

Large print guide

BATTLE OF BRITAIN

Hangar 4

The Battle of Britain was one of the major turning points of the Second World War.

From the airfield of Duxford to the skies over southern England, follow the course of the battle and discover the stories of the people who were there.

Scramble

Paul Day

2005

Scramble is a bronze maquette model for part of the Battle of Britain Monument in central London.

The monument features many scenes relating to military and civilian life during the Battle of Britain. The centre piece, *Scramble*, shows pilots running toward their aircraft after receiving orders to intercept an incoming air attack.

ZONE 1

Defeat in France

May – June 1940

Britain and France declared war on Germany on 3 September 1939, two days after the country invaded Poland.

Several months later, on 10 May 1940, Germany attacked Luxembourg, Belgium, the Netherlands and France in a rapid 'Blitzkrieg' offensive.

During a brief, but costly campaign, Britain deployed multiple Royal Air Force (RAF) squadrons to France. The aircraft were sent to support the British Expeditionary Force fighting on the ground and to counter Germany's powerful air force, the Luftwaffe.

Within 6 weeks, France had fallen. The remaining British, French and other Allied troops retreated to the coast, where over half a million were evacuated. The majority departed from the port of Dunkirk.

On 22 June, France surrendered to Germany. Britain had lost its main ally and now found itself open to invasion.

- **3 September 1939:** Britain and France declare war on Germany
- **10 May 1940:** Germany invades Luxembourg, Belgium, the Netherlands and France
- **10 May:** Neville Chamberlain resigns as British Prime Minister and is replaced by Winston Churchill
- **14 May:** British War Minister Anthony Eden calls for men to enrol in the new Local Defence Volunteers (LDV)
- **26 May:** The evacuation of Dunkirk begins
- **17 June:** The last RAF squadrons leave France
- **18 June:** Winston Churchill declares that 'the Battle of Britain is about to begin'
- **22 June:** France signs armistice with Nazi Germany

Hurricanes over France

The Hawker Hurricane was the main RAF fighter aircraft flown in France when the Germans invaded in May 1940.

The RAF was reluctant to send over too many fighters, believing they would be needed to defend Britain. The Hurricanes performed well, shooting down over 300 German aircraft before they were withdrawn to cover the Dunkirk evacuations.

Of the 452 Hurricanes sent to France, only 66 returned to Britain. Most were destroyed on the ground or abandoned.

This **Hurricane Mk. IIb**, though not a type used in 1940, is painted with the markings of 111 Squadron, which fought over France.

Equipment losses

When the British Expeditionary Force was evacuated from France in June 1940, saving lives was the priority. As a result, the majority of its equipment, including tanks, vehicles and guns, was left behind. This lack of equipment and ammunition made Britain

vulnerable to air attack and possible invasion. Until the Army could reequip, the defence of Britain was left to the Navy and Air Force.

Bofors gun

This 40 mm **Bofors Mk I light anti-aircraft gun** (left, behind) was one of the few to return to Britain. Over 100 were left in France.

It was evacuated from the French port of Brest on 18 June 1940, less than a week after it had been sent to France with 170 Battery, 57th Light Anti-Aircraft Regiment. 170 Battery was the only light anti-aircraft unit to return to Britain with all of its guns. It was then sited in Kent to defend London and the Thames Estuary from air attack during the Battle of Britain.

Gunner Arthur Hicks

Arthur Hicks celebrated his 21st birthday on 8 May 1940, whilst stationed on the French-Belgian border with his six-man Bofors gun team.

Two days later, Hicks woke up to the sound of bombs falling in the distance. His team was quickly sent into Belgium to counter the German invasion. Eventually, they were forced to retreat to the coastal town of La Panne, near Dunkirk. Setting up their gun on the beach, they fended off German air attacks for four days.

Hicks and his team were evacuated on the night of 31 May after dismantling their Bofors gun and throwing its working parts into the sea.

ZONE 2

Channel Battle

July – August 1940

Following the British evacuation from France, Germany's leader, Adolf Hitler, believed that Britain could be persuaded to negotiate. When it became clear that the country would continue fighting, Hitler planned an invasion.

Britain's main defence – the aircraft of RAF Fighter Command – had to be defeated first. The Luftwaffe began attacking supply convoys in the English Channel, as well as ports and naval installations along the south coast. These attacks disrupted Britain's vital supply lines and drew RAF fighters into battle to test their strength.

Although the Luftwaffe initially inflicted heavy losses on shipping, it soon became clear that RAF Fighter Command was stronger and better organised than expected.

