# DH 2 VS ALBATROS D I/D II

## Western Front 1916

JAMES F. MILLER

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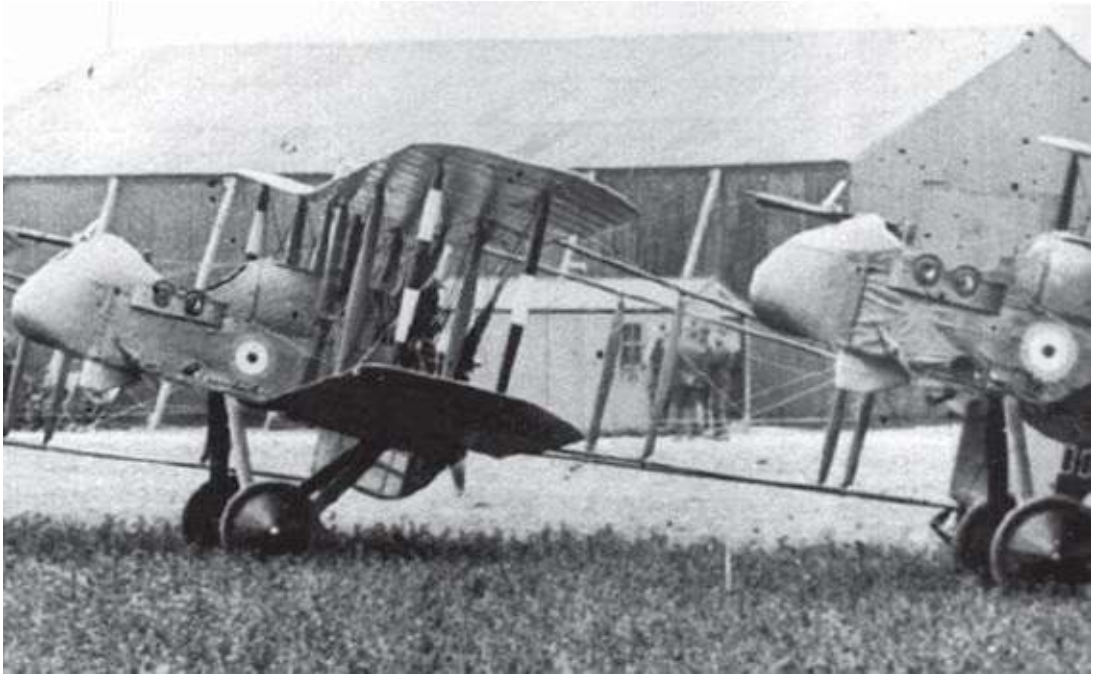
# INTRODUCTION

While modern air forces employ time-tested, combat-proven tactics and decades-old aeroplan designed on well understood aeronautical principles and built with ample time for testing and refinin air forces of World War I were literally writing the book on tactics and aeroplane design as dictate by the current state of the war. Indeed, throughout the conflict a perpetual reactionary arms ra existed to counter and hopefully conquer the enemy's latest aeroplane technology. Nowhere was th more evident than with single-seat scouts.

Better known today as 'fighter aeroplanes', single-seat scouts were born as a direct result of tw seater aerial reconnaissance and artillery observation. Such infantry cooperation aeroplanes we crucial for the furtherance of army strategic and tactical planning for ground force success. This w particularly the case on the static Western Front, where trench-based warfare throttled any cavalry based reconnaissance. Without exaggeration, two-seater photographic reconnaissance was important in World War I as satellites are today.

Naturally, it became desirable for all combatants not only to amass as much intelligence as possib via two-seater excursions over the frontlines but to simultaneously prevent the enemy from achievi the same. This begat two-seater crews arming themselves for aerial interception of their belligere counterparts, but soon single-seat 'scouts' were developed to use speed to dash quickly over the line conduct a specific observation, and then quickly regain the lines. However, both sides realised th single-seat scouts provided an effective means with which to hunt and shoot down enem reconnaissance aeroplanes, as well as to protect their own reconnaissance types from simil treatment. A natural result of these tactical implementations was scout-versus-scout combat – th 'fighter aeroplane' and 'dogfighting' were born.



No. 24 Sqn DH 2s 6000 (left) and 5925 (right) at Bertangles in July 1916 – note 5925's slightly lower nacelle front. This aircraft was one of three DH 2s involved in an epic clash with *Jasta* 2 that saw the loss of No. 24 Sqn CO Maj Lanoe Hawker.

However, the superiority pendulum swung without equality as each side strove to counter what th enemy already possessed. The Germans struck first with their Fokker Eindeckers, armed with a sing

Maxim machine gun that was synchronised to fire through the propeller arc. Not necessarily a extremely nimble aeroplane – it did not have to be when pursuing sluggish two-seater reconnaissanc types such as the Royal Aircraft Factory (RAF) BE 2c – the monoplane's armament and spee (approximately 88mph compared to the BE 2c's modest 69mph at 10,000ft) allowed it to plund Allied reconnaissance machines. This in turn gave rise to the legendary 'Fokker Scourge' descriptio given to German air superiority over the Western Front from late 1915 through to early 1916.

As yet the Triple Entente (Great Britain, France and Russia) had no reliable synchronisation ge with which to counter the new threat. However, the single-seat French Nieuport 11 'Bebe' soo appeared with a single Lewis machine gun mounted atop the upper wing that fired *over* the propell arc, bypassing the need for propeller synchronisation.

The British answer to the problem was to employ the 'pusher' aeroplane concept – i.e. locate th engine behind the cockpit to allow the pilot freedom to fire a machine gun forward without an interference from the propeller. This arrangement had previously been used in two-seaters such as th Farman F 40 and RAF FE 2b, but the Aircraft Manufacturing Company's DH 2 was the first single seat pusher designed specifically for air-to-air interdiction.

Now equipped with fighters that were as fast and more nimble than the German monoplanes an crucially, available in greater numbers, the Entente had once again achieved control of the skies ov the Western Front by the summer of 1916. A postwar German analysis concluded:

With a dose of right rudder, *Jasta* 2's Ltn Otto Höhne guns Albatros D I 390/16 *Hö* on its takeoff run in the autumn of 1916. Höhne had shot down six aeroplanes with *Jasta* 2 by the time he was wounded in January 1917. A year later he would return to the unit as *Staffelführer*.

> The start of the Somme battle [1 July 1916] unfortunately coincided with the low point in the technical development of our aircraft. The unquestioned air supremacy we had enjoyed in early 1916 by virtue of our Fokker monoplane fighters had shifted over to the enemy's Nieuport, Vickers [generic German term for British lattice-tailed pushers, in this instance referring to the DH 2] and Sopwith aircraft in March and April.

As the German monoplanes were replaced by biplane fighters such as the Fokker D I and variou Halberstadt machines, pilots wanted a fighter that had power enough to promote speed *and* bear th weight of twin-gun firepower. Enter the Albatros D I and D II, each boasting a 160hp engine that gav the pilots what they had asked for. The Albatros Ds were not as manoeuvrable as the Nieuport 11 o

DH 2, but this was not a detriment when one considers that shooting down ungainly two-seaters was primary endeavour. All pilots sought to attack under a cloak of surprise, using speed to swift approach one's target unseen and then hammer it down before the crew of the aeroplane was eve aware that they were under attack.

Head to head, the DH 2 was more manoeuvrable than the Albatros D I and D II, but the latter we faster, had better rates of climb and were equipped with two beltfed machine guns and 1,000 rounds ammunition. The DH 2 had a single gun with less than half that amount of ammunition, carried in 4 or 97-round drums that had to be replaced during combat. The Albatros also enjoyed a much mo reliable inline engine than the DH 2's rotary motor, which was prone to power loss or outright failu due to mechanical faults. However, even with properly running engines, speed triumpl manoeuvrability. The latter is a defensive tactic and fighter aeroplanes are offensive weapons, be employing surprise in order to prevail over an opponent. The DH 2's nimble attributes, therefor could not easily overcome the Albatros's superior speed (the DH 2 was nearly 20mph slower in lev flight), especially when in a dive, and firepower.

