

LARGE PRINT GUIDE



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RAF Stories: The First 100 Years 1918 – 2018

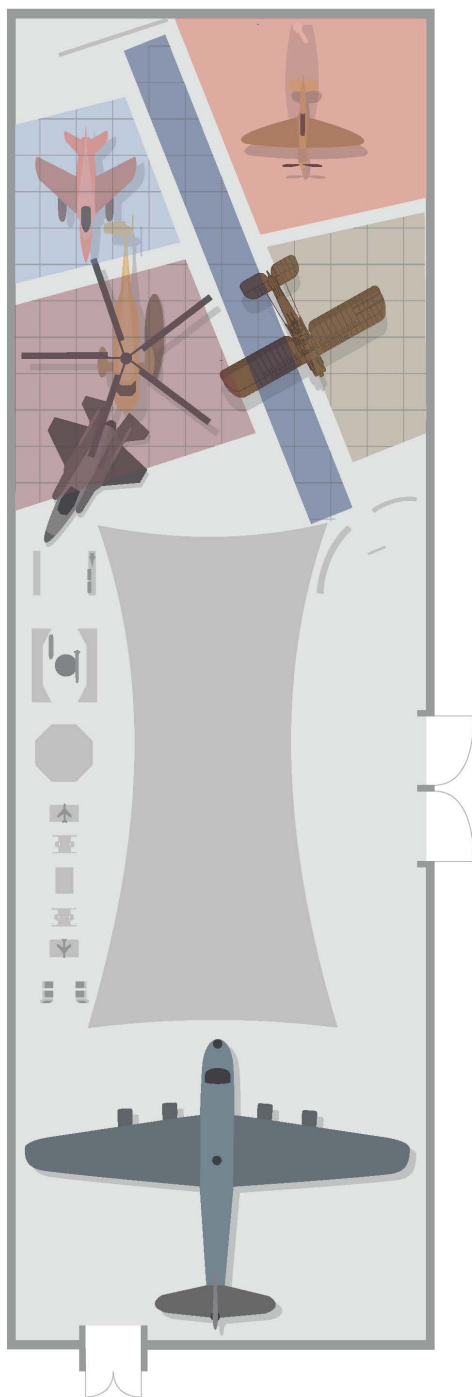
Defend

BAE SYSTEMS

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Location of the Defend theme



 Defend

Defend

Since 1918, the Royal Air Force has protected the interests of the UK from hostile threats in the air, at sea and on the ground.

The RAF defends the skies 24 hours a day, seven days a week. It has withstood and triumphed against prolonged aerial attack and defended forces and civilians on land and sea. Its work alongside the Royal Navy, the British Army and the UK's allied nations continues to deliver vital global security.

In the Air

The UK's first line of defence is provided by the RAF using fighter aircraft. In 2018 Eurofighter Typhoons stand ready 24/7, fulfilling the role previously held by Spitfires, Hurricanes and Lightnings.

The important role of the fighter pilots, and the many who support them on the ground, was perhaps best demonstrated during the Battle of Britain in 1940, 'their Finest Hour', when the German Luftwaffe was repelled and the Nazi invasion of Britain was cancelled.

[Cut out figure]

Corporal Sonia 'Sony' Campbell

Joined the RAF in 1999

Sony Campbell is an Aerospace Systems Operator, or 'Scopie', and says 'while you sleep, I watch the skies'. She has served all around the world, including tours of Afghanistan and the Falkland Islands. Campbell has represented the RAF in volleyball and athletics. Her only regret is that she didn't join up earlier.

'The RAF has given me a lifestyle I never thought I could have and I'm making the most of it.'

Sony Campbell, 2017

[Image caption]

Campbell has served in Norway, Germany, Romania, Cyprus, Oman, the Falklands and Afghanistan. She parachutes and skis and has run the London Marathon for the RAF Association and Diabetes UK.

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[Cut out figure]

Squadron Leader Franciszek Kornicki

Joined the RAF in 1951

Franciszek Kornicki joined the Polish Air Force in 1939 and served until the end of 1945. He escaped to Britain after Poland was invaded by Germany and Russia in 1939 to continue fighting in exile, flying in independent Polish Air Force squadrons under the overall control of the RAF. His skill as a Spitfire pilot and his quiet authority saw him become the youngest Polish squadron commander in 1943.