- **4 July 1940:** Luftwaffe dive bombers attack British supply convoys in the Channel
- **10 July:** The Luftwaffe begins a concentrated offensive against Channel shipping and coastal installations
- **10 July:** Fighter Command's first Czech squadron is formed at RAF Duxford
- **13 July:** Fighter Command's first Polish squadron is formed at RAF Leconfield
- **16 July:** Hitler orders preparations for an invasion of Britain codenamed 'Operation Sealion'
- **22 July:** The Local Defence Volunteers are renamed the 'Home Guard'
- **24 July:** RAF Duxford's 19 Squadron is deployed to the nearby satellite airfield at Fowlmere
- **26 July:** Britain prohibits daylight convoy movements through the Straits of Dover
- **1 August:** Hitler orders the Luftwaffe to destroy Fighter Command by attacking its airfields and aircraft industry
- **11 August:** 25 RAF pilots are killed in action, the highest number of losses on a single day during the battle

The Luftwaffe

Despite restrictions imposed on Germany after the First World War, the Nazis secretly established a new air force known as the Luftwaffe. By 1939, this air force was larger than Britain's RAF.

Although German pilots were well-trained and more experienced than their British counterparts, the Luftwaffe's Supreme Commander Hermann Goering lacked a clear strategy for defeating the RAF.

Photo courtesy of Michael Meyer via Donald L. Caldwell

Messerschmitt Bf 109 E-3

The Luftwaffe's main fighter during the battle was the Messerschmitt Bf 109. A fast and highly manoeuvrable aircraft, its performance exceeded the RAF's Hawker Hurricane and was matched only by the Supermarine Spitfire.

This **Bf 109 E-3 (W.Nr. 1190)** was flown by Luftwaffe pilots from *Jagdgeschwader 26* during the Battles of France and Britain. The aircraft has been restored to its appearance at the end of the Battle of Britain.

Find out what happened to this aircraft on the other side of the display.

Luftwaffe and RAF fighter units

The main Luftwaffe fighter unit was known as a *Jagdgeschwader*. A *Jagdgeschwader* was made up of three or more *Gruppen*, which were in turn divided into three *Staffeln*. A *Staffel* consisted of nine to twelve aircraft, further divided into three *Schwärme* of four aircraft each, and divided again into two *Rotten* of two aircraft each.

An operational RAF fighter squadron consisted of twelve aircraft, which were divided into two 'flights' of six aircraft or four 'sections' of three aircraft. Squadrons sometimes combined into a 'wing' of three or more.

Hauptmann Karl Ebbighausen

This **Messerschmitt Bf 109 E-3** was flown by 26-year-old *Hauptmann* (Captain) Karl *Ebbighausen* of *Jagdgeschwader 26* during the Battles of France and Britain.

A veteran of the Spanish Civil War and Polish campaign, Ebbighausen was appointed commander of 4 *Staffel* during the French campaign. He shot down five Allied aircraft, including a Spitfire over Dunkirk. He was later given command of II *Gruppe* fighters and led the unit into action over the Channel and Britain. After adding two more Spitfires to his tally, Ebbighausen went missing on 16 August after being attacked by RAF pilots of 266 Squadron.

Photo courtesy of Michael Meyer via Donald L. Caldwell

Channel convoys

Anti-aircraft guns like this **12-pounder Mk. VR** were often mounted on British naval ships to protect them from air attack.

Britain relied on the Merchant Navy to bring vital supplies from abroad. These ships formed protective convoys, often escorted by warships. German air and sea attacks on convoys passing through the Channel threatened Britain's lifeline.

The Navy demanded increased protection from the air, but the RAF refused to send too many fighters

over the Channel. Pilots who bailed out or crash-landed on water were much less likely to survive, and their aircraft would be lost permanently.

British defences

In response to the threat of German invasion, Britain built a network of defensive structures along the coast and around strategic locations like airfields.

This rotating steel **Alan Williams turret** (right) was placed near the village of Nazeing in Essex, while the retractable concrete **Pickett Hamilton fort** (centre) was installed at RAF West Malling.

To make up for equipment lost in France, the Army was forced to improvise. For example, vehicles like the **Standard Beaverette** armoured car (left) were built on the chassis of civilian saloon cars.

Barrage balloons

Massive hydrogen-filled 'barrage' balloons formed another line of Britain's defence. They were manoeuvred into position and raised using special vehicles, like this **Fordson WOT 1 balloon winch** (far left).

