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The RAF Museum in Focus



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THE STORY OF RAF HENDON; BRITAIN'S CRADLE OF AVIATION;
RAF APPRENTICES - THE NEXT GENERATION; NEW EXHIBITS;
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Foreword

Welcome to this special Royal Air Force publication, dedicated to the RAF Museum, in the year that celebrates the service's 100th birthday. Originally conceived to mark the RAF's 50th anniversary, the Museum was founded in 1968 to commemorate achievements of the past, celebrate the incredible group of people that have made - and continue to make - the service special, and to inspire the next generation of men and women. Our founding fathers set out to achieve those aims five decades ago, and we continue their fine work today.

There have been many triumphs over the years. The magnificent, world-class museums at London and Cosford are full of incredibly engaging stories that are a great source of pride within the service and beyond. Our purpose is to share the RAF story and we fulfil this role at our Museum sites, through our digital platforms and social media, and through our outstanding outreach programme that sees members of the RAF Museum team visiting schools and communities.

This community engagement, locally, nationally, internationally and online, is spreading the word of the RAF's story around the world.

Also, in the best tradition of the RAF, we continue to look towards the future and improve, using the latest innovative ideas in our displays. After countless hours of work, the massive redevelopment of our London site has been completed and is now open to the public - some £26 million has been invested to transform the museum into a focal point that marks the RAF's Centenary. The overhaul has resulted in new interactive exhibitions that

explore the first 100 years of the RAF and its roles today, and entice visitors to imagine its future contribution and technology.

This has been achieved while the museum has remained open to the public, thanks to the terrific efforts of our team at London, supported by colleagues at Cosford and Stafford. The transformation of the landscape, from a functional area to one that welcomes you in, guides you around the site and has open spaces for everyone to enjoy, is magnificent.

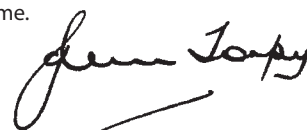
In common with the service we commemorate, raising the funds to achieve our aims and hit our targets has always

been challenging. The RAF Museum is grateful to have such first-class backing from the public, members of the armed services, our corporate supporters and many Trusts and Foundations. The Heritage Lottery Fund has been incredibly important to us, as its advice and grants have made the seemingly impossible, possible.

We have achieved much from our somewhat humble beginnings - some might say this mirrors the RAF's motto:

Through Adversity To The Stars.

I very much hope you enjoy this special publication, and that you visit our museums at London and Cosford in person, or engage with us online, soon. We look forward to giving you a warm welcome.



**Air Chief Marshal Sir Glenn Torpy
GCB CBE DSO, Chairman of the Board
of Trustees, RAF Museum**



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Hangar 1's Airco DH-9A is a remarkable aircraft, having the distinction of shooting down an enemy aircraft only to be brought down itself, and then flown by its foes! In the first of a series of features that detail the history of important items on show at the museum, Andrew Simpson reviews this biplane's incredible history.

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One of the most impressive aircraft in the new *RAF Stories, the First 100 Years* exhibition fought in the deadly skies over Dieppe in 1942. Editor Nigel Price and the Royal Air Force Museum's Andrew Simpson chart the history of Supermarine Spitfire Vb BL614 – a true 'warbird' from World War Two.



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We take a look at what could be the next major redevelopments at the RAF Museum Cosford and London.

RAF Museum London

The RAF Museum London is located on Grahame Park Way, London, NW9 5LL. It is open all year except for certain dates at Christmas and is free to enter. A small car parking charge is made, however. For opening times and more details see page 21, or visit www.rafmuseum.org.uk/london

RAF Museum Cosford

The Museum's site at Cosford, Shropshire, is sited on the edge of the RAF station of the same name. It's also open all year except for certain dates at Christmas, and is free to enter - but a small car parking charge is made. For more details, see page 95, or visit www.rafmuseum.org.uk/cosford

First opened to the public in 1972, the RAF Museum London has always had a clear purpose – to commemorate the service's many achievements and bravery of its men and women, to celebrate its professionalism and dedication and to inspire the next generation of personnel by telling the RAF's unique story. As it entered its fifth decade, the Museum's Board of Trustees reviewed how the story was being told – and found that while the public were enjoying their visits, the RAF's story wasn't being communicated as effectively as it could be. A strategy was developed to improve the situation and bring that story to life.

One of the primary parts of the strategy was to carry out visitor, and non-visitor, research. This was undertaken and produced some interesting results. Firstly, it was found that a huge percentage of visitors were looking for good day out at a free museum but had little or no knowledge of the RAF. Worryingly, the research showed that visitors knew precious little more when they departed the site at the end of their visit. Secondly, the site layout and landscaping made it both unwelcoming and hard to navigate. Clearly the story needed to be told in a more engaging way, and the site required extensive work to make it both functional and inviting. Plans were drawn up in close collaboration with local communities and a fundraising campaign started.

Moving Forward

Rebecca Dalley, Head of RAF Centenary Programmes at the Museum, was part of the team from the very beginning some six years ago. Thinking back to the start of the venture, Rebecca commented: "Our research showed



The Museum site from the air in late 2004.

RAF Museum Chief Executive Officer, Maggie Appleton MBE. All photos via the RAF Museum unless noted



that 90% of visitors were spending an average of two hours at the Museum, but were walking out without understanding anything more about the Royal Air Force than when they walked in. They could perhaps pull out some facts about the aeroplanes and the technology but not who was using it, or why. The big strategic change for us was to focus back onto the RAF."

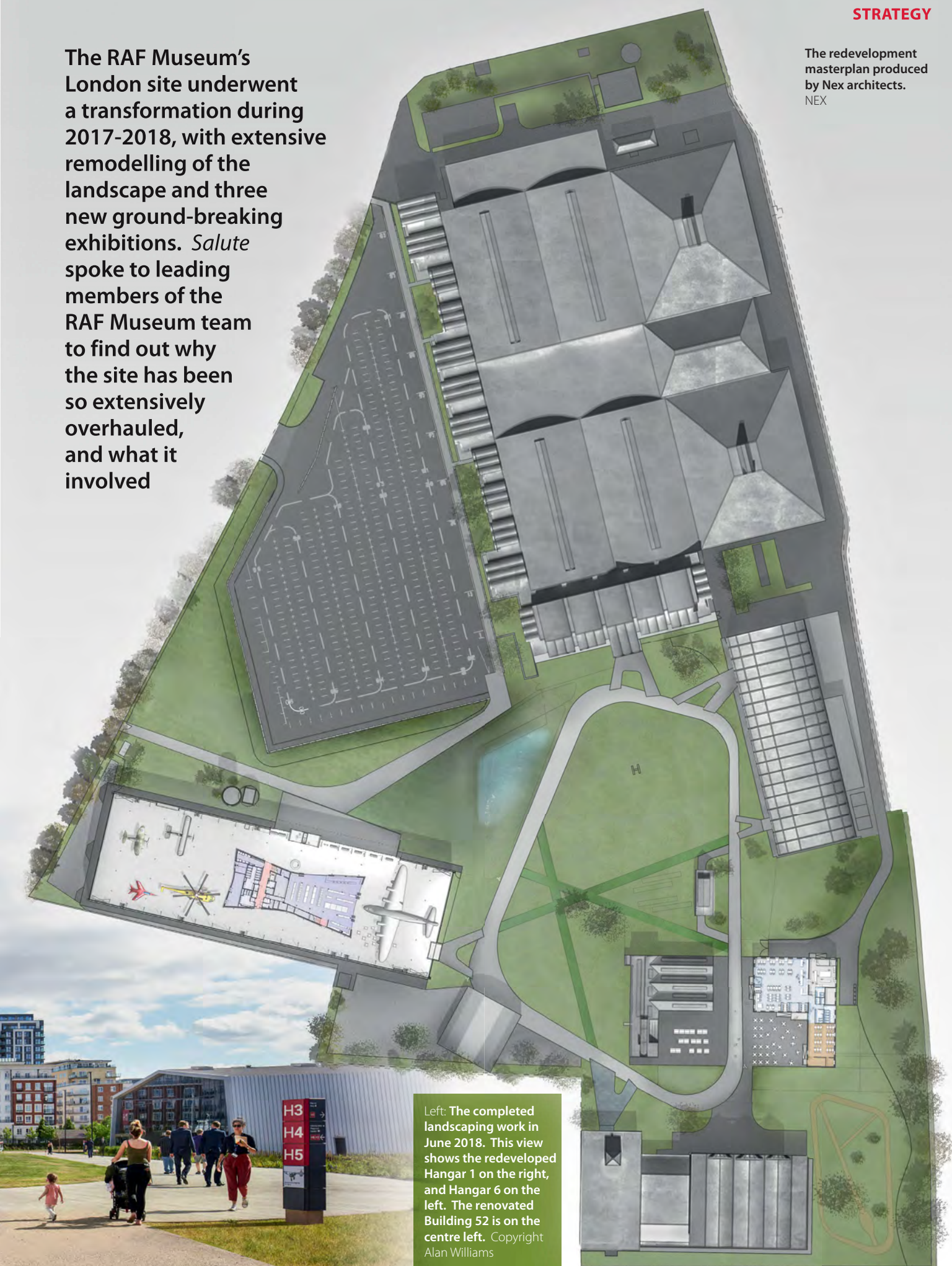
The Museum's external appearance and layout also needed addressing. Viewed from the outside, the site appeared to be a sea of concrete and Tarmac, dominated by 1970s-style buildings and a car park. There was little to entice people in, and when visitors did arrive, they were in the middle of the site, and were often unsure of where to go. »

The Bigger Picture



The redevelopment masterplan produced by Nex architects.
NEX

The RAF Museum's London site underwent a transformation during 2017-2018, with extensive remodelling of the landscape and three new ground-breaking exhibitions. *Salute* spoke to leading members of the RAF Museum team to find out why the site has been so extensively overhauled, and what it involved



Left: The completed landscaping work in June 2018. This view shows the redeveloped Hangar 1 on the right, and Hangar 6 on the left. The renovated Building 52 is on the centre left. Copyright Alan Williams

Karen Whitting, the Museum's Director of Content and Programmes and a key member of the redevelopment team. This photo was taken in the historic Claude Grahame-White office in Hangar 2.



Karen Whitting, the Museum's Director of Content and Programmes, elaborates: "The way the car park used to be in the middle of the site wasn't family-friendly and didn't help visitor flow. Our research showed that around 65% of visitors had no idea of where the entrance/reception area was, even though we had signage showing the way.

"We did some monitoring of the site to see how many people went to the other hangars

Funding

Redeveloping the Museum has cost around £26 million and has been completed on time, and on budget. It has been supported by many organisations, companies and people. The Heritage Lottery Fund has been a major backer, as have BAE Systems. The State of Kuwait and Northrop Grumman, and many others have all generously contributed. Money from the Armed Forces Covenant LIBOR Funds were also allocated to the project by the government and of course, the public have been prime supporters – without their sponsorship, the project is unlikely to have taken place.

once they had found the entrance. Only 40% viewed the Battle of Britain collection, for example, and only 9% found our multi award-winning *First World War in the Air* exhibition. People were completely missing it, thought they had finished their trip and would leave.