After the Second World War, Poland was controlled by Communist Russia so Kornicki remained in Britain and joined the RAF serving as an officer for over 20 years. He died a few weeks before his 101st birthday in 2017.

'Long after final victory ... the brotherhood-in-arms of the RAF and the Polish Air Force will be remembered by us with pride and gratitude.'

Chief of the Air Staff, Marshal of the Royal Air Force

Sir Charles Portal, 2 May 1945

[Image caption]

Kornicki as a Flight Lieutenant seated on the wing of Supermarine Spitfire Mk Vb, RAF Northolt, 1942.

Courtesy of the Kornicki family

Reverse image: Courtesy of the Arkady Fiedler Museum, Poland

The Battle of Britain

Between July and September 1940 Britain found itself under prolonged attack from the German Air Force, whose aim was to destroy the RAF so that an invasion and occupation of Britain could take place.

Day after day the pilots of Fighter Command met this onslaught in full view of the people of London and South-East England.

2,937 pilots and other aircrew are officially recognised as having taken part in the Battle of Britain, including 145 Poles, 127 New Zealanders, 112 Canadians and 88 Czechs. 544 Fighter Command aircrew were killed. In one two-week period 295 Hurricanes and Spitfires were lost, 171 were badly damaged and 231 pilots were killed or wounded.

After losing around 2,600 Luftwaffe aircrew throughout the whole of the Battle of Britain, Hitler postponed his invasion plans.

'Never in the field of human conflict was so much owed by so many to so few.'

Winston Churchill, 20 August, 1940

[Image caption]

Spitfires from No. 222 Squadron climb to meet an incoming raid, September 1940.

© RAF Museum P008-701

FN1A Lobster-Back Gun Turret 1937 1

Fighter aircraft which carried a gunner proved very successful during the First World War. In the 1930s the idea was revived in the form of the Hawker Demon aircraft. Some Demons were fitted with this power operated turret to help the gunner manipulate the Lewis machine gun against the slipstream.

ADEN 30mm Cannon 1954–2007 2

Adapted from a German design of the Second World War, the ADEN Cannon was introduced to service on the Hawker Hunter. It was later used on a number of RAF aircraft including the Jaguar, Hawk and Harrier.

Hispano Cannon 20mm Mk V*, 20mm 1940s–1960s 3

After some teething problems, this British adaption of a French design became one of the most successful cannon of the Second World War and continued in service until the 1960s.

Browning 0.5in. MG 1940 4

This large calibre machine gun was used on many American built aircraft used by the RAF during the 1940s and 1950s. It was also installed on a number of British built aircraft and turrets.

Vickers MG .303 Mk II 1927–1945 5

The belt-fed Vickers machine gun was first fitted to aircraft during the First World War and remained the standard fixed machine gun on RAF aircraft until the late 1930s.

Browning MG .303 Mk II* 1937

6

This fast firing, American designed machine gun was the standard weapon fitted to RAF aircraft and gun turrets during the first half of the Second World War. Its effectiveness was hampered by its rifle calibre round which lacked hitting power.

Flight Lieutenant Raymond Towers Holmes

Joined the RAF in 1937

On 15 September 1940, No. 504 Squadron's Hurricanes scrambled from here at RAF Hendon to intercept enemy bombers over central London. Leaping from his bath to scramble, Ray Holmes sighted a lone Dornier heading for Buckingham Palace. His ammunition gone, he rammed the bomber, which crashed into Victoria Station.

Ray's damaged aircraft crashed nearby, while he landed by parachute in a dustbin in Pimlico. His bravery on Battle of Britain Day was filmed by Pathé News and witnessed by thousands of grateful Londoners.

The Hurricane at the entrance to the Museum is painted in the colours of No. 504 Squadron.

'There was no time to weigh up the situation ... I just went on and hit it for six.'

[Image caption]

Sergeant Raymond Towers Holmes

Ray joined the RAF as a volunteer reserve pilot.

© Crown Copyright

The Merlin III powered both Spitfires and Hurricanes during the Battle of Britain. In May 2004, Chris Bennett and Steve Izard led a team who excavated the remains of Raymond Holmes' Hurricane on live television. The 90-year-old Holmes attended the dig and was presented with the control column he had last held 64 years before.

[Image caption]

Ray (seated, far left) later joined No. 81 Squadron and went to Russia to train pilots to fly Hurricanes.