Operated by the RAF's Balloon Command, barrage balloons were placed near important locations and could reach heights of 5,000 feet. Their presence around a target forced Luftwaffe aircraft to fly at higher altitudes, which reduced bombing accuracy and made dive bombing almost impossible.

Nearly 1,500 balloons were deployed during the Battle of Britain.

Private Peter Douglas Taylor

Like many people in Britain, 19-year-old Peter Douglas Taylor believed that an invasion could happen at any moment. If it did, he would be on the front line.

Taylor joined the 1st Battalion, London Rifle Brigade in 1937 and was sent in 1940 to Hawkinge in southeast Kent, the closest RAF airfield to France. Southern airfields were especially vulnerable to paratrooper attack, so Taylor's unit was ordered to build a defensive line of trenches and pillboxes. During air raids, they manned these defences and guarded key crossroads.

Jack Foreman Mantle (Silhouette)

Leading Seaman Jack Foreman Mantle was serving as an anti-aircraft gunner on HMS *Foylebank* in Portland Harbour, Dorset when it was attacked by 26 German Stuka dive bombers on 4 July 1940. The ship was repeatedly bombed and machine gunned, killing most of Mantle's gun crew and badly shattering his leg. Despite severe wounds, Mantle continued to fire his guns at the Stukas. Eventually, he slumped over his gun unconscious, but was evacuated before *Foylebank* sank. 176 crewmen died as a result of the attack.

23-year-old Mantle died in hospital later that day. He was posthumously awarded the Victoria Cross, Britain's highest award for gallantry.

ZONE 3

Bombs on England

August – September 1940

The Luftwaffe believed it could destroy Fighter Command through a series of massive raids against its airfields, radar installations and aircraft industry. These attacks began on 13 August, codenamed *Adlertag* (Eagle Day).

Luftwaffe aircraft flew 1,485 missions on Eagle Day, primarily targeting southern England. However, bad weather, poor organisation and Fighter Command's early warning and defence system prevented them from inflicting major damage. The offensive continued for three weeks, putting serious strain on Fighter Command's pilots, aircraft and airfields.

By the beginning of September, Fighter Command had lost 472 aircraft and 244 airmen. The Luftwaffe had suffered far greater damage, however, losing nearly twice the number of aircraft and over 1,300 aircrew.

- **12 August:** The Luftwaffe attacks radar stations and airfields prior to *Adlertag* (Eagle Day)
- **13 August:** The Luftwaffe's *Adlertag* (Eagle Day) begins
- **16 August:** RAF pilot Eric James Brindley Nicolson's actions lead to the award of a Victoria Cross
- **18 August:** Known as 'The Hardest Day', Fighter Command loses 33 aircraft and 10 pilots
- **20 August:** Winston Churchill delivers 'The Few' speech
- **24 August:** A Luftwaffe formation accidentally bombs London
- **25 August:** RAF Bomber Command launches its first raid on Berlin in retaliation for the bombing of London
- **31 August:** Fighter Command suffers its heaviest aircraft losses of the battle, with 41 lost
- **31 August:** RAF Duxford is bombed for the first time

Squadron Leader Brian Lane (Silhouette)

23-year-old Brian 'Sandy' Lane took command of RAF Duxford's 19 Squadron in September 1940. His promotion to this position followed the death of the squadron's previous commander, Philip 'Tommy' Pinkham, and came at a time when Duxford's role in the Battle was growing.

A talented fighter pilot and a natural leader, Lane had proven himself over Dunkirk and was highly regarded by his fellow pilots. Having already shot down a Messerschmitt Bf 110 on 24 August, he added three more to his tally in September, as well as a Bf 109.

He was killed in action in December 1942.

Duxford's role

Within Fighter Command, Duxford was the sector station for 'G' Sector in 12 Group. The station was supported by its nearby satellite airfield at Fowlmere. Since most of the fighting took place over the 11 Group area in London and southeast England, 12 Group's fighters were rarely involved in the early weeks of the Battle of Britain.

As the fighting intensified, 12 Group was ordered to protect 11 Group airfields during raids. This supporting role frustrated 12 Group's commander, Air Vice Marshal Trafford Leigh-Mallory, who wanted more involvement in the action. Several squadrons later operated out of Duxford and Fowlmere, occasionally forming a 'Big Wing' of five squadrons led by Douglas Bader, one of the RAF's most famous pilots.

