Richard p. Hallion. Designers and Test Pilots (Alexandria. Time-Life Books, 1983), 17-28

⁶⁸ Boyle, Trenchard, 119-120. All the airplanes in service had either 70hp Renaults or 80hp Gnome rotary engines. Historian Walter Raleigh asserts that more powerful engine had yet to be developed by the British because they "were satisfied with smaller engines, which worked well, and enabled our aeroplanes to accomplish all that at that time seemed likely to be asked of them" Raleigh, The War in the Air: Being the Story, Vol. 1, 263.

⁶⁹ Clark, Aces High, 23-24.

RFC's planes were sent to France as part of the British Expeditionary Force (BEF) on August 14, 1914.⁷⁰ When the war began, Major General Sir David Henderson was in command of the RFC. Henderson had long been a supporter of the airplane and had been in command of the RFC since its inception.⁷¹ Without Henderson and subordinates like Lieutenant Colonel Trenchard, the RFC's strength at the start of the war would have been even weaker than it was.

With the start of the First World War, the real test for the airplane began almost immediately. The first reconnaissance mission of the war was flown by a member of the German Air Service on August 3.⁷² In addition to gathering intelligence, the pilot dropped several small bombs on the French town of Luneville from his Taube monoplane. Nine days later, German Oberleutnant Reinhold Janow was shot down by a French soldier armed with a rifle.⁷³ Janow was the first airmen to die during the war, and his death from ground fire was not surprising given the circumstances. Because there was no system of markings, soldiers on the ground fired at any airplane in the sky. Also because planes such as the Taube were constructed with wood, canvas, and wire, virtually no protection was afforded to the pilot. As airplane technology progressed, this problem subsided somewhat

⁷⁰ Thomas R. Funderbunk, The Fighters: The Men and Machines of the First Air War (New York: Grosset and Dunlap Publishers, 1965), xv.

⁷¹ General Henderson saw reconnaissance as the primary role for the airplane and wrote extensively on the subject. His work, The Art of Reconnaissance, served as the *de facto* manual for British pilots prior to and during the First World War. In 1911, Henderson received his pilot's certificate after training at Brooklands. Prior to the RFC's inception, Henderson served as Director of Military Training at the War Office in London, England. Raleigh, The War in the Air: Being the Story, Vol. 1, 199-200

⁷² Clark, Aces High, 24.

⁷³ Lawson and Lawson, The First Air Campaign, 31-32.

after metal plates were fitted to key areas of the plane.

While bombs were used on the very first reconnaissance mission of the war, such employment was rare. Primarily, airplanes on reconnaissance would rise to an altitude of about 1,000 feet and fly over the target area without incident. Normally, the pilot or observer would simply jot down on maps what they saw from the cockpit. The job was extremely difficult given the fact that cockpits were open and the wind was rather gusty at cruising altitude.⁷⁴ In addition, the markings of the observer or pilot were often inaccurate. Therefore, steps were taken to try and alleviate the problem. Some planes began to carry cameras which afforded more accurate intelligence of the target area; however, the first cameras used were rather difficult to use.⁷⁵ As a result, they were used sparingly in the early months of the war.

The airplane's first major achievement of the war came in late August of 1914. The German First and Second armies under Generals Alexander von Kluck and Karl von Bulow, respectively, had pushed through Belgium fairly easily and were pouring into France.⁷⁶ The recently-arrived BEF with General Sir Horace Smith-Dorrien and Sir Douglas Haig took a defensive position at the French town of Mons and tried to halt the German push.⁷⁷

⁷⁴ "Cruising altitude," was generally around 10,000 feet. Cecil Lewis, Sagittarius Rising (New York: Harcourt, Brace and Company, 1936), 32.

⁷⁵ For the difficulties of using the early camera's see: *Ibid.*, 55 and Rene Fonck, Ace of Aces: The Combat Memoirs of the Foremost Allied Fighter Pilot (New York: Ace Books, Incorporated, 1967), 38-40.

⁷⁶ Keegan, The First World War, 97-100.

⁷⁷ Douglas Haig, The Private Papers of Douglas Haig: 1914-1919 (London: Eyre and Spottiswoode, 1952), 70-73. The German forces were moving according to the von Moltke-altered Schlieffen Plan that had been devised by Count Graf von Schlieffen in 1905 during his tenure as Chief of

On August 22, Captain P B Joubert de la Ferte of the RFC took to the air to assess the situation. Joubert soon spotted German troops moving on the British flank.⁷⁸ The German forces were attempting to surround the rear of the British lines. Pilots from RFC Squadron 5 brought back similar news.⁷⁹ Having received the reports from the various pilots, Sir John French, leader of the BEF, decided to withdraw across the Marne river to regroup.⁸⁰ The work done by the Allied pilots likely helped save the BEF from being surrounded and possibly defeated by the swift-moving German forces.

The next key triumph for the airplane came during the Battle of the Marne which followed the BEF's retreat from Mons. The Germany Army, foiled at Mons, continued

the German General Staff. Von Schlieffen's plan called for a quick and decisive strike against France that would then enable Germany to deal with Russia without having to fight a two-front war. Historian John Terraine summarized the Chief of the General Staff's plan stating, "von Schlieffen determined to hurl, at the outbreak of war, almost the whole land strength of Germany against France. His belief that, by adopting this intrepid policy, with all its risks, he could overthrow his most dangerous military rival in a sufficiently short time to re-deploy against the ponderous Russian masses, was fortified by the tactical thinking then current in Germany." Von Moltke altered the Schlieffen Plan upon assuming the Count's post in 1906. Von Moltke, unwisely perhaps, reduced the size of his forces in the east and strengthened his forces in the west. This meant that the initial crushing blow that von Schlieffen's plan required lost some of its force because the eastern forces, which were tasked with delivering the blow, did not have sufficient manpower to finish the job. Then too, von Schlieffen had not counted on stiff and immediate French or British resistance. For a general discussion of the German advance through Belgium and into France see: John Terraine, Mons: The Retreat to Victory (London: B.T. Batsford, Limited, 1960), 21-180.

⁷⁸ Joubert reported seeing "gray streams...where we knew that there were no Allied troops." The "gray streams" were, of course, columns of German soldiers moving towards Mons. Bowen, Knights of the Air, 34. Captain P.B. Joubert de la Ferte is better known to history as Air Marshall Sir Philip Joubert. Joubert flew the first Allied reconnaissance mission of the war on August 14, 1914 in a Bleriot monoplane Terraine, Mons: The Retreat to Victory, 61.

⁷⁹ Dupuy, The War in the Air, 12.

⁸⁰ Haig, The Private Papers of Douglas Haig, 72-73.

the push into France.⁸¹ Along the Marne river, the BEF joined with French forces under the command of Marshall Joseph Joffre. The situation was critical as the Allied forces stood with their backs toward Paris, only 50 kilometers to the east. As at Mons, airplane reconnaissance helped determine the movements of German troops before the engagement began.

On September 2, French pilot Louis Breguet saw Kluck's First Army moving to drive through the gap between the BEF and French armies.⁸² Kluck was attempting to cut the Allies off from Paris. After receiving the news, General Joffre decided to halt the retreat of the Allied forces and fight along the Marne. On September 6, the Allied forces turned to face the oncoming Germans.⁸³

Two days later, with the Allied counterattack succeeding, airplanes coordinated with artillery batteries for the first time during the war. The coordination was rather primitive. The French pilots' first job was to observe the positions of the German artillery. Then they would turn around and drop a hand-written note to friendly artillery batteries. The process would have to be repeated until the target was successfully ranged and engaged. Accordingly, the French pilots did so successfully allowing French artillery guns

⁸¹ Falkenhayn, The German General Staff and Its Decisions, 13-17.

⁸² Anthony Livesey, Great Battles of World War I (New York: Macmillan Publishing Company, 1989), 132

⁸³ General Joffre decided to fight along the Marne after receiving General Franchet d'Esperey's plan to end the Allied retreat. According to d'Esperey's plan, "his own army would retire just far enough to bring it into line with the British; the British would pivot round to face eastward to his left; on their left the 6th Army would make a wide wheel to cover the British and strike in at the German rear; on the right, Foch's 9th Army would cover the flank of the 5th and menace the German left. All would advance concentrically towards the Marne. Terraine, Mons. Retreat to Victory, 207

to destroy over half of the German XVI Army Corps artillery.⁸⁴ Many were amazed at the results

Air-Artillery coordination was relatively new, but it soon became standard procedure as the rapid fighting typical before the Battle of the Marne slowed. Following the Allied victory at the battle, trench warfare began in earnest.⁸⁵ Although reconnaissance remained the airplane's primary mission, artillery coordination was given greater importance. In fact, following the Battle of the Marne General Joffre ordered that each artillery battery have a plane assigned to it.⁸⁶ Barely one month into the war, the airplane was already proving its worth.

During this early phase of the war, conflict between airplanes was extremely infrequent. Most airplanes at the time carried few or no weapons. A few airmen took pistols or rifles with them when they flew in the hope that they could take pot-shots at enemy aviators.⁸⁷ Not surprisingly, this method of aerial combat was not very successful

⁸⁴ Lawson and Lawson, The First Air Campaign, 41-42.

⁸⁵ In the 1890s, Polish economist and military thinker Ivan S. Bloch predicted that trench warfare would be inevitable in future wars. Due to the ever-increasing destructiveness of modern weapons Bloch believed, "everybody will be entrenched in the next war. It will be a great war of entrenchments. The spade will be as indispensable to a soldier as his rifle. The first thing every man will have to do, if he cares for his life at all, will be to dig a hole in the ground, and throw up as strong an earthen rampart as he can to shield him from the hail of bullets which will fill the air." Ivan S. Bloch, The Future of War in its Technical, Economic, and Political Relations, trans. R.C. Long, preface W.T. Stead (New York. Dpubleday and McClure, 1899), xvi. For an excellent interpretation of the Battle of the Marne and its effects see: Douglas Porch. "The Marne and After: A Reappraisal of French Strategy in the First World War" in *The Journal of Military History*, Volume 53, Issue 4 (October, 1989), 363-386.

⁸⁶ Lawson and Lawson, The First Air Campaign, 43.

⁸⁷ French aerial observer and artist Henry Farre recalled that nearly every pilot he knew in the French Air Service carried either a pistol or rifle in their airplane. Henry Farre, Sky Fighters of France (New York. Arno Press, 1980), 17-18. The same was true for the pilots of the RFC. In early 1915 RFC wing commander W.S. (Shoto) Douglas recounted the psychological comfort and entertainment a rifle brought him while in the air. Douglas recollected that "just for safety's sake I always carried a carbine

As a result, a few aviators had the idea of arming a plane with a machine-gun

In the fall of 1914, aircraft designer Gabriel Voisin fitted several Hotchkiss light machine-guns to Escadrille V 24's biplanes. On October 5, two members of Escadrille V 24, equipped with a Hotchkiss, encountered a German Aviatik monoplane. Pilot Sgt Joseph Franz and his observer Corporal Louis Quenault succeeded in shooting down the Aviatik.⁸⁸ Franz and Quenault's victory was the first time that an airplane equipped with a machine-gun had ever shot down an enemy plane. Aerial combat, or "dog fighting" had begun. Despite being proven feasible, few airplanes were equipped with machine-guns until the middle of 1915 because of the limited load-carrying capabilities of the airplanes. Little extra weight was allowed on board because something as heavy as a machine-gun could severely hamper an airplane's performance. Creatively, RFC pilot Louis Strange added a Lewis machine-gun at the expense of his observer. Strange felt the ability to fire on enemy planes was worth the exchange.⁸⁹

Bombing enemy targets using airplanes also increased toward the end of 1914. The German Air Service was especially fond of bombing even though it had very few real successes. In conjunction with several Zeppelins, German aircraft bombed a number of

with me in the air. In the ensuing two or three months I had an occasional shot at a German machine. . . . We scarcely expected to shoot the enemy down; but it was a pleasant break in the monotony of reconnaissance and artillery observation." Jones, The War in the Air: Being the Story, Vol. 2, 137

⁸⁸ Funderbunk, The Fighters: The Men and Machines of the First Air War, 15

⁸⁹ The Lewis gun was preferable to the Vickers machine-gun due to its light weight. Yet, even so, the Lewis was often too heavy for the fragile planes of the period. Fortunately for Allied pilots, as airplane technology progressed both the Lewis and Vickers machine-gun were able to be mounted on airplanes without the restrictions they had previously imposed. Alexander McKee, The Friendless Sky: The Story of Air Combat in World War I (New York: William Morrow and Company, 1964), 20-21.

French railroad stations.⁹⁰ The French capital was also an important target. By striking Paris, the Germans hoped to weaken the morale of the French. Yet, the size and weight of the bombs used was so small that no lasting damage was done.⁹¹ The RFC and French also bombed but were no more successful than the Germans. In fact, only three out of 141 bombing attacks met with any success.⁹²

The success of the airplane in late 1914 garnered support from many who had previously failed to see its potential.⁹³ As a result, increased emphasis was placed on the development of airplanes and the training of pilots by all combatants. For example, in France, the ineffective General Bernard was removed from his post as head of the Directorate of Aviation by General Joffre and replaced by the more aggressive Bares.⁹⁴

⁹⁰ Morrow, The Great War in the Air, 68-69.

⁹¹ The first attack on Paris took place on August 13, 1914, when a German Air Service pilot dropped two four-pound bombs on the French capitol. Besides bombs, leaflets were also dropped by German pilots that urged "People of Paris! Surrender! The Germans are at your gates! Tomorrow you will be ours." The French, however, were not easily defeated by such attacks and their morale remained high. Dupuy, The War in the Air, 10-11. In 1914, the heaviest bombs used weighed a mere 15 pounds. Goldstrom, A Narrative History of Aviation, 86.

⁹² Quentin J. Reynolds, They Fought for the Sky (New York and Toronto: Rinehart and Company, Inc., 1957), 66. Bombing was in its infancy at the time and most pilots had little experience dropping them from their airplanes. More importantly, simple and effective means of carrying bombs onboard airplanes had yet to be perfected. Beginning in 1912 the RFC, both its Naval Wing and Military Wing, had begun conducting bombing tests to develop suitable equipment for dropping bombs. However, the Military Wing put far less effort into the experiments than the Naval Wing and, therefore, lacked pilots trained in proper bombing techniques when the war began. The greatest obstacle was, of course, the limited load-carrying capabilities of airplanes of the period. Raleigh, The War in the Air: Being the Story, Vol. 1, 266-271.

⁹³ For example, On September 7, 1914, Sir John French, praised the RFC's efforts in the early months of the war stating, "Their skill, energy, and perseverance have been beyond all praise. They have furnished me with the most complete and accurate information, which has been of incalculable value in the conduct of operations. Fired at constantly by friend and foe, and not hesitating to fly in any kind of weather, they have remained undaunted throughout." General Smith-Dorrien expressed similar sentiments on September 27, 1914. Raleigh, The War in the Air: Being the Story, Vol. 1, 329.

⁹⁴ Morrow, The Great War in the Air, 60-64.

Bares concentrated on replacing outdated airplanes with those that had proven themselves in the first two months of fighting. He also moved to assign specific duties for airplanes. Some planes would undertake reconnaissance missions, others would direct artillery fire, several would be placed in bombing squadrons, and a few would be solely for aerial combat.⁹⁵

The Germans also realized that some planes in their arsenal had become obsolete. The ubiquitous Taube was simply too fragile for the increased tasks now demanded of airplanes. The Taube was replaced by the Aviatik BII, Albatros BII, and L.V.G. (*Luft-Verkehrs-Gesellschaft*) BI.⁹⁶ The RFC, on the other hand, continued using the airplane models they brought to France at the beginning of the war. Partly, this practice came about because of the quality of their airplanes. In addition, the main aerial actions of the early part of the war occurred between the Germans and French. As a result, RFC airplanes did not receive the wear and tear of their French or German counterparts. Therefore, RFC simply stuck with what was effective.⁹⁷

Other changes were made by the end of 1914. One of the most important judgments made by all sides was the decision to paint markings on airplanes. The hope was that clearly marked airplanes would prevent friendly ground fire.⁹⁸ The reverse was

⁹⁵ Ezra Bowen, *Knights of the Air* (Alexandria: Time-Life Books, 1981), 46

⁹⁶ Morrow, *German Air Power in World War I*, 12.

⁹⁷ Boyle, *Trenchard*, 128-129.

⁹⁸ RFC Captain Joubert de la Ferte lamented the arrival of BEF troops in France recalling that he “had only been fired on by the French whenever we flew. Now we were fired on by French and English ... To this day I can remember the roar of musketry that greeted our two machines as they left the aerodrome and crossed the main Maubeuge-Mons road, along which a British column was proceeding.”

also true. With clear markings, enemy planes could also easily be picked out and attacked. The Germans applied black Maltese crosses to the wings and tail of their planes.⁹⁹ The French used roundels that were blue, white, and red. The RFC initially had “Union Jacks” on their wings. However, due to the high altitudes at which airplanes flew, these were often confused with the Maltese cross and were changed to roundels similar to those of the French Air Service¹⁰⁰

The lessons learned the first months of the war allowed the various air forces to expand and refine their roles during 1915. The French Air Service, for example, opened four new flying schools in March 1915. As a result, by month’s end, the French Air Service had 130 officers, 500 pilots, 240 observers, and 4,650 additional support personnel.¹⁰¹ The Germans also bolstered the strength and efficiency of their air service. In February, Colonel Herman Leith-Thomsen was promoted to Chief of War Aviation with Major Wilhelm Siegert as his deputy. Thomsen and Siegert placed their field headquarters in the French town of Charleville.¹⁰² This location, very near the front,

Incidents such as de la Ferte’s helped convince other officers that some sort of markings were needed on airplanes. Raleigh, *The War in the Air: being the Story, Vol. 1*, 295

⁹⁹ Joseph A. Phelan, *Heroes and Aeroplanes of the Great War, 1914-1918* (New York: Grosset and Dunlap Publishers, 1968), 31

¹⁰⁰ On October 26, 1914, RFC Squadron 4 leader Major G.H. Raleigh, witnessed two fellow aviator’s deaths while on a simple reconnaissance mission. Their airplane was “completely demolished. Pilot and passenger had both been wounded by our won infantry fire... with the large Union Jack plainly visible.” The infantry that fired on the plane were, in fact, French rather than British. An officer on the ground informed Major Raleigh that at flying altitude, the ‘Union Jack’ appeared as a red cross and was mistaken for a Maltese Cross similar to those used by the German Air Service. Raleigh, *The War in the Air: Being the Story*, 348-349.

¹⁰¹ Morrow, *The Great War in the Air*, 90-91.

¹⁰² Johannes Werner, *Knight of Germany: Oswald Boelcke, German Ace*, trans. Claud W. Sykes (New York: Arno Press, 1972), 93.

allowed them to direct the German Air Service more efficiently than earlier commanders could. Now, messages and orders no longer had to be relayed from the field, to Berlin, and then back again. Sievert, in particular, was essential in increasing the number of German airplanes that reached the front by the end of 1915 ¹⁰³ The RFC made no major changes to the structure of chain of command during the first half of 1916 primarily because of the lack of a large RFC presence along the front. At that point, the French assumed the greatest burden in the air and on the ground

Bombing, artillery coordination, aerial photography, and reconnaissance all progressed quickly as the year 1914 unfolded. By the end of 1914 instances of aerial combat were few. Only a handful of encounters such as that between French fliers Franz, Quenault, and their German counterparts took place. Yet, 1915 would truly prove to be the year in which the fighter plane began to come into its own. In early 1915, the race was on to develop the airplane into a more effective offensive weapon. The French Air Service was at the forefront of this development. Consequently, it maintained air superiority throughout the first half of the year.

In order to protect the slow-moving reconnaissance and observation aircraft, the French Air Service began forming *Escadrilles de Chasse* that consisted exclusively of fast and agile “escort” or “pursuit” airplanes.¹⁰⁴ The first airplane solely allotted for the job was the Morane-Saulnier N “scout.” The “N” was also the first airplane specifically designed with aerial combat in mind. It was a single-seater monoplane that had an 80hp

¹⁰³ Morrow, German Air Power in World War I, 36-37

¹⁰⁴ Funderbunk, The Fighters: The Men and Machines of the First Air War, 23-25.

Le Rhone engine. The plane's top speed was 164 kilometers-per-hour with a ceiling of 4,000 meters.¹⁰⁵

As the premier fighter plane in the French Air Service, the Morane-Saulnier was the obvious choice for "hot rodding." French pilot Roland Garros flew the "N," but felt the position of its machine-gun was impractical in a "dogfight." Garros proceeded to enlist the help of designer Raymond Saulnier, the man who had designed the "N." Saulnier mounted a Hotchkiss machine-gun directly in front of the pilot¹⁰⁶ In order for the gun to fire forward without destroying the propeller Saulnier had to be creative. He made long steel deflectors that bolted snugly against the surface of the wooden propeller. This device allowed the majority of the bullets to pass through the propeller. The ones that hit the propeller simply ricocheted off the steel guards.¹⁰⁷

On April 1, 1915, Garros took off on his first flight in the newly equipped "N." He shot down one German airplane that day and an additional two on the eleventh. Unfortunately for the Allies, Garros was forced down behind enemy lines on April 19. Capturing this modified plane was quite a coup for the German Air Service which had yet to develop such a device.¹⁰⁸

Immediately upon capturing Garros and his Morane-Saulnier, the Germans began taking it apart. Dutch-born aircraft designer Anthony Fokker was selected to examine the

¹⁰⁵ Pope and Wheal, The Macmillan Dictionary of The First World War, 329.

¹⁰⁶ Stanley Ulanoff, Illustrated History of World War I in the Air (New York: Arco Publishing Company, Inc.), 31.

¹⁰⁷ Phelan, Heroes and Aeroplanes of the Great War, 40-41.