© RAF Museum P010552

Radar

Radio Detection And Ranging, originally known as Radio Direction Finding or RDF, is a method of detecting objects by using reflected radio waves.

During the 1930s Chain Home Radar, a network of radar stations, was constructed along the British coastline giving the RAF vital early warning of incoming threats and removing the need for constant aerial patrols. In 1940 this fledgling technology was to prove its worth in the defence of UK airspace during the Battle of Britain.

By 1940 the early network was supplemented by radars capable of detecting low-flying aircraft. Later, Ground Controlled Interception radars were used to guide radar-equipped aircraft towards their targets.

During the 1950s radar was employed to guide ground-based air defence missiles and by the late 1960s radar-guided missiles were being fitted to aircraft.

The RAF continues to monitor both air and space for threats, and stands ready to intercept any unidentified contacts 24/7.

The RAF continues to monitor both air and space for threats, and stands ready to intercept any unidentified contacts 24/7.

[Image caption]

A WAAF checks the screen of her Chain Home Radar.

© Crown Copyright

Meteor Missile Entered service 2018 1

The Meteor is powered by a ramjet and can engage fast manoeuvring targets at ranges beyond 100km. It is intended to replace the AMRAAM on the Typhoon and F-35.

Skyflash Missile 1978–2010 2

Based on, and replacing the US Sparrow missile, Skyflash had an improved seeker which used the reflected pulses from the radars of Phantoms or Tornados to home in on targets beyond visual range.

Red Top Missile 1964–1988 3

A close relative of the Firestreak, Red Top entered RAF service with the Lightning F3 in 1966. Its enhanced seeker head enabled Red Top to engage targets from any direction.

ASRAAM Missile 1998–today 4

The Advanced Short Range Air-to-Air Missile replaced the Sidewinder in service with the Tornado and is the standard heat-seeking missile on the Typhoon and F-35 Lightning II.

AIM-9 Sidewinder Missile 1978–2018 5

This US heat-seeking missile was introduced into service with the RAF on the Phantom aircraft. It became the standard self-defence missile carried by RAF aircraft from the 1970s into the 2000s.

Firestreak was the first UK designed guided missile to enter widespread service with the RAF. This heat-seeking missile was carried by the Javelin and Lightning and remained in service until 1988.

Air Defence

The principles of air defence in 2018 are very similar to those used in 1918. Reports of raids are sent to a central point, where the information is filtered before being forwarded to the defending forces. What have changed are both the detection methods and the capabilities of the aircraft and weapons employed.

In 1918 the only detection methods available were direct observation and sound location. By the 1940s radar helped to direct defending forces and was being fitted directly to night-fighters. During the Cold War, air defence was focussed on protecting the nuclear deterrent. Cannon armament was replaced by air-to-air and ground-based guided missiles. The move of the nuclear deterrent to the Royal Navy in the late 1960s saw the emphasis of UK air defence move to cover the North Atlantic, with Airborne Early Warning Aircraft enhancing radar coverage.

In 2018 Quick Reaction Alert aircraft remain on standby to intercept unidentified aircraft, while monitoring of the skies has extended to include space and cyberspace.

‘From the first the British had an extraordinary advantage, never to be balanced out at any time during the whole war, which was their radar and fighter control network and organisation. It was a very bitter surprise...’

General Adolf Galland, Luftwaffe pilot. ‘The Most Dangerous Enemy’, Stephen Bungay, 2001

[Image caption]

No. 87 Squadron practice a scramble with their Gloster Gladiators.

© RAF Museum PC98-173-5738-6

David Stubbs 2001

David Stubbs joined the RAF as an Air Electronics Operator and was posted to No. 42 Squadron flying Nimrods on maritime patrol operations. After being commissioned he transferred to the E-3 Sentry Airborne Early Warning Aircraft completing three tours, two with the RAF and one with the US Air Force.

He flew on operations over Bosnia and Iraq enforcing United Nations no-fly zones. Crews on the Sentry would direct NATO fighter aircraft that were policing the zones. They also monitored the locations of surface-to-air missile systems to ensure that NATO aircraft were not endangered.

[Image caption]

David Stubbs (fourth from left, back row).

© RAF Museum X008-4339/007

At Sea

Britain is an island nation and is reliant on sea trade for its survival. Since its formation, the RAF has worked closely with the Royal Navy to protect these trade routes.