"So a key point for us was to make sure the visitor journey around the site needed little effort: that even without reading a single sign you could find exactly where to go. We did

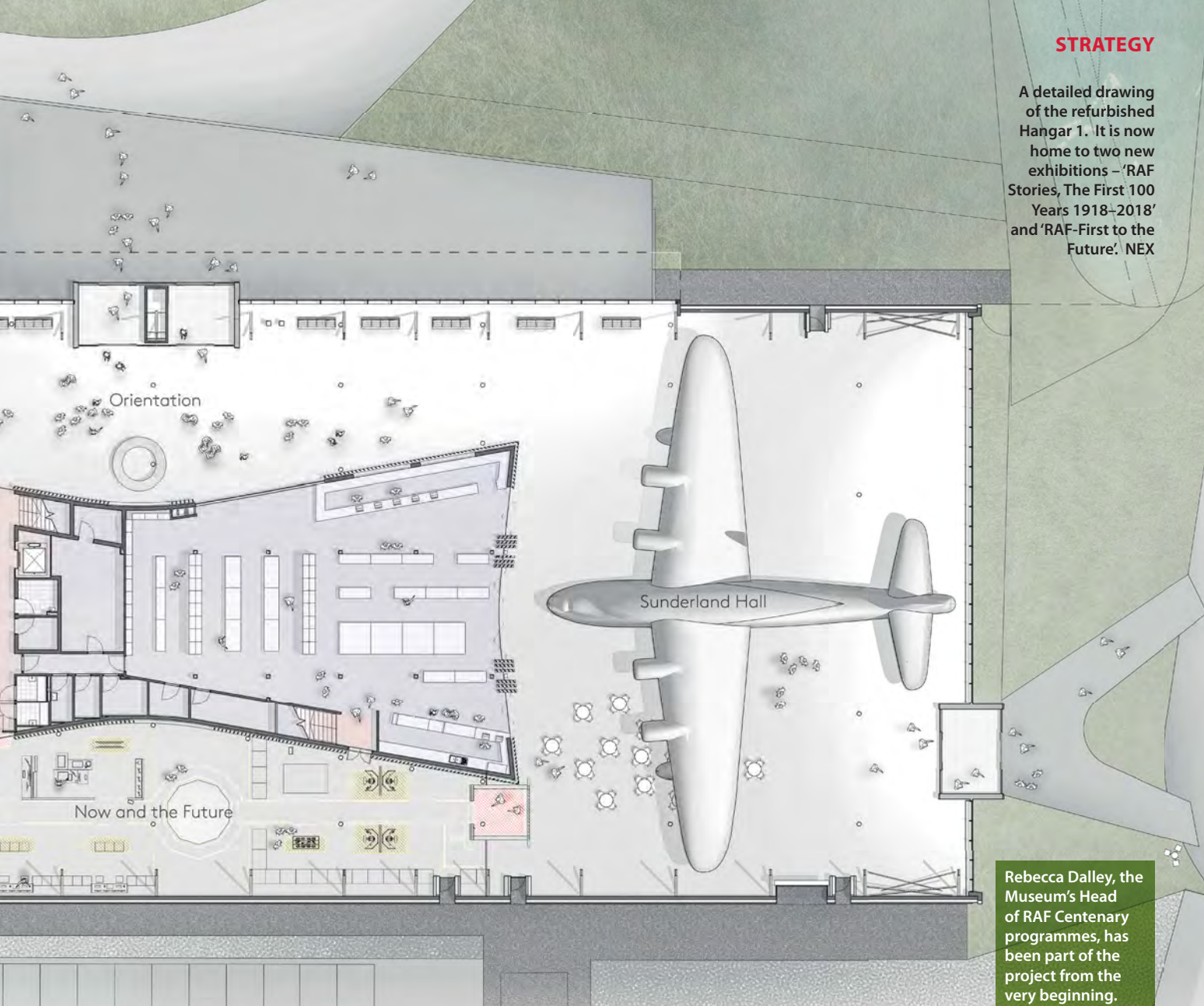
The rather unwelcoming former Museum entrance. The main reception was subsequently moved to the Milestones building.



this by making a shared entrance and exit to the Museum - on arrival visitors can see the whole site and choose where to go using the dedicated paths."

In 2014, Maggie Appleton MBE, someone with vast experience of running museums and cultural organisations joined the team as Chief Executive Officer and drove the project forward. She has a special connection with the Royal Air Force – her father served as an

A detailed drawing of the refurbished Hangar 1. It is now home to two new exhibitions – 'RAF Stories, The First 100 Years 1918-2018' and 'RAF-First to the Future'. NEX



Rebecca Dalley, the Museum's Head of RAF Centenary programmes, has been part of the project from the very beginning.



The interior of Hangar 1 slowly taking shape in 2017.



Avro Lancaster armourer in World War Two. Her vision for the Museum is that every man, woman and child who visits should understand and be inspired by the RAF – and the London site before the recent redevelopment didn't do that anywhere near as well as it could.

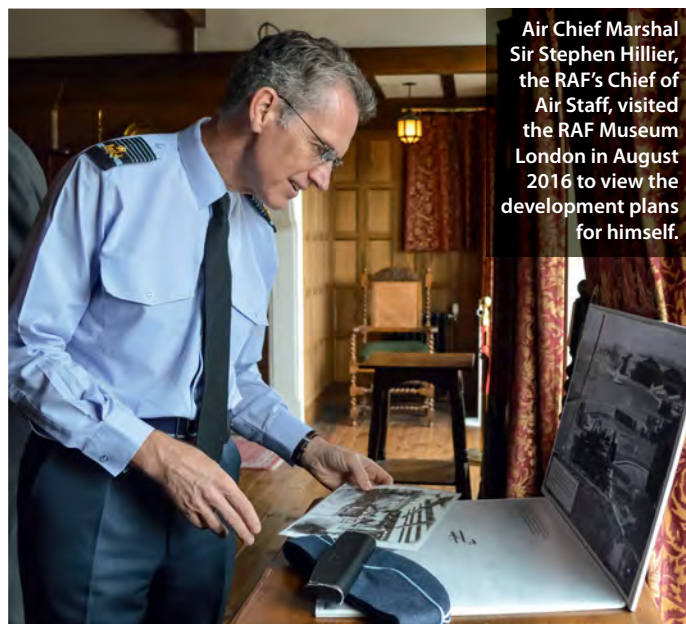
Maggie: "Visitors struggled to find their way around the site and many of the exhibitions were centred around statically displayed aircraft with little information on how the

machines fitted in with the RAF's story. In fact, the role played by the men and women in the Royal Air Force was scarcely covered. Bringing objects to life and making them sing out is absolutely key to what we should be doing. Giving information is important, and we've woven it into the current transformation but, more than that, we needed to give a strategic overview of the service and the length and breadth of what the Royal Air Force does

through the stories of the people. Across the 100 years, across every rank and trade. That was a very clear starting point."

Bringing Down the Barriers

The site started to be re-landscaped in 2017 to give the feel of a mini aerodrome. The central area previously used as a car park was grassed over, with paths created around its edge, peri-track style, created - echoing Hendon's »



Air Chief Marshal Sir Stephen Hillier, the RAF's Chief of Air Staff, visited the RAF Museum London in August 2016 to view the development plans for himself.



A Blue Steel missile arriving on site for inclusion in a Hangar 1 display.

airfield heritage. Designed by Agence Ter Landscape Architects, the remodelling creates a green space for people to enjoy. The intention was to dramatically improve the feel of the site, making it considerably more welcoming and attractive. The per-track would also tie the Museum's eclectic assortment of buildings together, another important step forward in improving the visitor experience.

With the landscaping plan in place and work in hand, thoughts turned to the exhibitions, and how best to bring the RAF's story to life. The decision was made early on to

reuse existing buildings, as constructing a new hall would be expensive and time consuming, and would increase long-term running costs.

The strategic plan called for new exhibitions that, in one building, give an overview of the RAF's history, its values and current/future role. After spending time in the introductory hall, visitors would then be guided to the other exhibitions, which would be themed into time-specific areas, using the newly created paths and green space.

Part of the work was the renovation of Building 52, and its transformation into a 120-seat café/restaurant. The building

The Octopus

A new computer publishing platform that unites the Museum's gallery and external digital platforms has been introduced as part of the recent work. Nicknamed the 'digital octopus', it enables content – whether it's from the Museum's website, photographic material or audio store – be pushed out to the galleries through a simple IP address. This means every screen in the new galleries can be updated from anywhere in the building. It uses the industry-leading WordPress interface, so it's simple to use with minimal training. This will allow the displays to be changed, enhanced or updated quickly and simply, something that wasn't possible before.

The Supermarine Spitfire replica being taken down from its display perch in the central courtyard in 2017. After conservation work and a repaint, it is now on display as a gate guardian close to the main pedestrian entrance.



The relocation of the Museum's RAF search and rescue boats to their new position close to Hangar 1 on May 18, 2018.



dates back to the 1930s and was used by the RAF to hold supplies. Bringing the previously derelict structure back into use was welcomed by Historic England - a key factor in attracting lottery funding for the Museum redevelopment.

Starting on Site

As with any project of this size, there were countless stages that needed to be completed before work could begin - planning permission, surveys, consultation, tenders, contracts and fundraising being just a few.

In addition to Agence Ter Landscape Architects, several major contractors were employed on the project, with the principal companies being London-based architects Nex, SDC builders, which carried out the main capital work and St Albans-based Borras Construction, who refurbished Building 52.

In March 2016, the first major physical signs of the redevelopment began to be seen. Aircraft were dismantled and gradually moved step by step, the site was transformed, the buildings overhauled and the displays made ready.

To make the site more user-friendly, a single point of entry/exit was created by taking down the old restaurant building. Channelling everyone through one point means they can be welcomed onto the site by staff and given information on what there is to see at the start of their visit. It also means they only have to go through a security checkpoint once - previously they had to do this on entering every building, which

could result in queues and could prove to be irritating to visitors.

The Museum now had the landscaping planned, had identified the buildings to be used and knew the themes that would be covered. All that needed to be done was to select which items from the 1.3 million in the collection to use!

Project teams that included members of staff from various departments were set up to produce the ideas, themes and content for the new displays. Each of the three galleries had a different team to ensure each exhibition achieved its own look and feel. Once the theme/content was set, professional external

designers were brought in to work with the teams.

Gradually the themes took shape and the refitting work started. Getting the right message, look and feel was vital, which took careful management and thorough understanding of the desired result to achieve. Karen: "We have a strong voice, and we are very clear in what our vision is - we've been involved in every single step. We've worked with the contractors on how things were built, what materials were used, everything. It was important to us that all of the companies we've worked with understood us and how we wanted to work. We did lots of walk-rounds, »



The nose section of Lockheed C-130E/WC-130E Hercules 64-0553 arriving on June 14, 2018. It's now on show in the 'RAF in an Age of Uncertainty 1980 - Today' exhibition.



Short Sunderland MR.5 ML824 stayed in Hangar 1 during the building's transformation. The big flying boat was covered in protective foam sheets and then wrapped in fireproof polythene to protect it. It came out unscathed.

seeing samples of everything, and if we didn't like something, we said so. That's why the result is so close to the original concept - we've hung on to our original vision. I've worked on a lot of major projects before and that rarely happens - you usually have to do a lot of expectation management. You normally say these are concept drawings, they are not formal technical designs; there will always be a change before we deliver. On this project every single drawing we have produced we have delivered. It has become the reality we hoped for.

"We now have an introductory exhibition - the RAF story, our 100-year overview. If you know little or nothing about the RAF, that's where to start. Even if you do know plenty about the service, there is still a lot of new


information within the exhibit, and objects that we've never had on display before.

You've then got the opportunity to go into something that looks forward - where is the RAF going next - in our new *RAF - First to the Future* exhibition."

CEO Maggie Appleton was equally impressed: "The depth of research that has gone into the new exhibitions is incredible - it's second to none. A lot of the interpretation has been done in a layered way to engage with non-specialists, but as you dig down there is more and more information. The research underpinning it has come from our archives, or from current serving members of the RAF, who are the experts in their fields. Our team have been to stations such as Waddington and Brize Norton, and the RAF have generously

shared what they can with us. They have been immense.

"The Museum staff and volunteers across all of our sites have worked incredibly hard on this project and I can't praise, or thank them, enough.

"I'm proud of how we are now telling the story of 100 years of the RAF, those pivotal and important moments in the service's history. We are making visitors aware of the legacy of those brave and incredible people who have fought for their country, and the important work the men and women serving today are doing for the nation." 

Turn to page 34 for a detailed look at the exhibits and displays on show within the refurbished buildings.



A Hawker Hunter being moved to Cosford as part of the work.

Flood Prevention

The Museum isn't alone in being redeveloped in the wider Hendon area - some 10,000 new homes have been built around the site, with around 30,000 new residents. It is already a heavily populated area, with the nearby Barnet and Brent boroughs having a combined population of around one million.

The tremendous amount of new housing has increased the risk of flooding during severe weather, due to lack of run-off. Flooding can be devastating for any building but especially a museum - the damp, mould and damage it does to important historical items is disastrous.

To reduce the risk of flooding, a sustainable urban drain - a kind of giant pond - has been created as part of the RAF Museum's landscaping work. Surplus water from a major storm from around the site, including the car park, will be held in the drain until the normal drainage system can cope. It's not the most glamorous part of the project, but it might just save the day at some point in the future.



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Hendon

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Below: Workers gathered outside the Grahame-White buildings during a visit by King George V and Queen Mary on December 4, 1917.



**Grahame-White
Aviation Company
staff in June 1918.**

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Ken Ellis and Andrew Renwick chart the history of RAF Hendon

The site at Hendon where the RAF Museum stands is steeped in aviation history and along with Farnborough in Hampshire, was at the very forefront of early aviation in the UK. The flat land off the Edgware Road, where Colindale Avenue ended near Hendon, looked ideal for flying and caught the eye of local aviators-to-be.