Royal Flying Corps (RFC) pilot Capt R. H. M. S. Saundby's recollections succinctly set the stag for the chapters that follow:

> The Albatros single-seater fighting machine was the first formidable tractor [engine in front] biplane scout produced by the enemy. While we had occasionally met them before, they only became numerous and, therefore, offensive at the beginning of November [1916]. The de Havilland Scout had a hard job when outnumbered by these machines, and only carried on because of its handiness and manoeuvring power, for its speed and climb were much inferior to these new Huns [slang for Germans and/or German aeroplanes].

This outstanding close-up photograph of American volunteer pilot Lt Geoffrey H. Bonnell of No. 32 Sqn clearly reveals the DH 2's nacelle and single 0.303in Lewis machine gun. Bonnell would later join the US Army Air Service and command the 147th Aero Squadron. (Aaron Weaver)

# CHRONOLOGY

## 1914

| | |
|---|---|
| **March** | Geoffrey de Havilland joins the Aircraft Manufacturing Company as chief aeroplane designer and test pilot. Begins work on a two-seater pusher, forerunner of the DH 2. |
| **June** | Albatros Type DD wins 100km (60 miles) speed prize at the Aspern *Flugmeeting* in Vienna. Designed by Ernst Heinkel and Robert Thelen, the Type DD is considered to be the forerunner of the Albatros D series of scouts. |
| **28 June** | Archduke Franz Ferdinand of Austria assassinated by Serbian student Gavrilo Princip, beginning a period of international diplomatic manoeuvring. |
| **July** | To end Serbian interference in Bosnia, Austria-Hungary delivers a ten-demand ultimatum to Serbia, intentionally made to be unacceptable and provoke war. Serbia agrees to eight demands. |
| **28 July** | Austria-Hungary declares war on Serbia. |
| **29 July** | Russian Empire orders partial mobilisation in support of Serbia. |
| **30 July** | German Empire delivers ultimatum to Russia to cease mobilisation against Austria-Hungary. |
| **1 August** | France orders mobilisation and Germany declares war on Russia. |
| **3 August** | Germany declares war on France and invades Belgium. |
| **4 August** | UK declares war on Germany in support of Belgian neutrality. World War I fully under way. |

## 1915

| | |
|---|---|
| **June** | de Havilland conducts inaugural DH 2 flight and begins series of test flights and refinements. |

No. 32 Sqn DH 2 7907 features clear doped fabric sides, grey metal nacelle panels and dark undercarriage struts. A black ring on the white wheel cover denotes a ‘B’ Flight machine. (Aaron Weaver)

Albatros D I D.446/16 displays its high gloss finish. Although the engine and radiators necessarily jut into the slipstream, Albatros has taken care to reduce drag via faired inverted 'V' struts, wing root fillets and a 'bowl' over the port Maxim's expended belt chute.

| | |
|---|---|
| **Summer** | German monoplanes armed with synchronised machine guns decimate RFC reconnaissance two-seaters, begetting the 'Fokker Scourge'. |
| **9 August** | DH 2 prototype sent to France for combat evaluation is shot down and captured mostly intact by the Germans. |

## 1916

| | |
|---|---|
| **February** | DH 2 arrives in France with No. 24 Sqn. |
| **June** | Thelen design team's Albatros D I undergoes flight evaluation and static load tests at Adlershof. |
| **18 June** | German 15-victory ace Ltn d R Max Immelmann is killed in action, his death marking the end of the 'Fokker Scourge'. |
| **July** | Albatros D I ordered into production. |
| **1 July** | The Battle of the Somme commences. British Army suffers 60,000 killed or wounded on the first day of the offensive. |
| **August** | Germans implement the *Jagdstaffel*, a dedicated group of single-seat fighters tasked primarily with hunting enemy two-seater reconnaissance and artillery-spotting machines. |
| **16 September** | Albatros D Is and a single D II arrive in the frontline with *Jagdstaffel 2*. |
| **28 October** | *Jagdstaffel 2 Staffelführer* and 40-victory ace Hptm Oswald Boelcke is killed after a mid-air collision with Ltn Erwin Böhme, who survives. |
| **22 November** | No. 24 Sqn pilots Capt John Andrews and 2Lt Kelvin Crawford shoot down and kill *Jagdstaffel 2 Staffelführer* Stefan Kirmaier. |
| **23 November** | No. 24 Sqn commanding officer and RFC luminary Maj Lanoe Hawker is shot down and killed by *Jasta* 2's Manfred von Richthofen after an eight-minute swirling dogfight and race to the lines near Bapaume, France. |
| **Late December** | Albatros D IIIs begin arriving at frontline *Jagdstaffeln*. |

# DH 2

In the first decade of the 20th century the UK's aviation endeavours lagged significantly behind thos of their continental neighbours France and Germany. France had taken to the new heavier-than-a aeroplane with an ardent fervour after American Wilbur Wright so ably demonstrated the Wrigh Flyer there in 1908. Germany had focused its aviation interest primarily upon lighter-than-a machines, such as Graf Zeppelin's rigid airships, which by 1909 had gained acceptance into th German military.

Concurrently, the British had no aviation mindset either. Case in point, in 1908 the British Secreta of State for War's response to inquiries regarding the placement of government aeroplan manufacturing orders said, succinctly, 'we regret we cannot do this as we are trustees of the publ purse and we do not consider that aeroplanes will be of any possible use for war purposes'.

However, English journalist George Holt Thomas set out to change that opinion. In 1906 he ha offered a £1,000 prize for the first heavier-than-air machine to complete a straight-line flight of on mile, and his frequent trips to Paris kept him in the know regarding the significant advancements French aviation. These trips included visits to French manufacturers and aviation pioneer particularly Henry Farman, and after attending the 1909 Reims Aviation Meeting Holt Thoma returned to England determined to increase the country's aviation interests and awareness.

Toward that end he organised the first officially recognised British aviation meeting at Blackpoo arranged demonstration flights around London and then became manager of French aviator Lou Paulhan, who subsequently won a £10,000 prize for being the first to fly from London to Manchester

In September 1910 Holt Thomas attended French army manoeuvres on the continent, where h witnessed the progress military aviation had made with aerial reconnaissance and artillery spottin Recognising the aeroplane's military importance, but cognizant of the British lack of progress in i furtherance, Holt Thomas wrote a letter to the *Daily Mail* on 17 September that said, in part, 'A ne weapon of the utmost importance in war has appeared, and with that weapon our Army is whol unprovided'. Nevertheless, the British army remained unconvinced that the aeroplane would repla the cavalry as a method of reconnaissance.

Undeterred, Holt Thomas used his influences with the press to further his cause, and in Octob 1910 was able to arrange purchase of two French aeroplanes (a Henry Farman Type *Militaire* and Paulhan biplane) for the War Office, and further pressure eventually resulted in the Britis government agreeing to a nearly 500 per cent increase in the 1911 allotment for military aviatio from £9,000 to £52,000. Shortly thereafter Holt Thomas brokered a deal with the Farman Brothers build and sell their machines in Britain through his Aeroplane Supply Company, which he establishe in 1911.

When a similar attempt to broker a deal with Prince Henry of Prussia to construct Zeppelin airshi fell through in 1912, Holt Thomas sought and received licence to build French Astra-Torres airshi and subsequently formed Airships, Ltd. In May 1912 he merged his two companies, and the followin month he re-registered them as the Aircraft Manufacturing Company (AMC – the oft-used 'Airc prefix was not officially adopted by the Aircraft Manufacturing Company until October 1918), whos first British-built Maurice Farman machine was completed in 1913. Holt Thomas's fledgling compan soon became the pinnacle of the British aircraft industry.

Prior to his tenure with AMC, 26-year-old Geoffrey de Havilland designed the legendary BE and FE series of aeroplanes for the Royal Aircraft Factory. Although he was initially hesitant to work on pusher designs with AMC, his efforts produced the redoubtable DH 2.

With a want to expand AMC beyond manufacturing and into aviation design, Holt Thomas wa advised to contact a 26-year-old aircraft designer by the name of Geoffrey de Havilland. Born on 2 July 1882, de Havilland had graduated from Crystal Palace Engineering School in 1903 and ha initially worked as a motor engineering draughtsman in Birmingham prior to returning to London take up employment with a bus-building company.