¹⁰⁸ Morrow, German Air Power in World War I, 40

airplane's propeller in order to figure out how it worked.¹⁰⁹ Fokker, however, did not simply adapt Saulnier's invention to German airplanes. Using his engineering skills and tremendous inventive mind, he created something new. Like Saulnier, Fokker had the machine-gun fire forward through the propeller. Yet unlike Saulnier, he recognized that the bullets ricocheting off the propeller put too much stress on the blades. Eventually, he believed, the propeller would break apart as a result ¹¹⁰

To resolve the problem Fokker developed a synchronization device that restricted the fire of the Parabellum machine-gun he used in his tests. His "interrupter gear" kept the Parabellum from firing when the propeller was directly in front of it. This prevented the potential stress cracks inherent in Saulnier's steel deflectors. Consequently, it restricted the Parabellum's rate-of-fire.¹¹¹ Nonetheless, the number of bullets fired was close to that of a plane equipped with deflectors.

Fokker then placed his invention in a airplane of his own design. The plane was a Fokker E.I monoplane (Eindekker) that was similar to the Morane-Saulnier "N." In fact, the E I was almost a direct copy of the "N." The two planes shared the same engine output and nearly the same ceiling.¹¹² However, Fokker's device gave the E.I and its

¹⁰⁹ Inventor and airplane manufacturer recalled Anthony Fokker recalled the effect of Garros' airplane stating, "German pilots, watching this plane fly towards them with its propeller spinning like a solid disk in front, confidently flew on, feeling safe from attack. To their astonishment the nose of the ship began spurring a stream of lead. Several of the Germans planes were downed. No one knew the secret, although spies were instructed to discover, if possible, the trick and the identity of the flyer. Fokker and Gould, The Flying Dutchman, 123.

¹¹⁰ *Ibid.*, 122-3.

¹¹¹ *Ibid.*, 125.

¹¹² *Ibid.*, 126-127.

subsequent upgrades a distinct advantage: the pilot did not have to worry about the propeller breaking off.

The result of Fokker's invention was tremendous. As soon as sufficient numbers could be manufactured, brand new Fokker E.III's with the interrupter gear were ruling the sky over the Western Front.¹¹³ In the meantime, the German Air Service introduced the equally superb C-type biplanes.¹¹⁴ The C-types were two-seat observation planes made by several German aircraft manufacturing firms.¹¹⁵ They were referred to as C-types because they shared similar design features. Unlike earlier observation airplanes used by the Germans, the C-type had the observer sitting behind the pilot. This arrangement allowed the observer a greater range of motion for either observation, bombing, or using his machine-gun. The new positioning also allowed the observer to protect the rear of the plane. The earlier models had no such protection. As a result, a great many were brought down rather easily as they tried to flee back to their aerodromes. With the ultra-effective C-types in their arsenal, the German Air Service could concentrate on developing the E.III and using it as a pursuit airplane.¹¹⁶

¹¹³ The E.I initially had problems. According to historian John H. Morrow, Jr. the "Oberursel rotary (engine) presented problems while German pilots, who were used to heavy, stable airplanes, had difficulty flying the light, maneuverable monoplane." Several fatal crashes resulted which further slowed the airplane's deployment. Many thought the E.I, rather than the pilot's inexperience in such an aircraft was to blame. As a result, several changes were made culminating in the E.III which was the airplane that actually entered combat service. Morrow, German Air Power in World War I, 41

¹¹⁴ The C-types were developed per Colonel Thomsen's request. He wanted an all-purpose airplane that could defend itself during aerial combat. Werner, Knight of Germany, 95.

¹¹⁵ Morrow, German Air Power in World War I, 104.

¹¹⁶ The E.III had a 80hp French Gnome rotary engine and then a 100hp Oberursel engine copied from the Gnome. The top speed of the 80hp equipped plane was 70 mph with a 6,000ft ceiling. The top speed of the 100hp model was 86mph with a ceiling of 11,500ft. The high ceiling of both engines allowed Fokker pilots to out climb and dive upon their opponents. Thurston, The World's Most

In late July and early August the Fokker E.III's began arriving at the Western Front.¹¹⁷ Thus, the air superiority previously enjoyed by the French was about to end. The first pilots who received the new E.III's were Lieutenants Oswald Boelcke and Max Immelmann.¹¹⁸ Both men had made names for themselves flying the C-type planes during the spring and summer of 1915. On August 1, Immelmann won his first victory in an E.III. Boelcke soon followed suit on August 19.¹¹⁹ Boelcke in particular was quite fond of the freedom his new Fokker gave him. He explained to his parents, "In addition to its technical points my little single-seater possesses the advantage of giving me complete independence; I can fly when, where, how long and how I will."¹²⁰

With the E.III in Boelcke and Immelmann's hands, the "Fokker Scourge" was in its full fury. During this period, the German Air Service lost one airplane for every four enemy airplanes they shot down.¹²¹ More importantly, German pilots kept Allied fliers from flying over German lines which kept the Allied airplanes from relaying information

Significant and Magnificent Aircraft, 77-79.

¹¹⁷ Morrow, German Airpower in World War I, 104.

¹¹⁸ The success of Boelcke and Immelman led to Fokker's factory receiving vital manufacturing materials ahead of other aircraft firms. Fokker and Gould, The Flying Dutchman, 137-138.

¹¹⁹ Immelmann's first victim was, RFC 2 Squadron pilot, Lt. William Reid who remained a German captive throughout 1916. Norman Franks and Hal Giblin, Under the Guns of the German Aces: Immelmann, Voss, Goring, Lothar von Richthofen: The Complete Record of their Victories and Victims (London, Grub Street, 1997), 12-13. For Boelcke's account of his first victory see, Werner, Knight of Germany, 117.

¹²⁰ *Ibid*, 115.

¹²¹ The time frame referred to as "this period" covers the Battle of Loos. Lawson and Lawson, The First Air Campaign, 70. The RFC had 530 airplanes in service up to May 31, 1915. Out of the 530, 300 had been either destroyed or worn out. Also as of the end of May, 2, 260 planes were on order for the RFC alone. The Royal Naval Air Service, which split from the RFC in January 1914, was in a similar situation although it required fewer airplanes. Raleigh, The War in the Air: Being the Story, 455.

back to their headquarters. As a result, virtually no artillery coordination could be conducted because the German artillery batteries could not be located with any accuracy. Bombing raids to the rear of German lines almost completely ceased as well.¹²²

RFC Colonel Brooke-Popham described the increasing ferocity of the Fokker's and German airplanes in general during the Battle of Loos stated, "The German aeroplanes are becoming far more active, and are making a regular habit of attacking our machines when on reconnaissance, and we are having to fight for all our information"¹²³ Thus, the Allied air forces' hands were tied until the "Scourge" could be dealt with properly.

The RFC and French, although slow to react, did so by the fall of 1915. The RFC sent Squadron 11 to the front to try and deal with the Fokkers and C-types¹²⁴ Squadron 11 flew the excellent Vickers FB.5. The FB.5 was a two-seat "pusher" airplane. In this type of plane, the engine was placed behind the pilot and observer with the propeller facing the tail of the plane. The observer sat in front of the pilot and had an unobstructed view to both sides as well as forward which gave the observer a very wide field of fire.¹²⁵ The only obvious disadvantage was that the rear of the plane was hard to protect

The French sent newly formed Escadrille N 65 to help the RFC cope with the German airplanes. N 65 was equipped with Nieuport X and XII sesquiplanes. The

¹²² Boyle, Trenchard, 152-156

¹²³ Letter from Brooke-Popham to Colonel Ashmore, Commander of RFC Administrative Wing, July, 31, 1915. Raleigh, The War in the Air: Being the Story, 446.

¹²⁴ Fitzsimmons, Warplanes and Air Battles of World War I, 46-47.

¹²⁵ Mason, The British Fighter Since 1912, 24-25

sesquiplane was a biplane but the bottom wing was smaller than the top wing. In addition to being smaller, the bottom wing was placed further toward the rear of the plane. This design feature allowed the pilot to see the ground much better than in biplanes with the traditional arrangement.¹²⁶ Both the X and XII were two-seater “tractor” airplanes with the engine in front of the planes occupants rather than behind. The observer sat behind the pilot and could easily cover the sides and rear of the plane.

The other plane Escadrille N 65 flew was the Nieuport XI Bebe. The Bebe was a single-seat fighter that had a Lewis machine-gun mounted awkwardly above the top wing.¹²⁷ The Bebe was primarily used as an escort to protect friendly bombers from the Germans Fokkers.¹²⁸

The final factor that helped the RFC cope with the “Fokker Scourge” was the appointment of Hugh Trenchard. General Henderson was sent back to Britain to oversee the nation’s aviation industry. Trenchard, now a Brigadier General, was sent to France as Henderson’s replacement in August.¹²⁹ Trenchard’s pre-war ideas and theories of offensive warfare would be put to the test.

The year 1915 taught all sides a valuable lesson that would apply throughout the remainder of the war. Simply, technological advances could be decisive. After all, the

¹²⁶ Pope and Wheal, The Macmillan Dictionary of the First World War, 341-342

¹²⁷ Having the Lewis machine-gun mounted on the top wing made changing ammo quite a chore. In order to change ammunition drums the pilot had to stand up in his seat and attempt to control the airplane with his knees until the task was complete. Of course, top wing mountings were the best method available until Allied mechanics and inventors could get their hands on a German synchronization gear to copy. Jones, The War in the Air: Being the Story, Vol. 2, 139.

¹²⁸ Pope and Wheal, The Macmillan Dictionary of the First World War, 341-341

¹²⁹ Boyle, Trenchard, 151.

German Air Service had been fighting an uphill battle in the early months of the war.¹³⁰

The Allies took advantage of the poor quality of airplane such as the Taube and were able to control the sky over the Western Front using their superior aircraft. The introduction of the C-type and the nimble Fokker ended Allied control almost immediately, proving that technical advances were the key to air superiority. To maintain such control, designers on all sides had to continue to out-invent their enemy.

The belligerents also learned that a strong organization was vital to the success of an air force. The Germans recognized this early in 1915. If Thomsen and Seigert had not been given the amount of control they received in February, it is debatable whether the German Air Service would have been as successful throughout the later half of the year. The French too, realized this and began to increase the numbers of training schools. This allowed the French to have a manpower pool to draw from which sustained their effort against the Germans well into 1916. The RFC already had a strong organization under General Henderson, an organization that only grew stronger with Trenchard's appointment in August.

¹³⁰ In the early months of 1915 the German Air Service had 230 airplanes at the front versus the RFC and French Air Services combined strength of slightly over 500. Bowen, Knights of the Air, 52.

CHAPTER IV

AIR POWER DURING THE BATTLE OF THE SOMME

Arguably, the most important year for the use of the airplane during the war was 1916. In that year, the airplane perfected many of the roles it would play throughout the wars and conflicts that followed the First World War. The year began with the Entente armies (Great Britain, France, Russia, and their allies) doing rather poorly and facing strong German pressure on all fronts. The pressure was particularly intense in France around the many fortifications that skirted the countryside town of Verdun. The initial decision to attack the French at Verdun had been made by the Chief of the German General Staff (*Chef des Generalstabs*), General Erich von Falkenhayn. Falkenhayn hoped to break the French determination to fight and achieve a decisive breakthrough before the British readied their substantial numbers of men and materiel. Falkenhayn stated, "Within our reach behind the French sector of the Western front there are objectives for the retention of which the French General Staff would be compelled to throw in every man they have. If they do so the forces of France will bleed to death."¹ Falkenhayn was of course referring to Verdun which was the last major obstacle between the German army and Paris. However, he underestimated the fortitude of the French army led by General

¹ Falkenhayn, The German General Staff and Its Decisions, 210-215.

Joseph Joffre as well as the time it would take to achieve concrete results at Verdun.

Falkenhayn also drastically overestimated the strength of his forces. One thing Falkenhayn was certain of was that the fighting would be bloody and result in tremendous casualties

The German offensive at Verdun began on February 21st with an artillery bombardment that lasted nearly twenty-one hours during which over a million artillery shells were fired on French positions along a 12,000 meter line. More importantly, the German army had over a million troops poised to strike the French defenders whose number barely exceeded 200,000.² The next day, the German infantry attacked *en masse*. With the help of German artillery they moved as far as the French forces' second line which was predominantly composed of a series of trenches. Yet, the initial successes of the German army were short-lived and any further advances they made were achieved only by the expenditure of previously unheard of numbers of men and supplies on both sides. The struggle at Verdun had precious few intermissions and continued throughout the remainder of 1916 resulting in over 550,000 casualties for the French army and roughly 434,000 German casualties.³ When all was said and done, neither side had gained more than a few miles at such enormous cost.

It became clear to General Joffre and other Entente commanders that relief of the situation at Verdun was needed almost immediately. In response General Joffre appealed to the British to shoulder the burden of a new offensive with minimal French support to

² A.H. Farrar-Hockley, The Somme (London: Pan Books, 1966), 45-47.

³ Figures taken from Pope and Wheal, The Macmillan Dictionary of the First World War, 496. Exact figures are not known, especially for the casualties suffered by the Germans whom, according to A.H. Farrar-Hockley, B.H. Liddell-Hart, and John Keegan, deliberately lowered their figures in an attempt to preserve morale at home and decrease enemy morale.

end the stalemate at Verdun.⁴ The “new” offensive had already been planned and grudgingly agreed to by British commander Field Marshall Sir Douglas Haig in early February.⁵ However, the German attack at Verdun on the 21st delayed the offensive which was supposed to commence near the Somme river.⁶ The Somme was chosen because the British and French armies were gathered side by side one another. Meanwhile, the German army was close by, occupying the positions they had fallen back to following the Battle of the Marne. According to historian John Keegan, “The Germans had profited from the peace in which they had been left since 1914 to construct the strongest position on the Western Front. The hard, dry, chalky soil was easily mined and they had driven dugouts thirty feet below ground, impervious to artillery fire.”⁷ Unfortunately for Allied troops, the Germans’ trenches were not the only defenses along their line. Strewn across the entire front, the Germans had a number of machine-gun posts ready to decimate enemy troops that crossed into “no man’s land” as the gap between the British and German lines was known. The Germans were prepared, and by the spring of 1916, British preparations for the Battle of the Somme were underway.

⁴ The French were supposed to take the leading role during the Somme offensive, but Verdun made that impossible. Haig, The Private Papers of Douglas Haig, 1914-1919

⁵ Haig was in charge of the discussions with the French after he took command of the British Expeditionary Force on December 19, 1915. Sir John French was the previous commander of the BEF, having occupied the position since the beginning of the war. Jones, The War in the Air: Being the Story, Vol. 2, 145

⁶ B.H. Liddell-Hart, The Real War: 1914-1918 (Boston, Toronto: Little, Brown and Company, 1930). The first discussions for an offensive at the Somme occurred during the Chantilly Conference on December 5, 1915. Sir Douglas Haig preferred to undertake the offensive in Flanders, but agreed that the Somme was an acceptable area to launch an attack in order to relieve the burden on the French. Evidence of Haig’s opinions can be found throughout Haig, The Private Papers of Douglas Haig

⁷ Keegan, The First World War, 289.

On March 4, 1916, Haig met with the British General Staff at its headquarters in the town of St. Omer near the English Channel to lay out the plans for the upcoming offensive.⁸ At the meeting, Haig and his subordinates discussed the initial plans for the attack but had yet to reach a definite date for the beginning of the offensive. Two days later on March 6th, the commander of the British Fourth Army, Sir Henry Rawlinson, met with several British Corps commanders at Querrieu to formulate the details of the attack. Assuming the fighting at Verdun was going to continue, Rawlinson and the other leaders present decided that the main attack at the Somme should take place in late June or early July depending on the amount of time it would take to accumulate sufficient quantities of men, weapons, and ammunition.⁹ With the time frame in place, preparations for the battle began at once since the logistical requirements of the offensive were simply immense.

The Royal Flying Corps, or RFC, began preparing for the battle by conducting aerial photographic reconnaissance missions over the Somme. These early flights were few and far between and did little more than take photographs of the already heavily fortified German positions. They did not yet undertake any offensive strikes on enemy targets; that would have to wait a few months. By March of 1916, with the arrival of General Rawlinson's Fourth Army, full scale preparations for the offensive were underway. Photographic duties increased and became an almost daily and difficult routine for the pilots of the RFC.¹⁰

⁸ Farrar-Hockley, The Somme, 59-60.

⁹ *Ibid.*, 60-61.

¹⁰ The first aerial photographs of the Somme area were taken in October 1915 while the Battle of Loos and the "Fokker Scourge" were at their peak. By March when the photographic effort was

Although aerial photography missions had been flown since the beginning of the war, the task had not been made any easier by the spring of 1916. The difficult part of using the cumbersome cameras in the air was still the fact that, according to RFC pilot Second Lieutenant Cecil Lewis,

The pilot had to look after the camera because at least from his seat you could look straight down. The camera was one of those real antiques made by the ancient Greeks! Good square mahogany box with a leather concertina pullout with a good big lens and a little handle that you pushed and pulled to change the plates. Real good old glass plates. In addition to that a bit of wire or string with a ring on it, which was skittering around in the wind, to pull every time you wanted to take a picture. The whole thing was strapped on the outside of the aeroplane and you had a sort of ball and ring sight at the back. To take the photo you had to lean over the side of the cockpit and look down through this ball sight, fly the aeroplane with the left hand, move the camera handle changing the plates with the right. Every time you change the plate you pull the string, wait until you'd flown along a bit more, judge the overlap and did it again.¹¹

In addition to the danger taking the pictures represented, the RFC pilots had to contend with enemy troops taking pot shots at their planes as they flew by. Another danger for the RFC was anti-aircraft fire, which the pilots nicknamed "Archie." For the most part, the anti-aircraft fire was ineffective, but the shells bursting and bullets whizzing by their planes undoubtedly unnerved all but the most fearless of pilots.

As for enemy aircraft, the RFC had very few encounters with pilots from the German Air Service during spring of 1916. Primarily, this can be attributed to the fact that the overwhelming majority of the German Air Service and their planes were in action

stepped up, the size of RFC squadrons was increased from 12 to 18 airplanes. Jones, The War in the Air: Being the Story, Vol. 2, 198.

¹¹ Lewis, Sagittarius Rising, 55. RFC wing commander W.S. Douglas also recalled the troubles of taking photographs stating that "each plate had to be changed by hand, and I spoilt many plates by clumsy handling with frozen fingers." Jones, The War in the Air: Being the Story, Vol. 2, 87.

over Verdun, including the famous winners of the Pour le Merite (nicknamed the “Blue Max”), Max Immelman and Oswald Boelcke.¹² Then too, the few German Air Service planes that were in action at the Somme were severely outnumbered and dared not take too aggressive a stance toward enemy airplanes. In fact, the German pilots rarely ventured across their lines toward “no man’s land” and the British lines¹³

Regardless of the dangers, RFC pilots persevered because they were aware of the importance of their duties. By flying on photographic reconnaissance missions day after day in the weeks and months before the offensive began, the RFC pilots gathered enough individual photographs to make complete and up-to-date maps of the German lines and trench systems. This allowed the generals at Army Headquarters to assess the situation with a greater degree of accuracy than they otherwise may have been afforded. Another benefit of the photographic reconnaissance missions was that the photographs were to be used as guides for the massive artillery bombardment that Haig and Rawlinson planned to precede the ambitious infantry attack. Haig hoped the size of the assault would achieve a decisive breakthrough and end the battle rapidly with as few losses as possible.¹⁴

¹² At the beginning of the Battle of Verdun, the German Air Service 168 planes, 21 of which were Fokker E III's that were equipped with twin Spandau machine guns that carried up to 600 rounds each and were capable of firing through the propeller. As the war progressed every plane designed and used for fighter duty would be equipped with versions of the synchronization system. Bowen, Knights of the Air, 71

¹³ Christopher Cole, ed., Royal Flying Corps Communiqués, 1915-1916 (London Tom Donovan, 1969). Evidence of German reluctance to fly over British lines can be seen during virtually every month of the battle of the Somme

¹⁴ Haig underestimated the strength of the German forces and their defenses, believing that a quick victory could be achieved. General Rawlinson was perhaps a bit more realistic and recognized the fact that only a series of strong and continual attacks would have any effect on the German positions. But, as Haig was in overall command of British forces on the Western Front, he made the final decision. Haig, The Private Papers of Douglas Haig, 132-151 and 365-368.

However, reality turned out a bit different than Haig had imagined.

RFC pilots also undertook artillery observation missions which were very similar to the photographic reconnaissance missions; the only difference was that the pilots performing observation duties were freed from the troubles of taking photographs. Instead, the RFC pilot on an observation mission would fly over the German lines and take note of the placement of German artillery guns and other defensive and offensive weapons and structures. Knowing and marking down the locations of the German battlefield assets, particularly the artillery guns, was crucial for Haig's plan. The placement of the German guns was then marked down on various maps by the RFC pilots for future reference. RFC pilot Lieutenant Alan Jackson described artillery observation missions saying,

You went up for about an hour, an hour and a half. You looked out across enemy territory and if a gun was operating you'd see a flash and then white smoke would be visible. You'd realise then that there was an enemy battery and on the large scale map you were carrying, you'd make a note of the exact position¹⁵

Identifying the German gun emplacements could take hours for a pilot, depending on the amount of fuel in the plane and the number of German batteries that were active at that particular time¹⁶

While noting the position of the German artillery batteries was important, it certainly did not guarantee that British guns would hit the target or even come close. After all, lobbing a shell from several miles away was not an exact science. Shells often

¹⁵ Peter Hart, Somme Success: The Royal Flying Corps and the Battle of the Somme, 1916 (Barnsley: Pen and Sword Books Limited, 2001)

¹⁶ Zones in June 1916 kept difficulties to a minimum. According to the British official Historian of the air war, H.A.Jones, "zones were based on the lettered squares of the 1/40,000 map. Each of those squares was divided into four zones....covering an area of 3,000 yards square." Jones, The War in the Air Being the Story, Vol. 2, 175-176.

landed in front, behind, to the left, or to the right of the intended target. Therefore, RFC pilots had to fly over the active German batteries and use a clock-code system to direct British guns in order to achieve a direct hit. The clock-code system was fairly simple and straightforward. Directly in front of the plane, in the direction it was traveling was twelve o'clock with six o'clock being directly behind like the face of a clock.¹⁷ While this system proved effective, several shells would have to be fired before the pilot could direct the friendly battery to the enemy target.¹⁸ Of course, just as their friends on photographic reconnaissance missions, the pilots flying artillery observation had to contend with enemy ground fire as well as the shells from both sides flying past them as they flew their missions.