Supermarine Spitfire Mk IA

The iconic Supermarine Spitfire first entered RAF service in 1938 with 19 Squadron at Duxford. Designed by Reginald J. Mitchell of Supermarine Aviation, the aircraft was fast and manoeuvrable, equalling the Luftwaffe's Bf 109 fighter in combat.

This restored **Spitfire (N3200)** was flown by Geoffrey Stephenson, commander of 19 Squadron when he was shot down over Dunkirk on 26 May 1940. Crash-landing on a beach near Calais, he was captured and held as a prisoner of war until 1945.

If the Spitfire is not on display here, it may be out flying!

Ground support

RAF ground crew support was vital to keeping Fighter Command's aircraft in the sky. They maintained and repaired their squadron's aircraft, ensuring that the pilots could rely on the machines in combat. Ground crew were highly trained. They were responsible for servicing and maintaining different parts of the aircraft: armourers for the guns, riggers for the airframe and fitters for the engine.

Ground crew used a wide variety of equipment, such as this **Trojan trolley accumulator** (left), which was essentially a portable battery used to start aircraft engines.

During the Battle of Britain, ground crew often worked 16-hour days in all weather conditions.

Corporal Fred Roberts

Fred Roberts was the armourer for Flight Sergeant George 'Grumpy' Unwin of 19 Squadron during the Battle of Britain.

From Swansea, Roberts joined the RAF at the age of 18. In July 1939, he was posted to Duxford, where he serviced the eight **.303 Browning machine guns** (left) of Unwin's Spitfire and ensured they were

loaded. He would have used an **armourer's trolley** (left) to transport the heavy guns.

Roberts proudly claimed, 'They were my guns, he only fired them for me... My guns shot fourteen down, but it was George that shot them down for me.'

Supermarine Spitfire Mk. 1a cockpit interactive

Fighter pilots normally received about 190 hours of flying training before entering combat. 40 hours were spent training in Hurricanes or Spitfires.

Take a seat inside this interactive cockpit. How would you feel taking the controls of this aircraft in 1940?

International pilots

The Nazi conquest of Europe left many well-trained pilots from occupied countries without an air force to fly for. Several of these experienced flyers escaped to Britain, eager to continue fighting the Germans. This was a relief to the RAF, who faced a shortage of pilots.

After completing RAF training, these international pilots were integrated into British fighter squadrons.

Since many of these pilots came from Poland and Czechoslovakia, the RAF formed Polish and Czech squadrons from July 1940.

Volunteers also came from the Commonwealth, Ireland and the United States.

During the Battle of Britain, RAF Duxford was home to one Canadian squadron, two Czech squadrons and one Polish squadron.

Hawker Hurricane Mk I V7497

The Hawker Hurricane entered service in 1937 as the RAF's first monoplane fighter. It was a rugged, reliable aircraft and regarded as the 'workhorse' of Fighter Command. During the Battle of Britain, 33 squadrons were equipped with Hurricanes, compared to 19 with Spitfires. Hurricanes also shot down more German aircraft than Spitfires.

This restored **Hurricane** flew against the Luftwaffe in late September 1940, serving with 501 Squadron. It was shot down over Kent while being flown by Pilot Officer Everett Rogers, who bailed out unhurt.

Fighter Command

Fighter Command was responsible for defending Britain from the air. It controlled Britain's fighter squadrons, anti-aircraft defences and Chain Home radar system. Fighter Command divided Britain into geographical 'groups,' which were subdivided into 'sectors.' Each sector had an airfield known as a 'sector station' with an Operations Room that controlled its aircraft.

Air Chief Marshal Sir Hugh Dowding was the head of Fighter Command. He had been involved in establishing a complex system of early warning and fighter control that gave the RAF a vital advantage over the Luftwaffe. Nicknamed 'Stuffy', Dowding was cautious, often formal and distant, but ensured that the RAF's valuable resources were used carefully.

Squadron Leader Tom Gleave

Tom Gleave of 253 Squadron was shot down near Biggin Hill on 31 August 1940. Gleave had just fired at two German bombers when his Hurricane was hit and burst into flames. He attempted to put out the fire and escape, but was badly burned. When the Hurricane exploded, Gleave was blown clear.

Gleave underwent pioneering plastic surgery at Queen Victoria Hospital in East Grinstead and was a founding member of the Guinea Pig Club, a social club and support network for the hospital's burns patients.

The **Rolls-Royce Merlin III engine** displayed to the left was powering Gleave's Hawker Hurricane when he was shot down.

Photo courtesy of the London Battle of Britain Monument

The Dowding System

The RAF relied on an innovative air defence system named after its creator and head of Fighter Command, Air Chief Marshal Sir Hugh Dowding.