Around 1908, Helmut Martin and George Handasyde built a monoplane in the ballroom at the back of Hendon's 'Old Welsh Harp' public house and tested it in a nearby field; it was not a success. Their machine was badly damaged when its engine tore itself free of the airframe while being ground-run and the project was then abandoned, but the pair went on to form the Martinsyde Aeroplane Company.

A year later, local businessmen Edgar Everett and Kenelm Edgcumbe began work on a monoplane to their own design and are said to have enlisted Hawkers the Drapers to help with the fabric work. The project was housed in a specially built shed near to where the

Museum stands today, but this machine was only ever destined to be the 'Grass Hopper', that the locals nicknamed it.

Claude Grahame-White

In 1910 Claude Grahame-White had hoped to use Everett & Edgcumbe's shed to prepare for a London to Manchester race. He felt the site was too exposed, however, leaving it available for his opponent and eventual winner of the race, Louis Paulhan. Everett & Edgcumbe formed the London Aerodrome Co Ltd to manage the new airfield at Hendon, which opened on October 1, 1910; the first residents included the Aeronautical Syndicate and Blériot School, occupying sheds built by F Smith & Co of Stratford.

Claude Grahame-White recognised Hendon's potential, and in 1911 he acquired the site from the London Aerodrome Co Ltd. His company, the Grahame-White Aviation Co Ltd (GWAC) began assembling Burgess Baby aircraft in 1910. The following year it produced

the New Baby and was also soon building Morane-Saulnier monoplanes under licence.

On May 12, 1911 the Parliamentary Aerial Defence Committee witnessed a display of flying machines, including Claude Grahame-White dropping flour bombs from his aeroplane on a mock-up of a battleship. More and more individuals and organisations came to fly from Hendon, with a string of 'firsts' and record flights achieved; for example, Gustav Hamel flew the first UK aerial post, flying between Hendon and Windsor in a Blériot XI on September 9, 1911.

George Holt Thomas established the Aircraft Manufacturing Company - Airco - in 1912 and, along with GWAC, started to build aeroplanes at Hendon. The latter company received orders for two new RAF BE.2s from the War Office in 1912, followed by a transaction to buy seven existing aircraft in March of the following year.

Grahame-White was determined that Hendon would be a place the public would »



Claude Grahame-White.

“Grahame-White was determined that Hendon would be a place the public would throng to and on June 8, 1912 he staged the first Aerial Derby when an amazing crowd of 45,000 turned up”

throng to and on June 8, 1912 he hosted the first Aerial Derby when an amazing crowd of 45,000 turned up.

In 1913 John D North joined GWAC and he began designing aircraft for the company, many of which were used by the Grahame-White flying school and local pilots. The bi-rudder Bus aircraft was one of the first machines from North's drawing board – the company went on to make over 20 different types, plus assembly work. Some were relatively successful, others didn't progress beyond the prototype stage. Winston Churchill, First Lord of the Admiralty, was a notable visitor to Hendon in April 1915, an opportunity exploited by Grahame-White who sought more orders for aircraft.

Call to Arms

At the start of the First World War, Grahame-White offered himself, his company and Hendon Aerodrome to the Admiralty.

His offer was accepted by the Royal Naval Air Service. Airco, GWAC and other local companies then received orders for aircraft for both the Royal Flying Corps (RFC) and Royal Naval Air Service (RNAS). In June 1914 Geoffrey de Havilland joined Airco, having previously designed for the Royal Aircraft Factory. His DH.1 first flew from Hendon in 1915 - the start of a huge wartime production run. An Aircraft Acceptance Park was established to take delivery of aeroplanes from the many factories in the area, including the Grahame-White works, Handley Page and Airco.

Hendon housed several flying schools, training pilots for both RFC and RNAS. Three aviators who trained at Hendon, Edward 'Mick' Mannock, Albert Ball and Reginald Warneford, were later awarded the Victoria Cross for their bravery in the air.

With the formation of the RAF on April 1, 1918, Hendon kept the title 2 Aircraft Acceptance

Park and was not known as RAF Hendon until the following decade. By the time of the Armistice, the factories had peaked with over 15,000 employees and nearly 8,000 aircraft produced, but the decline in manufacturing was dramatic, leading to mass lay-offs and terminated contracts.

In December 1918 the negotiations at Versailles that were to bring World War One to a formal end brought into being No.1 (Communications) Squadron, with DH.4As and Handley Page O/400 shuttling between Paris and Hendon with diplomats and administrators. Air Travel and Transport Ltd formed at Hendon and on May 1, 1919 set off on the first commercial post-war flight, in a DH.9.

The Aerial Derby returned on June 21, 1919, but the following year it was 'all change'. The RAF staged a spectacular tournament on July 30, which this was the precursor of the famous annual Air Pageants.



The RAF Display at Hendon in 1928.



Westland Wapiti, Avro 504N and de Havilland Moth aircraft of 600, 601 and 604 Squadrons, Auxiliary Air Force, outside their hangars at RAF Hendon, circa 1931.



The aerodrome was bought by the RAF in 1925, becoming the preserve of 600 (City of London) and 601 (County of London), and later 604 (County of Middlesex), Squadrons, Auxiliary Air Force. Parts of the aerodrome became accommodation blocks and married quarters; various other buildings were erected, including the station headquarters. RAF Hendon's proximity to the capital meant it was also home to communication units: the most significant was the King's Flight which formed there on July 20, 1936.

World War Two

During the Second World War it was 'comms' units that held sway at the airfield, with the varied fleet of 24 Squadron being the most prominent. This communication work was vitally important, with many VIPs being flown by the unit from Hendon. One of the most well known aircraft to be based at the airfield in World War Two was Avro York C.I

LV633 *Ascalon*, the type's third prototype. Configured for use by VVIPs, it was delivered to 24 Squadron on May 21, 1943, and joined the King's Flight. It was used by King George VI and Winston Churchill. The York flew the Prime Minister to and from many of his most important conferences, and also conveyed the King on visits to Italy and North Africa.

Hendon also played an important part in defending London during the Battle of Britain, and one of its airmen was at the heart of one of that historic summer's most famous, and heroic, incidents. Sgt (later promoted to Flt Lt) Ray 'Arty' Holmes of 504 Squadron took off from Hendon in Hawker Hurricane I P2725 'TM-B' on September 15, 1940 to defend London from yet more attention from the Luftwaffe's bombers.

Reichsmarschall Hermann Göring dispatched a force of around 1,500 aircraft to fly over southern England that day in an attempt to smash the RAF and British defences



The advertising poster for the 1933 RAF Display.

once and for all. The massive force inflicted considerable damage, with Buckingham Palace and other important sites being struck.

'The Few' of Fighter Command did their best to stop them and Holmes intercepted part of the bomber stream, battling several Dornier Do 17s. He sighted his third Do 17 over central London and attacked. He soon discovered he was out of ammunition so decided drastic action was needed to stop his foe from raining down its war load on the capital. He pointed his speeding Hurricane at the German, intending to use his wing to slice off the rear fuselage close to the tail. He said afterwards that he believed the Luftwaffe machine would be cut in two at this weak point, and his sturdy aircraft would remain more or less intact. He was proved partly right – the Do 17's rear end was neatly severed, but unfortunately so was a big part of P2725's wing! Holmes took to his parachute while the German aircraft crashed close to Victoria railway station. Amazingly, »



The New Types Park at Hendon's 1932 RAF Display.



A Grahame-White-assembled Burgess Baby circa 1911. At least seven were constructed at Hendon, one of which was used by the flying school. Miss Lily Irvine, one of the world's first female aviators, is illustrated trying the aircraft for size. She was taught to fly by her husband, James V Martin, an instructor at Hendon and the first man to fly over London. It's unclear if she made her first solo flight before or after their marriage in 1911. The couple departed for America – and more flight adventures – in 1912, before she could qualify for her pilot's licence.



The mass flypast being filmed as it passes over the Grahame-White Factory during the 1937 display.

Royal Air Force Hendon Units

Many flying units called Hendon home during its 60 or so years of service. Some stayed a brief time, others had a longer residency. The following are known to have been based at Hendon and are listed in squadron order, followed by flights and units.

Squadrons: Metropolitan Communications Squadron; 1 (Communications); 2 (Communications); 24 (Communications); 24; 31; 116; 248; 257; 504; 512; 575; 600 (City of London); 601 (County of London); 604 (County of Middlesex); 611 (West Lancashire).

Flights and Units: Home Communications Flight; King's Flight; Transport Command Communications Flight; 50 Group Communications Flight; RAF Antarctic Flight; Blenheim Conversion Flight; 1316 (Dutch) Flight; 1416 Flight; Air Ambulance Unit.



Above: A Luftwaffe target map showing RAF Hendon circa 1940. The map was somewhat out of date, but shows the airfield was a primary target.

the Dornier's demise was caught on film by a camera crew.

The Hurricane's remains were excavated in 2004 by a Channel 5 television documentary team – the control column was recovered and incredibly it was still in the 'fire' position. Today, the RAF Museum's 'gate guard', a Hurricane replica, carries the P2725 serial number and 'TM-B' code of Ray's aircraft.

Unwanted Attention

Hendon's importance was understood by the Luftwaffe during the war, and it is known to have been bombed several times. The nearby Colindale Underground station took a direct hit on September 25, 1940 and was badly damaged. A hangar was destroyed in a raid on October 7, 1940 and a string of bombs fell on the airfield on November 11 that same year. At least two V-1 flying bombs hit the station, or

close to it, in 1944, tragically claiming the lives of 13 servicemen and women.

The Metropolitan Communications Squadron (MCS) was established in April 1944, and redesignated as 31 Squadron in July 1948 until, in March 1955, it reverted back to MCS. Post-war, 601 and 604 re-formed, soldiering on with Supermarine Spitfire 16s until the advent of jets forced a move to North Weald, Essex, in 1949.

US Army and Navy units were also based at the station, flying Douglas R4D Skytrains and types such as DHC L-20 Beavers during the early 1950s. In 1957 the airfield closed to regular flying and it fell to the MCS to perform a farewell flypast on November 4, comprising DH Devon C.2 VP958, DHC Chipmunk T.10 WZ875 and Avro Anson C.19 TX214. Devon VP952 was present on that day, and today it is preserved at the RAF Museum Cosford. The »

“He sighted his third Do 17 over central London and attacked”

A Douglas Dakota III at Hendon in June 1944, with the Grahame-White Watch Office in the background.





Top: A Devon C.2 of the Metropolitan Communications Squadron over Hendon's main gate in 1957. Below: Bristol Blenheim If fighters taking off during the 1939 Empire Air Day. Above, left: LACW Ruth Jarvis and two colleagues loading a patient on a stretcher into an Airspeed Oxford II, air ambulance practice, RAF Hendon 1943. Above, right: Members of the Women's Auxiliary Air Force at work at Hendon in 1939. Key Collection



HENDON'S HISTORY

last resident aircraft to depart was TX214 on the 7th - which is also now at Cosford. The honour of making the final scheduled landing went to Blackburn Beverley C.1 XH124, which flew in for preservation on June 1968.

Occasional Visits

There was still the occasional visit by fixed-wing aircraft, although these weren't usually intended as such. On June 2, 1966, for example, a USAF Douglas C-54 Skymaster made an emergency landing with a possible in-flight fire. It appears it was a false alarm and the transport aircraft continued its journey the following day. A West German Nord Noratlas dropped into Hendon on January 25, 1967 after mistaking the airfield for Northolt.

The final two landings by fixed-wing aircraft came in December 1968. On the 23rd, Piper Cherokee G-AVWD put down at Hendon after the pilot had become lost in poor weather. On Christmas Eve, Cherokee G-AVUR landed to help get the first aircraft back in the air and thus ended nearly 60 years of flying. (The occasional helicopter has dropped in since, including Boeing Chinook HC.4 ZA718/BN on July 18, 2007.)


Hendon remained a functioning RAF station with a variety of ground-based units and the silent wings of 617 Gliding School (1959 to 1968). From mid-1968 Barnet Council began building houses on the airfield site, the RAF



An Anson and a Devon in the Grahame-White building in November 1957.

presence being reduced to the 10 acres destined to become the RAF Museum - and the East and West Camps, housing the Joint Service Air Trooping Centre (JSATC) and the Supply Control Centre (SCC).

RAF Hendon officially closed on April 1, 1987. East Camp finally closed in February 1988, the Grahame-White Factory and the Watch Tower being within its confines. Both listed buildings, it would be some time before their future could be defined. West

Camp closed in August 1988, but the RAF Ensign continued to be flown from the refurbished and repositioned RAF Hendon Station Headquarters flagstaff, courtesy of the RAF Museum. 