Intrigued by reports of aviation feats and advancements on the continent, de Havilland and a partn quit their jobs to build an aeroplane of their own, financed by de Havilland's grandfather. The accomplished this in 1909, but the machine was destroyed after de Havilland stalled it on takeof Uninjured, de Havilland and his partner assembled a second machine the following year and flew successfully. The aircraft was purchased by the War Office, who then offered de Havilland a positio as both designer and test pilot at His Majesty's Balloon Factory, forerunner of the famous Roya Aircraft Factory.

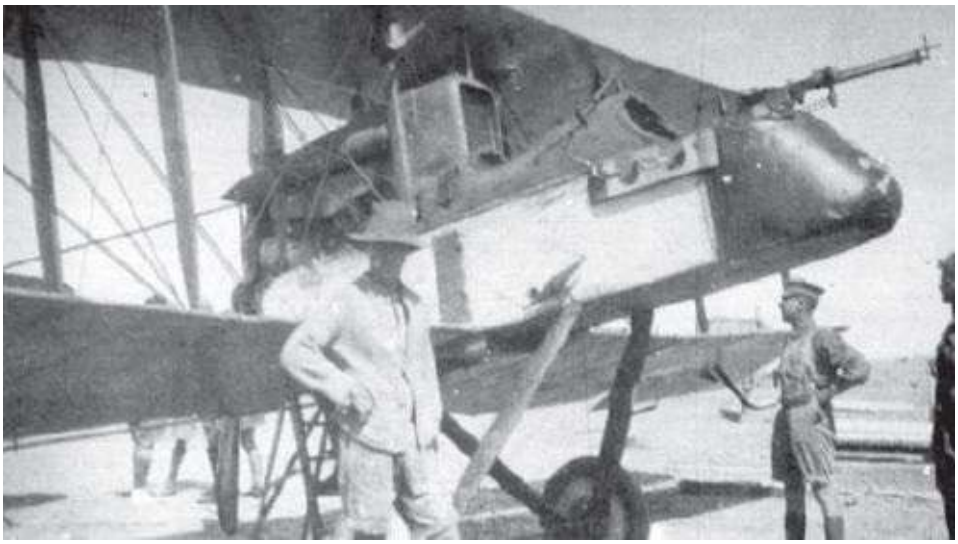
So employed, de Havilland helped design and develop such legendary aeroplanes as the BE and F series, but by 1914 he found himself inspecting aircraft from other designers rather than working o his own. After voicing dissatisfaction about his plight, it was suggested (by the same man who ha told Holt Thomas to contact de Havilland) that he seek employment with AMC as it was expandin into aircraft design. Taking heed of this advice, de Havilland approached Holt Thomas when the latt next visited the RAF facility at Farnborough, and on 23 March 1914 he signed on as AMC's chi designer and test pilot.

Initially working on a rotary-engined version of the BE 2, de Havilland was soon redirected by Ho Thomas to commence design work on a two-seater pusher biplane instead. Although de Havilland wa reluctant at first because he knew the tractor configuration was more aerodynamically sound than th pusher, Holt Thomas had made the request because it was believed within the RFC that the pusher wa a superior weapons platform at the time. With the engine and propeller behind the pilot, the new sco

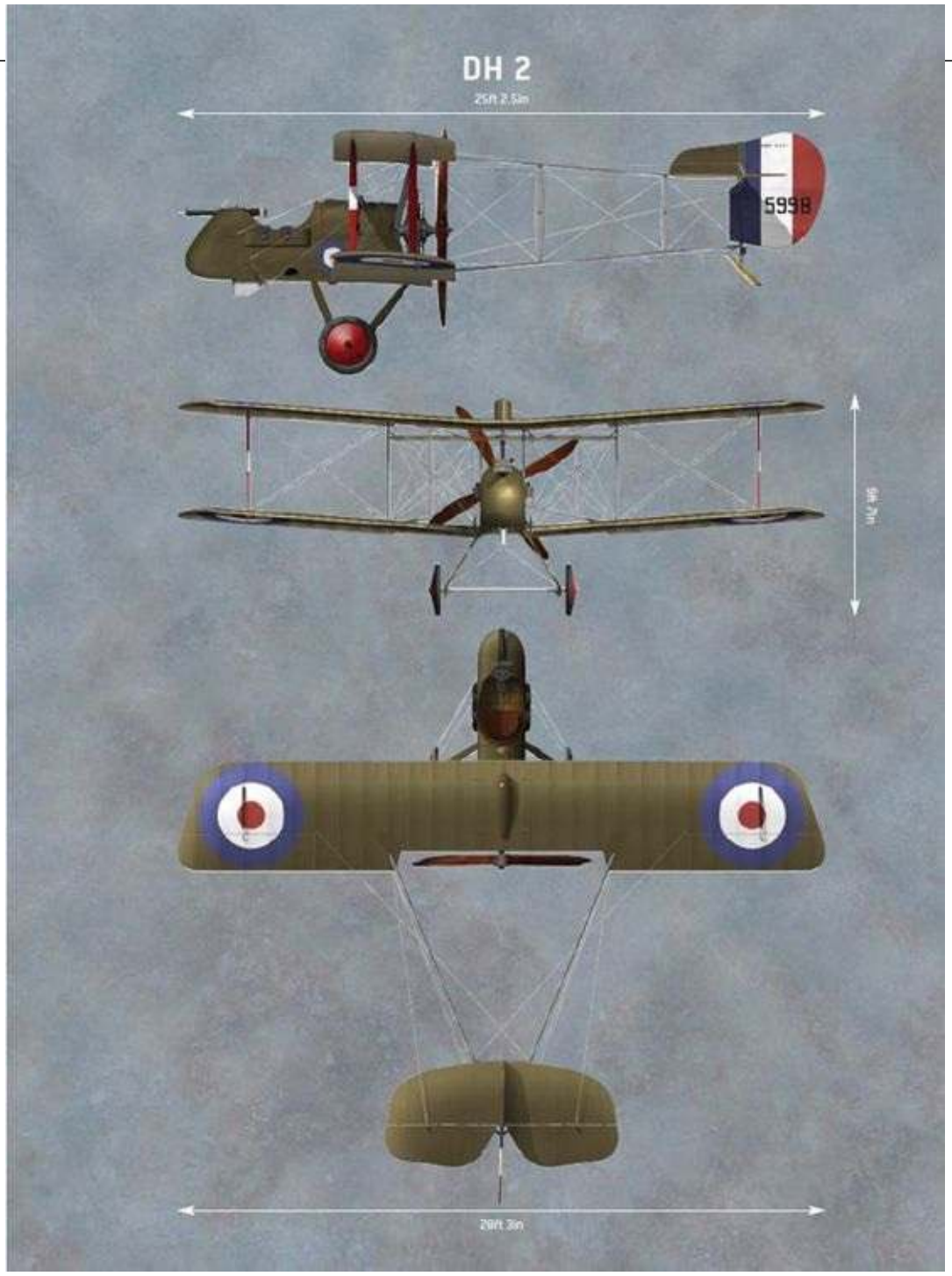
could dispense with the then oft-unreliable interrupter gear needed to enable a machine gun to fi through a propeller arc.

With experience from working on previous pusher designs, de Havilland set about creating the D 1. A two-seater powered by a 70hp Renault V8 engine, the aircraft was armed with a telescopicall mounted Lewis machine gun that could be fired by the observer in the front cockpit.