The Dowding System depended on Britain's coastal radar network, known as Chain Home, which gave early warning of approaching German air raids. After crossing the coast, the aircraft were visually tracked by the Observer Corps. This enabled Fighter Command to know where and when to expect attacks.

Raid information was processed through the chain-of-command and ended with the 'scrambling' of RAF

fighters to intercept the raiders. Anti-aircraft, barrage balloon and searchlight units on the ground were also put into action.

Cierva C30A autogiro

The RAF used this **Cierva C30A autogiro** to check radar accuracy.

The predecessor to modern day helicopters, autogiros have rotors instead of wings, which spin around as the aircraft is driven forward by its propeller. This gives lift like a wing, but since the rotors are not powered, it cannot hover like a helicopter.

Autogiros could fly in a tight circle, making them well-suited for calibrating Britain's radar network. The RAF's Autogiro Radar Calibration Flight, No. 1448, was based at Duxford from 1940 to 1942.

Reggie Brie

Reginald 'Reggie' Brie was an experienced autogiro test pilot and First World War RAF veteran. He played a key role in ensuring the accuracy of Britain's coastal radar chain, which was crucial to its air defence.

In late 1939, Brie was asked to develop and test radar calibration methods using autogiros. This involved flying a specially equipped autogiro in a tight orbit 1,200 feet high off of the coast, allowing radar stations to adjust the accuracy of their equipment. Brie's methods were so successful that he formed No. 1448 Flight at RAF Duxford for this purpose.

He later became a pioneering helicopter pilot.

Photo courtesy of Dr Trevor Hudson

The Women's Auxiliary Air Force

The Women's Auxiliary Air Force (WAAF) was established in 1939. Members of this women's branch of the RAF, known as WAAFs, were instrumental in the Dowding System's flow of information.

WAAFs carried out essential roles during the Battle of Britain, including in operations rooms, where they received and transmitted radar data, plotted raids and operated communications equipment.

Six WAAFs were awarded the Military Medal for bravery during the battle.

To learn more about WAAFs and the Dowding System, visit the 1940 Operations Block.

Antoni Głowacki (Silhouette)

Warsaw-born Antoni 'Toni' Głowacki became the Battle of Britain's first 'ace in a day' after shooting down five German aircraft on 24 August 1940.

Głowacki joined the RAF following his escape from Poland in September 1939. After training in Hurricanes, he was posted to 501 Squadron at RAF Gravesend. He shot down eight German aircraft and damaged four more during the battle.

Although he was shot down on 31 August, he went on to serve in four different Polish RAF squadrons throughout the war.

ZONE 4

The Blitz

September – October 1940

Luftwaffe intelligence believed that Fighter Command was on the brink of defeat. To lure the RAF into battle, the Luftwaffe changed its strategy to a day and night bombing campaign against London which became known as the 'Blitz.'

Although Fighter Command had suffered heavy losses, the Luftwaffe underestimated its strength. Britain's aircraft industry had been producing new fighters and repairing damaged ones at a greater rate than they were being lost.

The Luftwaffe also believed that it was destroying Fighter Command's airfields and radar stations, unaware that most were repaired within hours.

Round-the-clock raids on London continued, causing great destruction and loss of civilian life. Fighter Command remained undefeated, however, and Hitler was forced to postpone the invasion.

- **6 September:** Squadron Leader Douglas Bader's 'Duxford Wing' of three squadrons flies its first patrol
- **7 September:** First day of the Luftwaffe's 'Blitz' bombing campaign on London
- **15 September:** Known as 'Battle of Britain' day, Fighter Command shoot down 75 German aircraft
- **15 September:** The Duxford Wing adds two squadrons to form the first 'Big Wing'
- **17 September:** Hitler's British invasion plan, 'Operation Sea Lion', is postponed indefinitely
- **30 September:** The Luftwaffe launches its final daylight attack on London

Anderson Shelter replica

During the Blitz, many families sought safety in domestic air raid shelters.

Go inside this replica Anderson Shelter. How would you feel hearing the sound of bomb blasts overhead?

Observer Corps post

The Observer Corps was responsible for visually tracking and reporting aircraft as they flew over land. Using binoculars, a special calculating instrument and a telephone, volunteers reported the type, number, speed, height and direction of the enemy aircraft to their local Observer Centre. This information was then sent directly to local fighter stations.

Observer Corps activity

One of the most important jobs of an Observer Corps volunteer was identifying the types of aircraft overhead and knowing whether they were friendly or hostile.