This feature has been extracted and adapted from Great Aviation Collections of Britain by Ken Ellis and available from Crécy Publishing. It also uses much information from the excellent RAF Hendon – The Birthplace of Aerial Power by Andy Renwick, available from the RAF Museum shop.

Grahame-White Buildings Preserved



The Grahame-White Watch Office in use for air traffic control, circa 1945.

The Grahame-White Watch Office, now preserved and part of the RAF Museum.
RAF Museum-Iain Duncan



The Grahame-White Watch Office, is the oldest building on the RAF Museum's site, and was built in 1915 as part of the expansion of his factory. The building included Claude Grahame-White's office, the company boardroom, the accounts department and the drawing office - so was at the heart of his thriving enterprise. The adjoining factory building was added during further expansion but came too late for aircraft production.

By the time the Air Ministry took complete control of Hendon in 1926 Standard Telephones and Cables Company (STC) leased most of the factory buildings, including the Grahame-White offices. In 1934 the aircraft radio section of STC moved to Southgate and the RAF took control of most of the factory buildings.

Before World War Two the factory building was used as a vehicle store and later as a clothing store. During the war the Watch Office became the airfield control tower and continued in this role until the airfield closed in 1957. Parts of the factory had also been used as a passenger and freight terminal.

After the airfield shut, various uses were found for the Grahame-White buildings until the station closed in 1987. All the structures on site were eventually left empty pending redevelopment of the site. As part of the re-development the Grahame-White factory was moved to the museum site and reopened in 2003. In 2010 the developers, St George, moved the Grahame-White Watch Office and reunited it with the factory.

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From humble beg

Ken Ellis outlines the Museum's history, from an eclectic collection of items to two world-renowned heritage centres

As related in the feature on pages 14 to 20, the expansive site on the former RAF Hendon airfield was an ideal home for a museum dedicated to Britain's foremost air arm. The site, steeped in a rich aviation history, was large enough and available at the right time. Its proximity to London was also an advantage – it was a perfect location.

It was as far back as the 1930s that the idea of collating and presenting the heritage of the RAF was first mooted. Some far-sighted chiefs appreciated that, although the service had only been created in 1918, too many artefacts, large and small, had already slipped the net, probably never to be regained. But the 1930s were not good years for the RAF to establish a museum, swinging from a chronic lack of funding early

in the decade to massive expansion to meet the threat of Fascism during the mid-to-late 1930s. Plans for a formal collection were shelved, but a small department established in 1920 was already carrying out a vital task and would assume greater responsibility – the Air Historical Branch (AHB).

Tasked with advising the Air Staff on historical matters, collating Air Ministry and RAF records and producing official histories, AHB has essentially the same role today. To the praise of all involved, during World War Two the AHB was recognised as the best body to itemise, locate and preserve artefacts important to RAF heritage. With limited resources and without a clear view of the 'outcome', AHB personnel, and some

gifted COs, managed to secure some incredible aircraft for future generations.

By 1945, the work of the AHB was such that several generic phrases were in use: 'an AHB aircraft' and 'the AHB collection', even 'the AHB museum'. During the late 1940s a series of RAF stations looked after AHB aircraft, many of which were dismantled and in packing cases, destined to move around the country as airfields closed or changed priority. In September 1946 what became known as the Cranwell 'museum' was established on the North Airfield and it can be regarded as the prototype 'station museum'. Four others followed: Colerne, Wiltshire; Cosford, Shropshire; Finningley, Yorkshire; and St Athan, Wales.

Sopwith 1½ Strutter
on display in the
Museum's Grahame-
White Factory.

innings



The Start of Bigger Things

In November 1958 the imposing Air Ministry, now Ministry of Defence (MoD), building in Whitehall, London, was fully open for business. Designed by Vincent Harris, this enormous creation had been started in 1938 and struggled its way through the war, and budget constraints to completion. Consideration was given to opening a room, or two, to the public at weekends. Material on view was to include uniforms, medals, photographs and documentation. For a variety of reasons, this was turned down. But the idea of 'opening up' stuck, and in 1961 the Air Council set up the Historical Advisory Committee, chaired by Sir Dermot Boyle, with the brief of identifying what to

preserve to show the RAF's heritage and how it should be displayed.

In 1953 John Tanner (Dr Tanner from 1960) became librarian of the RAF College at Cranwell, home to the first station museum. As well as organising enthusiasts' tours of the 'museum' hangar on Cranwell North, John developed a memorabilia room within the fantastic college building, which was open to cadets, teaching staff, VIPs and members of the public by prior arrangement. In many ways this was a taste of what *nearly* happened at Whitehall and he wrote to Sir Dermot Boyle in 1962 outlining what would make an RAF Museum (RAFM).

In 1963 John was given a job co-ordinating the inaugural steps in forming the RAF

Museum. A board of trustees, with Sir Dermot chairing, was up and running and John was appointed as its founding director. An assessment of where the museum should be located was begun and an early favourite was Carlton House Terrace, off The Mall near St James Park, but this was quickly discounted - an airfield was the answer. Among those shortlisted were Biggin Hill in Kent, Upavon in Wiltshire and Hendon in Middlesex. In 1967 Hendon was announced as the RAFM's home.

When Dr Tanner was appointed as the founding director he had the most extensive of collections, thanks to the efforts of the AHB and thousands of RAF personnel who had recognised the value of this artefact or that aircraft. Henlow in Bedfordshire had »



His Royal Highness Prince Philip, The Duke of Edinburgh, the Museum's patron, speaking at the 25th anniversary dinner in 1997.



become the major repository for what were still being referred to as 'AHB airframes', along with workshop facilities. Before long, this store had a purpose other than as a holding unit for a conceptual museum: Henlow had a target, it was the 'funnel' through which the RAF Museum would be 'fed'.

Nash Collection

A significant addition was the Nash Collection, previously in the custody of the Royal

Aeronautical Society: two Avro 504s, Blériot XI and XXVII, Caudron G.3, Fokker D.VII, Royal Aircraft

Factory SE.5a, Farman F.41 and Sopwith Camel. Latterly held at London Heathrow Airport, courtesy of the British European Airways Engineering centre, the whole collection was placed on loan to the embryonic RAF Museum in March 1963 and the trek to Henlow began.

The Museum's collection was healthy and expanding; and a 'site' had been secured. A large publicity and advertising campaign was launched to solicit donations from the public and corporate sponsors. Hendon's 'Belfast truss' hangars built in 1917 on the eastern perimeter of the airfield, alongside the railway line, were to be the Museum's home. There had been three of these buildings, but one was destroyed on April 21, 1942.

Dr John P Milford Reid, a former RAF officer, came up with the concept of linking the hangars and 'wrapping' them in a modern facade providing entrance hall, shop, restaurant, theatre/conference facilities etc. Architect Geoffrey Bodker turned this into an impressive and remarkably cost-effective building, the space linking the hangars being named the Camm Hall, in honour of aircraft designer Sir Sydney Camm.

The edifice was 650ft long, 170ft wide and encompassed over 175,000 square feet of display space. With the 'space' defined, under the guidance of Ray Lee, the Keeper of the RAF Museum, and John Tanner, the job of deciding on exhibits and how to arrange them was embarked upon, using the time-honoured method of models within a scale mock-up

Below: **The Gladiator and Hurricane at the Founder Members' Day, Hendon, July 5, 1968.**
All images via the RAF Museum unless noted





The RAF Museum under construction in January 1971.

of the building. An early staff appointment was Jack Bruce, who later became Keeper of Aircraft and Research Studies.

Everything started to come together in 1972, and on November 15 of that year Her Majesty Queen Elizabeth II opened the Museum, which housed some 36 aircraft.

The 'open' presentation of the airframes, with 'kerbs' providing a subtle, but very effective, barrier to any adventurous visitors, was praised. So were the lighting levels and the very 'airy' feel, plus the elevated galleries providing views from a variety of angles and aspects.

Hard on the heels of the main museum opening was the inauguration of the Dermot Boyle Wing - in honour of the guiding light from 1961 and the Historical Advisory Committee - to house special displays. Special events and exhibitions such as the incredible 'Wings of the Eagle' in the mid-1970s, were planned to 'ring the changes'.

Although many of the important items relating to the service's history were on show, the Museum was exhibiting less than a third of the airframes to hand. Growth was on the cards from the earliest days.

Expansion Period

The Hendon site could accommodate more buildings without the need to expand its boundaries, so thoughts turned to extending the Museum, and what it could display. Two themes were obvious - the Battle of Britain and Bomber Command - and once again the two-pronged process of developing exhibits while acquiring the funding were put into action.

First on Dr Tanner's list was the Battle of Britain theme, and while the Museum would have no trouble finding aircraft and artefacts connected to the conflict, there was no building suitable for them. So land was chosen on the south-western boundary, close to Grahame Park Way and a new building, in the shape of a World War Two hangar, was put up especially and the Battle of Britain Museum was opened in 1978 by Her Majesty Queen Elizabeth the Queen Mother.

It proved to be world-class, with a breathtaking collection of aircraft, artefacts and exhibits. In 1990 the rebranded 'Battle of Britain Experience' was opened to great acclaim, and the building underwent



A historic moment. The opening of the RAF Museum by Her Majesty Queen Elizabeth II on November 15, 1972.



"Everything started to come together in 1972, and on November 15 of that year Her Majesty Queen Elizabeth II opened the museum, which housed some 36 aircraft"



Transferring the Grahame-White Factory across Hendon was a truly epic undertaking. It is seen here being reassembled in late 2002. Key-Steve Fletcher

HISTORY OF THE RAF MUSEUM/LONDON

A general view of the First World War in the Air exhibition. His Royal Highness The Duke of Edinburgh opened the new display on December 2, 2014.



another transformation in 2010 with the east wall becoming all-glass.

The Bomber Command Museum, opened by the Queen Mother in 1983, required immense space to meet the ambition of containing the Lake Hockling Halifax, Lancaster *S-for-Sugar*, Valiant and Vulcan V-Bombers and, as part of a tribute to the United States Army Air Force, a Boeing B-17 Flying Fortress and North American B-25 Mitchell, among others. The hall was, and still is, large but every inch of space was needed.

Dr Michael Fopp, whose father was a fighter pilot in the Battle of Britain, was elected as the first volunteer Secretary of the Society of Friends of the Museum in 1974. In September 1979 he joined RAFM's full-time staff and within a year became, highly appropriately,

Keeper of the Battle of Britain Museum. He left in 1985, but three years later John Tanner retired as director and Michael slipped seamlessly into the hot seat.

The Bomber Command Museum failed to raise the funds needed, and Michael needed to get things firmly onto a business footing. The Ministry of Defence paid off the Bomber Command Museum debt, the three museums merged and an admission charge for the whole site was introduced. More income streams were sought, including the arrival of simulators for the public to sample. Without a firm financial base, development was impossible.

By 1988 the Director RAFM was responsible for three sites: London, Cosford and the restoration centre at Cardington, Bedfordshire.

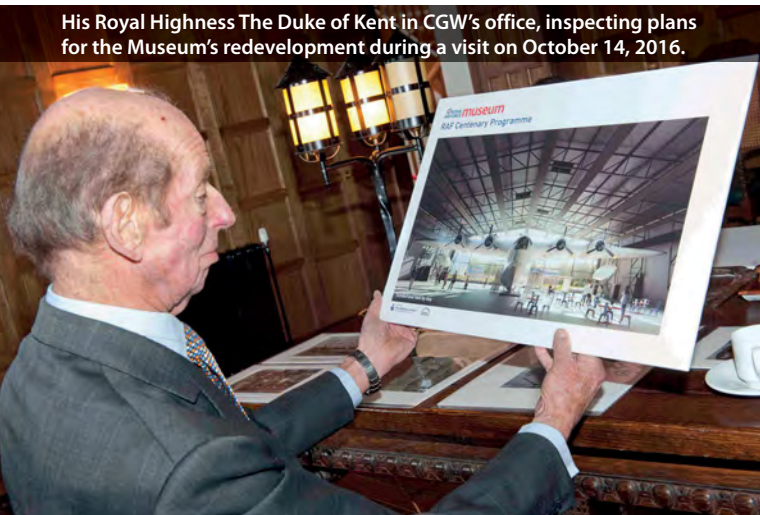
Much of Michael's time was devoted to upping both the status and capabilities of Cosford.

As already mentioned, the former Nash collection had been placed on long-term loan to RAFM by the Royal Aeronautical Society (RAeS). In the early 1990s, RAeS wished to dispose of the collection to the Museum permanently. The MoD acquired the Nash machines on behalf of Museum until September 2004 when it gifted them to the Museum.