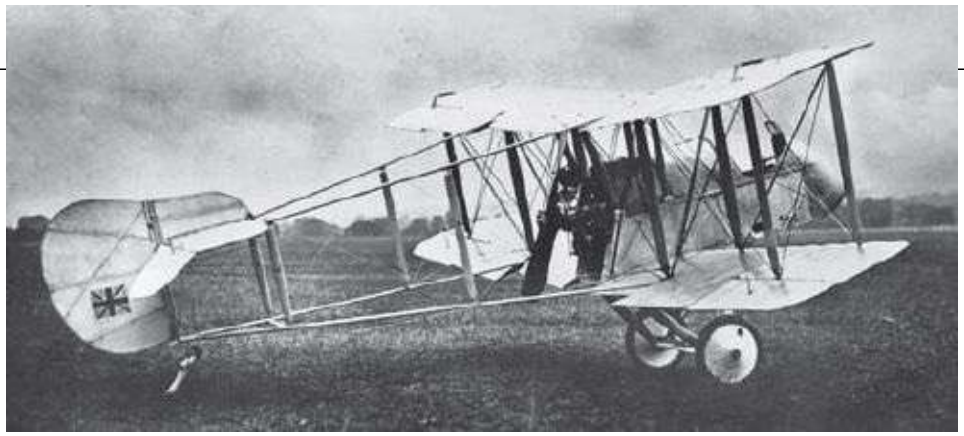
The war with Germany that everybody had expected finally broke out that August, and as a memb of the RFC reserve, de Havilland was ordered to report to Montrose, in Scotland, where he flew ant submarine sorties over the Firth of Forth. Fortunately, then RFC Military Wing commandant Lt C Hugh Trenchard (future Brigadier-General and Officer Commanding the RFC in France) soon realise de Havilland would better serve his country as a test pilot and sent him back to Farnborough. Ho Thomas also lobbied for de Havilland's return, and after three months he successfully managed have his chief designer seconded back to AMC in December 1914, whereupon he returned to work o the DH 1. The prototype was completed in February 1915, but by then the RFC favoured use of th RAF's FE 2a, which carried a larger payload than the DH 1.



An AMC DH 1A, forerunner of the DH 2, seen here in service with No. 14 Sqn in the Middle East. DH 1As were DH 1s fitted with a 120hp inline Beardmore engine, which generated a top speed of 90mph at sea level. (Aaron Weaver)




DH 2 5998 was part of the AMC's first production batch in September 1915, and it went on to become a stalwart of No. 24 Sqn. This machine was flown regularly (although not exclusively) by Capt John Andrews, who used it to attain five of his 12 victories, the most significant being that over *Jasta* 2 *Staffelführer* Oblt Stefan Kirmaier in November 1916. However, the next day 5998 was badly damaged during the same aerial battle in which No. 24 Sqn commander Maj Lanoe Hawker was killed, forcing Andrews to glide the stricken pusher, which he described as having been 'shot to pieces' and 'riddled like a colander', with damage to the fuel tank and engine, away from the fight. Once back over British lines he made a successful dead-stick landing.



Prototype DH 2 4732 circa early summer 1915. Equipped with a two-bladed propeller and port-mounted machine gun, this aeroplane was sent to No. 5 Sqn on 25 July for service evaluation but was shot down and captured just 15 days later. (Colin Owers via Aaron Weaver)

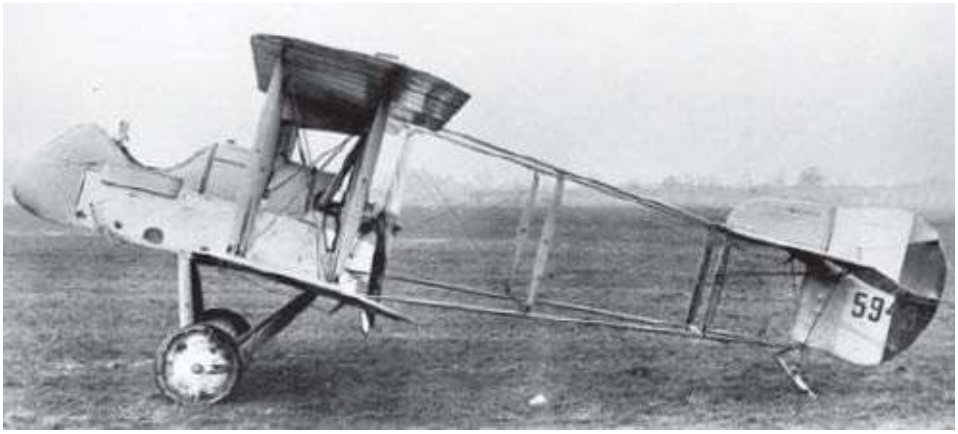
de Havilland worked on several concurrent designs, but in March he and his design team of Charl Walker and Howard Ker concentrated on a single-seat pusher biplane – born from a scaled-dow version of the DH 1 – which soon became known as the DH 2. The biplane design sandwiched streamlined wood and metal nacelle that held the pilot, fuel tank and 100hp Gnome Monosoupap rotary engine, with twin booms leading back to the empennage. de Havilland made the inaugural flig in the aircraft on 1 June 1915 and reported that the machine was tail heavy, but after employing som weight-saving measures and moving the nacelle forward 4in the craft flew satisfactorily two wee later with a top speed of 88mph at 6,000ft. The chosen armament was a single Lewis 0.303in machi gun that was externally mounted to port within an aluminium fairing, and this could be elevated by t pilot.

On 22 June the prototype was evaluated by Capt Robert Maxwell Pike, who suggested installi streamlined flying wires to increase speed and angling the vertical stabiliser to starboard to count engine torque. Overall, Pike thought the DH 2's visibility was the best of any aeroplane he had ev flown, and that he 'has not seen a German machine which can equal this Scout for speed and climbi power'. Following alterations, the prototype was assigned serial number 4732 and in late July it w sent to France for in-service evaluation with the RFC's No. 5 Sqn. Unfortunately, on 9 August Pik was mortally wounded by a German two-seater observer, but before dying he crash-landed behi enemy lines, giving the Germans a mostly intact and up-close preview of their new adversary.

Prototype DH 2 4732 lies inverted and captured after its mortally wounded pilot Capt Maxwell Pike of No. 5 Sqn crash landed on 9 August 1915. Despite the damage and souveniring, the Germans were able to reconstruct the machine.

Regardless of the loss, AMC conducted further alterations to its design, the most notable of whi was moving the Lewis gun from its external mount and relocating it within the cockpit atop a centr

mounting bracket. The first production batch was ordered in September 1915, and these machines (D
2s 5916 to 6015) began appearing that November. Subsequent 100-machine production batches we
ordered in March 1916 (7842 to 7941) and August 1916 (A2533 to A2632). A 50-aircraft productio
order was placed in October 1916 (A4764 to A4813) and a final 100 machines (A4988 to A5087) we
ordered in September 1916. Changes during these production orders included replacing the two-blade
propeller with one of four blades, relocating the gravity fuel tank from the upper wing's undersurfac
to its uppersurface, enlargement of the ailerons, employing a balanced rudder and various chang
with the layout of the cockpit instrumentation.




A factory photograph of the first production batch DH 2 5943, equipped with a two-bladed propeller and gravity tank mounted under the upper port wing. (Aaron Weaver)

The first DH 2s arrived at the Central Flying School in December 1915 and four were sent to Nos
11 and 18 Sqns in France for evaluation in early 1916. The machine arrived in France in earnest wi
No. 24 Sqn in February 1916, and by late May Nos 29 and 32 Sqns had been equipped with DH 2
1916 saw 222 DH 2s serve with the British Expeditionary Force (BEF) in France. DH 2s also sa
combat with the Middle East Brigade but in comparatively smaller numbers – a single machine w
delivered in 1916 and only 31 in all of 1917. Home Defence also received two machines in 1917, b
none thereafter. 1916 was unquestionably the DH 2's year, initially dominating the skies bu
subsequently enduring a hard fought fall from grace.

# ALBATROS D I/II

For much of the first decade of the 20th century Germany's aviation aspirations focused on lighte
rather than heavier-than-air flight. Having formed a *Luftschiffer Detachement* (Lighter-than-a
Detail) in 1884 to evaluate the reconnaissance applications of balloons, by 1901 the *Detachement* ha
grown into a *Luftschiffer Bataillon* (Lighter-than-air Battalion) that employed free and moore
balloons. In 1900 the first practical powered flight of a lighter-than-air machine occurred via a 1
minute flight of Graf Zeppelin's rigid airship LZ 1, and this event piqued *Kriegsministerium* (W
Ministry) interest in the craft's possible military usefulness.

Still, new heavier-than-air machines were not unknown. In 1905 the Americans Orville and Wilbu
Wright brought their aeroplane to Europe to demonstrate controlled powered flight and showed i
practicality via a flight of 39km (24 miles). Nevertheless, the War Ministry conference of 190
established that military aeronautics ought to focus on rigid airships, in large part due to the
familiarity with lighter-than-air machines versus the newer heavier-than-air craft.