Patrolling the seas and coastlines became an important task for the flying boats and long-range shore-based aircraft of the RAF. In this task they were supported by the RAF's own fleet of marine craft.

Before 1939 the carrier-based aircraft of the Fleet Air Arm were also part of the RAF and RAF personnel and aircraft continue to operate from Royal Navy vessels today.

[Cut out figure]

Lieutenant-Colonel Thomas Edward Lawrence, CB, DSO

Joined the RAF in 1922

T E Lawrence is perhaps better known as the legendary Lawrence of Arabia. In an attempt to escape his fame following the First World War, Lawrence twice enlisted in the RAF under different false names. During this time he assisted in the development of high-speed boats designed to recover airmen forced down into the sea. Lawrence wrote 'The Mint', an account of his life in the RAF. He died in a motorcycle accident in 1935, only weeks after leaving the service.

'His motivations for joining the ranks were disillusionment ... his desire for a life of discipline ... plus the more prosaic need for a regular income.'

'Another Life: Lawrence after Arabia', Andrew Simpson, 2008

[Image caption]

Aircraftman TE Shaw (Lawrence) at the wheel of a fast armoured target boat during the early 1930s. Lawrence worked to perfect fast boats for the RAF, especially in the rescue role.

© RAF Museum PC71/19/499

Reverse image: © RAF Museum P009851

[Cut out figure]

Flight Lieutenant William Duncan

Joined the RAF in 1958

After his National Service as an Air Wireless Mechanic, William Duncan re-enlisted in 1962 as an Air Signaller with Transport Command, which moved people and supplies long distances by Hastings aircraft.

In 1968, Duncan was commissioned and joined Coastal Command as an Air Electronics Officer aboard maritime reconnaissance aircraft including the Shackleton and Nimrod. He ended his service career on Victor tankers in 1976.

'My only regret about joining the RAF is that I didn't do it when I was 18.'

William Duncan, 2017

[Image caption]

Duncan joined the Mountain Rescue Service and also learned life-saving in deserts and jungles. He completed a sea survival exercise on his last day in the RAF (pictured).

© Iain Duncan

Reverse image: © Iain Duncan

Supermarine Spitfire Mk Vb 1941–1945

The Mk V was regarded by pilots as the best handling Spitfire, despite its very short development time. It was also the most widely produced, equipping over 140 RAF squadrons. Entering service in February 1941, the Mk V was significant for introducing many design refinements, featuring an improved altitude performance and a wider range of armament configurations.

This Spitfire Mk Vb saw active service with five RAF squadrons between 1941 and 1943, Nos. 64, 118, 222, 242 and 611. [Touch]

The Spitfire's distinctive curved wings are designed to give agility and good handling.

Dimensions

Span: 11.2m /
36ft 10in.

Length: 9.1m /
29ft 11in.

Use

Single seat fighter

Engine

1,470hp Rolls-Royce Merlin 45 V-12

Top Speed 374mph at 13,000ft / 602km/h at 3,962m

Maximum Altitude

Service Ceiling 11,277m / 37,000ft

Armament

Two 20mm cannon

Four 0.30in. machine guns

Where Used

Europe Middle East Far East Australia

Marine Branch

Power boats were initially used to support sea planes and flying boats. In the 1930s TE Lawrence (of Arabia) and power boat specialist Hubert Scott-Paine developed speed boats to reach seaplanes quickly which led to successful high-speed rescue operations for ditched aircrew. The Air Sea Rescue Service's motto, 'The Sea Shall Not Have Them', highlights the lifesaving capabilities of these high-speed launches.

After 1940, the RAF Marine Branch was expanded and rescued over 13,000 aircrew and civilians during the Second World War. A fleet developed, and examples of a Seaplane Tender, Rescue and Target Towing Launch and Pinnace can be seen at the Museum. The Branch disbanded in 1986, with the role of the high-speed launches replaced by helicopters.

Wherever British aircrews operated over the sea, the RAF provided rescue cover for them. 'Sailors in the RAF', Keith Bearded, 1993

[Image caption]

A Rescue and Target Towing Launch equipped with powerful Sea Griffon engines.

© Crown Copyright

Wings over Water

In 1918 the RAF took over the aircraft, roles and personnel of the Royal Naval Air Service. In 1924 the Fleet Air Arm was formed with a mix of RAF, Navy and Royal Marine personnel operating aircraft from Royal Navy ships. In 1939 the Fleet Air Arm passed to Royal Navy control – however flying boats and coastal patrol aircraft remained within the RAF's Coastal Command.