See if you have what it takes to be an Observer Corps volunteer:

Pick up the binoculars and try to spot the aircraft models above you. Can you identify the types of aircraft using the posters? Are they friendly or hostile?

Air raid precautions

Anticipating that Britain would come under air attack if another war broke out, the British government passed the Air Raid Precautions (ARP) Act in 1937. This legislation made local councils responsible for organising air raid precautions and response services.

Air Raid Wardens were first in a chain of ARP services that included firefighters, rescue and first aid parties, ambulance crews, medics and messengers. Wardens advised on air raid precautions, enforced the night-time 'blackouts' and issued gas masks. During raids, wardens sounded sirens, guided people into shelters, monitored and reported bomb damage, and coordinated other ARP services' responses.

Air raid shelters

Anderson shelters (behind, left) were the most widely used form of domestic air raid protection at the height of the Blitz.

Made from corrugated steel sheets, they were usually embedded 3 to 4 feet into the ground and covered with earth. An Anderson shelter could accommodate up to six people and withstand most

bomb blasts. Over 2,300,000 were distributed by September 1940.

Air raid wardens were provided with their own shelters to use while on duty, including the all-steel **'Shelter for Key Men'** (left).

Jo Oakman

Like thousands of other women, Jo Oakman volunteered as a part-time ARP warden. Based at a post in Chelsea, she was on duty during the first night of the Blitz and most nights thereafter. According to a fellow warden, Oakman 'always wanted to be out on patrol or roof spotting.'

On 14 September, Oakman was called out to a shelter that had taken a direct hit. Whilst cycling to the scene, she was knocked off her bike twice by bomb blasts, but got up and went on to put out fires and attend to casualties. She returned to her home the next evening to find that it had also been bombed.

Senior Warden Ita Ekpenyon

Ita Ekpenyon was on duty in the Marylebone area of London for most nights of the Blitz.

Ekpenyon immigrated to Britain from Nigeria in 1928 to study law. He joined the ARP in 1939. He was a popular warden in his sector who risked his life for others on several occasions. Ekpenyon put out incendiary bomb fires, provided first aid and carried people to safety during raids. He was later promoted to Deputy Post Warden and made several broadcasts on the BBC's Calling West Africa programme, sharing his experiences of the Blitz and rallying support for the war effort.

Photo courtesy of Oku Ekpenyon MBE (daughter)

Emergency services

Anticipating the strain that German bomber attacks would put on Britain's emergency services, the government set up the Auxiliary Fire Service (AFS) in 1938 and the Emergency Medical Service (EMS) in 1939.

The AFS was a voluntary firefighting force created to

support local fire brigades. Many firefighters lost their lives during the Blitz, as they worked whilst bombs fell. In 1941, all firefighting services were combined into the National Fire Service (NFS).

The EMS coordinated Britain's medical services, placing voluntary and municipal hospitals under government control. Thousands of extra doctors and nurses were recruited and paid by the government, and air raid casualties were given free treatment. The EMS became the blueprint for the National Health Service.

Austin K2 fire tender and Scammell trailer pump

This **Austin K2 fire tender** was manufactured in 1942 and used by the National Fire Service in London.

Based on the design of the commercial Austin K30 truck, it could carry twelve firefighters and was fitted with an extendable ladder and warning bell. Many towed trailers that pumped water to put out fires, like this **Scammell trailer pump**.

Nash Ambassador ambulance

Many private cars and commercial vehicles were converted into emergency ambulances.

This **ambulance** was provided for the Bata Shoe Factory in East Tilbury during the war. Originally an American Nash Ambassador saloon car, it was purchased by the factory owner, Mr Thomas Bata, and converted in 1939.

Fortunately, neither the factory nor estate were bombed during the Blitz.

Dora Jane Falconer

Dora Falconer was working as a surgeon for the EMS at South Middlesex Fever Hospital in Twickenham when the Blitz began. Falconer's hospital was designated for air raid casualties, and ambulances brought wounded men and women to her team's operating theatre around the clock. The team continued operating during air raids, prioritising patients above their own safety. When Blitz attacks decreased in 1941, Falconer served in East Africa with the Royal Army Medical Corps.