However, 1909 saw a boon in the interest and development of the aeroplane thanks to an injectio
of public money to promote development. Demonstration flights were conducted and the country

first flight meeting took place at the inaugural German aerodrome at Johannisthal, near Berli Various manufacturers attended this event and, under licence, began building aeroplanes of foreig design. In October of that year a 3km (1.8-mile) flight from Johannisthal netted the pilot a 40,00 mark prize for the first flight of a German aeroplane powered by a German aero engine. Lighter-tha air machines still retained the focus of the German military, but many people realised that th aeroplane was coming of age.

One such person was German biologist Dr Walther Huth, who so embraced the thought of flight v aeroplane that he sent his chauffeur Simon Brunnhuber to France and paid for his flight training ther Upon successfully completing his tuition, Brunnhuber returned with a Levasseur Antoinette singl seat monoplane that Huth had purchased. Later, he also bought a Farman two-seater. With foresigh enough to recognise the aeroplane's future importance toward military applications, Huth contacte the *Kriegsministerium* in October 1909 and offered the services of his aeroplanes for the purpose flight instruction, *gratis*, with Brunnhuber serving as instructor. While the subsequent negotiatio were underway Huth established his own company – the Albatros Flugzeugwerke GmbH, named aft the seabird with which he was familiar from his scientific studies – at Johannisthal that December.

Negotiations with the *Militärbehörde* (Military Authority) lasted until March 1910, when Huth proposal was accepted. It is believed flight instruction began that July, and by March 191 Brunnhuber had trained six pilots. Progress had been slow due to a lack of funds, suitable trainin space (aero engines frightened the horses of troops training nearby) and lingering doubts regarding th aeroplane's useful military role. There were also concerns about the long training times for aeropla maintenance personnel. Regardless, training continued as Albatros was contracted to build lattic framed Farman reproductions with the type designation Albatros MZ 2.

In 1912 Albatros hired *Diplom-Ingenieur* (Engineering Graduate) Robert Thelen as chief designe The 28-year-old Thelen had been the ninth German pilot trained to fly (in May 1910), and prior joining Albatros he had been a competition pilot flying Wright biplanes. Teaming up with *Dipl. In* Helmut Hirth (trained in March 1911) and employing the perfected semi-monocoque wooden fuselag designs of *Ober-Ingenieur* Hugo Grohmann, Thelen's designs moved away from the Farman typ open-lattice construction. His construction technique provided enough strength via the external skin eliminate the need for internal bracing, thereby reducing weight and increasing performance an payload capacity. Albatros would soon become renowned for building aeroplanes with enclose wooden fuselages (*Rumpf-Doppeldecker*, or fuselage double-decker).

Chief among these would be the Albatros Type DD, later known as the B I, designed in early 191 by Ernst Heinkel (whose future company produced many aeroplanes in World War II) and improve by Thelen's suggestions based on his experience as a pilot. Thelen referred to the type as 'Albatr DD, system Heinkel-Thelen'. Powered by a 100hp Mercedes D I engine, the semi-monocoque thre bay (*Dreistielig*) DD was a successful design that in the months immediately prior to World War I s several world records for duration and altitude. That summer a single-bay version known as th *Renndoppeldecker*, which was powered by a 100hp Hiero engine, won the 100km (60 miles) spe prize at the Aspern *Flugmeeting* in Vienna. Experience gained with this machine is considered to hav sown the seeds for the future Albatros D I.

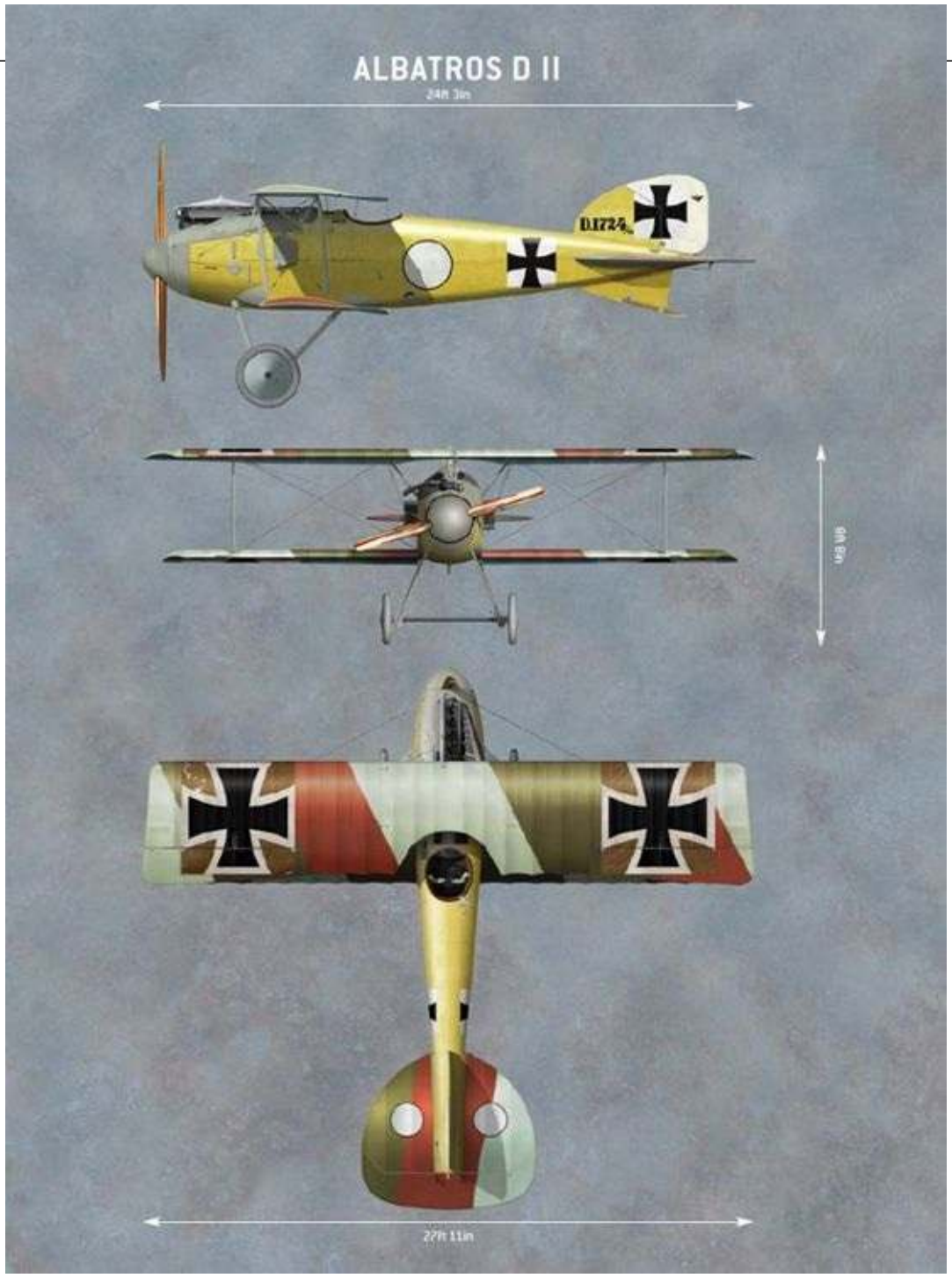
Robert Thelen was a 28-year-old pilot when he joined the *Albatros Werke GmbH* in 1912 as Chief Designer. His design team ultimately begat the Albatros D lineage that was so crucial to the success of the German mid-war effort. Thelen died in 1968. (Collection DEHLA)

Following the commencement of World War I in August 1914 Albatros concentrated o manufacturing two-seat B- and C-type machines. Aerial observation and artillery spotting were cruci for the support of ground forces, which required that these types had manufacturing and engi allocation priority. Naturally, as the war progressed the opposing forces developed single-seat fighte to protect their two-seater observation machines and destroy those of the enemy.

These fighters were, in the main, powered by rotary engines. Those powered by inline motors ha been somewhat hamstrung by the lack of availability of higher horsepower engines, as they we prioritised for B- and C-type machines. This did not lessen the born-from-experience calls fro fighter pilots requesting that single-engined machines be equipped with higher horsepower motors a armed with two rather than the then-standard single machine gun.