Ambitious Projects

Within the confines of RAF Hendon's East Camp were two listed buildings, both from the days of Claude Grahame-White's transformation of Hendon. Built in 1915, the Watch Office afforded views over the comings and goings of the aerodrome as the nerve centre of the

His Royal Highness The Duke of Kent in CGW's office, inspecting plans for the Museum's redevelopment during a visit on October 14, 2016.



The Claude Grahame-White Office being opened by HRH The Duke of Gloucester on March 15, 2011.

Inside the Milestones Hall in November 2011. The Lockheed Martin F-35 Lightning replica is now on show within Hangar 1.



organisation, and was last used as a control tower in 1957. The Factory, with offices overlooking the shop floor, was built in 1917 but completed too late for production of aircraft to take place.

RAF Hendon's East Camp did not close until February 1988 and disposal to developers and plans for the site took time to emerge. Part of the deal that brought about today's Beaufort Park was the relocation of the Watch Office and the Factory to the southernmost edge of the RAFM site. This was no trivial undertaking, requiring detailed liaison between Historic England, local authorities, developers, the many specialist contractors and RAFM.

During the creation of the original Museum building, the 'Belfast truss' hangars stayed

while everything grew up around them.

For the Grahame-White projects the structures needed relocating, using the maximum amount of original materials while meeting modern regulations and visitor requirements. Skills in building relocation and restoration were well established but, despite this, the two-phase project was an enormous undertaking.

The Factory was the first element to be re-sited and aircraft were rolled into it in February 2003 - it opened to the public later in the year. While the Watch Office was smaller, in terms of challenges it was a far bigger project than the Factory. The building was adapted

and extended so that it linked to the Factory with the space in between telling the story of Grahame-White, Hendon, aircraft manufacture in the area and the history of RAFM itself.

The replica of 'G-W's' personal office is breathtaking, the fireplace containing offcuts of aircraft-grade wood in a typical example of Edwardian 'waste not, want not'. Site developers St George completed the migration of the Watch Office in 2010 and it was formally opened by HRH The Duke of Gloucester on March 17, 2011.

Dr Fopp retired as Director in 2010, with a string of major projects successfully delivered, at London, Cosford and the Museum's storage facility at Stafford. He was superseded by AVM Peter Dye, who took the helm as Director General on

June 9, 2010; >>



In 2009 a new glass frontage was fitted to one end of the Battle of Britain Hall.

The Milestones of Flight building under construction in December 2002. Key-Steve Fletcher




“It proved to be world-class, with a breathtaking collection of aircraft, artefacts and exhibits”

the first former RAF officer to take command of the Museum. He moved on after some four years and Maggie Appleton MBE became Chief Executive Officer in October 2014. Maggie, a highly experienced museum professional, has since led the team during the recent regeneration of the London site.

First World War in the Air

The highly acclaimed and award-winning *First World War in the Air* exhibition within the refurbished Grahame-White Factory was ceremonially opened by His Royal Highness The Duke of Edinburgh, on December 2, 2014. Now known as Hangar 2, this impressive exhibition displays artefacts in an innovative and highly effective way, affording close-up views of exhibits, and makes extensive use of historical items, and not ‘just’ aircraft. The lighting use, along with big-screen projections, also make a very positive impact on the visitor’s experience.

First World War in the Air has proved very successful, and many of the ideas and concepts used have formed the basis for the redevelopment of Hangar 1 and Hangar 6. In the summer of 2018, Hangar 1 (*RAF Stories – the First 100 Years*) and Hangar 6 (*The RAF in an Age of Uncertainty*) opened along with the regenerated and realigned landscape, which brings the RAF Museum’s story up to date in the service’s centenary year. 

This feature has been extracted and adapted from Great Aviation Collections of Britain by Ken Ellis and available from Crécy Publishing.



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Equal part



Cosford has many of the most fascinating aircraft in the RAF Museum's collection on show. It also has one of the most distinctive buildings – the incredible Cold War hall. Ken Ellis charts the history of the RAF Museum's West Midlands 'arm'

Located between Wolverhampton and Telford, just off the M54 motorway, the RAF Museum Cosford is something very, very special. Fabulous exhibitions; some of the most interesting aircraft on the planet; located on the edge of a busy RAF station. It doesn't get much better than that!

Its origins lie with the RAF's regional collections, or station museums, and its first displays were established within the hangars at the northern edge of the site, today housing the Test Flight and Warplane exhibitions. Just like other station museums, requests from the public to visit were met whenever it was practical and slowly this developed with the occasional open day or special event. During the early 1970s Cosford had taken on the name Aerospace Museum, and a change from a purely station collection to somewhere the public could visit without prior permission was on the cards.

The prime mover for the Aerospace Museum was Flt Lt Derek Eastwood - and his efforts, and those of the team he gathered around him, provided the firm foundation

on which Cosford became a world-ranking museum. In the 1970s the Aerospace Museum received no grant funding from the MoD, or the from RAFM; it was known as a 'Unit/Branch Museum' and costs were covered by the station. Tragically, Derek died in 1983. His place was taken by Flt Lt Len Woodgate, who had been running the St Athan, Wales, 'out-station'. Vital to the Museum, then and now, was the input of volunteers and the support of the Cosford Aerospace Museum Society.

By 1975 the Museum was open much more regularly and by the late 1970s Hangar 1, on the flight line and alongside the control tower, was fully in use. The site encompassed 170 acres, essentially the boundaries that it occupies today, and there was a small shop and cafe.

Full-time Opening

As it grew in stature, RAFM Trustees accepted management of the collection at Cosford, and the Aerospace Museum opened on May 1, 1979. John Francis was appointed as General Manager in 1990 and was to oversee the

transitions at Cosford up to the advent of the National Cold War Exhibition. Alex Medhurst took over the role after John's retirement, and today Alan Edwards is the Museum's General Manager.

In 1996 Hangar 1 was remodelled in a £154,000 project that included new galleries and an elevated walkway. An impressive visitor centre was inaugurated in June 1998 which dramatically improved the 'reception' element, with a large car park, a huge and airy lobby area and a restaurant overlooking the airfield.

On May 13, 2002, Marshal of the Royal Air Force Sir Michael Beetham opened a new conservation centre named after him. This facility was the culmination of seven years of planning to move the RAF Museum's Reserve Collection to Stafford and the conservation workshop to Cosford, from Cardington in Bedfordshire. In addition to being the engineer base for the RAFM, the Michael Beetham Conservation Centre is also home to the Museum's award-winning apprentice scheme; see page 42 for more details. »

ner

Three of the aircraft on show at Cosford, with the impressive National Cold War Exhibition in the background. The trio of machines in this photo are (from left to right): HS Dominie T.1 XS709; HS Nimrod R.1 XV249 and Lockheed SP-2H Neptune 204.



A view inside the Cold War hall. All images via the RAF Museum





The new RAF100 display, located in an annexe to the Test Flight hall.



Europe's only complete Avro Lincoln, B.2 RF398, can be found in Hangar 3 'War in the Air'. Several Axis aircraft are also on show, including Fieseler Fi 156C Storch 4750811 and Messerschmitt 262A-2a 112372.

Royal Air Force Cosford

RAF Cosford has been part of the Shropshire countryside since building work began on hangars and accommodation in 1937. Part of the pre-World War Two expansion plan, it was formally opened on July 15, 1938 as a training and maintenance unit.

No.9 MU was formed on the airfield in 1939 and was responsible for the receipt and despatch of a wide variety of aircraft ranging from Spitfires to Lysanders, Hudsons and Horsa gliders. At its peak the MU was handling 400-500 aircraft movements each month. No.2 School of Technical Training was formed at the station on July 15, 1938, and by the start of the war Cosford had 3,580 trainees on its books. Many important trades were taught, such as all aspects of aircraft maintenance (engines, airframes, rigging and mechanics) plus an assortment of other skills.

Today, Cosford is a major part of the Defence College of Technical Training, including No.1 School of Technical Training and is commanded by Group Captain Tone Baker.

RAF Museum Cosford

The museum is open every day, including Bank Holidays, from 10am to 4pm (5pm from March to October), and is free to enter. There is, however, a small charge for parking. Opening times, and availability of exhibitions/certain aircraft can vary, please check the Museum's website for the latest information before travelling.

Catering facilities at Cosford include a restaurant in the Visitor Centre and a café within the National Cold War Exhibition. Address: RAF Museum Cosford, Shifnal, Shropshire, TF11 8UP. www.rafmuseum.org.uk/cosford



Landmark Display Hall

The ambitious scheme for a ground-breaking National Cold War Exhibition at Cosford was first announced in December 2003 as a £12 million project planned for the autumn of 2006 and in March 2004 a £4.9 million grant from the Heritage Lottery Fund was secured. Initially to have been called 'Divided World: Connected World' to emphasise the schism of ideologies and the nature of the building proposed, the name National Cold War Exhibition was eventually settled on. Her Royal Highness Princess Anne opened the building on February 7, 2007 and it has met with wide acclaim ever since.

Today, the Museum has four major themed areas for the public to enjoy. The National Cold War Exhibition houses aircraft, tanks, vehicles, models and memorabilia. A number of its 19 aircraft are suspended in flying attitudes and this is the only place in the world where you can view Britain's three V-Bombers: the Vulcan, Victor and Valiant.

The incredible Test Flight hall contains various English Electric Lightning development aircraft and prototypes, a BAC TSR-2 and the EAP, the forerunner to the Eurofighter Typhoon, plus much more. These unique exhibits are supported by excellent displays that put the aircraft into context, telling the story of how Britain's aircraft industry pioneered the post-war jet age.

The War in the Air hangar focuses on conflicts the RAF has been involved with up to the start of the Cold War. The hall is dominated by Europe's only complete Avro Lincoln bomber, and it also contains several interesting Axis aircraft from World War Two, such as a Japanese Kawasaki Ki-100, a Luftwaffe Messerschmitt Me 410 and an Me 262 jet fighter. RAF aircraft on show include a de Havilland Mosquito and a locally built type, the Boulton Paul Defiant.

This building also hosts the *First World War in the Air* display, which opened in 2015.



At its heart are three iconic World War One aircraft; a Sopwith Pup, a Sopwith 1½ Strutter and a Bristol M.1c. The Pup was used extensively during the Great War by the Royal Naval Air Service and the Royal Flying Corps and considered the perfect flying machine by its pilots. The M.1c and the Strutter are full-scale reproductions. This display was made possible with a lottery grant, with support from BAE Systems.

Several of the Museum's collection of transport aircraft are displayed in Hangar 1, alongside training aeroplanes used by the RAF over the years. More large machines, such as a Hawker Siddeley Nimrod R.1, a Lockheed Hercules C.3 and a Vickers VC-10, are on show in the Museum's grounds.

New Displays

Regular special displays have taken place at the Museum over the years and are typically on show for a year or so. Two have opened in 2018, the first of which commemorated the 80th anniversary of RAF Cosford's creation. Located in Hangar 1, Cosford at 80 has been created by a small team of personnel from the station. The exhibition looks at the history of some of the units

Several of the larger aircraft, such as Vickers VC-10 C.1K XR808, are displayed outside.



Cosford's BAC TSR-2 within the Test Flight hangar.

that are currently based at Royal Air Force Cosford (No.1 Radio School, the Defence School of Photography and the RAF School of Physical Training). It also includes less well known elements of the base's history such as Operation Exodus (the repatriation of military personnel from prisoner of war camps across Europe and the Far East). During World War Two some 2,700 Spitfires were assembled at Cosford and the serial numbers of these aircraft have been captured and displayed in a Spitfire image. Cosford at 80 can be found in the Temporary Exhibition Gallery. The Museum's latest exhibition, *RAF Stories*:

The First 100 Years 1918-2018 opened on May 22, 2018 and offers a compelling snapshot of the Royal Air Force's principle roles: prepare; attack; defend and support. It is in an annexe to the Test Flight hall, and although much smaller in scale than its sister display at the RAF Museum London, it gives an excellent overview of the roles carried out by the RAF, both past and present.

Cosford may have been the second RAF Museum to open, but it is considered an equal partner, and complements Hendon superbly well. 📍

“Her Royal Highness Princess Anne opened the building on February 7, 2007 and it has met with wide acclaim ever since”



Mission Comple



etted

We take a pictorial look around the newly refurbished areas of the RAF Museum London



Above: The main entrance to the Museum, which is in Hangar 1. The shop can be seen on the left. Alan Williams. Below: The newly refurbished Hangar 1, with an RAF Marine Branch air-sea rescue boat in the foreground.