Fortunately for the pilots of the RFC, new planes had been slowly arriving in the months prior to the beginning of the offensive to replace outdated planes such as the Vickers fighter and BE2 C which had been in service since the early days of the war. The new planes were significant improvements over their predecessors and allowed the RFC to gain air superiority during a large part of 1916. The first of these new planes was the FE2 B which was a two-seat pusher aircraft.¹⁹ The engine itself was a Beardmore. It produced

¹⁷ Jones, The War in the Air: Being the Story, Vol. 1, 86-87.

¹⁸ The Sterling transmitter equipped with a "clapper brake" was also used to communicate with friendly artillery batteries. The transmitter which produced a high note which was effective for the purpose of signaling friendly artillery batteries. The problem was that ground operators could not differentiate one friendly airplane from another. This often caused mixed messages that decreased the effectiveness of the missions. As a result, the "clapper brake" was developed to allow the transmitter to produce either a high, medium, or low note. This expanded range of tones allowed ground operators to determine which airplane was which. The low note was most frequently used for long-range communications. *Ibid.*, 174-175.

¹⁹ FE2 Bs began arriving at the Western Front in December of 1915 and continued to see service until the end of the war as a night bomber. Jones, The War in the Air: Being the Story, Vol. 2, 158.

120 HP which was not as powerful as the Fokkers but was well suited for photographic reconnaissance and artillery observation because of its slowness. The FE2 B gunner/observer sat in front of the pilot and was armed with the standard British light machine-gun, the Lewis gun.²⁰ The position of the gunner/observer allowed him to swing the Lewis gun in nearly every direction. Soon, a second Lewis gun began to be placed on the top wing of the FE2 B, adding to the plane's effectiveness as both an offensive and defensive weapon. Yet, as with most pusher-style aircraft, the rear of the airplane was vulnerable from below--a problem that plagued errant pilots of the FE2 B.

Another important addition to the RFC squadrons during the early part of 1916 was the DH2. Somewhat similar in appearance to the FE2 B, the Geoffrey de Havilland designed DH2 was a single-seater pusher aircraft that served as the RFC's primary fighter and escort during the Battle of the Somme.²¹ The fuselage of the DH2 was very small with the engine directly behind the pilot. The plane's engine was either a 100 HP Le Rhone or Gnome that in each case allowed the plane to reach speeds up to 85 mph. Yet, the DH2 had the same vulnerability from below as the FE2 B and only had a forward firing Lewis gun. In addition, the placement of the engine on the DH2 made the plane

²⁰ Mason, The British Fighter Since 1912, 12-13.

²¹ One of the more famous DH2 squadrons was Number 24 led by RFC Major Lanoe Hawker. Receiving their airplanes on February 8, 1915, Number 24 was the first equipped solely with the DH2 and as a result were among the first to see action over the Somme. Pleased with the performance of the DH2 equipped squadrons Fourth Army commander Sir Henry Rawlinson stated in May 1916 that "the de Havilland machine has unquestionably proved itself superior to the Fokker in speed, manoeuvre, climbing, and general fighting efficiency." The arrival of the DH2 did, in fact, lead to the end of the Fokker's domination of the air which lasted from roughly October 1915, when large numbers arrived at the front, to May of 1916 when the RFC began to gain the upper hand. Jones, The War in the Air: Being the Story, Vol. 2, 159

somewhat unstable if not in steady hands.²²

A third addition to the RFC aerodromes was the two-seat Sopwith 1 ½ Strutter. The Sopwith, the first British plane of the war to feature the synchronized system for firing through the propellers.²³ Unlike the FE2 B and DH2, the Strutter was armed with the heavier Vickers machine-gun. The French-built Glerget engine of the Strutter also outmatched that of the DH2 in performance and generated 110hp allowing the plane to reach speeds up to 99 miles an hour. However, the FE2 B and DH2 were slightly more stable than the Strutter.²⁴ Consequently, they were used to a greater extent for reconnaissance, photography, and artillery coordination missions.

The fourth and most advanced fighter to serve the RFC over the Somme was the French built Nieuport 16 Scout designed to replace the inferior British made Bristol Scout. The Nieuport's engine was the 110hp Le Rhone which allowed the plane to go as fast as 110 mph.²⁵ The disadvantage of the Nieuport, which was British ace Albert Ball's favorite plane, was that the forward-firing Lewis gun did not fire through the propeller. Instead, the gun was awkwardly mounted on the middle of the top wing and controlled by

²² Michael Taylor, ed., Jane's Fighting Aircraft of World War I (London: Random House Group Ltd., 2001), 40..

²³ After capturing a German Fokker E.III, the British developed three different interrupter gears, the Vickers, Scarff-Dibovsky, and the Aisiad. All three were used on the Vickers machine-gun. Only three RFC squadrons at the Somme had airplanes fitted with synchronized machine-guns. They were number 70 which flew Sopwith Strutter's and Numbers 19 and 21 that were outfitted with Beardmore-powered BE 12s. Therefore, the Germans had a slight advantage as more of their airplanes had the synchronization system. Jones, The War in the Air: Being the Story, Vol. 2, 163.

²⁴ Mason, The British Fighter Since 1912, 48-49.

²⁵ The first Nieuports arrived near the Somme in March 1916. Jones, The War in the Air: Being the Story, Vol. 2, 161.

a wire that ran down to the pilot's joystick.²⁶ Even with this flaw, the Nieuport was arguably the best fighter the RFC had in their arsenal at the beginning of the battle of the Somme because of its speed and maneuverability. Overall, each type of aircraft had its own strengths and weaknesses although they would all hold their own against German aircraft throughout the majority of 1916 and the Battle of the Somme.

As the pace of the preparations for the infantry attack increased, RFC planes were in the air during virtually every hour of daylight from May on.²⁷ In rare cases RFC planes even flew at night.²⁸ Pilots flew photographic reconnaissance, artillery observation missions with increasing frequency. In addition, they escorted the slower moving bombing and observation aircraft such as the FE2 B and BE2 C as they attacked German Zeppelins and observation balloons (*drachen*), and bombed various German targets on the ground.²⁹

British ace Albert Ball in his sleek Nieuport 16 was one of the RFC pilots selected to accompany the reconnaissance planes as they flew over German lines. Ball, someone who especially loved to engage enemy aircraft when he was outnumbered, prosecuted his duties quite successfully. On the 29th of May, "Lt Ball on a Nieuport of 11 Sqn, attacked a hostile machine at 6,000 feet patrolling over Moyenneville. He dived from 10,000 feet firing half a drum at 30 yards range. The hostile machine was last seen diving vertically."

²⁶ Bowen, Knights of the Air, 93-96.

²⁷ British General Sir Henry Rawlinson praised the RFC's efforts up the end of May 1916. On May 23, he wrote "I cannot speak too highly of the work of these young pilots, most of whom have recently come out from England." Jones, The War in the Air: Being the Story, Vol. 2, 161.

²⁸ General Trenchard encourage his pilots to bomb the Germans at night whenever possible. On April 8, Trenchard issued orders for all RFC pilots to practice night flying in order to familiarize themselves with the associated problems of doing so. *Ibid.*, 183

²⁹ For a day-by-day account of their activity see: Cole, Royal Flying Corps Communiqués.

Yet Ball was not done, “Shortly afterwards he sighted an L.V.G. (German Bomber) and two Fokkers. He turned towards them, climbing and awaiting an opportunity.

Meanwhile, two other Fokkers appeared well above the other three machines.”³⁰

According to Ball, “I forced the L.V.G. down with a drum and a half, after which I zoomed up after the Fokkers. They ran away at once”³¹ As can be seen by the large number of German planes that Ball encountered, his services were vital to the RFC’s flights over the Somme. Without escorts such as Ball, the reconnaissance and bombing planes would have been extremely vulnerable to enemy aircraft.

Lieutenant Ball was not only sent on escort missions; on several occasions, he and his fellow RFC pilots were ordered to attack German observation balloons and Zeppelins. The observation balloons were raised high above the German lines to observe the British buildup along the front and were tethered to the ground with a large rope that could be winched in at a moment’s notice in order to protect them from enemy fire. On the 25th of June, six RFC planes, including Ball’s, took off from their aerodrome at Savy and attacked twenty-three German balloons. Not surprisingly, the Nieuports were easily seen by their intended targets and the majority of the balloons had been winched down before the RFC pilots were within striking distance. Ball missed on his first pass, but was able to drop several “phosphorus-bomb containers” on one of the German balloons while three of his fellow pilots each brought down a balloon.³² The balloons raids were important because

³⁰ Cole, Royal Flying Corps Communiqués, 155. Communiqué Number 38 for May 29, 1916.

³¹ Amazingly, Ball had only been a member of the RFC since January 29, 1916. W.A. Briscoe and H. Russell Stannard, Captain Ball, VC (London: Herbert Jenkins Ltd, 1918), 156-157.

³² Communiqué 40 for June 25, 1916. Cole, Royal Flying Corps Communiqués, 165-166

they disrupted the best tool the German Army had for observing the British's preparations for the upcoming attack.³³

Bombing of German targets also picked up pace as July 1st neared. RFC bombing runs were often directed toward railway stations, aerodromes, and headquarters behind the German lines rather than German troops or artillery gun emplacements. In the final days of June, the RFC conducted numerous bombing raids against German targets. Bad weather, however, interrupted the bombing missions for a couple of days preceding the battle. RFC Captain Harold Wylie commented on an unsuccessful flight saying that he "Gave it up after two hours during which time I hardly saw the ground... Nearly had a head on collision in a thick white cloud."³⁴ Yet, despite the weather, many bombing raids were successful. On June 30th for example,

Six machines of 21 Sqn attacked with 336-pound bombs the munitions depot and store houses at St Sauveur Station, Lille, in the evening... Observation was difficult but two large holes were observed in the roof of two sheds, and one bomb exploded in a house north of the station, blowing it up.³⁵

The bombing raids helped disrupt German supply lines, shake German morale, and soften German defenses before the infantry attack. After all, any German gun, soldier, or article of food that the RFC could destroy only lessened the strength of the German defenses.

³³ French-made Le Prieur Rockets were also used to attack German balloons. The Le Prieurs' were invented by French Navy officer Lt Y.P.G. Le Prieur. The rockets "were attached to the interplane struts of the aeroplane and were fired electronically by the pilot. Their best range was under 400 feet; beyond this range the curved trajectory of the rocket made accurate aiming impossible. Jones, The War in the Air: Being the Story, Vol. 2, 207.

³⁴ Hart, Somme Success, 82. The lack of airplanes forced the batteries to fire twice the normal number of shells to try and compensate. However, they still were not as efficient as they were with the assistance of the RFC. Jones, The War in the Air: Being the Story, Vol. 2, 208

³⁵ Communiqué Number 41 for June 30, 1916. Cole, Royal Flying Corps Communiqués, 170.

While bombing raids were helpful, the most effective weapons the British utilized were their artillery guns. The preparations for the artillery bombardment had been underway for some time as monstrous piles of shells seemingly sprouted from the ground on the British side of the line near the Somme. Amazingly, “Nearly three million shells had been dumped forward for the preparatory bombardment, to feed 1,000 field guns, 180 heavy guns and 245 howitzers.” The concentration of so many artillery guns resulted in “a density of one field gun per twenty yards of front and one heavy gun or howitzer to fifty-eight yards.”³⁶ The British artillery guns opened fire on June 24th and continued to pummel the German lines with ever increasing number of shells until the morning of July 1st when the shelling reached its most intense point just before the infantry attack finally began. Finally, at 7.30 in the morning, the eight-day artillery barrage halted briefly as the British and French infantry began pouring over the top of the trenches that they had anxiously been waiting in. Almost immediately, the British artillery fire began again with a “creeping barrage” that was designed to fall ahead of the first line of infantry troops in order to clear the first line trenches of the German defenders.

The artillery fire was not nearly as effective as British commanders had hoped. The German defenders were dug deep into the ground and the majority of them rode out the barrage without incident. As the British and French troops neared the German lines, the British artillery had to cease the “creeping barrage” so that they would not hit friendly troops. As a result, the German troops who survived the bombardment left their trenches and “dragged out their machine-guns, to pour an unslackening hail of lead into the unduly

³⁶ Keegan, *The First World War*, 291. During the seven day preparation 1, 627, 824 shells were fired. David T. Zabecki, *Steel Wind: Colonel Georg Bruchmuller and the Birth of Modern Artillery* (Westport and London: Praeger Publishers, 1994), 16

dense waves of the attackers ”³⁷

At this point in the war, the majority of the warring nations still used tactics that were holdovers from the previous century. “Battalions attacked in four or eight waves, not more than a hundred yards apart, the men in each almost shoulder to shoulder, in a symmetrical well-dressed alignment.” The soldiers were also trained to “advance steadily upright at a slow walk with their rifles held aslant in front of them, bayonets upwards-so as to catch the eye of the observant enemy.”³⁸ As one can imagine, the losses of British and French troops were tremendous.

In fact, so many British and French soldiers were killed, wounded, or fighting for their survival that the “Contact Patrols” flown by the RFC to determine the advance of the infantry could not be completed successfully. As for Contact Patrols, the advancing infantry were equipped with burdensome packs that held a variety of things including red flares which they were supposed to light at certain point along their way so that the RFC planes circling above could pinpoint their location and relay it to headquarters using their wireless (copper wire antennae).³⁹ Some of the infantry also used white sheets laid out on the ground to send messages to the pilots. Often, the pilots used the Klaxon horns their planes were equipped with to try and get the infantry to either light the flares or lay out the white sheets.⁴⁰ However, the infantry were too busy for the Contact Patrols to be effective. Lt. Cecil Lewis who was sent up to fly a Contact Patrol as the infantry attacked

³⁷ Liddell-Hart, The Real War, 234.

³⁸ *Ibid.*, 234.

³⁹ Jones, The War in the Air: Being the Story, Vol 2, 179-181

⁴⁰ Lewis, Sagittarius Rising, 91.

on July 1st, reported, “Not a single ground sheet of Battalion or Brigade Headquarters was seen. Only two flares were lit on the whole of both Corps fronts.”⁴¹ As a result, the RFC pilots had to fly dangerously low over the battlefield in an attempt to determine the progress of the friendly infantry by the color of their uniforms. Therefore, the Contact Patrols during the first day’s attack did not work as well as planned. As a result, the low flyovers became standard practice over the course of the battle and in future battles.

In keeping German planes from assisting their artillery, the RFC pilots were able to be quite effective. By July 1st, the RFC had 185 planes at the Somme versus the German Air Services 129. In addition, the RFC were supported by 201 French planes that shifted their attention between Verdun and the Somme.⁴² In total, the British and French outnumbered the Germans nearly three-to-one.⁴³ Therefore, the British and French pilots had numbers on their side which gave them an advantage on almost every occasion. For example, on the 1st, a total of thirty-five “dogfights” occurred with the RFC winning the majority.⁴⁴

Despite the casualties incurred during the initial infantry attack, Field Marshall Haig was not deterred and believed another strong push would serve to break the

⁴¹ Lewis, Sagittarius Rising, 92.

⁴² The overwhelming majority of the French Air Service was occupied at Verdun during the spring and summer of 1916. Significant numbers of French escadrilles did not arrive until the middle of October. Flammer, The Vivid Air, 130

⁴³ The RFC had a total of 27 Squadrons in France on July 1. Martin Middlebrook, The First Day on the Somme, 1 July, 1916 (New York: W.W. Norton and Company, 1964), 84-85.

⁴⁴ Cole, Royal Flying Corps Communiqués, 170-173

Germans' will and win the battle.⁴⁵ For the remainder of July, British and French infantry troops fought piecemeal on numerous excursions into "no mans land" towards the German trenches with few gains to show for their efforts. The RFC, however, were somewhat more successful and active during the month and continued to harass German rail stations, headquarters buildings, observation balloons and aerodromes. Photographic reconnaissance continued uninterrupted as did artillery observation flights that allowed the British guns to hit their targets. Likewise, the RFC and their French counterparts kept the pilots of the German Air Service from assisting their artillery.⁴⁶ As a result, the German guns were inaccurate and ineffective, providing some relief for the British soldiers who were suffering enormously in their attempts to take part of the German line. Yet, the RFC pilots paid high costs for their achievements and by the end of July had lost just short of 100 planes over the Somme.⁴⁷

The Germans, particularly the infantry and the Air Service, were well aware of their inferiority in the air.⁴⁸ German General Fritz von Below, stationed at the headquarters of the First Army, commented that,

The beginning and first weeks of the Somme battle were marked by a complete inferiority of our own air forces. The enemy's aeroplanes enjoyed complete freedom in carrying out distant reconnaissances. With the aid of aeroplane observation, the hostile artillery neutralized our guns and was able to range with the most accuracy on the trenches occupied by our infantry; the

⁴⁵ The British forces had 8,170 killed, 35, 888 wounded, and 17, 758 missing. The Germans had about 6,000 killed and slightly over 2,000 wounded. Martin Marix Evans, The Battles of the Somme (London: George Weidenfeld and Nicholson Ltd, 1996), 33.

⁴⁶ Cole, Royal Flying Corps Communiqués, 170-203.

⁴⁷ *Ibid.*, 170-203.

⁴⁸ Morrow, German Air Power in World War I, 60-61.

required data for this was provided by undisturbed trench reconnaissance and photography. By means of bombing and machine-gun attacks from a low height against infantry, battery positions and marching columns, the enemy's aircraft inspired our troops with a feeling of defencelessness [sic] against the enemy's mastery of the air. On the other hand, our own aeroplanes only succeeded in quite exceptional cases in breaking through the hostile patrol barrage and carrying out distant reconnaissances; our artillery machines were driven off whenever they attempted to carry out registration for their own batteries. Photographic reconnaissance could not fulfill the demands made upon it. Thus, at decisive moments, the infantry frequently lacked the support of the German artillery either in counter-battery work or in barrage on the enemy's infantry massing for attack.⁴⁹

Consequently, the German leadership took steps to remedy the situation. Because of Verdun, the Germans had few planes to spare, but by late July the Germans had increased the number of their planes at the Somme from 129 to 164.⁵⁰ The German Air Service also increased the number of missions they flew in an attempt to offset the numerical superiority of the RFC and the French. By August their efforts began to show some limited results.⁵¹

Overall, the most important events concerning the German Air Service and their situation as August began were the removal of Falkenhayn in favor of Field Marshall Paul von Hindenburg and General Erich von Ludendorff as well as the arrival of German ace Captain Oswald Boelcke. General Falkenhayn was removed because his offensive at Verdun was a virtual failure in as much as it stalled and failed to achieve the desired

⁴⁹ Jones, The War in the Air: Being the Story, Vol. 2, 270-271.

⁵⁰ Specifically, German fighter strength increased from 16 to 60 by early August. In addition, three reconnaissance flights composed of six airplanes each were added. Morrow, The Great War in the Air, 152.

⁵¹ RFC Communiqués beginning in latter part of July and continuing in August continually mention increased German airplane activity, especially that of German fighter planes trying to disrupt the British and French reconnaissance, bombing, and artillery observation planes. Cole, Royal Flying Corps Communiqués, 195-239.

results.⁵² In addition, although his defense at the Somme was holding, the German Army's offensive capabilities, namely artillery and airplanes, were hampered by RFC and French Air Service planes. On the other hand, Field Marshall Hindenburg, now the Chief of the General Staff, had been rather successful on the Eastern Front. His success was partially due to his leadership ability and the efforts of General Ludendorff, who upon Falkenhayn's removal was given the position of First Quartermaster General of the German Army (*Generalquartiermeister die Oberste Heeresleitung*). General Ludendorff was the man in charge of gathering the necessary tools of war and getting them to the troops in the field. More importantly, General Ludendorff was a strong supporter of air power and realized that air superiority was becoming a decisive factor in the success of the army in field. Therefore, both Hindenburg's and Ludendorff's military and managerial skills would be the keys if the German Air Service and field army were to succeed at the Somme.⁵³ Hindenburg and Ludendorff, however, did not receive their appointments until the 29th of August.⁵⁴

As a result, the most important event for the German Air Service during the month of August was the arrival of Captain Oswald Boelcke. Captain Boelcke had served over Verdun and had accumulated a great number of victories, establishing him as an "Ace." In

⁵² Falkenhayn's removal was also sped up by Ludendorff and Hindenberg who felt they could do a much better job. Both men heavily campaigned against Falkenhayn, taking their complaints to the Kaiser. Asprey, *The German High Command at War*, 151-160. For Falkenhayn's view on his removal see: Falkenhayn, *The German General Staff and its Decisions*, 324.

⁵³ Beginning in late August, Hindenburg successfully increased the number of German airplanes near the Somme. By October the strength of the German Air Service on the Somme reached its peak. Jones, *The War in the Air: Being the Story*, Vol. 2, 251.

⁵⁴ J.H. Johnson, *Stalemate! Great Trench Warfare Battles* (London: Cassell Military Classics, 1995), 82.

fact, Boelcke was the first German fighter pilot to receive the *Pour le Merite* (“Blue Max”) following his ninth victory in January of 1916. By June of that year, his tally had reached nineteen, but before he could increase the number of French planes he shot down over the Somme, he was sent away from the front.⁵⁵ While it may seem odd for the German High Command to remove one of their most successful pilots from the Western Front during such a critical battle, the reason was sensible. On June 18th, Boelcke’s fellow pilot Max Immelman was shot down and killed over Verdun.⁵⁶ Immelman, known as the “Eagle of Lille” and winner of the *Pour le Merite*, was a well-loved public figure in Germany due to the fact that he led German Air Service in aerial victories at that point in the war.⁵⁷ Pictures of Immelman and Boelcke were pasted on thin cardstock and made widely available for the German public to purchase. These picture-cards, on which many German heroes’ photographs were placed, served to boost the morale of the German people.⁵⁸ Not surprisingly, his death was a shock to both the German public and German military. Therefore, sending Boelcke away from the dangerous front would, in the hopes of German leaders, preserve the German Air Service’s remaining hero.