Thoughts also surfaced among German pilots that while rotary-engined fighters – with their rap capacity for engine start and takeoff – were ideal for intercepting enemy machines, a fighter powere by a more reliable inline engine and armed with twin machine guns would be better suited protecting two-seater aeroplanes beyond the enemy lines. Although German aerial tactics evolve differently, this mindset came at a time of increasing engine manufacture productivity, and it set th stage for the birth of a new breed of fighter – and none too soon.

German aerial domination, once achieved by rotary-engined Fokker and Pfalz E-type wing-warpi monoplanes, had been lost to the more nimble French Nieuport 11s and British DH 2s, which not on out-flew the German fighters but were present in greater numbers. Rather than compete with th manoeuvrability of these adversaries, the Thelen-led Albatros design bureau set to work on wh became the Albatros D I and D II. By April 1916, the bureau had developed a sleek yet rugge machine that featured the usual Albatros semi-monocoque wooden construction and employed 160hp Mercedes D III engine with power enough to allow the aeroplane to be equipped with tw forward-firing machine guns. Visual hallmarks of the D I and early-production D II included fuselag mounted Windhoff radiators and matching chords for the upper and lower wings.




Built by Albatros at Johannisthal, D.1724/16 was a third production batch machine and one of the last D IIs to employ the fuselagemounted Windhoff radiators, which were replaced by a Teeves und Braun radiator centrally located in the upper wing (as seen just three machines later, on D.1727/16). Flown by *Kasta* 11 pilot Ltn Karl Emil Schaefer – who went on to fly D IIIs with *Jasta* 11 and down a total of 30 aeroplanes, winning the Orden Pour le Mérite before being killed on 5 June 1917 – D.1724/16 represents a typical D II, with camouflaged wings and large national markings on a glossy wood fuselage. The large serial number on the vertical stabiliser is a hallmark of Johannisthal-built machines, although soon such simple personal markings as a bordered circle would give way to more ostentatiously decorated aeroplanes.

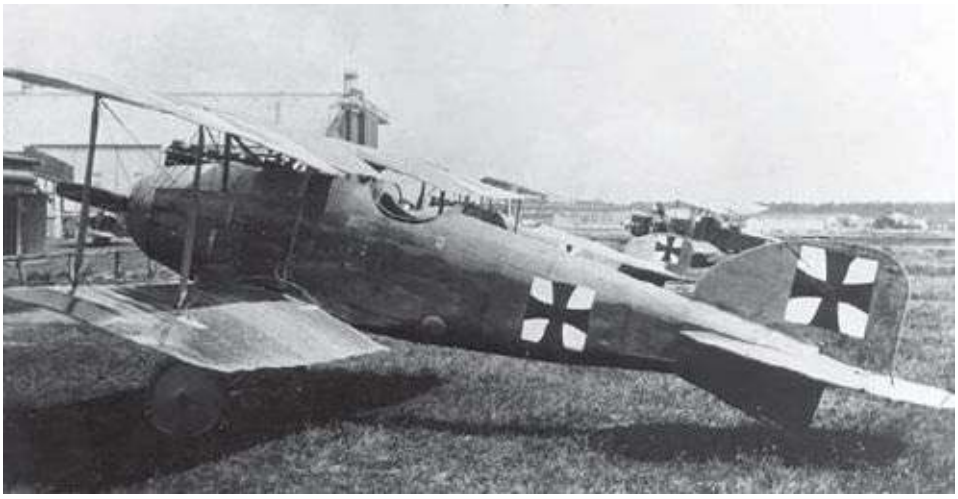
On 6 June 1916 a D I prototype began flight evaluation and static-load testing at the Adlershof te centre. Results were mixed. A test flight yielded a climb rate of 1,000m (3,280ft) in four minute 2,000m (6,560ft) in eight minutes, 3,000m (9,840ft) in 14 minutes and 4,000m (13,120ft) in 2 minutes – a good performance even when considering that the machine was unarmed and thus light than gross weight. Yet in further static load tests the D I's upper wing rear spar failed the loa

requirements for pulling out of a dive, and when retested on 3 July it failed again. Tests for glidi flight and inverted flight requirements were passed on 4 and 5 July, and two days later a new wi spar was tested, which finally passed as well.

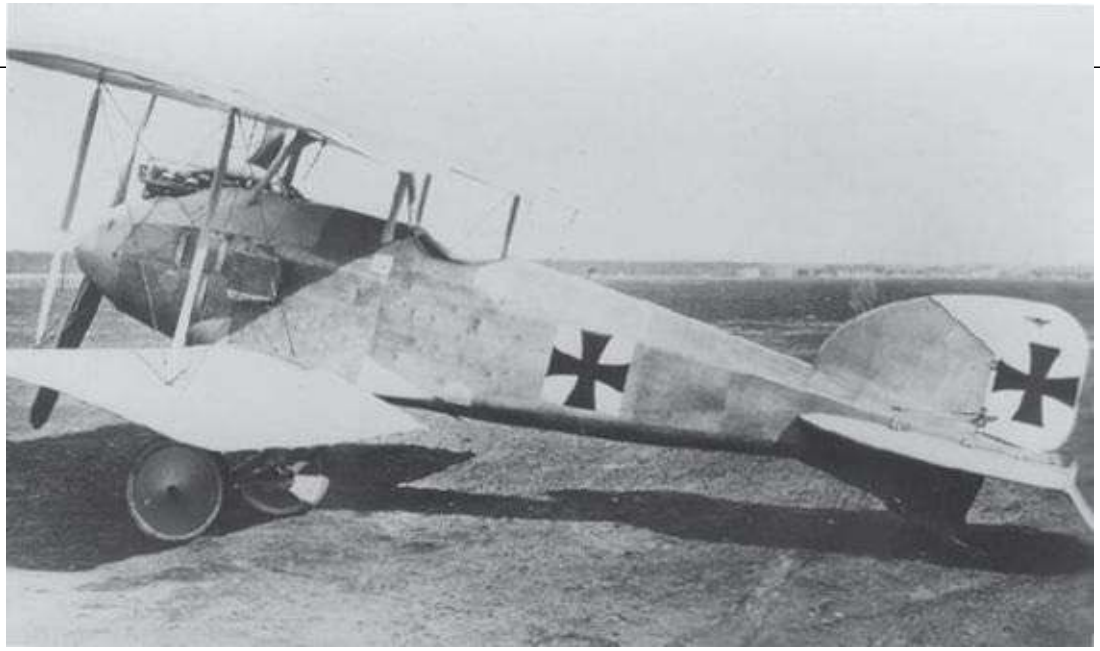
Meanwhile, *Idflieg* (*Inspektion der Fliegertruppen*, or Inspectorate of Aviation Troops) had ordere 12 pre-production machines – D.380/16 to 391/16 – of which several were armed and sent forward f combat evaluation. By July the *Zentral Abnahme Kommision* (*ZAK*, or Central Acceptan Commission) recommended the Albatros D I for production, after which *Idflieg* signed an order f 100 Albatros fighters.

However, concurrent with the development of the D I, Thelen's team had also designed a constructed a second machine that was similar to the D I, the Albatros D II. It is important to note th these aircraft evolved simultaneously, and that the D II was not the result of post-combat feedba from D I pilots. Proof is found not only in photographs but in the pre-production order of 12 machine One of the latter was D II D.386/16 (which became legendary German ace Oswald Boelcke's machin as will be seen), and another example (D.388/16) served as a prototype Albatros D III.

Essentially, the D I and D II were the same machine, but the latter had several noticeable extern differences and improvements. For example, the D I's inverted V-strut centre section pylon wa replaced by outwardly splayed N-struts in the D II, this arrangement improving forward visibility. Th wing gap was reduced by lowering the upper wing by 250mm (9.8in), which also improved forwa and upper visibility. Finally, the side-mounted Windhoff radiators were replaced with a Teeves un Braun wing-mounted radiator located between the new struts. This modification did not take effe until after the first production run of 50 D IIs (excluding Boelcke's pre-production D II D.386/1 which was built with a wing-mounted radiator), which made up the second half of *Idflieg's* initi order for 100 Albatros fighters – 50 D Is, serialled 422 to 471/16, and 50 D IIs, 472 to 521/16 – ha been completed.