All images via the RAF Museum unless noted



On Armed Forces Day, June 30, the RAF Museum London fully reopened with three innovative galleries, a re-landscaped site and a new restaurant. Packed with inspiring displays, Hangar 1 explores the first 100 years of the RAF and its role today, and invites visitors to imagine its future contribution and technology. The other rejuvenated hall – Hangar 6 – looks at the RAF in an *Age of Uncertainty, from 1980 to the current day*.

Refurbished Hangar 1

Hangar 1 is now the single point of entry for the Museum and is where visitors are

welcomed and they can pick up map or a guidebook to orientate themselves with the site. The primary area within the hall contains the *RAF Stories, The First 100 Years 1918–2018* exhibition, which is designed to provide an overview of the RAF's history, tasks, values and structure. It looks at four key roles – Attack, Defend, Support and Prepare – and uses aircraft, historical items in cabinets and freestanding life-sized figurine boards, interactive displays, vehicles and much more to tell the story.

It is fair to say that it's the people at the heart of the RAF that make it so special, and

the new displays tell their stories – from all walks of life and across all ranks.

A particularly impressive presentation within *The First 100 Years* is the 'wall of hats' – a display featuring headgear from many of the different RAF trades, roles and services from down the years. It's simple, but very effective.

There are plenty of opportunities to get hands-on within the first exhibition. There are RAF uniforms to try on, a Folland Gnat jet trainer flight simulator to sample and an interactive Second World War operations room table to get to grips with – plus plenty of specially designed displays to keep younger children happy.



RAF Stories The First 100 Years 1918 – 2018

The Royal Air Force's story is woven into the history of the United Kingdom, from its formation during the First World War to the role it performs today as the nation's first line of defence.

The function of the RAF, the world's first independent air force, remains unchanged across a hundred years: its mission is to defend the UK, to attack if required, to provide surveillance and intelligence, to support in times of humanitarian crisis and to move people and equipment across the world quickly. The RAF provides the UK Government with choices in a rapidly changing world.

Discover how the Royal Air Force delivered this mission across its 100 years through stories about its extraordinary people, innovative technology, global operations and partnerships with industry.



“Eight aircraft are also on show within this area, including a newly arrived General Atomics MQ-1 Predator unmanned aerial vehicle”

The second major exhibit in Hangar 1 is called *RAF – First to the Future*, showcases the technology used by its personnel and the innovation that makes the Royal Air Force so strong. This area of the Museum contains many digital interactive displays, enabling visitors to – among other things – ‘virtually’ design their own aircraft by selecting wings, fuselage, engines and tailplane and then testing their machine against a pre-assigned task. There is also a debating board – a large multi-touch screen computer that looks at elements of a controversial subject and gives visitors a chance to register their opinion and perhaps even change other people’s views. Further displays, developed with support from RAF Waddington, explore military intelligence, surveillance, cyber security, science and technology.

Away from the main exhibitions, Hangar 1 also contains the Museum shop and café, which is dominated by a Short Sunderland flying-boat. Easy-to-follow paths lead from this building to the rest of the Museum.

Hangar 6 - The RAF in an Age of Uncertainty 1980–Today

This exhibition looks the Royal Air Force’s history from the Falklands Conflict to the



current day and examines how technological change has enabled it to be agile, adaptable and responsive to the challenges it has, and continues, to face. People stories are again at the heart of the new displays – a good example is the cabinet containing artefacts belonging to Robbie Stewart, an RAF navigator shot down during the 1991 Gulf War. The items include his PoW suit, along with flight maps and a safe conduct pass.

Eight aircraft are also on show within this area, including a newly arrived General Atomics MQ-1 Predator unmanned aerial vehicle, which is on loan from the National Museum of the USAF and the only one of its kind on show in the UK. Another recent delivery from America is the nose section of a C-130 Hercules.

Interaction is once again encouraged, with visitors being able to leave comments on a large-screen wall. VDUs along the timeline wall show magazine covers and film clips from around the world, dating from the 1980s to the 2010s, which offers a different perspective on conflicts and important events. On a lighter note, there are quizzes on popular culture that can be played on touchscreen consoles, designed to make learning fun, which certainly hits the mark for visitors of all ages. »

Below: **An overview of the RAF Stories, The First 100 Years 1918–2018 displays.**

Far Left: **The simple but highly effective ‘wall of hats’.**



Aircraft on Show in Hangar 1

Airco DH.9A	F1010 – see page 48
Folland Gnat T.1	XR977
Lockheed Martin F35 Lightning	Replica
Short Sunderland MR.5	ML824
Supermarine Spitfire Vb	BL614 – see page 54
Westland Sea King HAR.3	XZ585 – see page 62

Folland Gnat T.1 XR977, plinth-mounted in Hangar 1.



Aircraft on Show in Hangar 6

BAe Harrier GR.9A	ZG477
Boeing CH-47D Chinook (nose)	83-24104
Eurofighter Typhoon DA2	ZH588
General Atomics MQ-1 Predator	03-3119
HS Buccaneer S.2B	XW547
Lockheed C-130E/WC-130E Hercules	64-0553
Panavia Tornado GR.1	ZA457
SEPECAT Jaguar GR.1	XX824


The General Atomics MQ-1 Predator on show in Hangar 6.

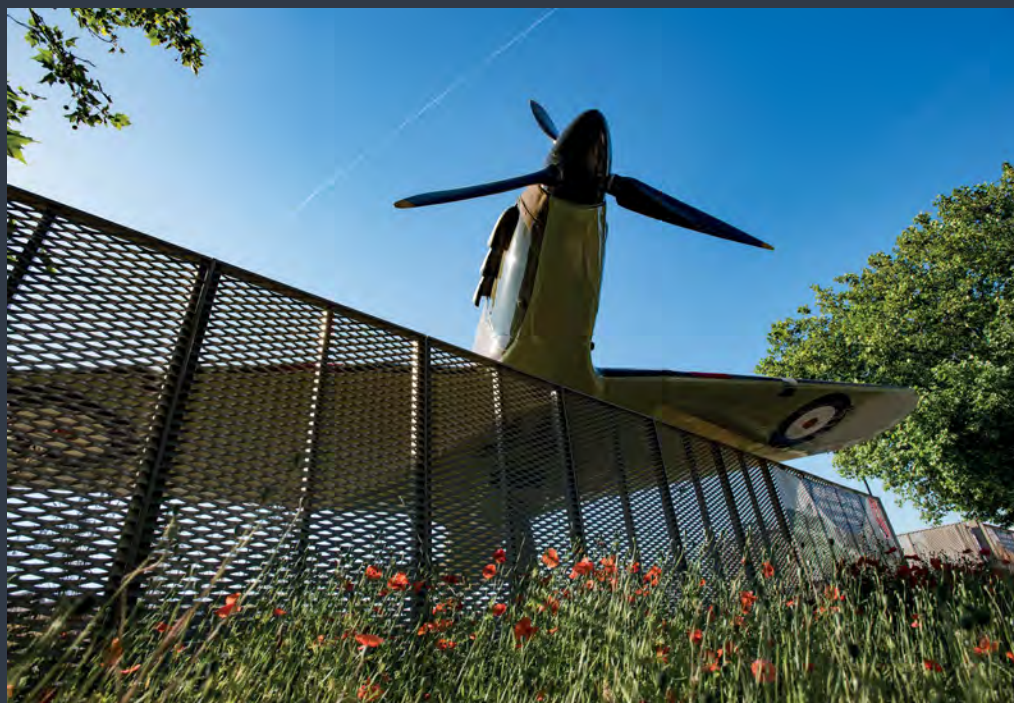


Green Space

Moving outside, new the landscaping has brought about a vast improvement to the site's layout – it's now easier to navigate your way around, and there's plenty of green space to enjoy on a sunny day. The landscaping has been inspired by the site's heritage as The London Aerodrome and RAF Hendon. A new car park has been constructed on the edge of the site, and it is appropriately 'guarded' by a plinth-mounted Hawker Hurricane replica.

Creature comforts have also been enhanced, with the conversion of a derelict 1930s-era building into the light and airy Claude's Restaurant, which offers an array of food and snacks to suit every visitor. Buying something from the onsite catering outlets and the gift shop supports the Museum financially, and is a good way to help fund its work.

The multi-million-pound transformation to the award-winning, free-to-enter RAF Museum is most impressive. It sets out to inform visitors of the RAF's fine work and inspire them – it does that and much more. 



“It is fair to say that it's the people at the heart of the RAF that make it so special, and the new displays tell their stories – from all walks of life and from all ranks.”

Above: The Hawker Hurricane replica 'gate guard'. Below: Some of the many life-sized figurine boards in Hangar 1's RAF Stories, The First 100 Years 1918–2018 exhibition.





Top: Entering the RAF – First to the Future area in Hangar 1. Above left: One of the main displays within the RAF Stories, The First 100 Years 1918–2018 looks at the service’s attack role, from its creation in 1918 to the current day’s Remotely Piloted Aircraft System. Above right: RAF uniforms on show – these can be tried on by members of the public. Right: Hangar 1’s timeline display.

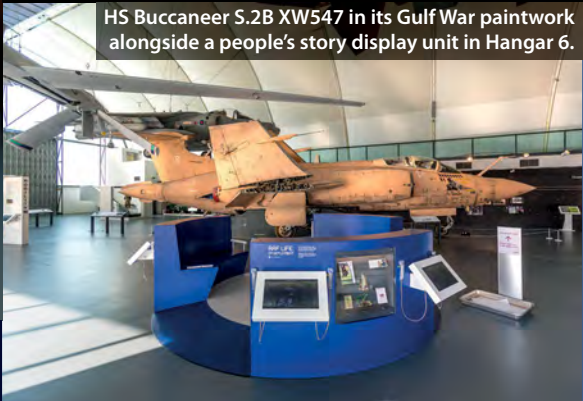


A key feature in the *The RAF in an Age of Uncertainty 1980–Today* area is the large-screen timeline wall, on which visitors are encouraged to leave comments. Touchscreen consoles have also been installed to enable them to take part in quizzes on popular culture.

Claude's Restaurant – perfect for mid-visit refuelling! Russ Price



HS Buccaneer S.2B XW547 in its Gulf War paintwork alongside a people's story display unit in Hangar 6.



An evening scene at the Museum. Alan Williams



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Educate and **Inspire**



Mick Shepherd, the RAF Museum's Apprentice Training Manager, outlines how engineering skills from yesteryear are being passed down to a new generation of heritage-minded aircraft technicians



RAF Museum trainees help to move Hawker Hurricane I P2617 at the start of refurbishment work at the London site in 2016. All photos via the RAF Museum



Former RAF Museum apprentice Laura Pringle with her National Apprentice Award in 2012.



Students removing an engine from the Museum's Heinkel He 111 as part of the renovation work in London's Hangar 1.

The Royal Air Force has been at the forefront of cutting-edge technology since its formation in 1918, constantly pushing the boundaries of aeronautical engineering. Over the years, monoplanes replaced biplanes, metal wings and fuselages were used instead of wood, jet engines were adopted over piston powerplants and computerised fly-by-wire systems superseded traditional flight control methods. This list is seemingly never ending, as the service has adapted and matured.

Today's RAF aircraft fleet is young, and the average age of the machines in use is set to decrease as the Lockheed F-35 Lightning replaces the oldest type in the attack fleet – the Panavia Tornado. Computer diagnostics and 'black box' technology are changing the skill base needed by engineers working on the front line, as progress gallops forward. This does present a problem in the aviation heritage sector though, as many traditional skills such as fabric work and mechanical engineering that are vital to the wellbeing of vintage machines are being lost.

The RAF Museum is a charitable trust that exists to promote the history and traditions of the service; to educate present and future generations about its values and ethos and to encourage young people to understand aviation, science and technology. The Museum has over 250 airframes in its care, and some 1.3 million objects which range from original aircraft to historic documents and contemporary film.

The Museum conservation department deals with everything from the regular inspection of the Museum's static exhibits to the deep restorations of unique types that take many years to complete. The professional engineering staff are also expert in moving giant aircraft across the country and into impossibly tight spaces or hanging them at dramatic angles from the roof. Much of this work takes place using a dedicated facility at

Bethany Colburn working on parts from the Museum's Dornier Do 17 in 2013.



the Museum's Cosford site in a purpose-built conservation centre named after former Marshal of the Royal Air Force Sir Michael Beetham.

The centre is home to around 15 professional staff including a carpenter, a welder, painters and aircraft fitters. In addition, it is currently training seven apprentices. It's fair to say that every project the team undertakes is a challenge, a journey back through time, utilising old or forgotten skills to repair, restore or replicate the original.