These aircraft models represent many of the aircraft flown by the RAF and the Fleet Air Arm during this period.

For more information see the printed booklet at the far end of this showcase. A Short Sunderland flying boat can be seen at the other end of this hangar.

Maritime Reconnaissance

Ensuring the safety and free movement of UK and allied maritime vessels, and denying that freedom to enemy shipping, has been an essential task for the Royal Air Force.

Since 1918, the RAF has patrolled the seas using ever more capable and sophisticated aircraft and devices for detecting surface targets and submerged threats. This keeps the service at the forefront of maritime reconnaissance and anti-submarine warfare.

[Image caption]

A Short Sunderland – the last of the RAF’s flying boats.

© RAF Museum P100580

Type 17054 Mk 1C Sonobuoy 1970s and 1980s **1**

First deployed in the 1940s, Sonobuoys are dropped from aircraft and used to detect submarines by either passively listening for them or, as with this example, actively seeking them out by using echo location.

Searchwater Console 1979–2011 2

Air-to-Surface Vessel radar revolutionised maritime warfare when introduced in the 1940s enabling aircraft to detect ships well beyond visual range. This console would have been used by the operator of a Nimrod MR2 aircraft's Searchwater radar. This was used to detect surface targets as small as a submarine's periscope.

AJ 168 Martel Missile 1975–1988 3

The Martel was an anti-shipping missile carried by Buccaneer strike aircraft. It was optically guided with course corrections being made by the Buccaneer's navigator and transmitted to the missile via a data link pod carried under the Buccaneer's wing.

Anti-submarine Bomb, 12,000lb Medium Capacity 1960s 4

Depth charges are used to attack submarines below the surface. This 12,000lb Medium Capacity depth charge is actually a nuclear bomb. A conventional depth charge would need to detonate close to a submarine's hull to cause damage but this nuclear device could remain effective over a much larger area.

On the Ground

Contrary to the popular image of the RAF pilot, the majority of personnel serve on the ground. All have to be ready to defend themselves against hostile and environmental threats. They are supported in this task by specialists including the RAF Police, RAF Fire Service and the RAF Regiment. From 2017, all roles were made available to female recruits.

After the First World War, the RAF often used locally-recruited troops to conduct defensive and policing operations in the British Empire. The early years of the Second World War demonstrated how vulnerable airfields were to attack from the ground. As a result, the RAF Regiment was formed and continues to carry out a force protection role today.

RAF Regiment

Although the RAF operated armoured cars from the 1920s, the need for a separate regiment was recognised during the Second World War.

The RAF Regiment was originally tasked with airfield defence against ground and air attack, but gradually took on a more offensive role which included patrolling, forward air control and even relieving regular army units. During the Cold War, its anti-aircraft guns were replaced with missiles and it developed a specialisation in defence against chemical, biological, radiological and nuclear warfare.

The Regiment is also responsible for teaching other RAF personnel the skills of Force Protection, ensuring they can defend their colleagues and themselves.

'Every airfield should be a stronghold of fighting air-groundmen, and not the abode of uniformed civilians in the prime of life protected by detachments of soldiers. It must be clearly understood by all ranks that they are expected to fight and die in the defence of their airfields.'
Winston Churchill, 1941

[Image caption]

RAF Regiment members practise launching a javelin anti-tank missile.

© RAF Museum 45153855

RAF Police Motorbike 1968

In March 1968 the RAF received the first of its 135 WD B40 motorcycles, all equipped with police escort equipment such as the streamlined fairing and the blue light. The WD B40 was introduced by the Ministry of Defence to replace the assortment of wartime vintage motorcycles with standard models used by all three services. RAF WD B40s would be seen escorting VIPs, convoys, or outsized loads.

[Image caption]

A Land Rover and Humber Light Reconnaissance Car on patrol in Egypt, 1953.

© RAF Museum PC71-19-907

Force Protection

Security and defence are duties for every member of the RAF but there are some who specialise in keeping the RAF safe on the ground. The RAF Police has been operating since 1918 providing security, law enforcement and criminal investigation within RAF sites.

Firefighting, originally seen as an additional duty of ground personnel, became a separate trade in 1922 with a duty of care extending to domestic as well as operational areas.