Recent photographic analysis has revealed this pre-production Albatros D II – shown here next to a pre-production D I at Johannisthal, circa summer 1916 – was received by *Jasta* 2 in September and became Oswald Boelcke's D.386/16. The nearby D I is also believed to have reached *Jasta* 2 and been flown by Ltn Dieter Collin, who shot down two No. 24 Sqn DH 2s during November and December. (Aaron Weaver)



The Albatros D I prototype at Johannisthal. Noteworthy items that were changed prior to production include the upturned exhaust manifold, unbalanced elevator and externally routed rudder cables. (Greg VanWyngarden)

In August, 50 more D IIs (890 to 939/16) were ordered from Huth's *Ostdeutsche Albatros Werk* (OAW, an independent firm at the time that would be assimilated into the main Albatros company i October 1917), located in Schneidmühl. Designated the Albatros D II (OAW), the aircraft wer constructed nearly identically to those built at Johannisthal, as were the 75 machines (1024 1098/16) to be built under licence by LVG (*Luftverkehrsgesellschaft*), also ordered in Augus September saw Albatros receive the final D II production order for 100 machines (1700 to 1799/16 after which the focus of production shifted to the next generation of Albatros fighters, the D III (se *Duel 36 – SPAD VII vs Albatros D III* for details).

Excluding prototypes, Albatros, OAW and LVG built a total of 50 Albatros D Is and 275 Albatros D IIs. After their introduction to frontline service in early September 1916, the D I's frontline inventor peaked at 50 in October and then dwindled slowly. By the end of 1917 there were eight still in servic The D IIs enjoyed a longer service career due to their greater production numbers, peaking at mo than 200 in December 1916 and sustaining this figure through to late February 1917. However, aft maintaining approximately three-quarters of this number through to the end of April, the frontli inventory fell dramatically to six by year end.

# DH 2

The AMC DH 2 arose from the need for a fast single-seat aeroplane armed with a forward-firin machine gun at a time when the still unreliable synchronisation gear necessitated that such a machi be of pusher design – i.e. engine at the rear. The standard engine used by the DH 2 was the 100h Gnome Monosoupape 9 Type B-2, a normally aspirated, air-cooled, nine cylinder rotary motor. Fu and oil tanks (20.8 and 4.5 gallons, respectively) were located forward of the engine (a 5.75-gallo auxiliary fuel tank was on the upper wing), surrounded by a doped canvas bag that collected fumes a fuel lost should the tanks be punctured and channelled them overboard via a drain pipe on t starboard undercarriage strut. Main tank fuel duration was two hours, and after tests showed th increasing fuel capacity to 26 gallons had a relatively unappreciable impact on performance, b August 1916 that capacity had been adopted as standard, which increased duration to 3.5 hou (including auxiliary tank).

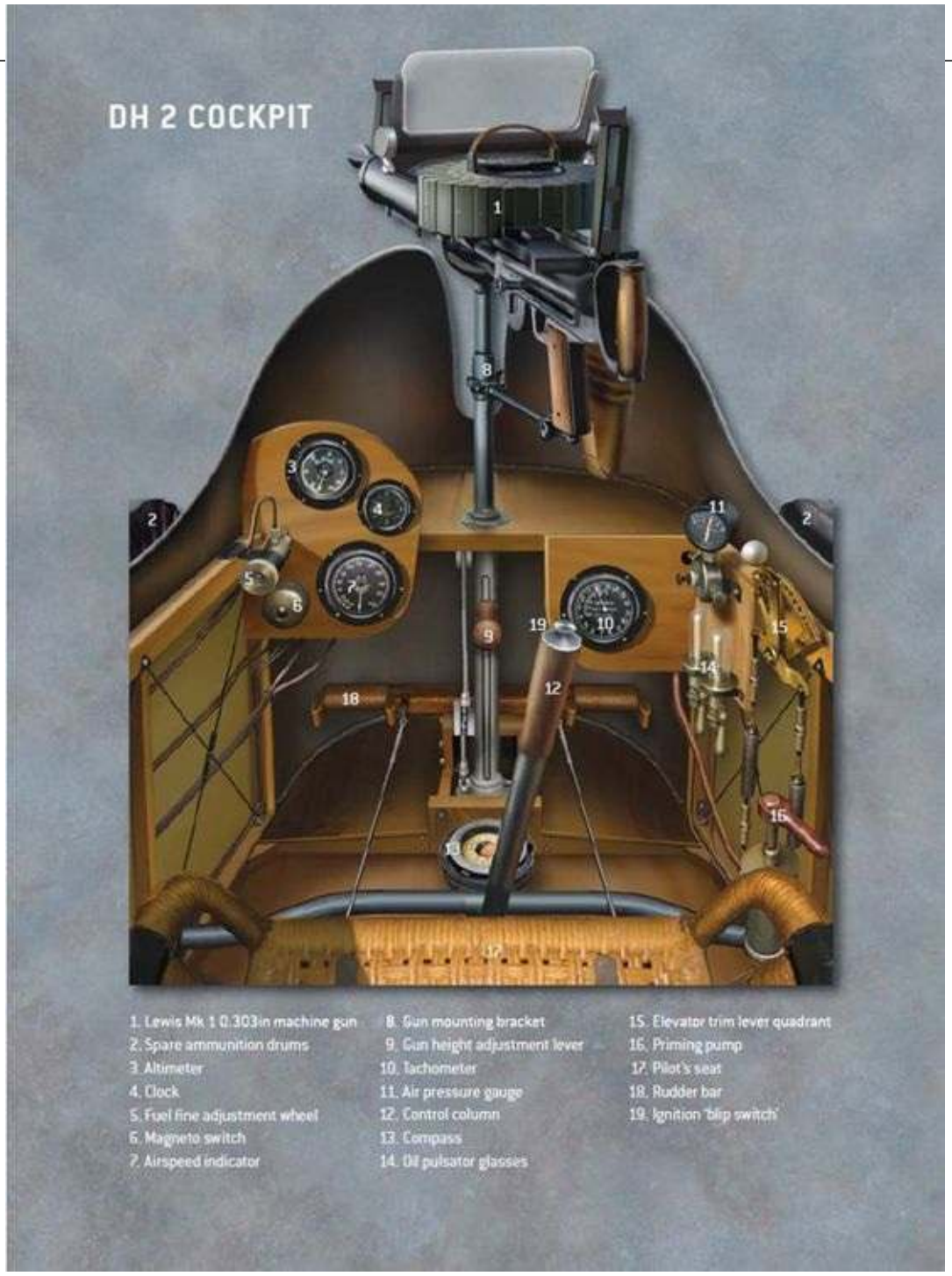
A DH 2 with the engine cowl panels removed, revealing the doped canvas bag that surrounded the fuel tank. (Alex Revell)

Pilot engine management included a magneto switch, a fine adjustment wheel for fuel and an on/o ‘blip switch’ on top of the control column. There was no throttle – the Gnome Monosoupape wa either off or running at full power – so the blip switch supplied a means of pilot engine control b ‘blipping’ or momentarily cutting off the magnetos that supplied current to the spark plugs. If the was no spark there was no combustion. The engine still rotated when blipped and fuel/air mixture w still drawn into the cylinders, so when the pilot released the blip switch after a short interval the spa returned and combustion began anew. The net effect was engine operation at less than full power.

Being an air-cooled rotary engine, the Gnome Monosoupape rotated with the propeller, which c early-production DH 2s was a fixed pitch, two-bladed wooden propeller made up of glued mahoga laminations by the Integral Propeller Company. In April 1916 tests showed the efficiency of a fou bladed propeller, and by that June all DH 2s in France were so equipped. Aircraft flown by trainin squadrons and the Middle East Brigade retained their two-bladed propellers, however. In either cas when ‘three-pointed’ on terra firma the pusher configuration brought the DH 2’s rotating propell blades into close proximity with the ground, where they were more susceptible to damage from ston

and pebbles than were the blades of tractor-powered aeroplanes. To prevent this, pusher propeller tip
were reinforced with doped fabric or brass sheaths.