Boelcke did not appreciate the motives of the German leaders and hoped stay on

⁵⁵ Reynolds, *They Fought For the Sky*, 60-75.

⁵⁶ RFC airmen 2nd Lt. G.R. McCubbin and his observer Corporal H. Waller were officially credited with the victory. Jones, *The War in the Air: Being the Story*, Vol. 2, 201-202.

⁵⁷ Terry C. Treadwell and Alan C. Wood, *German Knights of the Air, 1914-1918: The Holders of the Orden Pour le Merite* (New York: Barnes and Nobles Books, 1997). Immelman was known as the “Eagle of Lille” because Lille, was the French village where his squadron was stationed. Prior to joining the German Air Service, Immelman served in a railway battalion in Berlin-Schonberg. Aaron Norman, *The Great Air War, The Men, The Planes, The Saga of Military Aviation: 1914-1918* (New York: Macmillan and Company, 1968), 143.

⁵⁸ Bowen, *Knights of the Air*, 67-71. Also, Treadwell and Wood. *German Knights of the Air*, 7.

the Western Front where he believed he was most useful but agreed that a tour of the East would be more “useful” than remaining grounded at the German Air Services headquarters in Charleville.⁵⁹ Consequently, Boelcke was sent on what was termed a “inspection/public relations tour of Vienna, Budapest, Belgrade and Turkey ” Boelcke utilized his time wisely and wrote his thoughts on aerial combat down in a work titled “Air Fighting Tactics” that was used as a guide by future German pilots.⁶⁰

The most important aspect of Boelcke’s work and discussions with Colonel Hermann von Leith-Thomsen, head of the German Air Service, was the stress he placed on formation flying. Previously, German fighter pilots tended to fly alone and scout the sky for enemy planes. Boelcke, however, felt that such an approach did not make sense because German fighter pilots were often outnumbered by their enemy. By flying in formation, the German pilots would be able to protect one another and be more effective when attacking. As the increasing success of the German Air Service during the Battle of the Somme indicates, Boelcke tactics were well-founded.⁶¹ Boelcke also used his trip East to recruit members for the fighter squadron or “Hunting Pack“ (*Jagdstaffel* or *Jasta*) he had been promised upon his return to the Western Front.⁶² One of the men Boelcke recruited was the legendary “Red Baron,” Manfred von Richthofen who would later

⁵⁹ Werner, *Knight of Germany*, 180-181.

⁶⁰ *Ibid.*, 183-184.

⁶¹ To be discussed further, especially concerning the months September through November

⁶² On August 10, 1916 while in Kovel, Austria, Boelcke was informed by telegram that he was to “Return to west front as quickly as possible to organise and lead Jagdstaffel 2 on the Somme front ” Werner, *Knight of Germany*, 200.

assume command of Boelcke's Jagdstaffel 2.⁶³ Yet, just like the appointment of Hindenburg and Ludendorff, Boelcke and the members of his Jagdstaffel would not arrive until late August.⁶⁴ As a result, the British and French continued their mastery of the air.

On the ground, soldiers on both sides had settled into the routines they had begun shortly after the massive British push on July 1st. For the German infantry, the month was one of sitting and waiting, avoiding enemy shells, aircraft bombs, and the occasional infantry attack. The British and the much smaller number of French troops did the same, except they were preparing for another large assault in September. This meant that they would have to undertake periodic minor assaults on the German lines in order to push their own lines as far forward as they could before the major attack began. As part of the preparations the RFC pilots continued the duties that had become so common since July. Lt. Cecil Lewis described the typical duties RFC pilots undertook during August remarking,

We went out twice a day, averaging about four hours over the lines. Whatever we did, photos, trench reconnaissance, artillery observation, we made it our business to deliver the goods. We patrolled usually below the thousand-foot mark, and, now that the attack was steadying up, we began to receive unwelcome attention from machine-gun fire on the ground. We retaliated, never leaving the lines without emptying all our ammunition into the trenches where the Huns looked the thickest. When this happened, they used to fire white lights and a moment later Archie would open at us. But he was inaccurate at low altitudes and didn't bother us much.⁶⁵

Also, as part of their work, the RFC pilots begin increasingly to use night bombing

⁶³ Gibbons, *The Red Knight of Germany*, 43

⁶⁴ The official date for the beginning of Jagdstaffel 2 was August 27, 1916 with its headquarters at Bertincourt near the Somme. Werner, *Knight of Germany*, 204.

⁶⁵ Lewis, *Sagittarius Rising*, 124.

as a means to avoid German fighter planes and ground fire.⁶⁶ Flying in darkness, however, was tricky regardless of whether or not RFC pilots encountered German fire. RFC Lt.

Lessel Hutcheon described an average night bombing run saying,

Everything was inky black and I could only see an occasional thing directly below me. My mapboard was in the way of my compass, so I pulled the map off, chucked the board over the side and flew due East for about quarter of an hour.⁶⁷

Soon thereafter, Hutcheon saw some lights in the sky. The lights were German flares they had fired trying to determine the position of Hutcheon's plane which they could clearly hear but not see. Then, the Germans "loosed of some 'Archie'" near Hutcheon but failed to get near him. The Germans then "got a searchlight going and flashed it all round, passing over the top of me." Still, the Germans' gunfire failed to hit its mark and more flares were used that unwittingly allowed Hutcheon to see the ground although he still had only a vague idea of where he was. As a result, Hutcheon decided to turn back and used his compass to find his way home to his aerodrome. Hutcheon only complaint was that he "couldn't find my target, 'cos the bombs would have looked so pretty exploding in the darkness."⁶⁸ Several days later, Hutcheon went on another night bombing run which proved more successful. Yet, the increasing frequency of night bombing meant that the Germans on the ground had more occasions to practice hitting targets at night using flares and searchlights. On yet another night raid, Hutcheon experienced the increased accuracy

⁶⁶ By mid-August, the Germans had increased the number of planes they had at the front to 250. Although this was still half the number of planes the British and French had in the area, the increased number of German planes allowed them to be more aggressive over the Somme. However, the majority of the German did not venture beyond their own lines. Cole, Royal Flying Corps Communiqués, 204-244.

⁶⁷ L.F. Hutcheon, War Flying (London: John Murray, 1917), 99-101.

⁶⁸ Ibid ,

of German ground fire. Hutcheon recalled that,

There were some wonderfully near shots and the machine was badly shaken by one which made a most appalling crash just behind the tail. I was horribly scared, of course, I looked round, saw the tail was still there, said 'Remarkable!' and went on.⁶⁹

Despite such increasing hazards, the night bombings continued because the RFC planes, more often than not, caused more damage than they sustained.

During August the RFC's aerial arsenal expanded with the arrival of a more airplanes to assist their efforts. One such airplane was the BE12 which had been in service above the Somme, although in very small numbers. The BE12 was essentially a single seat version of the outdated BE2 C which had served the RFC since the early days of the war. While these planes had assets such as a forward-firing machine-gun and good rate of climb, they were not agile enough to serve as a good fighter or scout plane. As a result, the BE12's primary job became that of a bomber.⁷⁰ Even as a bomber though, the BE12 was fairly poor. On August 26th, 11 BE12s of the RFC's 19 Squadron left their aerodrome to bomb the Bois de Havrincourt. Out of the eleven BE12s that took off, only five returned. The loss of the six BE12s was due more to a "heavy storm" than German anti-aircraft fire or German planes.⁷¹ The RFC, however, really needed a new fighter/scout plane to compete with the increasingly superior German fighter/scout planes that were arriving at the Somme. The lack of a superb fighter would soon become apparent in early September when Boelcke's Jagdstaffel 2 squadron received the first

⁶⁹ Hutcheon, War Flying, 199.

⁷⁰ Cole, Royal Flying Corps Communiqués, 226-239.

⁷¹ Ibid., 233-234.

shipment of the new Albatross DI biplane. What the RFC and their French counterparts still had on their side throughout August were numbers. In fact, the German Air Service was outnumbered by over one-hundred planes.⁷²

As the month of September began, the RFC pilots had increasing worries due to the growing presence of highly maneuverable and well-armed German planes. Yet, the planes were not the only advantage the Germans slowly began to enjoy. The primary advantage the Germans gained in September was the arrival of Jagdstaffel 2 which Captain Boelcke immediately began training. Many of these pilots became some of the most prolific aces the war would see. While Jagdstaffel 2 was waiting for its new planes to arrive, its leader Boelcke was familiarizing himself with the area and one of the new Fokker DIII biplanes that had arrived the previous day.⁷³ On September 2, Boelcke went up in his Fokker on what was supposed to be a brief test flight. Boelcke soon saw two RFC DH2s attacking German LVG bombers and rushed to lend a hand. Boelcke was outnumbered and hit several times by enemy machine-gun fire. He only removed himself from the situation by flying his airplane in a manner that made it appear out of control to the two RFC fighter pilots. Boelcke then proceeded flying along until he sighted a “BE, followed by three Vickers single-seaters, i.e. an artillery plane with its escort.” Boelcke, always ready to test his flying skills, “went for the BE. But the other three interrupted me in the middle of my work, and so I beat a hasty retreat. One of these fellows thought he

⁷² The German's had nearly 250 planes at the Somme, the RFC and French almost 500. German fighter planes increased from 16 to 60 by the end of August. Bowen, Knights of the Air, 117.

⁷³ On September 2, Jagdstaffel 2 had only three planes total. Two of the planes were Fokkers, one of which Boelcke was flying, and the third an Albatros. Werner, Knight of Germany, 204

could catch me and gave chase.”⁷⁴ The “fellow” was RFC Captain Robert Wilson. Wilson was an experienced pilot, but his skills were not on par with Boelcke’s. Boelcke quickly polished off his victim who was barely able to land his plane. Unfortunately for Wilson, he landed behind the German lines and was taken prisoner.⁷⁵

Boelcke’s victory was one of the few for the German Air Service in early September. On the 2nd, the same day as Boelcke downed Wilson, the pilots of the RFC conducted a number of successful missions against German targets in preparation for the second large British infantry push which was due to begin on September 15th. According to RFC communiqués for the 2nd of September, eighty-six German artillery batteries had been located, ten batteries bombed, several German trenches were fired on destroying at least one German machine-gun emplacement, and nearly twenty German planes had been engaged. In addition, over fifty bombs had been dropped on a German ammunition depot at Bois de Harincourt, and a group of fifty German infantry men had been strafed, leaving numerous casualties.⁷⁶ As the infantry attack neared, the efforts of the RFC continued along much the same lines as a number of German targets were attacked daily in order to “soften them up.” The German Air Service could do little in return as their numbers were still inferior and in the case of Jagdstaffel 2, their planes had yet to arrive.

On September 12, British artillery began a heavy bombardment of the first two lines of German trenches. Similar to July 1st, the artillery would then fire a “creeping barrage” in front of the advancing “friendly” infantry along all but a small portion of the

⁷⁴ Werner, *Knight of Germany*, 205.

⁷⁵ *Ibid.*, 205-207.

⁷⁶ Cole, *Royal Flying Corps Communiqués*, 241-243.

line. The gap that was not being shelled was to be filled by a weapon previously unused in warfare, the tank.⁷⁷ As they had on numerous occasions over the preceding months, the RFC was readying to assist the infantry and the artillery on the day of the battle. On September 14th, RFC General Hugh Trenchard briefed his airman, explaining the importance their role would have during the attack. According to Lt. Alan Bott, Trenchard informed the pilots of the RFC that

No German machines could be allowed near enough to the lines for any observation. We must shoot all Hun machines at sight and give them no rest. Our bombers should make life a burden on the enemy lines of communication. Infantry and transport were to be worried, whenever possible, by machine-gun fire from above. Machines would be detailed for contact work with our infantry. Reconnaissance jobs were to be completed at all costs⁷⁸

Early the next morning, the attack, known thereafter as the Battle of Flers-Courcelette, began and the RFC performed their duties as well as Trenchard could have hoped.

RFC Lt. Cecil Lewis, flying Contact Patrol duties, once again witnessed the start of a large attack. Lewis described the opening of the attack saying,

There was a half hour hurricane bombardment and then the tanks were put over. From the air at about 5 or 6,000 feet behind the lines watching this whole scene, there was this solid grey wool carpet of shell bursts, but it was just as if somebody had taken his finger in the snow and pulled it through the snow and left a sort of ribbon....At Zero hour we saw the tanks beginning to lumber. They'd been cleared for the tanks to come in file, one behind the other. Of course they were utterly unexpected; the first lot went sailing over the trenches.⁷⁹

The tanks were unexpected because the German infantry had never seen such machines. In addition, the arrival of the noisy tanks was masked by the sound of the engines of the

⁷⁷ Johnson, Stalemate! Great Trench Warfare Battles, 82-86.

⁷⁸ Alan Bott, Cavalry of the Clouds (New York: Doubleday Page and Company, 1918), 28-29.

⁷⁹ Lewis recalled that during the month of September his plane received twenty to thirty bullet holes in it every time he flew a mission. Lewis, Sagittarius Rising, 126-127.

RFC planes that flew over the area where the tanks had gathered in order to preserve the surprise.⁸⁰ Lewis recalled that he and his fellow pilots criss-crossed the battlefield watching the tanks to see if they could use the element of surprise to break a decisive breakthrough that might make the war “mobile again.” In doing so, Lewis glance down to see the damage done below him. He stated,

The ground looked above like a pock marked skin. All the trees had been shot, there was no greenery, there was nothing. Except amongst the grey wool of the shell burst these lumbering chaps. One or two of them with red petrol tanks one their back; one even with a little mascot, a little fox terrier running behind the tank. Then one would stop and we had no idea why. Obviously it had been hit, or somebody had thrown a grenade at it, or it had broken down. At the end of two hours they had moved about a mile and we thought everything was going well because our petrol was finished.⁸¹

As for the immobile tanks, most had broken down and had not been disabled by enemy fire.⁸²

Besides the Contact Patrols flown by men such as Lt. Lewis, the sky above the Somme was filled with RFC planes on bombing runs, reconnaissance and artillery observation missions, and those on escort missions as well as several that were sent up to engage German planes. While the RFC pilots had performed those duties numerous times since the beginning of the Battle of the Somme, each mission presented a great deal of danger. After all, Boelcke was lurking about despite the efforts of RFC planes. Several RFC pilots, including Lt Bott, endeavored to attack the German aerodrome at Bois de

⁸⁰ Farrar-Hockley, The Somme, 229.

⁸¹ Lewis, Sagittarius Rising, 126-127,

⁸² Churchill states that the tanks proved their ability and the possibility that they could be used extensively in the future. As for the minimal effect they had on September 15th, Churchill attributes that to the “diseases of infancy” and their “largely untrained” crews. Winston S. Churchill, The World Crisis: Volume III (New York: Charles Scribner’s Sons, 1927), 185-187.

Havrincourt where Jagdstaffel 2 was stationed. Bott, recalled that he and his fellow pilots were over the aerodrome and saw several planes on the ground.⁸³ What they failed to see, at least at first, were the German planes flying below and behind them. Boelcke saw the planes and “took off at once and chased them” Bott and his squad soon saw Boelcke and dove on him. Boelcke, using his flying skill, was able to maneuver his machine to get a clear shot at the RFC plane. Boelcke then “gave him about 50 rounds at close range” as did Richthofen.⁸⁴ Out of the seven RFC Sopwiths that attacked Bois de Havrincourt four were shot down with Boelcke receiving credit for two kills. Other RFC pilots fared better than Bott and his squadron, and each were vital to the efforts of the infantry.

The attack on the 15th was not the breakthrough that Lt. Lewis and many in the British Army had hoped. The British suffered over 30,000 casualties that day primarily to German machine-gun fire.⁸⁵ Yet, the attack did push German lines further back. However, by weighing the gains against the losses, the British attack accomplished little and did nothing to speed up the progress or win the battle.

Following the September 15th attack, the real turning point of the air war was at hand. On September 16th the new German Albatros DI fighters arrived at the Western Front. Seen as the best squadron the Germans had, Boelcke’s Jagdstaffel 2 was one of the first to receive the new plane. The very next day, the pilots of the RFC learned how lethal the combination of a skilled pilot and a technologically superior plane could be. The Albatros was so lethal because it had not one machine gun, as the Fokker DII and other

⁸³ Bott, Cavalry of the Clouds, 35-36.

⁸⁴ Werner, Knight of Germany, 211

⁸⁵ Farrar-Hockley, The Somme, 240-241.

earlier planes had, but two Spandau machine-guns that fired forward through the propeller. The Albatroses had a 160hp Mercedes high compression engine that could reach nearly 110mph.⁸⁶ Most importantly, the Albatroses were very streamlined which gave the plane great aerodynamic capabilities.⁸⁷ Boelcke was quite pleased with the plane and wrote “Yesterday at least six arrived, so that I shall be able to take off with my Staffel for the first time today. Hitherto, I have generally flown Fokker biplanes, but today I shall take up one of the new Albatroses ”⁸⁸

That day, the 17th, Boelcke left the aerodrome at Bois de Havrincourt with several of his “puppies,” his nickname for the men he commanded. Soon Boelcke’s group came in contact with a number of RFC planes. The RFC planes of the 3rd Brigade were returning to their aerodrome after having bombed Marcoing Station, an unloading point for German supplies and men.⁸⁹ Boelcke wrote, “This morning I ran into an enemy squadron with two of my pilots (Lieutenants Reimann and Richthofen). We cleaned them up thoroughly; each of us got one.”⁹⁰ Richthofen later recalled his first victory saying,

My Englishman twisted and turned, flying in zig-zags... My opponent had apparently lost sight of me. In a fraction of a second, I was at his back with my excellent machine. I gave a short burst of shots with my machine gun. Suddenly I nearly yelled with joy, for the propeller of the enemy machine had stopped

⁸⁶ Taylor, Jane’s Fighting Aircraft of World War I, 140. Aircraft designer Anthony stated, after the war, that the 160hp Mercedes engine allowed the Germans Air Service to rule the air above the Western Front during the fall of 1916 to the spring of 1917. Fokker and Gould, The Flying Dutchman, 156.

⁸⁷ McKee, The Friendless Sky, 92-98.

⁸⁸ Werner, German Knight, 209

⁸⁹ Cole, Royal Flying Corps Communiqués, 261-262

⁹⁰ Werner, German Knight, 211-212.

turning⁹¹

The “Red Baron” had destroyed the FE2 B’s engine and sent the plane crashing to the ground killing RFC Lieutenants L.B.F. Morris and T. Rees.⁹² Boelcke’s lessons were paying off for his Staffel. On September 19th, they once again outmatched the RFC planes they encountered. Boelcke recalled, “Six of us rattled into a squadron consisting of eight or ten FEs and several Moranes.” Boelcke chose his prey and “shot up that monoplane from close range until he broke up in flames and fell into the wood near Grevillers in fragments.”⁹³

The RFC’s communiqués beginning on the 17th continually reported more frequent contact with enemy planes that were both aggressive and agile. This made the tasks the RFC pilots performed that much more difficult.⁹⁴ Now the Germans were becoming the harassers rather than the harassed. Yet, the RFC had to continue their missions regardless of the danger. Their work was especially needed once again when the British infantry, with French assistance, attacked on September 25th.⁹⁵

On the 25th, the attack known as the Battle of Morval began. The attack was an

⁹¹ Manfred von Richthofen, The Red Air Fighter (London: Greenhill Books, 1990), 93-94.

⁹² Cole, Royal Flying Corps Communiqués, 263-264.

⁹³ Werner, Knight of Germany, 213.

⁹⁴ Cole, Royal Flying Corps Communiqués, 261-276.

⁹⁵ On September 22, in preparation for the attack on the 25th, pilots of RFC IV Brigade flew a combined total of 303 hours. IV Brigade were working in coordination with Gen. Rawlinson’s Fourth Army which made the infantry attack on the 25th. The following day, RFC Airplanes bombed German positions and railway stations at Bapaume, Douai, Queant, and Maubeuge causing substantial damage. On September 24th, 60 RFC fighter airplanes conducted a sweep over the front as a show of force designed to keep the German Air Service in check. Their sweep, however, was only marginally successful. Jones, The War in the Air: Being the Story, Vol. 2, 284-288.

attempt to capture the German lines at Morval which had been an objective the British XIV corps failed to take on September 15th.⁹⁶ RFC pilots played their usual busy role during the attack and helped preserve the lives of many friendly infantrymen by ranging British artillery on 47 German artillery batteries, 34 of which were destroyed.⁹⁷ With the assistance of the RFC and the use of artillery to hold their captured positions, the British and French troops were able to take Morval and the German-held village of Thiepval the following day.⁹⁸ However, hopes for any further large scale attacks at the end of September began to evaporate as the rainy autumn turned the Somme into a mud pit.

In the meantime, the German pilots in Boelcke's Jagdstaffel 2 were having success after success. On the 27th, Boelcke scored another kill. Three days later, Richthofen did the same and landed near the fallen enemy's plane to retrieve its machine-gun as a souvenir.⁹⁹ The pilots of the RFC quickly became aware of the increasing skill and achievements of their German counterparts as September came to a close. The Germans' increasing skill in the air was addressed by RFC General Hugh Trenchard who wrote to his superiors,

Throughout the summer the Royal Flying Corps in France maintained such a measure of superiority over the enemy in the air that it was enabled to render services of incalculable value. The result is that the enemy has made extraordinary efforts to increase the number, and develop the speed and power, of his fighting

⁹⁶ Liddell-Hart, The Real War, 246.

⁹⁷ Cole, Royal Flying Corps Communiqués, 278-280.