The Next Generation

The Museum - having identified a skills gap both for itself and many other similar organisations, aircraft operators and local businesses - took the decision in 2004 to set up an apprentice programme. Partnerships were formed with the Defence College of Aeronautical Engineering (DCAE), co-located at Cosford, and with the Telford College of Art and Technology (TCAT), the local further education college, providing academic training.

The first two apprentices were recruited in 2005 and attended and successfully completed their DCAE Aircraft Maintenance Mechanics Course. However, it soon became apparent that there was often no spare capacity for DCAE to host the Museum's apprentices and they were unable to undertake their further training (Aircraft Technicians Course). In investigating a way forward, the Museum found that, due to the vocational nature of the military training, its apprentices wouldn't have been able to have their DCAE training correctly assessed in its workplace. Essentially, the conservation team's work is classified as aircraft manufacturing - whereas DCAE training is geared towards aircraft operations; two distinctly different NVQ disciplines. Therefore, they wouldn't have been able to be awarded the qualifications they deserved. As a result, the museum no longer utilise the DCAE courses.

"A highlight of my apprenticeship was an exchange to America where I worked for three weeks at the Smithsonian Institute at the Udvar Hazy Conservation Center in Virginia"

The apprentices undertake all their hands-on skills training in-house at the Michael Beetham Conservation Centre (MBCC) where they work side by side with a master craftsman who mentors them through their daily tasks. Many of the RAFM's aircraft are 'sole survivors' and supporting documentation and procedures don't exist; the apprentices are encouraged to use their initiative to develop, in consultation with their mentor, novel ways around complex and unusual engineering issues. This has proved to make them extremely capable, competent and self-confident individuals.

Once deemed competent they are each given a specialist project. This in-house instruction and development coupled with academic training from City of Wolverhampton College takes three years and leads successful apprentices to the achievement of NVQ level 3 in Engineering Manufacture and an Advanced Apprenticeship in Engineering Manufacture, specialising in fabrication and welding.

Notable Success

The scheme is certainly meeting its aim of producing highly competent, inquisitive young engineers with a wide range of heritage aviation skills. In 2007 Rebecca Pitts, a member of the first student intake, was nominated as both Engineering Apprentice of the Year and Apprentice of the Year at Telford College of Arts and Technology. She went on to meet Her Majesty the Queen as part of the celebrations of the Queen's Anniversary Prizes for Higher and Further Education 2007. Excelling in her studies, Rebecca realised, with the Museum's mentoring and encouragement, that she should be aiming higher and, after being sponsored by a major aerospace industry company, completed a degree in Aeronautical Engineering.

Two years later, trainee Daniel Perks, a member of the second intake, was awarded TCAT Student Achiever of the Year. »



Trainee Jack Rogers meeting members of the public during the MBCC's open week in November 2014.





Hands on work in the tail section of the Museum's Supermarine Seagull flying-boat, under the watchful eye of an experienced member of the engineering team.

“The Museum has over 250 airframes in its care, and some 1.3 million objects which range from original aircraft to historic documents and contemporary film”

Also in 2009 the MBCC was accepted as an approved training centre and training provider by the Industrial, Maritime, Aviation and Transport Technologies (IMATT) Training Scheme.

In 2010, David Timon, Daniel Perks and Kyle Anderton were invited to enrol for the foundation degree in engineering at TCAT; this qualification was franchised from Wolverhampton University and at the time was one of only three in the country accredited by the Institution of Engineering and Technology (IET). The MBCC was given the 'West Midlands Small Employer of the Year 2010' honour at the National Apprenticeship Service's Regional Awards and went on to be crowned winners of the 'National Small Employer of the Year' at the National Apprenticeship Awards 2010, an Oscar-style ceremony in London. Also in 2010, its first student to graduate, David Timon, was

recruited as a full-time technician and staff member of the MBCC.

In 2011 the Michael Beetham Conservation Centre was awarded 'West Midlands Small Employer of the Year' and went on to become runner-up in the National Apprenticeships Awards. That year it was also named in *The Times* and City & Guilds Top 100 Employers list because of the way it develops its young people. In 2011 apprentice Nathan Pugh was runner-up in the West Midlands round of the National Apprenticeship Awards 'Apprentice of the Year'.

The following year, trainee Laura Pringle, who studied at Wolverhampton City College, won the West Midlands Apprentice of the Year awards and went on to become National Intermediate Apprentice of the Year 2012.

In 2013 trainee Alex Weston won the Silver Medal in the UK Skills competition, for his practical sheet metal and welding skills,

Apprentices Brendon O'Gorman and Baljit Singh Badeshar getting to grips with the Museum's de Havilland Mosquito in 2012.



Moving the float from the Museum's Supermarine Seagull.



It's not all spanners, books and engine oil! Apprentices Brendon O'Gorman and Baljit Singh Badeshar doubling up as Royal Flying Corps personnel in the Museum's RAF RE.8 replica at a press event at Hendon in late November 2014.



and also won the Institute of Sheet Metal Engineering Skills accolade in the same year.

The RAF Museum was Highly Commended in the City of London National Apprenticeship Service Large Employer of the Year category in 2014 and the following year Matthew Trainor-Cartwright won the award for best written report with his engineering project at the annual Institute of Sheet Metal Engineering Awards held at the Morgan Car Company.

Hands-on Training

Without doubt the RAF Museum apprentice scheme is an enormous success. Its enthusiastic students have routinely produced high-quality work which is enthusiastically embodied within Museum exhibits. The current apprentices are all relied upon by MBCC management and have significantly increased productivity at the centre.

Apprentices played major parts in the completion of the RAF FE.2b, the Fairey Battle, the ongoing Handley Page Hampden project and the Vickers Wellington move and its restoration. In 2013 apprentices were dock-side when the Dornier Do 17Z was recovered from Goodwin Sands to Ramsgate and it was one of the team's trainees who removed the bolts to take its tail assembly off. Once the Dornier arrived at Cosford the students started the ongoing decontamination and stabilisation programme – working solidly around the clock for the first two months.

Variety of Tasks

Although the programme is based at Cosford, the work carried out by the MBCC staff takes


them all over the world and, once competent, the apprentices join them in going wherever they are needed. For example, they have assembled aircraft on Horse Guards Parade in Central London, as well as numerous other venues in the capital and will be supporting aircraft moves and builds throughout the UK in 2018 as part of the RAF100 programme. On a number of occasions in recent years they've collaborated with, and demonstrated their skills to, local students and have worked further afield in such places as the United Arab Emirates and Kuwait.

The apprentices have undertaken work placements at vintage aircraft establishments around the globe - most notably with the Smithsonian Institute in the USA and most recently with the National Norwegian Aviation Museum in Bodø, Norway.

This variety of training is certainly appreciated by the students. Looking back, former Museum trainee Ella Middleton commented: "During my apprenticeship with the Museum I have been given some fantastic opportunities to develop my skills, working on projects including the Handley Page Hampden, Dornier Do 17, Vickers Wellington and the First World War in the Air exhibition. A highlight of my apprenticeship was an exchange to America where I worked for three weeks at the Smithsonian Institute at the Udvar Hazy Conservation Center in Virginia."

The MBCC engineering team is small, so the opportunities to retain students once they've qualified are limited, though one apprentice has remained with the Museum and another has recently re-joined after a

couple of years building bespoke armoured vehicles. All the students are coached in CV writing and interview techniques and have all found employment with aviation and engineering companies at home and overseas. It's hoped they will return as volunteers in the future. Those working internationally often call in to socialise and give assistance when home on leave.

The apprentices are a vital asset and have enabled the Museum to be less reliant on outside contractors and to keep more work in-house under its direct control. Perhaps more importantly, they are keeping the skills alive, and will be well placed to pass them on to the next generation. 

Meet the Team in Person

For health and safety reason, visits to the Michael Beetham Conservation Centre are not generally possible, but for one week each November, the workshop opens its doors to the public. This year's dates are November 12 to 18, with just a small admission charge being made.

Pop along and you'll get the chance to view the aircraft being worked on by the team and have the chance to speak to museum staff, apprentices and volunteers about their work. It's a special experience and one not to be missed. See the museum's website for more details about the open week: www.rafmuseum.org.uk/cosford

Great War Warri

Airco DH-9A F1010
in the RAF Museum
London's Hangar 1
in late May 2018.
RAFM-Iain Duncan

At Sea

Britain is an island nation and is reliant on sea trade for its survival. Since 1914 Germany, the RAF has worked closely with the Royal Navy to protect these trade routes.

Painting the sea and coastline 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 maritime craft.

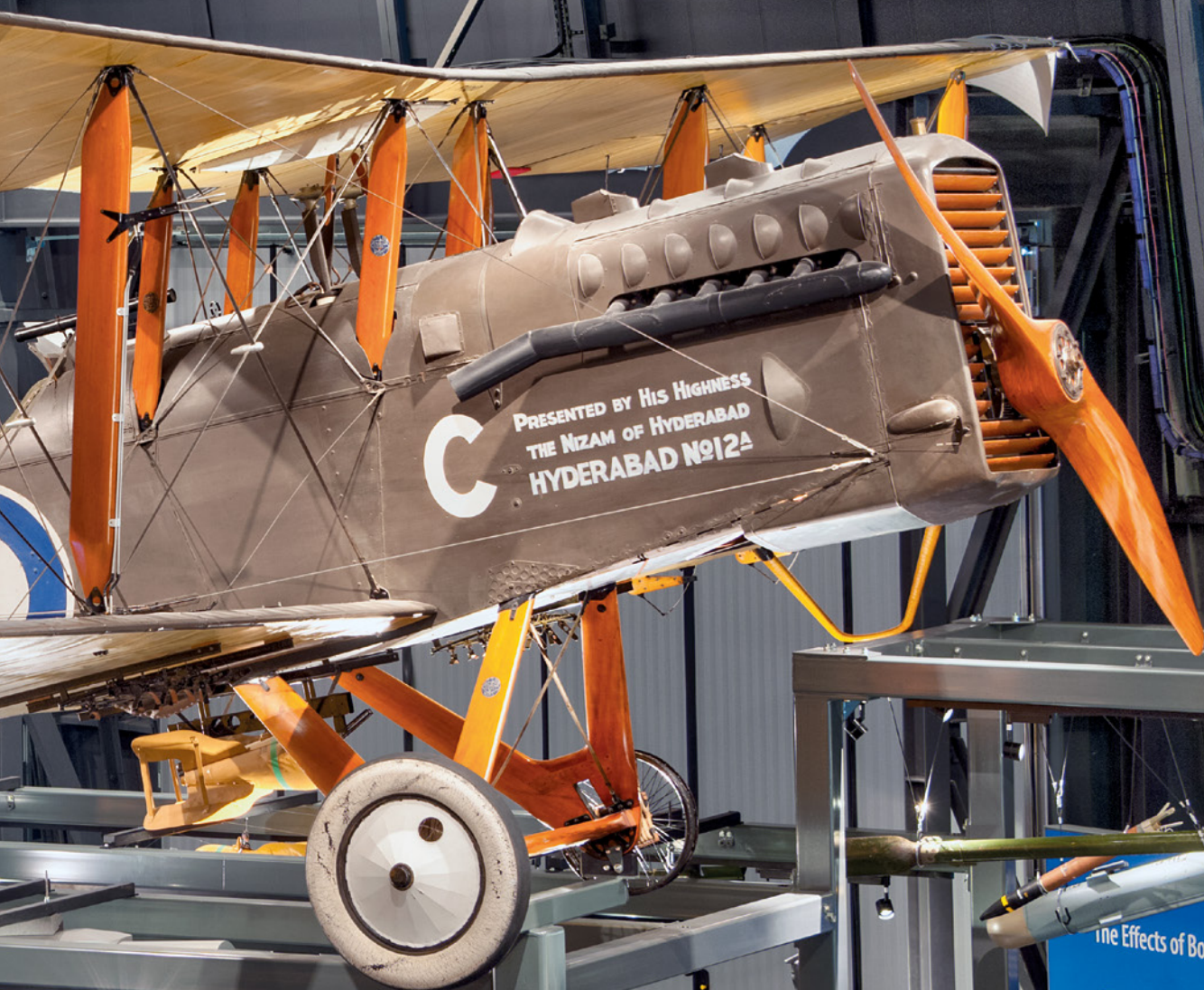
Before 1919 the carrier-based aircraft of the Royal Air Force were also part of the RAF and RAF personnel and aircraft continue to operate from Royal Navy vessels today.