Messerschmitt Bf 109 E-3

This **Bf 109 E-3 (W.Nr. 1190)** crash-landed in Sussex during the Luftwaffe's last major daylight raid on London in September 1940. It was being flown by 22-year-old Luftwaffe *Unteroffizier* (Corporal) Horst Perez of *Jagdgeschwader 26*. While on a bomber escort mission on 30 September, Perez and his wingman were suddenly attacked over Eastbourne by Spitfires of 92 Squadron. When his engine failed, Perez belly-landed the aircraft in a field. He was taken into custody by the local Home Guard and police. His aircraft was sent on a tour of North America to raise funds for Britain's war effort.

Heinkel He 111 parts

These **aircraft parts** came from two Heinkel He 111 bombers flown in 1940.

The small **section of fuselage** was removed from a Heinkel He 111H-2 that crash-landed in Hertfordshire on 30 August 1940. Piloted by Luftwaffe *Leutnant* (Lieutenant) Ernst Fischbach of *Kampfgeschwader 53*, the aircraft had just bombed Radlett airfield when it was shot down by Hurricanes of 601 Squadron.

The **tail fin** and **engine** are from a Heinkel He 111E recovered from a frozen lake in Norway. The aircraft is believed to have landed there due to engine trouble during the German invasion of Norway in April 1940.

Sergeant Donald Kingaby

Donald Kingaby was the Spitfire pilot who attacked Luftwaffe pilot Horst Perez's Bf 109. 20-year-old Kingaby worked in Cambridge before the war and joined the RAF in 1939. After training in Spitfires, he was posted to 92 Squadron at Biggin Hill. By December 1940, Kingaby shot down at least seven Messerschmitt Bf 109s and damaged several more, earning him the nickname 'The 109 Specialist'. Although no bullet holes were found in Perez's aircraft, Kingaby had fired at it and watched smoke pour from its engine.

Ground defences

Britain's fighter aircraft protected the skies, Anti-Aircraft (AA) Command defended from the ground. AA Command oversaw the anti-aircraft gun and searchlight units, or 'batteries', around cities, ports,

factories, airfields and other important areas. Anti-aircraft guns shot down and deterred enemy aircraft, whilst searchlights were used to illuminate and track them at night. Although officially part of the British Army, AA Command was controlled by Fighter Command to ensure its coordination with Britain's air defence system.

3.7 inch anti-aircraft gun

The **3.7 inch anti-aircraft gun** was the main heavy ground weapon used to defend Britain from air attacks. Used by the British Army from 1938, this mobile gun could fire explosive and shrapnel shells with timed fuzes up to 25,000 feet (7,620 metres). It was operated by a seven-man crew who were equipped with an analogue computer known as a 'predictor', which provided the location, course and speed of enemy aircraft. Guns were normally set up in groups of four, known as a 'Troop'. Anti-aircraft guns were effective at dispersing enemy bomber formations and reducing their accuracy.

90 cm projector searchlight

Anti-aircraft guns often worked in tandem with

searchlights, like this **90 cm projector searchlight**.

Officially known as a 'projector', the searchlight's main function was to illuminate and track enemy aircraft so they could be clearly seen by anti-aircraft guns or RAF night fighters. They could also temporarily blind German bomber crews and force them to take evasive action.

Frank Hurd (Silhouette)

Firefighter Frank Hurd was on duty on 7 September 1940, the first night of the London Blitz. Based at Euston Road fire station, 24-year-old Hurd later recorded what he saw in a diary:

'About a mile away to our right was the river front. The whole horizon on that side was a sheet of flame. The docks were afire! On all other sides it was much the same. Fires everywhere. The sky was a vivid orange glow. And all the time the whole area was being mercilessly bombed. The road shuddered with the explosions...'

Hurd was killed whilst on duty during an air raid on 30 December 1940.

ZONE 5

Victory?

November 1940 – March 1945

Luftwaffe Supreme Commander Hermann Goering was forced to accept that Fighter Command could not be defeated. The Germans had lost over 2,500 aircrew and nearly 2,000 aircraft. Britain had won the battle decisively.

Hitler and Goering believed that Britain could still be bombed into submission, however. The Luftwaffe extended major bombing raids to other British cities, including Birmingham, Liverpool and Glasgow. Major raids gradually ended when Germany began preparing for war against the Soviet Union.

In June 1944, the Luftwaffe began to launch V-1 'Vengeance' flying bombs against London in retaliation for the constant British and American bombing of German cities. They later used the larger, deadlier V-2 rocket.