⁹⁸ Leonard Wood, ed., The History of the First World War: Volume II (New York: Grolier Incorporated, 1965), 543-544

⁹⁹ In addition to collecting souvenirs from the planes he shot down, the "Red Baron" had a jeweler in Berlin engrave small silver cups with the date and the type of airplane he had shot down. Gibbons, The Red Knight of Germany, 52.

machines¹⁰⁰

Trenchard then conceded that the Germans had,

Succeeded in doing so. Within the last few weeks the enemy has brought into action on the Somme front a considerable number of fighting aeroplanes which are faster, handier, and capable of attaining a greater height than any at my disposal¹⁰¹

Trenchard then mentioned that the RFC had “one squadron of single-seater ‘Nieuports’” and “one of ‘Sopwiths.’” Yet Trenchard pointed out that these numbered far too few and commented that “the advent of the enemy’s improved machines has been a marked increase in the casualties suffered by the Royal Flying Corps.”¹⁰²

Trenchard was correct; during the month of September 123 British and French, mostly British, were shot down. In stark contrast, the German Air Service lost a mere 27.¹⁰³ Partly, this imbalance in casualties was caused by the greater number of British and French planes in action as well as the offensive strategy Trenchard advocated. Arguably, however, the primary reason the RFC and the small number of French Air Service pilots suffered as they did was the superiority of the German’s Albatross DI. The Albatross simply outclassed the British and French planes in firepower, speed, and maneuverability. The only element the RFC and French Air Service had on their side were numbers. This advantage was rapidly dissolving as the number of German planes on the Western Front

¹⁰⁰ Jones, The War in the Air: Being the Story, Vol. 2, 297

¹⁰¹ *Ibid.*, 297.

¹⁰² Fortunately for the RFC, Field Marshall Haig was fully behind Trenchard. On September 30th, Haig asked the British War Office to send more fighter squadrons to the Somme. Haig explained that the need for more fighters was most urgent because “an increasing number of German machines now come up to the lines, and a few cross them, whereas practically no German machines crossed the lines in the first two months of the battle.” *Ibid.*, 297.

¹⁰³ Reynolds, They Fought for the Sky, 123.

increased by early October.

As October began, the German Air Service started to undergo some very important changes that assisted its efforts at the Somme nearly as much as the addition of the planes from the now defunct Verdun sector. The most important of these changes was the creation of a unified German Army-Air Force, the *Luftstreitkräfte* (commonly known as the Imperial German Air Service) on October 8th.¹⁰⁴ The creation of the *Luftstreitkräfte* was the result of Colonel Leith-Thompson's request to the German high command for more independence from the Army.¹⁰⁵ Leith-Thomson's request was strongly supported by General Ludendorff. Earlier, it was mentioned that the appointment of Hindenburg and Ludendorff in late August were essential factors in the slow ascendancy of the German Air Service at the Somme. This was especially true by October, because without the support of Hindenburg and Ludendorff, the creation of the *Luftstreitkräfte* may not have taken place or would have been delayed for quite some time.¹⁰⁶ Once the *Luftstreitkräfte* was in place, General Ernst von Hoeppner was selected as the head of the Air Force (*Kogenluft*). Col. Leith-Thompson was appointed Chief Staff Officer for Aviation under Hoeppner which meant that he would control the *Kogenluft*'s

¹⁰⁴ Morrow, German Air Power, 69.

¹⁰⁵ Leith-Thomson felt that the field army commanders had far too much control over the German Air Service and hindered their efforts above the battlefield. By receiving more independence, the men who knew the capabilities of the Air Service and its machines were able to utilize its strength to the fullest. *Ibid.*, 69. For evidence of this see chapter. 3 of this paper which addresses the rise of the German Air Service in late 1916 through the spring of 1917, culminating in "Bloody April" in which German pilots devastated the French and British air forces.

¹⁰⁶ In 1919 Ludendorff recollected that British air superiority throughout most of the battle of the Somme severely demoralized German troops which hindered their enthusiasm for fighting. Erich von Ludendorff, Ludendorff's Own Story, August 1914-November 1918 (New York and London Harper and Brothers Publishers, 1919), 316-329.

activities at the Somme.¹⁰⁷ Also essential to German air power was Major Wilhelm Siegert who was selected to head the Inspectorate of Flying Troops (*Idfleig*) and “oversaw aviation supply and industry.” Siegert’s efforts to increase aircraft production resulted in a dramatic increase in German airplanes at the Western Front. In fact, by the middle of October, the Germans had 885 on the Western Front as a whole, 540 of which flew at the Somme.¹⁰⁸ Therefore, the success of German pilots, already on the rise, increased markedly as the numerical superiority of the British and French began to disappear. German planes and their RFC counterparts, however, would have to wait out the rains that began to fall in early October.

On October 1st, part of the British infantry attacked the German trenches at Eaucourt l’Abbaye with the RFC performing their usual duties. On the 1st, a number of “dogfights” occurred between RFC and German planes. Albert Ball, now an RFC captain, “drove down two patrolling machines out of control near Gommecourt. He afterwards waited and attacked three hostile machines which came up from Lagincourt aerodrome, forcing one to land and dispersing the remainder ” Besides the numerous instances of aerial combat that brought down a few German planes, the most effective RFC strikes that day took place on several German railway stations. RFC pilots bombed the German

¹⁰⁷ As head of the Kogenluft, Hoepfner also had control over German anti-aircraft batteries, observation balloons, Zeppelins, and any other element that related to German air power. By unifying the semi-chaotic elements of the German Air Service under one command, its effectiveness could, and in many cases did increase dramatically. In Chief Officer for Aviation, or more precisely the Chief of Staff to the Commanding General of the Air Forces, Lieth-Thomsen was directly subordinate to General Hoepfner, who in turn answered only to the Chief of the German General Staff (Hindenburg). Lawson and Lawson, First Air Campaign, 96.

¹⁰⁸ In 1928, official British historian of the air war during World War I, H.A Jones, placed the number of German airplanes along the Somme at 451. However, more recent works indicate that the German Air Service had nearly 100 airplanes more than that. (about 540) Morrow, German Air Power in World War I, 69-70.

railheads at Orchies, Miraumont, and Bois d' Havrincourt causing a good deal of damage Miraumont Station was hit particularly hard with over twenty 122 pound bombs that damaged the "station, buildings, and permanent way and a fire started in the station which burned for several hours ¹⁰⁹

The attack on the 1st was, however, one of the last substantial efforts undertaken for the first half of October due to the heavy rain that began falling, rains which interfered with the plans of both sides. Despite a few infrequent missions that occurred during brief breaks in the weather, significant aerial activity did not pick-up until mid-October when the heavy rains began to taper off.¹¹⁰

The rains decreased by October 19th, and aerial activity increased On the 20th, over eighty aerial combats took place, a trend that continued for the remainder of the month ¹¹¹ On the 21st, nineteen "dogfights" took place. Out of the nineteen instances of aerial combat, RFC 60 squadron participated in 9, managing to damage six German planes enough to force them to land. RFC Lt. Alan Bell-Irving of 60 squadron, escorting several bombers, reported on one of the encounters. According to Bell-Irving,

The Hostile Aircraft (HA) turned and out climbed me so I put my nose down to get over the lines. A bullet then hit my tank....The HA shot away a flying wire and damaged my plane on the right side so that my machine became

¹⁰⁹ Cole, Royal Flying Corps Communiqués, 275-276

¹¹⁰ Only the 10th and 16th were days in which any substantial activity took place in the air over the Somme before the rain finally ended Ibid., 280-285.

¹¹¹ On the 29th, Gen. Rawlinson once again pointed out the importance of the RFC. Rawlinson recalled that between June 23rd and October 20th 1,721 rounds were fired from British batteries, resulting in either the destruction or damage of 521. In addition, 307 were "silenced." All this, he believed, was made possible only with the RFC's assistance. German commanders, on the other hand, could not complement their pilots for doing similar jobs. Jones, The War in the Air: Being the Story, Vol. 2, 324.

uncontrollable.¹¹²

Bell-Irving was able to regain control of his plane briefly, but crash landed just over British lines. Bell-Irving, of course, was the exception as evidenced by the success by the other pilots of his squadron. All told, “153 targets were engaged with aeroplane observation and 31 kite balloon observers” In addition, the German rail station at Haubourdin was bombed, suffering significant damage and a German ammunition depot at Ath was obliterated¹¹³ The following day, the situation was rather the same. However, while the RFC was accomplishing quite a bit, its losses were rapidly piling up.¹¹⁴ Likewise, while the German Air Service had achieved a number of successes and managed to continue harassing the RFC, it also suffered a tremendous loss at the end of October

On October 28th, Boelcke and his men in Jagdstaffel 2 left their aerodrome to prey on enemy pilots Jagdstaffel 2 pilot Ernst Bohme recalled the day saying, “I had just begun a game of chess with Boelcke--then, about 4.30pm, we were called to the front because there was an infantry attack going on. We soon attacked some English machines we found flying over Flers; they were fast single-seaters that defended themselves well.” The single-seaters were two DH2s of the RFC’s 24 Squadron. Bohme stated that the DH2s “only let us get a few shots in for brief intervals, we tried to force the English down,

¹¹² Hart, Somme Success, 199.

¹¹³ Cole, Royal Flying Corps Communiqués, 290-292.

¹¹⁴ On October 22, two RFC pilots were killed, four wounded, and thirteen missing. The following three days were very raining and kept all but a few planes grounded. On the 26th the weather again allowed a number of targets to be engaged. Ibid., 292-297.

by one another of us barring their way.”¹¹⁵ However, the attempts by the German pilots to force the RFC pilots out of the area met with very little success. Richthofen, also flying with Jagdstaffel 2, recalled that

Boelcke tackled one and I the other. I had to let go because one of the German machines got in my way.... Close to Boelcke flew a good friend of his....Both men were shooting. It was likely that the Englishman would fall at any moment.¹¹⁶

Yet, the Englishman did not fall as Richthofen had expected. Bohme recalled that after having pulled beside Boelcke to attack the British DH2 another DH2 “chased by friend Richthofen, cut across us. Quick as lightning, Boelcke and I dodged him, but for a moment our wings prevented us from seeing anything of one another.”¹¹⁷ Richthofen described what followed stating, “Suddenly I noticed an unnatural movement of the two German flying machines. Immediately I thought ‘Collision.’” However, Bohme and Boelcke planes “merely touched one another. However, if two machines go at the tremendous pace of flying machines, the slightest contact has the effect of a violent concussion.”¹¹⁸ The effect was “violent” and tore off a large portion Boelcke’s wing causing him to fall towards the ground, crashing near a German artillery battery and killing him on impact due to the fact that “he never strapped himself in tight.” For the remainder of the Battle of the Somme, Richthofen would be Germany’s most recognized ace and

¹¹⁵ Werner, Knight of Germany, 228-229

¹¹⁶ Richthofen, The Red Air Fighter, 96.

¹¹⁷ Werner, Knight of Germany, 229.

¹¹⁸ Richthofen, The Red Air Fighter, 96

Jagdstaffel 2's, renamed the Boelcke Jagdstaffel, most successful pilot.¹¹⁹

For the RFC and their countrymen in the infantry, the remainder of October was spent readying for what would be the final large infantry attack at the Somme which occurred in the middle of November.¹²⁰ Yet, just as in September, the RFC's offensive tactics cost them a great deal of men. During the month, the RFC lost 88 planes while only downing twelve German planes.¹²¹ Of course, the RFC planes did cause much more damage to German supply lines, artillery emplacements, and infantry positions than the German fliers were able to do in return.

November, like the previous month, began rather slowly for the pilots of the RFC who only undertook a few missions from the 1st to the 8th. As with October, the primary reason for the relative inactivity on the Somme was due to weather. The British Fourth Army along with French infantry attacked German positions on the 5th and 6th, but air support was sparse due to the weather.¹²² Finally, on November 8th, the sun came out and the pilots of the RFC were extremely busy, as they had to make up for the time they lost over the preceding week. Performing numerous raids on a variety of German targets, they

¹¹⁹ On October 30, 1916, Lt. Hans Kirmaier was chosen to command the Boelcke Jagdstaffel. Kirmaier, as well as many others in the staffel, had more experience than Lt. Von Richthofen who became commander of his own staffel following the conclusion of the Battle of the Somme. Richthofen, The Red Air Fighter, 98-120.

¹²⁰ Cole, Royal Flying Corps Communiqués, 199-300.

¹²¹ Reynolds, They Fought for the Sky, 123.

¹²² A few RFC airplanes were able to perform their duties despite the heavy winds present throughout the day. However, no real assistance could be given due to the weather conditions. Primarily, the only missions flown during the day were Contact Patrol missions. Jones, The War in the Air: Being the Story, Vol. 2, 315.

assisted the British artillery guns in preparation for another infantry assault.¹²³ The German pilots, particularly Richthofen, took advantage of the heavy RFC presence in the air and relentlessly pursued them throughout the day. On November 9th, Richthofen had six planes with him and attacked an RFC formation that included sixteen bombers and fourteen fighter escorts from Squadron 11 and Squadron 16 that were on a mission to bomb Vraucourt at which a German munitions depot and headquarters complex were located.¹²⁴ While still outnumbered, two more groups of six German fighters quickly joined Richthofen's staffel which gave the Germans an advantage in fighters during the encounter. Richthofen came into firing range when the RFC planes had almost reached their targets. His "first few shots incapacitated the hostile machine gunner" of one of the RFC planes, forcing it to the ground near the German aerodrome at Lagnicourt.¹²⁵ Several other RFC planes suffered similar fates at the hands of the Germans who only lost three planes during the fight. In total on the 9th,

Eighty airplanes, and more than a hundred knights of the blue, took part in the aerial tourney of death... The English reported the German planes as numbering forty, and Richthofen estimated the English planes at between forty and fifty.¹²⁶

November 10th and 11th were similar to the 9th with a number of missions being

¹²³ The Allied infantry attacked and took Beaumont Hamel in the afternoon of November 10th. Farrar-Hockley, The Somme, 176-178.

¹²⁴ Cole, Royal Flying Corps Communiqués, 305-308

¹²⁵ Richthofen, as was usual, landed near the downed RFC plane to survey the damage and began talking with several high ranking officers. One of the officers was the Grand Duke of Saxe-Coburg-Gotha, whose headquarters was one of the RFC targets. To show his appreciation to Richthofen for helping to disrupt the RFC attack, the Grand Duke awarded him the Saxe-Coburg Gotha medal for bravery. Richthofen, The Red Air Fighter, 98-100.

¹²⁶ The actual number of RFC planes was closer to thirty, rather than forty or fifty. Gibbons, The Red Knight of Germany, 58.

flown by the RFC. On the night of the 9th and carrying over into the 10th, the German railroad station at Henin Lietard was “attacked with 34 bombs which fell on and around the station.” The RFC also “dropped 17 bombs on hutments at Houthem.” The 3rd Brigade attacked the Douai aerodrome and bombs were seen to burst among the sheds. In addition, “Eight 20-pound bombs were dropped on a train at Vitry.” During the night the German aerodromes at Velu, Lebuquiere, Villers, and Buissy were also attacked along with the German railroad stations at Arleux.¹²⁷ The night of the 10/11th also saw much of the same activity with RFC pilots continuing to harass German aerodromes as low clouds and a thick mist began to envelope the area.¹²⁸ The German pilots, meanwhile, could only attempt to interfere with the RFC attacks as they still were unable to conduct offensive operations against British targets.¹²⁹

On the 13th of November, the British initiated what would be their final attempt to achieve a victory at the Somme. Known as the Battle of Ancre, the infantry attack was forced to begin with virtually no air support “on account of the weather.” As the RFC 3rd, 4th, and 5th Brigades were grounded, the only attacks that did occur on the 13th were the “sixty-eight bombs dropped by the 1st Brigade. Provin aerodrome and station were attacked....Becelaere was attacked by 6 Sqn, 8 bombs falling on billets and starting a

¹²⁷ Cole, Royal Flying Corps Communiqués, 308-310.

¹²⁸ On the 12th the weather was poor and no missions were undertaken by the RFC. *Ibid.*, 312.

¹²⁹ Proof of the Germans offensive impotency can be seen throughout the Communiqués of the RFC. Only one rare occasions are attacks by German planes on British ground targets mentioned Manfred von Richthofen recalled the RFC’s tenacity saying, “They absolutely challenged us to battle, and never refused fighting. On the other hand the French take the greatest trouble to avoid meeting their opponents in the air.” Richthofen, The Red Air Fighter, 95.

fire.”¹³⁰ On the 15th, while the British infantry continued to push against the German lines, the RFC was able to lend their support once again. By the 18th, however, the British infantry attack had stalled. While Beaucourt, Beaumont Hamel, and Thiepval Ridge, were taken, the objectives of Redan and Serre Ridges remained unattained. Adding to the problem, the weather once again began to turn sour with torrential rains falling on the already soaked battlefield. Field Marshall Haig stopped the attacks and effectively ended the Battle of the Somme, at least as far as the infantry were concerned.¹³¹

As one would expect, an offensive the size of the Battle of the Somme could not simply cease immediately after months of bloody fighting. Therefore, the British artillery still fired on German targets. The RFC still conducted the daily missions they had perfected over the course of the battle as the infantrymen on both sides began to pull-back from the front lines.¹³² The German pilots, like their British counterparts, continued to fight as 1916 came to an end. Richthofen, was particularly successful during the remainder of November. Ever confident, especially after having received the Saxe-Coburg-Gotha medal for bravery and the Hohenzollern medal during November, Richthofen downed two more RFC planes on November 20th.¹³³ Three days later, on the 23rd, Richthofen shot down RFC Major Lanoe Hawker. Hawker, the first British ace,

¹³⁰ Cole, Royal Flying Corps Communiqués, 312.

¹³¹ As the Somme came to end, Haig and his subordinates were meeting with the French General Staff and were laying out the plan for the following year. Haig, The Private Papers of Sir Douglas Haig, 176-177.

¹³² The German forces withdrew to the Hindenburg Line which was a series of heavily fortified, bunkered, trenches not far from the front lines of the battle of the Somme. This inevitably led to future tensions and resulted in the second battle of the Somme in 1918 at which Manfred von Richtofen was finally shot down and killed after over eighty aerial victories. Farrar-Hockley, The Somme, 245-248.

¹³³ Richthofen, The Red Air Fighter, 160.

was flying the workhorse DH2 and Richthofen the superior Albatross DII.¹³⁴ Richthofen recalled that Hawker was probably the most skilled opponent he had met during his tenure at the Somme. Richthofen commented that,

We circled round and round like madmen after one another at an altitude of about 10,000....Soon I discovered that I was not meeting a beginner. He had not the slightest intention to break off the fight. He was traveling in a box which turned beautifully. However, my packing case was better at climbing than his.¹³⁵

Richthofen used his plane's speed and climbing ability to get behind Hawker. Richthofen stated that Hawker was "a good sportsman, but by and by the thing became a little too hot for him." Hawker tried to land over British lines and Richthofen moved in for the kill.

According to Richthofen, "when he had come down to about 300ft he tried to escape in a zigzag course....That was my most favourable moment. I followed him at an altitude of from 250ft to 150ft, firing all the time." Despite his guns jamming partway through the attack, Richthofen was able to hit Hawker's plane several times with rounds from his machine gun and the RFC ace "fell shot through the head 150ft behind our line."¹³⁶

Hawker, of course, was not the last of Richthofen's victories at the Somme, although he was the most well known. At the end of the battle of the Somme and the few weeks of aerial activity that followed, Richthofen had downed sixteen RFC planes. Richthofen's victories resulted in the deaths of sixteen men and the wounding of eight.¹³⁷

¹³⁴ The Albatros DII differed from the DI in that the top wing was lowered closer to the fuselage to give a greater field of view to the pilot. On the DI the top wing obstructed the pilots view upward. The 160hp Mercedes engine was carried over from the DI and both model were used extensively until replaced by the Albatros DIII in January 1917. Norman, The Great Air War, 148.

¹³⁵ Richthofen, The Red Air Fighter, 160.

¹³⁶ Norman, The Great Air War, 100-101.

¹³⁷ By January of 1917, the "Red Baron" as he was then known, shot down his sixteenth plane

Richthofen's success, beginning in September and continuing throughout the remainder of the Battle of the Somme and after, is indicative of the German Air Services achievements in the last few months of 1916 at the Western Front. The primary reason for this was the fact that the German fighter planes at Somme outclassed those that either the British or French produced at the time. The most advanced of the German aircraft were, of course, the Albatros DI and DII biplanes which had the advantage in nearly every category over the British and French planes produced during 1916. Consequently, the British suffered many needless losses due to inferior equipment, not inferior pilots.¹³⁸ Yet, while it would seem that the German Air Service procured air superiority beginning in September and maintained it throughout the rest of the battle of the Somme, the opposite is the case. While preparations for the Somme offensive were underway, the RFC performed a variety of tasks that softened German defenses while at the same time prohibiting German aircraft from doing the same. Therefore, although the Germans did gain an advantage in late August and early September as a result of the appointment of Hindenburg and Ludendorff, the moving of Captain Boelcke and Jagdstaffel 2 to the Somme, and the arrival of the new Albatros fighters, they rarely used their advantages in an offensive manner. Partly, this was the result of the overall strategy of the German Army at the Somme which was one of defense. The German forces at the Somme were well entrenched and had been for some time. Therefore, it would have been illogical for

and received the Pour le Merite. Richthofen, The Red Air Fighter, 157-162.