Sometimes the RAF can call on other organisations to protect its assets. Before the formation of the RAF Regiment, overseas airfields were frequently protected by local troops operating under RAF control.

'It developed a unique family spirit which ... has continued to be the envy of other Service branches.'

Air Commodore HM Shephard CBE, 'The Story of the Royal Air Force Police', Patrick Hennessey, 1992

[Image caption]

RAF Police on patrol at RAF Habbaniya, Iraq, about 1939.

© RAF Museum PC98-173-5857-1

Humber Light Reconnaissance Car (LRC) Mk IIIA 1943

Designed as a scout car to equip the Army

Reconnaissance Corps, the Humber LRC was also issued to the RAF Regiment. In North West Europe the Humber was used in support of the Tactical Air Force to capture airfields and act as a liaison to fighter-bombers.

It was also deployed after the war in places such as Aden, Iraq and the Suez Canal zone.

[Image caption]

RAF Police at Camp Bastion, Afghanistan, 2013.

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[On the Ground showcase 1 labels]

Leading Aircraftman Geoffrey Sherlock

Joined the RAF in 1953

Geoffrey Sherlock joined the RAF as a National Serviceman and trained as a Fireman. He was posted to RAF Hendon to be close to his parents after his mother suffered a nervous breakdown and was unable to look after his father, a disabled First World War veteran.

Although Geoffrey attended few fires at Hendon, he recalls rescuing a pilot from a burning training aircraft and 'accidentally' scorching his trousers to claim a new pair without charge.

'I was a cheeky git, but the RAF was marvellous to me and the Benevolent Fund helped me when I had no money.'

Geoffrey Sherlock

[Image caption]

Geoffrey Sherlock (second from right) and his fellow firemen posing with a Fordson fire tender at RAF Hendon, about 1954.

© Geoffrey Sherlock

Background image: © Ian Forshaw

Firefighter's Clothing:

Helmet, Jacket, Trousers, Gloves, Boots 1970s–1980s

RAF firefighters' priorities are to save lives, minimise damage to equipment and make safe any additional risks. They are trained in fire prevention as well as domestic and aircraft fire fighting. These risks could include unexploded ordnance including nuclear weapons. This figure is wearing typical fire fighting equipment of the 1970s and 1980s.

[Sensory display between the On the Ground showcases]

[Touch model of the Sector Clock]

Markers matching the triangular coloured segments of the clock were used to show Operations Room Controllers when information was placed on the plotting table.

[Smell]

RAF aircrew spent long periods of time on grassy airfields waiting for the call to 'scramble' – to get to their aircraft and take off.

[Sound]

During the Battle of Britain, fire bells were rung to alert fighter pilots to scramble as quickly as possible to meet the enemy.

[On the Ground showcase 2 lectern]

Sergeant Joan 'Elizabeth' Mortimer MM, Corporal Elspeth

Henderson MM, Sergeant Helen Turner MM

**All three women joined the Women's Auxiliary Air Force in
1939**

**At the height of the Battle of Britain, in late August 1940,
RAF Biggin Hill was heavily bombed by the German Air
Force. During the air raids three telecommunications
operators, Elizabeth, Elspeth and Helen, remained at their
posts.**

**They calmly continued to relay vital signals despite the
danger. Although badly damaged, the fighter station
remained operational and the women were each awarded
the Military Medal for their bravery.**

**'During ... intensive enemy air raid[s] ... Sergeants
Mortimer and Turner and Corporal Henderson ...
displayed courage and example of a high order.'**

'London Gazette', 5 November 1940

[Image caption]

Elizabeth, Elspeth and Helen at RAF Biggin Hill, 1940

© RAF Museum X003-4682/002

Background image: © RAF Museum PC71-19-336-2

Women's Auxiliary Air Force Uniform:

Jacket, Skirt, Head and Breast Set, Shirt, Tie, Collar About 1940

This figure is a plotter, and wears a head and breast set to receive and reply to instructions.

The WAAF Other Ranks Service Dress uniform was made out of Barathea, the same fine wool material used for RAF Officers' uniforms and much less rough than the serge material used for Airmen's Service Dress.

Operations Clock 1940s

Operations (sector) clocks were used in Operation Rooms to help track the movements of enemy aircraft. Coloured markers were placed behind plots on the table which corresponded to the coloured segments on the clock. This enabled the controller to see how up-to-date the information was.