- **23 April 1942:** The Luftwaffe bombs Exeter, the first in a series of attacks on British cultural targets known as the 'Baedeker Raids'
- **21 January 1944:** The Luftwaffe begins a new bombing campaign against Britain, codenamed 'Operation Steinbock'
- **6 June 1944:** Allied forces invade France (D-Day)
- **13 June 1944:** The Luftwaffe launches the first V-1 attacks on London
- **8 September:** The Luftwaffe's first V-2 attacks on London
- **27 March 1945:** The last V-2 attack on London
- **8 May:** Germany surrenders, and Victory in Europe Day is celebrated around the world

V-1 Flying Bomb

This is an original **V-1 'Flying Bomb'**. Over 10,000 were launched against Britain from mid-1944, killing nearly 6,000 people. Most V-1s were fired from launch sites on the French coast. Pre-set controls guided the missiles to their target area where they dived to earth and exploded, causing widespread damage. Because of the characteristic buzzing

sound produced by the V-1's internal motor, the British public often referred to them as 'doodlebugs' or 'buzz bombs'.

Strategic bombing and Operation Crossbow

Allied intelligence knew about the V-1 programme several months before the first flying bomb hit Britain. In response, military planners launched a counter campaign known as *Crossbow*. *Crossbow* operations included a strategic bombing campaign undertaken by RAF Bomber Command and the US Army Air Forces, which targeted V-1 and V-2 development facilities and launch sites. A new system of air defence was also developed, combining anti-aircraft guns, barrage balloons and RAF fighters to stop the weapons before they hit.

Daimler-Benz DB 603-A aircraft engine

This **engine** was recovered from a Dornier Do 217M bomber shot down by anti-aircraft fire over Essex in 1944. After three years of little air activity over Britain, the Luftwaffe renewed bombing attacks on London and other major cities in January 1944. Codenamed

Operation *Steinbock*, it resulted in the deaths of over 1,500 civilians.

The operation was Germany's last major bombing offensive against Britain and ultimately failed. The Luftwaffe suffered heavy losses of over 300 aircraft and many more aircrew.

Private G Morgan

Morgan was a member of an anti-aircraft battery that shot down German bombers and V-1 flying bombs.

After joining the Auxiliary Territorial Service (ATS) in 1942 at the age of 17, Morgan volunteered for anti-aircraft duties. As women were not permitted to operate the guns, she trained as a telephonist, responsible for receiving and transmitting orders that would spring the 3.7-inch gun battery into action.

After combating German bombers in Yarmouth, Morgan's battery was moved further south to defend against V-1 attacks from mid-1944.

Air defence of Great Britain in the 20th Century

The air defence system that helped win the Battle of Britain had its origins in the First World War. From 1915, German 'Zeppelin' airships and early biplane bombers attacked British cities, killing nearly 1,400 civilians. Britain responded by developing a system of coordinated air defence that evolved during the interwar years to become the Dowding System.

After the Second World War, a new threat emerged from the Soviet Union. The successful testing of the Soviet Union's first atomic bomb in 1949 brought the danger of nuclear attack against Britain and Europe to critical levels. Fighter Command's squadrons now became responsible for intercepting Soviet aircraft before they could reach Britain.

Bristol F2b fighter

This **Bristol F2b fighter** (far right) served with 39 (Home Defence) Squadron in 1918.

Like most biplane aircraft of the period, the F2b was made of wood and covered in hardened fabric. Whilst most fighters had one crew, the F2b had both a pilot and an observer, each armed with machine guns.

With a maximum speed of 113 mph, the F2b was fast and manoeuvrable. It was successful from 1917 on the Western Front and was used to defend Britain from German bomber attacks.

First World War anti-aircraft defences

This 1 pounder **Vickers Gun Mk II** (front, right) fired the first shot in the air defence of London on 8 September 1915. Mounted on top of Gresham College, it fired eleven shots at the first Zeppelin (L13) to bomb central London. This type was one of Britain's earliest anti-aircraft guns.

Anti-aircraft guns could also be mounted on top of lorries for mobile defence. This **Thornycroft J Type lorry** (back) is mounted with a 13 pounder anti-aircraft gun, the main type used by Britain during the First World War. Many of the German airships and bomber aircraft that attacked Britain were powered by engines like this **Maybach 200 HP Model AZ** (left) and this **Maybach 300 HP** (centre).

Gloster Meteor F8

This **Gloster Meteor F8** (far left) served with one of Britain's six air defence sectors during the 1950s. The Meteor was Britain's first jet fighter and the only Allied jet aircraft to see combat in the Second World War. Improved versions of the Meteor, like the F8, followed post-war and the type served as the RAF's main jet fighter until phased out in the mid-1950s. Duxford was home to five Meteor squadrons in the post-war years.