¹³⁸ The RFC communiqués for the period of the Battle of the Somme, demonstrate the fact that RFC pilots continued to risk their lives on a daily basis despite the increasing effectiveness of German pilots. Cole, Royal Flying Corps Communiqués

them to take the offensive against the massive numbers of British and French opposing them. To do so would have wasted a great deal many more men which the Germans had a smaller supply of than either the French or British.¹³⁹ The German Air Service, not surprisingly, took a similar approach and decided that offensive actions were too risky. While German fighters were encouraged to attack RFC planes that ventured behind German lines, they seldom attacked British targets or RFC planes over the British lines. Again, the reason was simply man power and not a lack of courage on the part of the Germans. After all, until late October, the German Air Service still had fewer planes at the Somme than the RFC and French Air Service which necessitated more reserved tactics. Consequently, while it may seem that the Germans gained air superiority beginning in September, the real victor of the air war over the Somme battlefield was the RFC. The RFC managed to strike German railroad stations, supply depots, headquarters, aerodromes, engage in successful aerial combat despite inferior planes, and direct friendly artillery fire which resulted in over 600,000 German casualties.¹⁴⁰ In the end, the RFC

¹³⁹ The British were especially well off as far as troops went because the French Army bore the brunt of the fighting that had taken place on the Western Front. General Ludendorff, in My War Memories stated the German dilemma at the end of 1916. Ludendorff said "GHQ had to bear in mind that the enemy's great superiority in men and material would be even more painfully felt in 1917 than in 1916....Our position was uncommonly difficult and a way out hard to find. We could not contemplate an offensive ourselves, having to keep our reserves available for defence." Erich von Ludendorff, My War Memories, 1914-1918 (London: Hutchinson and Company, 1919), 307.

¹⁴⁰ The Germans defensive fortifications and defensive tactics did save many soldiers that would likely have been killed in infantry assaults on open ground, but even strong and well built fortifications could not hold up under intense artillery bombardment forever. As a result, most of the German casualties during the battle of the Somme were caused by exploding artillery shells. On British, French, and German sides combined, casualties reached over 1,200,000 during the course of the battle. The Estimate of 600,000 casualties is close to correct, but as A.H Farrar-Hockley pointed out, German casualties reports were deliberately lowered in an attempt to keep morale as high as possible. As for the battle on the ground, no clear winner emerged as both sides were extremely battered. However, one could argue that the British and French were the victors of sorts because they had more manpower to fill the depleted ranks than the Germans. The same, therefore, could be argued as has been here, for the success of the

won the battle in the air over the Somme because they never let the advantages enjoyed by the German Air Service interfere with their numerous missions, and they kept the German planes from doing the same to them.¹⁴¹

RFC during the battle. Farrar-Hockley, The Somme, 251-253.

¹⁴¹ The RFC lost 363 airplanes. 190 planes were shot down, while 173 were damaged to such an extent that they could not be reused. More damaging, were the RFC's casualties during the battle. In all, the RFC had 499 airmen either wounded, killed, or missing in action. The German Air Service lost a total of 359 airplanes during the battle. Cole, Royal Flying Corps Communiqués, 312.

CHAPTER V

THE LESSONS LEARNED FROM THE USE OF AIR POWER DURING THE BATTLE OF THE SOMME

What was the importance of the Battle of the Somme, and for the purpose of this thesis, what did the Somme mean to the future of air power? The Somme demonstrated that contact patrols, night bombing, strong leadership, aggressive offensive tactics, a numerical advantage, good fighter aircraft in capable fighter squadrons were essential in future warfare. During the final two years of the war, the air forces of Britain, France, and Germany expanded rapidly and perfected the many roles undertaken during the Battle of the Somme in a series of aerial engagements that involved progressively greater numbers of airplanes. It was, therefore, during the final two years of the war that the lessons taken from the Battle of the Somme were most dramatically impressed upon the general staffs.

The Somme proved that the airplane could be an effective ground support weapon capable of assisting attacking infantry or of directly engaging enemy infantry. Used sporadically before the Battle of the Somme, the contact patrol became the primary way in which aircraft supported ground operations during the battle. On July 1, when the Allied infantry attacked, numerous RFC airplanes were in the air on contact patrols. The majority of the contact patrols, however, were ineffective as the infantry was too focused on fighting its way toward German lines to signal its position. Despite the initial failures,

contact patrols were increasingly used throughout the Somme for once the infantry realized the value of air support, it expended greater efforts to make its position known to the aviators flying above them.¹

At the Somme both the German Air Service and RFC used night bombing with increasing frequency. Throughout the first two years of the war, bombing had been used frequently by air forces on all sides. Night bombing, however, was used sparingly before the Battle of the Somme because of the dangers it presented to the fragile and difficult-to-fly airplanes of the time. One of the advantages bombing during the dark had was that it was virtually impossible to see and fire upon an airplane at night even during a full moon. Fewer aircraft were lost as a result.² Because the Battle of the Somme lasted for such a long time, airmen on both sides had ample opportunity to practice flying and bombing at night. Ground troops, in turn, had more opportunities to experiment with hitting an airplane they could barely see, but weren't very successful even when flares were used.

More importantly, the Battle of the Somme demonstrated that an autonomous air force with strong leadership was indispensable. Throughout the battle, the RFC maintained the solid organization it had built up following Trenchard's assumption of command in August of 1915. The RFC's capable commanders allowed it to cope and readjust as the situation required, which sustained the RFC for the remainder of the war.

¹ Another way in which the airplane assisted ground troops was by strafing. Strafing, however, used on rarely had been used prior to and during the first half of the battle of the Somme, only to begin to be employed at the very end of the battle. On only a handful of instances recorded in the RFC's communiqués during the months of the Somme, did RFC airmen fire on German ground troops. While the frequency of strafing attack had increased by the final months of the battle its use remained infrequent until the spring of 1917. Brereton Greenhous, "Evolution of a Close Ground Support Role for Aircraft in World War I" in *Military Affairs*, Volume 39, Issue 1 (February 1975), 22-28.

² Stephan L. McFarland, *America's Pursuit of Precision Bombing, 1910-1945* (Washington and London: Smithsonian Institution Press, 1995), 25.

The German Air Service, on the other hand, had to contend with numerous difficulties because of its lack of unity and centralized command during the first half of the war.³

Rather than a single command group directing its operations, control of the German Air Service passed to the several army commanders who used the airplanes at their disposal as each saw fit.⁴ The loose arrangement prohibited aircraft from combined efforts.

In late 1915, German Chief of Field Aviation Lieth-Thomsen attempted to unify the air service and to relieve its ineffectiveness. During the first two months of 1916, Lieth-Thomsen and his second-in-command Major Wilhelm Siegert worked feverishly to prepare for the Allied offensive the German high command anticipated in the spring, however, their efforts were largely blocked by army corps commanders who refused to give up control.⁵ Lieth-Thomsen responded by gathering airplanes from anywhere he could and rearranging them in new groups allotted for specific tasks. As part of this reorganization, Lieth-Thomsen and Siegert spirited a few fighter airplanes away from the

³ Unity of command means that from top to bottom the chain of command is intact and obeyed by each officer and soldier along the way. When unity of command is intact, the commander issues an order, that order is followed and not countermanded by another officer down the line. Historian Robert R. Leonhard, states “unity of command had always been nothing more than a technique for getting at what we really want: effective integration of battlefield activities. Robert R. Leonhard, The Principles of War for the Information Age (Novato, California: Presidio Press, 1998), 195. The lack of unity of command was not a problem in the German Army, as it was in the German Air Service. Primarily, the German Air Service’s cohesiveness issues resulted from its relative newness and the political disputes between the Bavarian and Prussian army for control of airplane manufacturing and supply. Morrow, Building German Air Power, 48-114. The Allied forces experienced the reverse. The RFC and French Air Service had unity of command early in the war. Their armies did for the most part as well, but cooperation between the British and French army’s always depended on the personalities of the commanders. Haig and Foch, for instance, often did not see eye-to-eye, leading to tensions and logistical miscommunication in the final year of the war. Georges Clemenceau, Grandeur and Misery of Victory (New York: Harcourt, Brace and Company, 1930), 27-46

⁴ In March of 1915, the situation had improved a little when the German War Ministry approved a unified command with Lieth-Thomsen as Chief of Field Aviation (*Feldflugchef*) and Major Siegert as his assistant. Treadwell and Wood, German Knights of the Air, 11.

⁵ Morrow, The Great War in the Air, 149.

hands of army commanders by placing some of their fighters in single-seat pursuit groups called *Kampfeinsitzer's*.⁶ In addition, Lieth-Thomsen restructured a number of squadrons equipped with two-seat airplanes into “combat groups” (*Kagohl's*) under the direct control of the German General Headquarters (*Oberste Heeresleitung* or OHL)⁷ With combat and fighter groups under the control of the OHL, Lieth-Thomsen had sole control over the airplanes and their employment.

While Lieth-Thomsen and Siegert's efforts strengthened the German Air Service during the winter of 1916 and were important to the future success of the Germany's air wing, the immediate effect was insufficient. Too many army commanders still had direct control over a large number of fighters. As a result, Lieth-Thomsen did not have the control over the German Air Service he felt he needed to compete with the numerically superior Allied air forces. In order to try and correct the situation, Lieth-Thomsen met with Chief of the German General Staff (*Chef des Generalstabs*), General Erich von Falkenhayn, on March 10 and proposed that all Germany's airplanes be united under a single command. Free from army or navy control, Lieth-Thomsen believed he would be able to utilize the German Air Service's potential more fully. Although Falkenhayn agreed, many in the German War Ministry did not. The opponents of Lieth-Thomsen's plan believed creating an independent air force would disrupt both the operation of the

⁶ By setting up the *Kampfeinsitzer's*, Lieth-Thomsen and Siegert gained more fighters by simply changing the assigned duties of many fighter aircraft. Rather than serving as bomber or reconnaissance escorts under various army commanders, the fighters were arranged in groups under Thomsen's control. Lawson and Lawson, *The First Air Campaign*, 81.

⁷ *Ibid.*, 81.

German Air Service and aircraft production.⁸ Consequently, the German Air Service's continued lack of unity resulted in a large number of casualties at the hands of the RFC and French Air Service during the first months of the Battle of the Somme. Despite the difficulties, Lieth-Thomsen did not give up and continued lobbying the German High Command for more control over Germany's Air Service

In late August of 1916, Lieth-Thomsen's continued persistence finally paid off following the appointment of Field Marshal Paul von Hindenburg and General Erich von Ludendorff to head the German General Staff (*Großen Generalstab*). Lieth-Thomsen's plans were also boosted by the considerable losses and overall poor performance of the German Air Service during the first two months of the Battle of the Somme.⁹ With Hindenburg and Ludendorff's influence in the German High Command and the horrible situation at the front, Lieth-Thomsen was able to shift more fighter airplanes to the Somme by early September. The transfer of the German Air Service fighters had a dramatic and immediate effect on the conflict for aerial supremacy at the Somme which proved that Lieth-Thomsen's efforts to unify the German Air Service were essential to its

⁸ For the most part, the German War Ministry was reluctant to agree to Lieth-Thomsen's request because of rivalry between the states of Prussia and Bavaria. Both Prussia and Bavaria wanted to maintain their positions as Germany's top aircraft manufacturers. Bavaria in particular, feared that a united air force would lead to Prussian domination of the aircraft industry and push them from the fold. The German Navy also disliked Lieth-Thomsen's idea because it felt that if a unified air force were created, the quality of Naval airplanes would suffer because of the different requirements each service had for their aircraft. Morrow, *The Great War in the Air*, 157.

⁹ During July and August the German Air Service had to contend with the RFC's increasingly better aircraft. The arrival of the DH2, Sopwith Strutter 1 ½, Nieuport 16, and other airplanes were simply better than the German airplanes they faced. All these airplanes had eclipsed the dreaded Fokker E III in nearly every category. Therefore, the Germans needed an airplane to compete with those flown by the RFC. This issue will be discussed further with regard to the importance of technology to the air war. For a thorough account of the RFC success during the period see: Jones, *The War in the Air: Being the Story*, Vol. 1-2, Cole, *Royal Flying Corps Communiqués*, Hart, *Somme Success*, 101-156, Lawson and Lawson, *The First Air Campaign*, Bowen, *Knights of the Air*.

continued survival.¹⁰ Lieth-Thomsen's efforts culminated on October 8, 1916, when the German High Command unified all airplanes in the *Luftstreitkräfte* under the command of Hoepfner and Lieth-Thomsen.¹¹ The *Luftstreitkräfte* became the organization that Lieth-Thomsen believed the German Air Service needed to become to successfully engage the Allied air forces.

By the end of the Somme, Hoepfner, Lieth-Thomsen, Siebert, Hindenburg, and Ludendorff transformed the German Air Service into an efficient organization that performed astounding feats for the remainder of the war even with its dwindling resources.¹² Without the experience gained during the Somme, the German Air Service likely would never have unified or, at the very best, unified much later in the war. For these reasons, the Battle of the Somme was the turning point for the German Air Service during the First World War.

An equally important lesson reinforced through the experience gained during the Battle of the Somme was that the airplane was most effective on the offensive rather than

¹⁰ As discussed in chapter.2 of this paper, Oswald Boelcke had been sent to the East following Max Immelmann's death on June 18, 1916. The primary reason for the trip was recruitment of other pilots to fill the ranks of the fighter squadrons Lieth-Thomsen had just procured for use at the Somme. Robert Jackson, Fighter Pilots of World War I (New York : St. Martin's Press, 1977), 20-21.

¹¹ The order for the creation of the *Luftstreitkräfte* was issued by Kaiser Wilhelm II on October 8, 1916. His order stated. The increasing importance of the air war requires that all air-fighting and defense forces of the army, in the field and in the hinterland, be united in one agency. To this end I command: The centralized improvement, preparation, and employment of this means of warfare will be assigned to a "Commanding General of the Air Forces" who will be directly subordinate to the Chief of the General Staff. The "Chief of Field Aviation," with the dissolution of that post, becomes "Chief of Staff to the Commanding General of the Air Forces." Morrow, German Air Power in World War I, 69.

¹² The effectiveness and deadliness of the German Air Service only increased after the creation of the *Luftstreitkräfte* reaching its peak in the spring of 1917. Impressively, they were able to do so with a numerical disadvantage to the Allies. Morrow, German Air Power in World War I, Hoepfner, Deutschlands Krieg in der Luft, Lawson and Lawson, The First Air Campaign, Reynolds, They Fought for the Sky, Clark, Aces High, Morrow, The Great War in the Air, and Jones, The War in the Air: Being the Story, Vol. 2.

the defensive. The RFC's commander, General Trenchard, wholeheartedly believed that the offensive was the only way to conduct aerial operations. His writings prior to the war clearly showed that he felt taking and maintaining the offensive was vital.¹³ Trenchard thought that the offensive allowed one to make the decisions and direct when and where actions would take place; those defending could only react to the moves made by the air force on the offensive. A stubborn but intelligent leader, Trenchard, never deviated from this belief.¹⁴

Upon taking command of the RFC in August 1915, Trenchard immediately began to put the pressure on the German Air Service during its strongest period of the first year-and-a-half of the war.¹⁵ By October of 1915, German Fokker fighters were at peak strength and caused tremendous losses among the RFC and French Air Service.¹⁶ Trenchard believed the only way to cope with the Germans was to meet them head on and use every available airplane to win back control of the sky.¹⁷ Trenchard did make some

¹³ Viscount Sir Hugh Montague Trenchard, "Air Power and National Security" in Emme, The Impact of Air Power, 190-195. For the development of Trenchard's ideas see Philip S. Meilinger, "Trenchard and 'Morale Bombing': The Evolution of Royal Air Force Doctrine Before World War II," 243-270.

¹⁴ For a detailed account of Trenchard's views prior to World War I, up to the beginning of the Second World War see: Boyle, Trenchard.

¹⁵ Trenchard took command when the "Fokker Scourge" was building up to its peak in October 1915. *Ibid.*, 151-155.

¹⁶ Between November 1915 and January 1916, over fifty RFC pilots and observers were downed. Many of them did not survive the crash. Hart, Somme Success, 20

¹⁷ Trenchard's biographer, Andrew Boyle, described the RFC commanders attitude in the fall of 1915. Boyle stated, "His contention from the beginning had been that air supremacy would sooner or later have to be fought for, the fact that the enemy possessed a "flying gun" (Fokker E III) vastly superior to anything the Allies were likely to produce in the near future did not deter him. There could be no standing on the defensive in the skies. Survival in three-dimensional warfare depended on maintaining the offensive, whatever the odds or the cost." Boyle, Trenchard, 154-157.

changes in order to try to save all the men that he could. In late 1915, he ordered that all airplanes fly in close formation and that “a reconnaissance should not be continued if any of the machines become detached.” In addition, all reconnaissance, photography, observation, and artillery coordination airplanes were to be accompanied by escort fighters.¹⁸ Trenchard’s action was partly a response to complaints from some members of the British government who believed he was too aggressive. Early in the year, Haig explained to British Prime Minister Lord Asquith that Trenchard was doing all that he could given the circumstances. Haig told Asquith:

We must continue to reconnoiter. The remedy is not to stop sending machines out for this purpose but to send them out in groups rather than singly. Our present experience with aeroplanes is somewhat similar to Napoleon’s in the matter of cavalry patrols before Jena in 1806. I think then the German cavalry was very efficient and regularly mopped up the French reconnaissances until the latter went out in double strength to the enemy’s patrols. Distant reconnaissances are not sent out without some object sufficiently important to justify the risk involved.¹⁹

As 1916 unfolded, the effect of Trenchard’s strategy began to show. Assisted by the arrival of several new airplanes, the RFC was better able to pursue the German Air Service above the Western Front. The RFC also had superior numbers of airmen and ground crew members which enabled Trenchard to continue pushing against the Germans and their limited resources. Yet, the real test of Trenchard’s offensive strategy was still to come.

The Battle of the Somme provided Trenchard with the first chance to apply his ideas on a large scale. The preparations for the offensive were immense and the RFC’s work was essential to the effort. Beginning in March, the RFC began photographing the

¹⁸ Jones, *The War in the Air: Being the Story*, Vol. 2, 156-157.

¹⁹ Haig, *The Private Papers of Douglas Haig*, 126.

area in and around the battlefield. Their work only increased as the number of men and materiel at the front increased. On July 1st when the British infantry unleashed their fury on the Germans, the RFC was extremely active. Trenchard's strategy for the aerial offensive entailed numerous flights throughout that day. Of the various missions performed by the RFC, Trenchard felt certain that bombing was of primary importance. He believed that bombing was more damaging to the morale and well-being of the enemy than any other weapon. Consequently, RFC airplanes bombed a number of German targets on July 1st and the months that followed.²⁰

Throughout the Somme Offensive, Trenchard's strategy did not waver. Even when the German Air Service began to regain air supremacy above the Somme in the fall of 1916, Trenchard continued to stress the importance of maintaining the offensive. On September 29, 1916, he issued a memorandum:

The policy which has enabled us to gain and keep the predominance in the air which we now enjoy is that of seeking out and fighting the enemy over his own aerodromes. It is of no use to fight him on the front line where, no matter how many machines we put up against him, he can still interfere with our work and carry out his own. In other words, an offensive policy, as against a defensive one, is essential.²¹

Trenchard's inflexible belief led many back in Britain to once again criticize his methods. His critics felt that he was ambivalent to the loss of the airmen under his command due to the heavy losses the RFC had sustained at the Somme.²² Criticism of Trenchard was particularly heavy beginning in late September when the Germans received

²⁰ Cole, Royal Flying Corps Communiqués, 170-173

²¹ Wrigley, The Decisive Factor: Air Power Doctrine, 61.

²² Boyle, Trenchard, 181-190.

their new Albatros fighters.²³ However, those with real power and influence, such as Field Marshall Haig, continued to support Trenchard and realized that the casualties among British aircrews were the result of heavy and frequent combat, not incompetence.²⁴ All the while, Trenchard never doubted himself and stuck to his belief that offensive operations were paramount²⁵ Consequently, the RFC maintained the offensive throughout the remainder of the Somme offensive despite mounting casualties.²⁶

The situation at the front had not changed by the spring of 1917, when the RFC had clearly lost its air supremacy and was quickly being chewed up by the German Air Service. Essentially, this was a result of the RFC's inferior aircraft during the period. Despite its disadvantage, Trenchard once again pushed forward hoping the RFC's superior numbers could overcome its difficulties. On April 4, the RFC launched its aerial offensive above Arras to prepare the way for the upcoming infantry attack. Trenchard's 365 airplanes faced 195 German machines. About one-third of the RFC's airplanes were fighters, while over half of the German airplanes were fighters. Trenchard used the fighters he had available to draw the German fighters away from his bombers. His strategy was successful, but large numbers of RFC airmen were shot down during the

²³ Nearly two-thirds of the RFC's casualties at the Somme were sustained between September and the end of the Offensive in November. In September alone, the RFC lost 170 men. Seventy-five percent of them were killed from the middle of the month on, a testament to the effectiveness of the Albatros DI's. Boyle, Trenchard, 197-198.

²⁴ The competence of the field commanders on both sides was suspect on many occasions during the Somme. Ibid., 186-190.

²⁵ During the Battle of the Somme Trenchard never once questioned the correctness of his strategy and tactics. He felt that the only reason the RFC was losing so many airplanes were the quality of the German's airplanes. Ibid. , 190-204

²⁶ Cole, Royal Flying Corps Communiqués, 235-339

preparatory aerial attacks ²⁷

During the remainder of the Arras offensive, Trenchard's strategy stayed pretty much the same. Unfortunately for the RFC, the result was a large number of casualties among the its aircrews. While Trenchard lamented the RFC's losses, he could think of few alternatives. Either his fighters had to seek out and engage the Germans or fly escort missions along side the RFC's reconnaissance, observation, artillery coordination, and bombing airplanes. Fortunately, the RFC losses did slowly drop as new fighters arrived during May and June.²⁸

With the arrival of new fighters, Trenchard's aggressiveness was far more effective. In the outdated machines previously at his disposal, any aggressive action entailed risks. In April alone, the RFC lost 50 percent of its airmen to the better equipped Germans. Some squadrons were completely decimated during that single month, others almost so.²⁹ The new fighters, capable of matching and in some ways out performing the German airplanes, allowed Trenchard to maintain an offensive posture without enduring such severe casualties. The casualties remained high, but nowhere near the previous figures.

While the new fighters helped the RFC, they could not replace the scores of experienced airmen that had been killed. With over three hundred airmen killed in April

²⁷ During the preparatory air assault 75 RFC airplanes were downed. 105 airmen were either killed or injured. Ulanoff, Illustrated History of World War I in the Air, 94.