Although slightly blurred, this photograph affords an excellent view of the DH 2 Monosoupape rotary engine spinning with the propeller. At such velocity, the damage wrought by a departing cylinder can be readily imagined. (Colin Owers via Aaron Weaver)


DH 2 COCKPIT
1. Lewis Mk 1 0.303in machine gun
2. Spare ammunition drums
3. Altimeter
4. Clock
5. Fuel fine adjustment wheel
6. Magneto switch
7. Airspeed indicator
8. Gun mounting bracket
9. Gun height adjustment lever
10. Tachometer
11. Air pressure gauge
12. Control column
13. Compass
14. Oil pulsator glasses
15. Elevator trim lever quadrant
16. Priming pump
17. Pilot's seat
18. Rudder bar
19. Ignition 'blip switch'

An example of the close ground proximity of the DH 2 propeller when three-pointed, illustrating the need for blade reinforcement. Note the ‘cat’s cradle’ of rigging and control wires. (Colin Owers via Aaron Weaver)

The DH 2’s firepower consisted of a single forward-firing Lewis 0.303in machine gun with a rate fire of approximately 550 rounds per minute. Early-production DH 2 gun mounts employed a flexib telescopic pillar – the so called ‘Wobbly Mount’ – that enabled pilots to swivel the gun freely as the flew. This created complex aiming solutions while airborne, so pilots preferred fixed mounts th allowed them to ‘aim’ the entire aeroplane. However, rendering the mounts stationary was prohibite officially, so pilots devised methods whereby the gun could be clipped stationary or unclipped swivel freely. For example, future 57-victory ace Flt Sgt James McCudden of No. 29 Sqn wrote th when a ‘Fokker passed above and in front of me I elevated my gun and fired a few shots at him fro under his fuselage’.

The Lewis was fed ammunition via a top-mounted rotating drum that contained 47 rounds – lat ‘double drums’ held 97, reducing the frequency of cumbersome in-flight drum replacement reloads which were externally housed in wooden bins that bracketed the cockpit. Double drums were store internally due to their larger sizes. A canvas deflector bag attached to the Lewis caught spent cartridg cases lest they foul the cockpit or blow back into the propeller to damage it. Later DH 2s are said have had a chute that funnelled the cases into a faired collector bin under the nacelle nose.

The danger posed by spent cartridge cases is illustrated by McCudden’s recollection that when wh he identified as a ‘Hun scout with a rotary engine and a very close gap’ passed in front and above hir he raised his gun and fired at the German machine. However, his deflector bag was either missing improperly seated, which allowed cartridge cases to impact and break the propeller and caused h immediate descent and forced dead-stick landing.

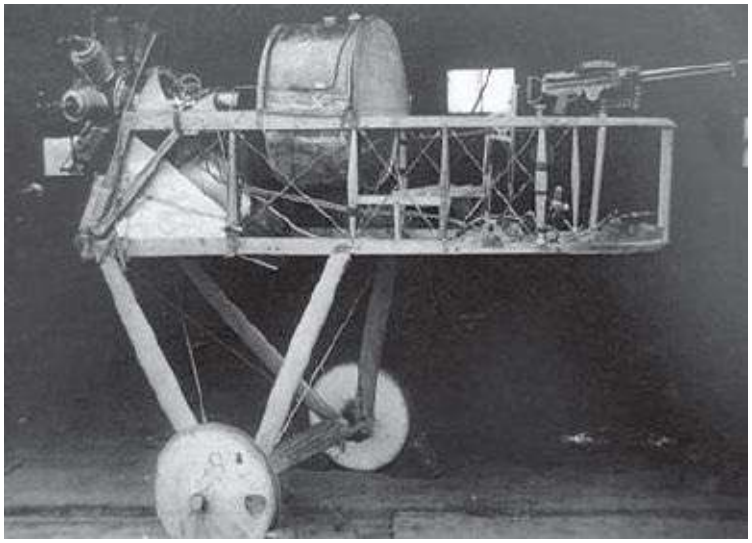
All of the above was housed within a stubby nacelle of cable-braced ash and spruce framework th supported a plywood floor and aluminium top and nose, with sides of stitched fabric. The pilot sat in low-sided cockpit that was much more cramped than that of the Albatros D I or D II, restrained in h wicker seat by a wide lap belt. Instrumentation included an altimeter, airspeed indicator, tachomete bubble inclinometer, air pressure valve and gauge, oil pulsator glasses and a floor-mounted compas A conventional control column and rudder bar provided pilot control about the axes, and elevator tri was provided by a sprung-lever quadrant on the starboard bell crank, to which the elevator contr cables were connected. Due to the DH 2’s pusher configuration, its pilots received no warmin benefits from residual engine heat, and thus the cockpits were notoriously cold. Wrote McCudden:

> I have never experienced such cold as that which we went through on those de Havillands [DH 2s] at 12,000–13,000ft during December 1916. I remember that on one patrol I was so intensely cold and miserable that I did not trouble to look round at all to see whether any Huns were behind me or not. I was so utterly frozen. I cannot explain the intensity of the cold when high up in a ‘pusher’ aeroplane, but it can be readily remembered by those who have experienced it.

Aerodynamic lift was provided by four subtly tip-tapered wings of equal span that had differe chords on either side of the boom attachments. The wings were rigged without stagger or sweepbac but employed approximately four degrees of dihedral, and all were identical. This in turn meant th they could be fitted in any port/starboard/upper/lower positions. The lower wings attached to th nacelle while the upper wings attached to a centre cabane section that connected to the nacelle v spruce struts just aft of the cockpit. The wings featured dual spar construction, with an internal braced spruce frame and three-ply ribs enveloped within a skin of doped fabric, and an aileron similar construction was affixed to the outboard trailing edges of all four wings which enabled pil control about the longitudinal axis.

The wings were rigged in such a way as to counter the torque produced by the propeller ar

spinning rotary engine, an effect of which was opposite roll about the longitudinal axis. This stabilise the machine when the engine was running, but when it was switched off or lost power from damag the DH 2 became unstable, which was a contributing factor in several accidents. Thus, squadrons ar aircraft depots were instructed to rig the wings with equal washout, which ensured the wing roo stalled before the tips and gave pilots a measure of lateral control with the ailerons prior to the wing entering full stall.



Skeleton of the DH 2 prototype's nacelle, which was stripped of its fabric after capture by the Germans. The uncovered cable-braced framework reveals the pilot's proximity to the fuel tank and the scant room afforded between it and the Lewis machine gun. (Aaron Weaver)

In lieu of a fuselage the DH 2 had a common-for-pushers arrangement of twin upper and low wire-braced and spruce strut-supported tubular steel booms that bracketed the propeller and extende back to the empennage, where the upper booms connected to the horizontal stabiliser and the low booms attached in a V at the rudder post. The empennage consisted of a steel tube framed and spru ribbed horizontal stabiliser with a spruce framed vertical stabiliser above, all covered by doped fabri The elevators and counter-balanced rudder were similarly constructed and controlled by the pilot v cables that led to the cockpit.

The empennage was supported by a spring-cushioned steel-shoed ash tailskid that was wired to th rudder control cables to afford a measure of ground steering, and the main undercarriage feature cable-braced ash V-struts to which a rubber cord sprung axle supported spoked wheels with 700mm 75mm (25.5in × 2.95in) tyres. The normal wheel track was 5ft 9in, but No. 24 Sqn sought to improv ground handling and widened the track by fitting the wheels on the axle outside-in.

Performance specifications differ between the fuel tank installations, but generally the heavier tan did decrease performance somewhat. For example, what was once an 11-minute climb to 6,000 became a 13-minute climb. However, much worse was the DH 2's chronic engine failure pandemi Squadron record books and combat accounts are filled with reports of 'engine went dud', 'engi cutting out', 'engine going very badly' and 'engine missing and cutting out'. One pilot stated that h 'engine was missing and vibrating badly – landed, where several plugs and a tappet rod, which w bent, were changed, engine still running badly. On examination a rocker arm was found to be broken Another noted that his 'engine was missing and cutting out at intervals', while squadronmates state 'engine cut out on two cylinders and started to knock' and 'engine ran well for first three-quarters o an hour then became rough and missed'.

If this were not bad enough, the DH 2 soon garnered a reputation for entering a spin that rumo stated was unrecoverable. After losing two pilots to spins and seeing fear creeping around the edges o his men, No. 24 Sqn commander Maj Lanoe Hawker took a DH 2 to 8,000ft and intentional