²⁸ The fighters were the S.E.5a, Sopwith Camel, Sopwith Triplane, Spad, XIII, and Bristol F2b. *Ibid.*, 96-98.

²⁹ In April, 316 RFC airmen were killed in action. The German Air Service lost one airplane for every five it shot down. Lawson and Lawson, The First Air Campaign, 122.

alone, the RFC was at a loss to replace them. The German Air Service, on the other hand, retained its pool of skilled and practiced pilots. As a result, the RFC tried to cope with new pilots who received their training above the battlefield.

In the fall of 1917, the RFC once again was heavily engaged during the Battle of Ypres. Recognizing the cost of his strategy during the Arras offensive, Trenchard chose a different route. At Ypres, Trenchard decided that the old practice of escorting artillery coordination, reconnaissance, photography, and observation airplanes would again have to be used. He believed that doing so would decrease the RFC's casualty rate. Fortunately for the Allies, it did, and the RFC was slowly able to regain air supremacy which it held onto for the remainder of 1917.³⁰

Trenchard's direct influence on the RFC's strategy and tactics continued into 1918. In March of that year, the German Army launched Operation Michael, a determined attack designed to achieve a decisive victory north of the Somme River. The German Air Service moved rather stealthily, assembling their aircraft near the front only a day or two before the battle. The RFC, caught off guard, lost their air superiority during the first few days of the battle.³¹

On April 1, 1918, the RFC officially became part of the Royal Air Force (RAF) which also absorbed the Royal Naval Air Service (RNAS). Trenchard, angered that he no longer reported to General Haig but to the politician Lord Rothermore, resigned.³² The government interceded and convinced Trenchard to continue to assist the war effort

³⁰ Clark, Aces High, 122-135.

³¹ Mitchell, Memoirs of World War I, 181

³² Boyle, Trenchard, 269-271.

Trenchard was given command of the Independent Air Force which became official on May 3.³³ The Independent Air Force was the RAF's first strategic bombing group.

Trenchard now applied the ideas he formulated before the war. He now had the tools at his disposal to conduct offensive operations far behind enemy lines. With the Independent Air Force, Trenchard bombed a number of targets deep within Germany in what was a precursor to Allied attacks on German cities during the Second World War.

Trenchard never deviated from his belief that the offensive was the most effective way for the airplane to be used. He had held this belief prior to the war even though he had no proof that using the airplane in such a manner would be successful. Trenchard's ideas were shown to have merit upon his assumption of command of the RFC in August of 1915. The Battle of the Somme was the occasion Trenchard used to prove, once and for all, that the airplane was an offensive tool worthy of further investment.

The Somme also taught the belligerent nations that having the numerical advantage, or at the very least parity with one's foes, was an essential ingredient in sustaining a long aerial operation. At the start of the Somme offensive, the German Air Service was outnumbered three-to-one by the combined British and French air forces.³⁴ This numerical advantage allowed the Allied air forces to dominate the German Air Service throughout the early months of the battle.

With the odds stacked against them, the fact that the Germans flew outdated aircraft made their job all the more dangerous. At the beginning of the battle, the German

³³ Boyle, Trenchard, 287-288.

³⁴ At the beginning of the battle, the RFC had 185 airplanes at the Somme. The French had 201 airplanes spread out between Verdun and the Somme, most of which were at Verdun. The German Air Service had only 129 airplanes. Morrow, German Air Power During World War I, 61.

Air Service was forced to limit itself to defensive actions because offensive actions entailed far too many losses in men and materiel which the Germans could not replace as easily nor as rapidly as the RFC or French Air Service.³⁵

Colonel Leith-Thomsen and others within the German Air Services top leadership realized the situation needed to be remedied and did all they could given what was available to them³⁶ However, the German Air Service and German Army were still heavily engaged in the fighting around Verdun which meant that the resources of both services were stretched to their limit, the German Air Service's most of all.³⁷ In addition, the German Air Service, suffering significant losses during the spring of 1916, further strained their already limited resources.³⁸

Attempting to alleviate the strain, the German Air Service leadership began looking for a place from which to draw more recruits. In the end, they decided that pilots would have to be transferred from other branches of the German military. Getting men to sign up was not a great problem. As a consequence of the long periods of inactivity, interspersed with short bursts of movement and death, many infantryman gladly left their

³⁵ With a smaller number of trained pilots and machines, all but the most frugal use of resources was detrimental to the German Air Service's effort. Arguably, had they conducted an offensive campaign as General Trenchard had, their resources would have been exhausted before new men could be trained and new airplanes built. Throughout the war the German aircraft industry always had problems producing enough engines to meet their needs. During the Battle of the Somme this was yet another factor that limited the aggressiveness of the German Air Service. Morrow, The Great War in the Air, 164

³⁶ Hoepfner, Deutschlands Krieg in der Luft, 54-70

³⁷ General Falkenhayn complained after the war that his forces were short of artillery and airplanes because they were being used in Galicia where German forces under von Hindenburg were engaged. Falkenhayn, The German General's Staff and Its Decisions, 299.

³⁸ Jones, The War in the Air: Being the Story, Vol. 2, 165-167

comrades on the ground to become pilots.³⁹ Another method used to procure more pilots was to send veteran fliers out to pick men they thought acceptable. Sometimes, the men were from the infantry; other times they were semi-experienced pilots who showed potential. It was in this manner that Manfred von Richthofen was recruited by Oswald Boelcke.⁴⁰ While the recruiting methods were successful, the new pilots did not arrive in large numbers until late August and early September 1916.

In addition to more men, the German Air Service needed more airplanes. Given the limited resources at their disposal, this was quite a task. The immediate solution, decided upon in July, was to shift pilots and their airplanes from Verdun to the Somme. At that point, the fighting at Verdun was slowly winding down while the fighting along the Somme had been intensifying.⁴¹ By the first week of August, therefore, the German Air Service was at a two-to-one numerical disadvantage rather than its earlier three-to-one disadvantage.⁴²

By the end of August, the German Air Service's increased strength received another boost with the appointment of Hindenberg and Ludendorff on August 29.⁴³ On August 31, Hindenberg and Ludendorff proposed a new armaments program to the

³⁹ Both of General Ludendorff's sons had been in the infantry but, according to Ludendorff, the "freedom of the air" led to their joining the German Air Service. Airmen he believed were free from the "disintegrating influences of battle." Ludendorff, The German General's Staff and Its Problems, 320.

⁴⁰ Richthofen had already been a pilot for a short time prior to Boelcke's visit. He had flown two-seat observation airplanes, but not fighters. When Boelcke found out that von Richthofen had managed to score a victory in such a plane he asked him to join Jagdstaffel 2 which was to fly near the Somme. Richthofen, The Red Air Fighter, 90.

⁴¹ Farrar-Hockley, The Somme, 45-47.

⁴² Morrow, German Air Power in World War I, 61.

⁴³ Bowen, Knights of the Air, 117.

German War Ministry. The proposal asked for increased industrial output to compensate for Allied numerical superiority. Of the top five priorities Hindenberg listed for industrial output, the airplane was last.⁴⁴ That did not mean that Hindenberg favored airplanes in the least and by simply including airplanes on the list, he demonstrated the importance he and Ludendorff placed on their use.

The Hindenberg Program, which was drawn from Hindenberg and Ludendorff's proposals, officially began in October of 1916. Yet, its effects were felt at the front as early as mid-September when, the German Air Service began receiving the high-performance Albatros DI. While the numbers were small at first, by month's end most of the Jagdstaffels operating with the German First and Second Army's at the Somme were equipped with the new fighter. The Jagdstaffels were able to be given the DI in such numbers because of the Albatros factories increased output in response to the Hindenberg Program. In September alone, the Albatros Aircraft Works manufactured 120 airplanes, twenty-seven more than the previous month. In October, an additional 135 aircraft were produced.⁴⁵ At the same time, the number of workers employed by the Albatros company increased from the July total of 1,630 to the October high of 2,083.⁴⁶ Therefore, one can clearly see that Hindenberg and Ludendorff's appointments were fortuitous for the German Air Service, allowing it to receive the airplanes it so desperately needed

⁴⁴The top five on Hindenberg's list were, from those of greatest importance to those of lesser priority; munitions, shells and artillery, machine guns, trench mortars, and airplanes. Morrow, German Air Power in World War I, 61.

⁴⁵ See table on page 62 of Morrow's book for complete Albatros Aircraft Works output from January through October 1916. *Ibid.*, 62

⁴⁶ *Ibid.*, 62.

throughout the summer of 1916. More importantly, the Hindenberg program allowed the German Air Service to have a sufficient number of airplanes to effectively deal with the Allied air forces during the remainder of the Somme offensive.

The Battle of the Somme also established the value of the fighter squadron. Prior to the battle, the Allies and the German Air Service had grouped airplanes together but not with the effectiveness of the Jagdstaffeln at the end of the battle of the Somme. Of all German fighter squadrons, Captain Boelcke's Jagdstaffel 2 was the most successful with numerous victories over Allied pilots throughout the course of the battle.

Following the Somme, the arrangement of the Allied fighter squadrons changed little. However, Trenchard recognized that more squadrons were needed at the front as soon as possible. Shortly after the battle of the Somme ended, Trenchard visited London and sent a letter detailing his concerns to the War Office, Admiralty, and War Cabinet.

The letter, sent out on December 13, 1916 read.

The RFC has at this moment one fighting squadron, besides the naval squadron lent to it, of a performance equal to that of the German machines. It is hoped that nine further squadrons of equal performance will be available before the end of March, making a total of eleven squadrons. This is the most that can be expected from army sources and falls far short, as will be seen, of the Commander-in-Chief's [Haig's] request for twenty additional squadrons.⁴⁷

Trenchard's request, followed by Field Marshall Haig's, did lead to the expansion of the number of RFC fighter squadrons, however, the squadrons and their airplanes did not immediately arrive due to the manufacturing and training time required.

Trenchard was forced to make due with the resources at hand during the Arras offensive, and the lack of fighter squadrons had the effect Trenchard believed they would

⁴⁷ Boyle, Trenchard, 205-209.

have on the RFC. The RFC's losses during the fighting at Arras in the spring of 1917 clearly showed the disadvantages caused by insufficient numbers of fighter squadrons. Fortunately for the RFC, the long-awaited fighter squadrons began arriving in May and June of 1917 after which time the RFC never again suffered from such a dramatic handicap.⁴⁸

The German Air Service, on the other hand, immediately chose to expand the fighter squadron concept after the Somme offensive. At Arras, the German Air Service introduced the most effective concentration of fighter squadrons during the war. In June of 1917, the Jagdgeschwader was introduced as an improvement upon the Jagdstaffel. The Jagdstaffel was simply a single squadron consisting of 12 airplanes under a single commander. The Jagdgeschwader, on the other hand, was made up of four Jagdstaffels. Each Jagdstaffel retained its leader, but they were under the command of the head of the Jagdgeschwader. The first "super squadron" was Jagdgeschwader 1 led by Captain Richthofen. Jagdgeschwader 1 contained Jagdstaffels 3, 4, 11, and 33.⁴⁹

Jagdgeschwader 1 was soon dubbed the "flying circus" because of its clever way of traveling around the front. Rather than having immobile aerodromes that were susceptible to enemy attacks, the Jagdgeschwaders used tents.⁵⁰ The tents used by the Jagdgeschwaders housed one airplane each and could be quickly set up, torn apart, and

⁴⁸ The number of RFC fighter squadrons thereafter remained rather high for the last year and a half of the war. Partly, this was due to Trenchard and Haig who continually pressured the War Office for more airplanes and men as the size of aerial conflicts grew. Boyle, Trenchard, 218-222.

⁴⁹ Norman, The Great Air War, 184

⁵⁰ On numerous occasions during the battle of the Somme German aerodromes were bombed and strafed by Allied airplane causing significant damage. Jagdstaffel 2s aerodrome at Douai was bombed several times, interrupting their duties and damaging several aircraft. Cole, Royal Flying Corps Communiqués, 169-323.

moved. The ability to move rapidly from location to location allowed the Jagdgeschwader to shift to the point where enemy activity was greatest. Whenever Allied forces, particularly Allied air forces, massed, the Jagdgeschwader could immediately move to that area which allowed the German Air Service to appear to have far more airplanes than they actually had. Billy Mitchell recalled after the war that the German Air Service “could almost always concentrate in one place more quickly than the Allies,” an attribute of the Jagdgeschwader that proved to be its greatest asset and that was adopted by all German squadrons during the rest of the war.⁵¹

An understanding of the increased importance of the fighter airplane to both sides was perhaps the most significant result of the Battle of the Somme. The Somme made it clear that the fighter airplane had become the most important airplane on the battlefield. Without a sufficient number of fighters, the reconnaissance, bombing, observation, and artillery coordination airplanes could not effectively do their jobs. To lack fighters was also to deprive the ground forces of their vital eyes in the sky. More importantly, without fighters to provide protection and defend the sky, the enemy’s airplanes could fly unopposed and decimate the slow-moving observation and reconnaissance airplanes.

True fighter airplanes, most notably the German Fokker E.III and French Morane-Saulnier, had existed prior to the Battle of the Somme. The Somme, however, was the first occasion in which fighters were used in large numbers. It was also the first time sizeable numbers of fighter squadrons competed with one another for aerial supremacy.

⁵¹ Mitchell, Memoirs of World War I, p. 181. The German Air Service simply applied the principle of war, concentration, to achieve the results they desired. While possessing fewer aircraft than the Allies, the German Air Service seemed to be everywhere in the air because the majority of their airplanes were in relatively small area rather than spread out over the front. Wrigley, The Decisive Factor: Air Power Doctrine, 71.

Previously, at the Battle of Loos in 1915, the German Air Service enjoyed the services of small groups of Fokker E.III's. The Allies, on the other hand, had few models that could be used as an effective fighter airplane and no airplanes specifically designed for the task.⁵² Just as significant, the RFC had not yet grasped the idea that fighters were more effective in groups than alone.⁵³ The German Air Service leaders did and had clearly shown the attributes of placing fighters in squadrons.⁵⁴ The result was the first period during the war in which the German Air Service could claim to have air superiority.⁵⁵

Before the Battle of the Somme began, the Allies finally met the German challenge and amassed a large number of fighter airplanes along the Somme front. The de Havilland DH2 was the most effective of the new airplanes to arrive. The rear-engine arrangement of the DH2 gave the pilot a wide field of fire. The propeller was no impediment, nor was anything else in front of, above, and to the sides of the pilot which gave him a slight advantage over tractor airplanes, even those that could fire forward through the propeller

⁵² During the Artois-Loos Offensive, commonly referred to as the battle of Loos, the "Fokker Scourge" was at its height. By October the RFC felt the full pressure of the German Air Service and slowly moved to produce British aircraft that could check the Fokker's and regain control of the sky above the Western Front. Cole, Royal Flying Corps Communique's, 17-62.

⁵³ In January 1916, General Trenchard decided that RFC airplanes should fly in formation, however, no squadrons had yet to be created that consisted solely of fighters. Jones, The War in the Air: Being the Story, Vol. 2, 156-157.

⁵⁴ In October 1915, during the battle of Champagne, the German Air Service first grouped its single-seaters into fighter groups (*Kampfeinsitzerkommando*). Ulanoff, Illustrated History of World War I in the Air, 45.

⁵⁵ In the spring of 1915, the German Air Service had only 230 competing against the Allies 500. The numbers of German airplanes increased by the fall of that year, but never reached parity with the Allies. Despite the numerical inferiority, only 11 German airplanes were shot down during October 1915. The RFC lost over twice that number during the same period; a total of 26. Bowen, Knights of the Air, 52 and 70.

like the Fokker. The FE2b, Sopwith Strutter 1 ½, and Nieuport 16 and 17, also bolstered the RFC's strength, resulting in the extremely rapid decrease of German control of the sky in the spring of 1916.

In June 1916, the German Air Service tried to counter the RFC's move by rushing several new fighter aircraft models to the Somme. However, the Fokker DI, DII, and the Halberstadt DI and DII that arrived were not up to par and made little headway against the superior numbers of British airplanes.⁵⁶ Upon test flying the new airplanes, Captain Oswald Boelcke commented that the Fokkers and Halberstadts shared a common flaw: they were far too stable.⁵⁷ Stability was a desired attribute of reconnaissance, observation, and bombing aircraft, but for fighters it was often a handicap. For the fighter pilot, the ability to perform acrobatics was key. Without the ability to turn, dive, and climb quickly, a fighter pilot was at the mercy of the enemy. Boelcke, realizing the value of acrobatics, recommended that a new airplane be developed that was more maneuverable.⁵⁸

⁵⁶ Part of the reason the Fokker DI and DII did not live up to their potential was the fact that the Fokker factory was denied the use of the 160hp Mercedes engine. Those in charge of distributing engines felt that Anthony Fokker was a risk even though his airplanes were always of top quality. The problem was that Anthony Fokker repeatedly refused to renounce his Dutch citizenship and become a German citizen. Rumors circulated within Germany that Fokker sent money he earned in Germany back to Holland. Fokker denied ever doing such a thing, but the mistrust caused by the gossip led to the Albatros company being favored over Fokker's company. Fokker's genius and excellent airplanes eventually led to his airplanes once again becoming favored by the German Air Service and High Command. Of course, von Richthofen's endorsement of the Dr.I Triplane in the summer of 1917 certainly helped Fokker. Fokker and Gould, The Flying Dutchman, 155. Historian Aaron Norman, commenting on the Fokker DI and DII states "neither of the Dutchman's new machines really showed much promise; in some ways they were inferior to the monoplane they were meant to supersede. Norman, The Great Air War, 147.

⁵⁷ In Boelcke's report he commented that the DI "loses much speed in climbing, so that several Nieuport Biplanes escaped me in consequence....The maneuvering power of the 160 H.P. machine [DI] is considerably inferior to that of the 100 H.P. and 80 H.P. types, because of the difficulty in counteracting the active force of the heavy engine." In other words, Boelcke felt that the airplane was of little use to either him or his men. Werner, Knight of Germany, 159-161.

⁵⁸ *Ibid.*, 159-160. In The Great Air War, Aaron Norman mentions that despite Boelcke's dislike

The by-product of the failure of the Fokker and Halberstadt D series, combined with Boelcke's request for a better airplane, was the superb Albatros D series.⁵⁹ The Albatros, however, had to be developed from the landing gear up and was slow to arrive. As a result, the German Air Service had to make do with the airplanes already on hand, many of which were outdated by the time of the initial British infantry attack at the Somme on July 1. The merely satisfactory performance of these airplanes, combined with fewer pilots, kept the effectiveness of German Air Service to a minimum throughout the summer of 1916.⁶⁰

When the first Albatroses finally arrived in early September, their presence was immediately felt. The first flight of Jagdstaffel 2 on September 17 in the new airplanes demonstrated that the DI was the fighter the German Air Service needed. On that day, nearly every member of the Boelcke's squadron shot down an RFC airplane.⁶¹ The trend continued with Jagdstaffel 2 having success after success for the remaining months of the

of the Fokker DI and DII, "mesmerized by the Fokker name, Berlin ordered the planes into production and wagered extravagant hopes on their success. The price of ignoring Boelcke's advice was paid in blood, for the new Fokkers were completely outclassed by the improved Nieuports and British DH-2's." Norman, The Great Air War, 147-148

⁵⁹ In late August, the Fokker DIII arrived at the Somme. Boelcke flew this airplane for a short period although he felt that it was still too stable to be a superb fighter. When the Albatros DI reached the front Boelcke immediately changed airplanes. The Fokker was still flown by other pilots in the German Air Service. Werner, Knight of Germany, 204.

⁶⁰ The RFC's daily communiqués during this period clearly show that German airplanes were fighting an uphill battle. During this period of Allied air superiority, the German Air Service rarely ventured beyond their lines as a result of the superior numbers of Allied airplanes. As a result, they were ineffective in nearly every way, including in aerial "dogfights" with RFC and French airplanes. The inability of the German Air Service during this period likely contributed to the large numbers of German casualties during the battle because they could not effectively stop Allied airplane missions that resulted in large numbers of German casualties. Cole, Royal Flying Corps Communiqués, 143-249

⁶¹ Richthofen, The Red Air Fighter, 92-94.

Somme offensive.⁶² In October, the Albatros DIs were augmented by the new Albatros DII which was visually and structurally a bit different than the DI. The major difference between the two airplanes was the location of the top wing. The upper wing of the DI was satisfactory, but it obstructed the pilot's view above him. Thus, the top wing of the DII was lowered, bringing it closer to the body and allowing the pilot to see far more above him.⁶³ Repositioning the wing kept the possibility of surprising an Albatros pilot as low as possible

With both Albatros models and many other lesser fighter airplanes, the German Air Service held its own despite superior enemy numbers during the majority of the battle. This upward trend continued following the battle when the German Air Service reached its most lethal level during the spring of 1917. The period eventually came to be called "bloody April" by the RFC pilots who were lucky enough to survive. Once again, the superiority of German fighter airplanes was a significant cause

The preceding developments were results of the lessons learned over the course of the Battle of the Somme. Using the strategies perfected during the Somme, the air forces of Germany, France, and Britain continued to compete with one another for aerial supremacy for the remainder of the war during which time the size and intensity of aerial battles grew exponentially. Without the knowledge and experience gained as a result of the Battle of the Somme, the remaining two years of the war would likely have turned out much differently for all the major air forces involved in aerial activity above the Western Front. While each air force cut its own path following the battle, the Somme was the

⁶² Reynolds, They Fought for the Sky, 122-123.

⁶³ Clark, Aces High, 81

turning point for the use of air power during the First World War and solidified the tactics and strategies of air force commanders on all sides for years to come ⁶⁴

⁶⁴ In the opinion of historians Eric and Jane Lawson, “the airplane and its uses evolved more in the 52 months of World War I than in the 52 years that followed” Lawson and Lawson, The First Air Campaign, 223.

CHAPTER VI

EPILOGUE

In January of 1917, the Albatros DIII arrived at German aerodromes. The DIII's wings and tail were redesigned to allow it to climb even faster than the DI and DII models. The DIII also borrowed the v strut support between its wings from the French Nieuport fighters. The v strut occasionally broke away from the lower wing, but German pilots willingly accepted the potential danger in exchange for the airplane's exceptional maneuverability.¹ During the Battle of Arras, the DIII was the German Air Service's primary fighter.

The British attack at Arras began on April 9, 1917 following a five day artillery bombardment and lengthy delay.² The attack was initially scheduled to begin in February but was delayed due to changes within the French high command and a German tactical withdrawal from positions southeast of Arras.³ At Arras the RFC performed the same duties it had during the Battle of the Somme. The only difference was that, at Arras, the

¹ By the end of 1917 over 500 Albatros DIII's were flown over the Western Front. DIII's also served the Austro-Hungarian air force in other theaters. Pope and Wheal, The Macmillan Dictionary of the First World War, 16.

² The attack on the 9th cost the British Army over 14,000 casualties. Ibid., 36-37.

³ In early 1917 Joffre was replaced by Neville as the Commander-in-Chief of the French Army. Haig agreed to limit the British attack to Arras while the French attacked German positions at Aisne.

German Air Service was far more determined and able to rule the air over the battle area.

Arras and the weeks immediately prior to the beginning of the battle represented the RFC's darkest hour. The worst month during the offensive was April, thereafter known as "Bloody April." The primary cause of the RFC's predicament was once again the lack of quality fighter aircraft. The introduction of the Albatros DI in September of 1916 was the factor that led to the RFC's air superiority slipping away during the end of the Somme offensive. When the Albatros DII entered service in October, the RFC had no new fighter of its own with which to respond. The same was true when the DIII arrived in January. Consequently, the RFC airplanes were increasingly outgunned and outmaneuvered.

One benefit the RFC enjoyed was a nearly three-to-one numerical advantage.⁴ Yet, having more airplanes did little to help the RFC during the early part of April. In the five days prior to the start of the Arras offensive on the 9th, 75 RFC airplanes were shot down. The result was 105 airmen either dead or injured.⁵ Richthofen and the pilots he commanded in *Jagdstaffel* 11 were responsible for many of the losses the RFC suffered. On April 2, the "Red Baron" shot down two airplanes in the same day, the first time in the war he had done so.⁶ Richthofen was flying the Albatros DIII at the time. Several days later he was able to surpass that feat by shooting down three RFC airplanes. In all, the pilots of *Jagdstaffel* 11 shot down thirteen enemy machines while flying their Albatros

⁴ At the beginning of the battle of Arras the RFC had 365 airplanes versus the German Air Service's 195. Lawson and Lawson, *The First Air Campaign*, 118.

⁵ Ulanoff, *Illustrated History of World War I in the Air*, 94.

⁶ By April 2, 1917 the "Red Baron" had achieved 33 victories against Allied airplanes. Richthofen, *The Red Air Fighter*, 114-118.

DIIIs.⁷ The following day they were not as successful but still managed to finish off eight RFC airplanes.⁸ The next few days were similar in their outcome with the pilots of the German Air Service pounding the RFC at every turn.⁹ The RFC pilots were simply outclassed by their opponent's airplanes and experience, however, superior numbers did allow the RFC to photograph almost the entire front immediately around Arras which was of paramount importance.¹⁰

The start of the Arras offensive only increased the pressure on the RFC which did not slacken until late April and early May of 1917.¹¹ In late April, the fighter airplanes the RFC desperately needed finally arrived at the front. The first fighter that appeared was actually borrowed from the Royal Naval Air Service. In an attempt to cut the RFC's losses the British Admiralty agreed to let RNAS squadron number 3 to assist the bloodied RFC.¹²

RNAS squadron number 3 flew the extremely agile Sopwith Triplane which was the first three winged airplane of the war. The Triplane had both a higher top speed and

⁷ Richthofen shot down three airplanes, Lt. Wolff downed four, and Lt. Festner, Lt. Schafer, and Lt. Lothar von Richthofen two airplanes each. Richthofen, The Red Air Fighter, 118-119.

⁸ *Ibid.*, 119-120.

⁹ The life expectancy of RFC pilots during April of 1917 was a brief 23 days. Ulanoff, Illustrated History of the First World War, 94.

¹⁰ Just as at the Battle of the Somme, without a well photographed battlefield the artillery was not as effective. Photographs allowed the artillery to fire when airplanes were either not available or able to fly over the target.

¹¹ During the Battle of Arras the RFC had a total of 754 airplanes, 385 of them were fighters. The German Air Service had only 264 airplanes, 114 of which were fighters. At the end of April, the RFC casualties were 316 airmen killed or missing to the Germans 119. The total airplanes losses were 151 for the RFC and 66 for the German Air Service. Morrow, German Air Power in World War I, 91.

¹² Raleigh, The War in the Air: Being the Story, Vol. 1, 478.

greater ceiling than the Albatros DIII due to its light weight.¹³ Yet, the most impressive advantage of the Triplane was its maneuverability. The Triplane's third wing was the design feature that allowed the airplane to maneuver as it did.¹⁴ The Triplane with its single machine-gun was outgunned by the Albatros which carried twin machine-guns

The second airplane to join the ranks of the RFC during April was the two-seat Bristol F2.B. While most two-seaters were used as everything but a fighter, the F2.B was an exception. With its 275 hp Rolls-Royce Falcon III engine and diminutive size the F2.B could fly and maneuver just as easily as any fighter in service at the time, except of course for the nimble Sopwith "Tripe."¹⁵

The French also introduced a new airplane that matched the Albatros in April. The new *Societe pour l'Aviation et ses Derives* (Spad) XIII was designed by French aircraft engineer Louis Bechereau. The Spad was, at the time of its introduction, the fastest airplane in the service of any nation.¹⁶ The Spad's speed was the result of its supercharged Hispano-Suiza 8Be engine that had an output of 235hp, 60hp more than the Albatros.¹⁷ The Spad also had twin Vickers machine-guns that fired through the propeller, giving it

¹³ The Sopwith was faster than the Albatros despite its engine being rated at 45hp less than the German airplane. The Sopwith's engine was a 130hp Clerget. Clark, *Aces High*, 84.

¹⁴ The German Air Service pilots recognized the Triplanes' acrobatic potential, particularly von Richthofen. As a result, aircraft designer Anthony Fokker began work on the infamous Fokker Dr.1. The Dr.1 was the first German triplane, but is without a doubt the most well-known airplane of the war due to its use by von Richthofen and his "Flying Circus." Richthofen, *The Red Air Fighter*, 132.

¹⁵ The F2.B was such a successful design that upgraded models were used by the British military until 1926. Thurston, *The World's Most Significant and Magnificent Aircraft*, 88-89.

¹⁶ The Spad's top speed was 138mph. In contrast, the Albatros DIII's top speed was 109mph and the Fokker triplanes was 103mph. *Ibid.*, 89.

¹⁷ The Spad was extremely well-built and was the favorite of many Allied aces. French ace Rene Fonck won many of his 75 kills in his Spad. American Ace Eddie Rickenbacker also scored the majority of his wins in his Spad. Bowen, *Knights of the Air*, 94.

fire power equal to that of the Albatros.

In May the RFC was further bolstered by the addition of the Sopwith Camel which became one of the most recognized fighters of the First World War. The Sopwith Strutter 1 ½ and Pup had performed well during the Battle of the Somme, but neither airplane was the equal of the Albatros. The Camel, on the other hand, was the Albatrosses equal and in some respects its superior.¹⁸ The Camel matched the Albatrosses twin machine-gun layout and was the first RFC airplane armed in that manner.¹⁹ The Camel's 150hp BR.1 engine produced 25hp less than the Albatrosses Mercedes engine, but was able to climb faster than the DIII which was a significant attribute during combat.²⁰

The final airplane to join the RFC during the Arras offensive was the Royal Aircraft Factory's S.E.5a that arrived at the front in June 1917. The S.E.5a was not as powerful as the French-built Spad, but its 200hp Wolseley Viper high compression engine was still more powerful than the Albatrosses Mercedes engine.²¹ Like the Spad and Camel, the S.E.5a had twin machine-guns. Rather strangely, one gun fired through the propeller, the other was mounted on the top wing and was able to fire either directly forward or tilted to fire at an angle above the airplane giving the pilot an incredible field of

¹⁸ By the end of the war 5,450 Camel's had been built. Thurston, The World's Most Significant and Magnificent Aircraft, 93.

¹⁹ The Camel was armed with two Vickers heavy machine-guns. Alan Clark, Aces High, 85. The Allied interrupter was designed by George Constantinesco and RFC Major George C. Colley. The gear was hydraulically operated by oil pressure. Norman, The Great Air War, 153.

²⁰ Thurston, The World's Most Significant and Magnificent Aircraft, 93.

²¹ Taylor, Jane's Fighting Aircraft of World War I, 38-39.

fire.²²

The arrival of these five airplanes between April and June 1917, reversed the fortunes of the RFC. No longer did the RFC have to suffer through their missions in inferior airplanes that were little more than targets for their German foes. Now the RFC had the fighters they needed to compete with the German Air Service. Consequently, the German domination of the sky over Arras quickly ebbed as the new RFC fighters arrived in force.

The German Air Service's response to the rapid reversal of their fortunes was almost one of ambivalence, at least initially. The dramatic impact of the Albatros upon its introduction during the Battle of the Somme and its subsequent success led to an attitude of complacency within the German command.²³ They were content with the performance of the Albatros DI, DII, and DIII.²⁴ As a result, the command was in no hurry to introduce a new airplane and when they finally did it was yet another Albatros design.

The German Air Service's newest fighter, the Albatros DV arrived at German aerodrome's soon after the Sopwith Camel reached the RFC. The DV was even more streamlined than earlier Albatrosses and had a more powerful engine. The DV, however, was not as successful as the earlier Albatros models.²⁵ The primary reason was that the weight of the airplane had been increased which made it less maneuverable. The DV also

²² Clark, Aces High, 85.

²³ Fokker and Gould, The Flying Dutchman, 156-157.

²⁴ In early 1917, 67 percent of the airplanes, not just fighters but all airplanes, were Albatrosses. Morrow, German Air Power in World War I, 90.

²⁵ Even with its flaws, a total of 1,512 Albatros DVs were built by the end of the war. Pope and Wheal, The Macmillan Dictionary of the First World War, 16-17.

had fatal flaw defect that led to the deaths of at least eighteen German airmen. According to Anthony Fokker, the DV had “certain structural weaknesses” which “resulted in the death of many pilots when the wings of the D-V tore off in flight.”²⁶

Von Richthofen was not impressed by the DV either. He complained that the DV was unacceptable. After being shot down and wounded on July 6, von Richthofen complained that the German Air Service was losing the technical edge it had on the Allies.²⁷ Richthofen commented that,

Our airplanes are inferior to the English in a downright ridiculous manner. The triplane and two-hundred-horsepower Spad, like the Sopwith single-seater [Camel], play with our D5s. Besides better quality aircraft they have quantity. Our pilots, though quite good, are consequently lost! The D5 is so antiquated and laughably inferior that we can do nothing with it.²⁸

Richthofen offered his remedy, stating, “We must unconditionally support and use every firm that produces a type merely somewhat better than this damn Albatros.”

Richthofen also wondered why Fokker’s airplanes were not in service. He stated,

What’s going on with Fokker? He has two machines that are superior to the Albatros and neither has been produced. There is his unbraced biplane with the stationary engine. It is unquestionably faster and has better qualities in the curve than the Albatros D5, and yet it is not built... Furthermore, he has a triplane that is certainly no longer in the formative stages and has already shown exceptional climb and speed, that must be unreservedly supported and sent to the front in large

²⁶ The lower wing of the DV often separated from the fuselage as a result of the use of a single spar. Fokker believed that “the lone spar, unable to absorb the tremendous tensions put upon it during air combat, splintered, the wing collapsed, and the doomed pilot crashed to his death. As far as could be ascertained, more than eighteen pilots were killed this way in Albatros D-Vs. Fokker also believed the reason for this was the fact that the DV was rushed to the front without having the proper sandbag load tests performed to test the durability of the design. Fokker and Gould, The Flying Dutchman, 157.

²⁷ Lawson and Lawson, The First Air Campaign, 134. Anthony Fokker supported Richthofen’s contention. He stated that because of the problems with the Dvs, “Allied aviators soon learned that the German airmen in an Albatros dared not dive too swiftly, and they frequently escaped from a tight corner by the simple expedient of diving away. Fokker and Gould, The Flying Dutchman, 176.

²⁸ Morrow, German Air Power in World War I, 109.

numbers. You would not believe how low the morale is among the fighter pilots presently at the front because of their sorry machines²⁹

As a response to the concern of von Richthofen and other German pilots, a successor to the Albatros DV was underway ³⁰

In August 1917, the first successful German fighter that was not an Albatros arrived at the front. The first pilots to receive the new airplane were those of *Jagdgeschwader 1* led by Manfred von Richthofen, known as the “Flying Circus”³¹ The new fighter, the last new airplane to enter German service in 1917, was designed by Anthony Fokker at his factory in Schwerin. Fokker’s new airplane was designed along the lines of the Sopwith Triplane whose maneuverability many German pilots admired.³² The Dr.I triplane had twin machine-guns that fired through the propeller, a standard arrangement by that point in the war. Although the similar Sopwith Triplane was deemed obsolete by the time the Dr.I was introduced, Fokker’s airplane proved otherwise.³³ The Dr.I lacked speed, but made up for it with phenomenal maneuverability.³⁴ Fokker recalled the maneuverability of the Dr.1 stating that Allied pilots “never had an opportunity to

²⁹ Richthofen speculated that officials in the aviation inspectorate were behind the lack of support given to Fokker’s airplanes. The triplane Richthofen referred to was the Fokker Dr.I. The “unbraced biplane with the stationary engine” was the early prototype of the Fokker DVII equipped with a water cooled, non-rotary engine. Morrow, German Air Power in World War I, 109.

³⁰ While production of the DV ceased, a few of the airplanes continued to be flown by German pilots until the end of the war. Ibid , 110.

³¹ The *Jagdgeschwader* consisted of four *Jagdstaffels*. Ibid., 111-112.

³² The Fokker Dr.I was developed with the idea of facing the Sopwith Triplane in mind. Fokker and Gould, The Flying Dutchman, 152-153.

³³ Clark, Aces High, 88.

³⁴ The Dr.I had either a 110hp Oberursel or 110hp Le Rhone, well below the horsepower output of most of the other fighters in service at the time. Pope and Wheal, The Macmillan Dictionary of the First World War, 166.

realize how slow the triplane was because of the way it climbed, flipped, and stunted in a fight. In the turmoil of combat, with its extraordinary climb and maneuverability, it proved almost invincible under able piloting.”³⁵

The strongest adherent of the Dr.I was von Richthofen who exploited the Fokker’s maneuverability as few other pilots could. Von Richthofen’s *Jagdgeschwader* also used the appearance of their Dr.I’s as a psychological tool designed to intimidate their enemies. Von Richthofen had long had the habit of painting his airplanes red, his personal machine always being completely red. Fokker recalled the effect of *Jagdgeschwader* I’s Dr.Is stating, “When the Allies saw its triple bank of planes, glittering red at the head of the Richthofen circus, and saw it fairly float in the air, it threw something of a panic into their men ”

Yet, the Fokker was difficult to handle for many pilots. In October several crashes occurred and production of the Dr.I suffered as a result.³⁶ Also, in despite of its maneuverability, the Dr.I was soon deemed too slow. The airplanes inability to reach high altitudes was also seen as a handicap considering the lofty heights newly manufactured Allied airplanes could reach. Consequently, the numbers of Dr.Is at the front declined beginning in late 1917 and early 1918.

In January of 1918, the German Air Service held a flying competition at the town of Aldershof. Anthony Fokker and Lt Kreft, head of von Richtofen’s technical staff, were the men responsible for initiating the competition. Fokker was still at loggerheads with the German command for his refusal to become a German citizen. Consequently,

³⁵ Fokker and Gould, The Flying Dutchman, 152-153.

³⁶ Morrow, German Air Power in World War I, 111-112.

Fokker's airplanes continued to be ignored. Only the persistence of pilots like Richthofen, as in the case of the Fokker Dr.I, enabled Fokker's designs to see action. As a result, the competition was held as the result of demands from fighter pilots who spoke out on Fokkers behalf.³⁷

The only airplanes in the competition were D series fighters. Like the early C-series two-seat airplanes, the D-series all conformed to certain design criteria.³⁸ Therefore, the outer appearance of many of the airplanes were quite similar. Airplanes produced by Rumpler, L.F.G., Albatros, and Pfalz companies were in the running for the right to produce the new fighter.³⁹ According to Anthony Fokker, the Rumpler fighter was his DVII's closet competition. The Rumpler was faster than the Fokker and had a very good rate of climb.⁴⁰ Yet, after a number of acrobatic demonstrations by many of Germany's top aces, the Fokker was chosen as the most well-rounded fighter at the competition.

Following its outstanding showing at the Aldershof competition, the Fokker DVII was brought into mass production. Ironically, the Albatros company was one of the many aircraft manufactures that built Fokker's new airplane. The DVII was manufactured in

³⁷ Fokker recalled that "we concocted a scheme to permit the fighting pilots to select their own planes, instead of being the goat of headquarters intrigues. Lieutenant Kreft and I got in touch with other Front pilots, who welcomed the plan because they realized at once how they would benefit from an open competition. It was agreed that a committee of aces make this suggestion to air corps headquarters." Fokker and Gould, The Flying Dutchman, 165

³⁸ Lawson and Lawson, The First Air Campaign, 176.

³⁹ Fokker commented on each airplane stating, "the Albatros D-VI was almost a duplicate of the D-V, no improvement. The Pfalz was obviously too weak for combat flying, while the L.V.G. had no visibility. The A.E.G. was an out-and-out flop." Fokker and Gould, The Flying Dutchman, 170.

⁴⁰ Oberlieutenant Bruno Loerzer led the pilots as they performed mock dogfights using all the fighters at competition. Fokker and Gould, *Ibid.*, 169.

that manner because the German Air Service decided that was the best course of action to take due to the limited material resources available to them. Having several firms build the DVII also allowed more airplanes to be built since the Fokker factory could only manufacture a certain number per month

In March and April of 1918, the first Fokker DVII's arrived at the front.⁴¹ The DVII was the fighter the German Air Service desperately needed. By the spring of 1918, they were heavily outnumbered by the Allied air forces and needed an airplane that could compete successfully. The Fokker was believed to be highly advanced. So advanced that many Allied pilots hoped to successfully force down and capture a DVII. American ace Eddie Rickenbacker came close on one occasion, but a Spad fighter cut across his path and shot the Fokker out of the sky. Rickenbacker lamenting the loss of such an excellent opportunity stated, "So nearly had I succeeded in capturing intact a most valuable Fokker from Germany's most famous squadron! So near and yet"⁴²

The Allies did eventually get their Fokker. However, it was not through combat, but through the peace treaty that ended the First World War. While many German airplanes were simply destroyed at wars end, the Versailles Treaty stated that all Fokker DVII's must be handed over. The American Air Service received a few of the DVII's. Rickenbacker, who missed his opportunity to shoot one down during the war, instructed other American pilots on how to properly fly them

In conclusion, the Battle of the Somme influenced the future course of the war in

⁴¹ Thruston, The World's Most Significant and Magnificent Aircraft, 101

⁴² The Fokker was from Richthofen's Jagdgeschwader 1. Edward V. Rickenbacker, Fighting the Flying Circus (New York: Frederick A. Stokes Company Publishers, 1919), 340-341.

the air during World War I as no other engagement. It was the first truly epic air battle of the war. Verdun had come close, but the number of airplanes involved and the casualties incurred did not equal those of the Somme. The Somme was also the first battle during which the value of aerial assistance became absolutely clear to all sides. The help of the air forces had been useful to the efforts of the armies on the ground prior to the Somme, but by the time the fighting at the Somme ceased, aerial assistance was no longer just useful; the British experience at the Somme clearly proved that it was vital

The British Army suffered tremendous casualties, but most of those casualties were the result of intense artillery bombardments and, to a lesser extent, the machine-gun and rifle fire during the numerous infantry assaults they had undertaken. The German casualties, on the other hand, were largely a result of numerous intense artillery barrages that would not have been as accurate or effective without the assistance of RFC airplanes. The RFC's artillery coordination missions, reconnaissance patrols, photographic flights, and bombing missions allowed the British and French armies to sustain the battle and wear down the Germans, even as they themselves were slowly sapped of strength. Without the assistance of the RFC, the British and French infantries would not have been able to sustain their offensive against the well-entrenched German Army.

The Battle of the Somme was not only a model for cooperation between air and ground forces. The Somme also helped the air forces of Germany, France, and Britain develop tactics, strategies, and technologies that influenced the use of the airplane for the decades and numerous wars that followed. Whether the value of contact patrols, the helpfulness of night bombing, the importance of strong and capable leadership, the strength of the offensive, the advantage of numbers, the essentialness of fighter squadrons,

or the fighter airplane itself, the Somme made it evident to all that the use of the airplane had changed warfare forever.

While the Battle of the Somme was not the decisive victory the Allies hoped for, it was essential to their survival. The Allies' decision to launch an attack on the German entrenchments at the Somme achieved the French High Command's goal of removing German pressure on Verdun which had been in danger of falling since the spring of 1916. Being the last area of strong resistance between the German Armies and Paris, if Verdun had fallen the outcome of the war would likely have been dramatically different. The Somme, therefore, was one of the pivotal events of the war for the Allies. In addition, the Somme also succeeded because it aided in the weakening of the German Armies on the Western front. The Allies had more reserves from which to draw than the Germans who were already stretched thin fighting a two-front war. The casualties the Allies inflicted only added to the strain on the German forces and likely decreased the length of the war by several months and prevented many Allied deaths.

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