Intelligence

Observing the enemy was the first role of pioneer aviators during the First World War. It remains a key role today.

or

Hangar 1's Airco DH-9A is a remarkable machine, having the distinction of shooting down an enemy aircraft, only to be brought down itself, and then flown by its foes! In the first of a series of features that detail the history of important items on show at the Museum, Andrew Simpson reviews this biplane's incredible history



Built at Yeovil in Somerset in late June 1918, F1010 was one of 18 early examples from the first batch of Airco DH-9As made under contract by Westlands and was delivered to the RAF's 110 Squadron at its base at Kenley, Surrey. All of the DH-9s that formed the squadron's initial batch were financed by His Serene Highness, the Nizam of Hyderabad - the first time that anyone had funded an entire squadron. In recognition of his generosity, each aircraft was marked with a suitable inscription, and from that time on, the unit was officially titled 110 (Hyderabad) Squadron, and eventually the Nizam's crest depicting a demi-tiger was used as the basis of the unit's badge. No.110 was also the first squadron to receive the DH-9A.

All 18 of the squadron's aircraft were marked on both sides of the nose with 'Presented by His Highness the Nizam of Hyderabad'. Each of the machines was individually numbered from 1 to 18, but superstition ensured that F1010 became No.12A rather than 13.

The first official reference to F1010 in RAF records is on August 8, 1918 when it was noted as being at No.7 Air Park at Kenley. It was officially allocated to 110 Squadron 12 days later.

It was soon on the move, as the unit flew to Bettoncourt in northern France, as a day bomber unit in the RAF's Independent Force - for use in strategic bombing of German targets - on August 31.

Two weeks later, on September 14, the squadron - and F1010 - began operations with a raid on the German aerodrome at Boulay, France. By this time F1010 had acquired a regular crew - 23-year-old pilot Capt Andrew Glover Inglis from Liverpool and 27-year-old observer Lt William George Lewis Badley from Cape Town, South Africa. Both had joined 110 Squadron on August 2, 1918.

The raid on Boulay involved two formations of six aircraft each - F1010 was number five in the second group, which ran into low cloud that persisted to the target, forcing a return with bomb loads intact due to nil visibility. The lead formation did, however, manage to bomb the airfield. There was only light anti-aircraft fire and no enemy fighters were seen.

Bloodied in Battle

The next day, F1010 dropped bombs in anger for the first time, on the German aerodrome at Buhl. Again two formations were used - six in the first and four in the second, in which F1010 was number three. Visibility was good, opposition light, and the airfield was bombed, which started a major fire.

The unit's next raid was on September 25 when two flights of six attacked the railway at Frankfurt, and involved the squadron in over five hours of combat with many formations of German fighters. The DH-9's 400hp Packard Liberty V-12 engines were having icing problems at the high altitude, which at the

A pair of 110 Squadron DH.9As at Bickendorf aerodrome in western Germany in 1919.

All images via the RAF Museum unless noted

"Six RAF machines were lost, and two German fighters claimed in return, one of them, a Fokker D.VII by Inglis and Badley in F1010"

time equated to 15,000 to 17,000 feet with a typical bomb load of three 112-pounders. For this raid, take-off was at 9.55am, the target being attacked at 12.05pm. One aircraft returned early at 11.30am. Six RAF machines were lost, and two German fighters claimed in return, one of them, a Fokker D.VII, by Inglis and Badley in F1010.

This successful combat occurred at 12.30pm near Saverne at a height of 16,500 feet while F1010 was on its way to the target. The following is quoted from the combat report, which is



Airco DH.9A F1000 of 110 Squadron's 'A Flight', circa 1918.

The Airco at Cardington after the restoration had been completed in 1983.



A member of the restoration department inspecting F1010's damaged engine at Cardington in June 1977.



held in the Public Records Office in London: "Fokker biplane. Fast machine. Good climb. Front of machine painted dark grey. Fuselage partly grey and partly white. Rudder white. Fokker with six others came up on formation from the right. This particular machine stalled up at leader of formation, then fell away, but he came up on a climbing turn with the rear of the formation. He then stalled again, upon which 2nd Lt Badley fired a burst and EA [enemy aircraft] went down obviously out of control."

Cologne was the next target assigned F1010, with two formations of six aircraft being dispatched on October 1. Bad weather forced the first formation to turn back, following F1010, which returned early with engine trouble. (The second formation bombed Trier instead). By this time F1010 had amassed some 25 hours flying time.

Forced Down Behind the Lines

Four days later a 13-aircraft strike was arranged on Cologne, Coblenz or Ehrang, in that order of preference. F1010 flew as No.3 in the second formation, flying at 17,000 feet.

Again there were constant enemy fighter attacks, both there and back which, coupled with a strong westerly wind, forced the formations off course - so Kaiserslautern was bombed instead, being reached at around 2pm. One German fighter was definitely destroyed and six driven down out of control for the loss of four DH-9As, including F1010. The latter landed intact and the uninjured crew of Inglis and Badley were taken prisoner by the Germans, only returning to Britain after the Armistice. Their forced landing may have been caused either by engine trouble or by flak damage - anti aircraft fire was medium to heavy and accurate during this mission. »



The biplane shortly after arriving at the RAF Museum's restoration centre at Cardington on June 28, 1977.

LONDON'S ICONS

It was one of 17 aircraft lost by the squadron between September 14, 1918 and the Armistice in November.

The aircraft is thought to have been repaired and flown by the Kaiser's forces. Evidence to support this theory comes in the form of German printed lozenge fabric that was found on the rear top section in the 1960s, and a German weight table painted on the rear port fuselage. The airframe wasn't returned to the British after the Armistice, as the RAF was in the process of disposing of thousands of redundant aircraft, so it went into long-term storage on the continent.

The bomber was out of the public eye for many years, and it wasn't until June 20, 1936 that it was seen in public again. This was at the 'Deutsche Luftfahrt Sammlung' (Berlin Air Museum) on the Invalidenstrasse, minus main wheel tyres and some fuselage fabric. It carried an inscription painted on the starboard fuselage which said 'Englisches Bomben Flugzeug erbeutet 1918' (English bomber aircraft taken as war booty 1918). It was exhibited with many other World War One types in this magnificent collection of over 100 aircraft. The timing of the display is significant, as Hitler's Germany was riding on a wave of nationalism at the time and showing a captured British bomber helped the Nazis' propaganda campaign.

The DH-9 was on the receiving end of RAF bombs on the night of November 23, 1943 when Bomber Command attacked Berlin, and the museum was heavily damaged by fire - almost half of the contents were destroyed. F1010 seems to have come through the raid

relatively unscathed, although the original engine is thought to have sustained some 'war wounds' from the strike.

At around this time at least 23 of the museum's aircraft, plus a number of engines, were transferred for safety to a forest storage site at Czarnikau in eastern Germany (now Czarńków, Poland). The area was captured by Polish forces in March 1945 and the aircraft collection was moved to the Regional Aircraft Repository at Gadki near Poznań. By 1950, F1010 had gone into storage at abandoned railway sheds at Deblin/Pilawa near Warszawa

and by the mid-1950s had moved to an exhibition shed at Wrocław, near Poznań.

The Muzeum Lotnictwa i Astronautyki at Rakowice, Krakow, was founded in 1963 and it became home to most of the former Berlin museum relics, although many were in storage and not on display. Staff at the collection carried out some restoration work on the very battered and tattered DH-9A airframe and undercarriage. Sadly, it had at some stage lost its wings since the move from Berlin, where it had been displayed complete.

Long Road Home

In May 1968, negotiations began to acquire the remains of this important aircraft for the RAF Museum. It was eventually agreed with the Polish authorities that F1010 would be exchanged for Supermarine Spitfire XVIe SM411.

The process of bringing F1010 home was long and arduous. Treasury approval for the DH-9A/Spitfire exchange was granted on November 24, 1971, and then followed protracted diplomatic negotiations to get permission for RAF recovery vehicles to enter Poland - very much an 'Eastern Bloc' country at the time - and retrieve the historic biplane. This took a long time, but the work needed to reach an agreement that allowed the British military into the communist country at the height of the Cold War shouldn't be underestimated.

With the negotiations and arrangements complete, F1010 was loaded onto an RAF vehicle at Krakow on June 15, 1977 and brought back by a party from 431 MU from RAF Brüggen, in the then West Germany, as part of

"In May 1968, negotiations began to acquire the remains of this important aircraft for the RAF Museum"

The rare biplane – the only DH.9A known to survive – is now an integral part of the bomber exhibition in Hangar 1.

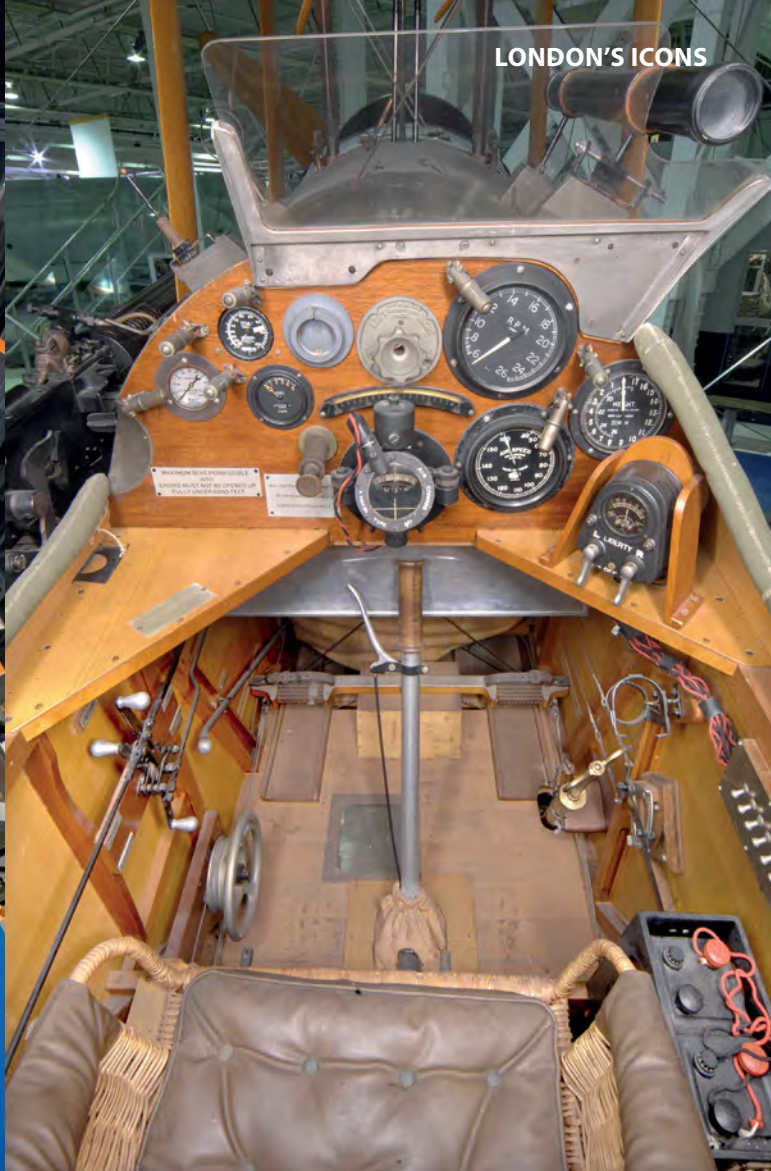


RAF Image

The RAF has always been keen to showcase its importance to the UK as an independent military service. It has also built a fine reputation for skills as varied as music, drill and dog handling.

However, it is the image of the RAF as a fighting force that has defined the RAF in the public's imagination. It is the image of the RAF as a fighting force that has defined the RAF in the public's imagination. It is the image of the RAF as a fighting force that has defined the RAF in the public's imagination.

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'Operation Fair Exchange' which took the Spitfire out and brought F1010 back. The DH-9A was delivered to RAF Museum restoration centre at Cardington, Bedfordshire, on June 28, 1977. It had been away from the UK for almost 59 years.

When the aircraft arrived at Cardington it was clear how much work was needed to restore it. The cockpit was stripped bare but for one damaged instrument, the radiator temperature gauge. The engine was damaged, with a smashed overhead camshaft, possibly by the bombs in Berlin - it was replaced during restoration by a Liberty acquired in the USA where it had been used as an emergency power unit in a flower mill. The wings and horizontal tailplane were missing completely. The propeller was present but in poor condition, and was replaced by another example that had been restored. The engine cowlings were missing, as were parts of the undercarriage. The fin, rudder and centre section of the upper wing did survive, as did one wheel.

Rebuild


The restoration at Cardington, masterminded by Bill Sayer, commenced in late 1978 and included the design and construction of a new set of wings and tail section. Much of the fuselage structure was also replaced, though the metal fittings were reused. (The original wooden sections remain in store with the RAF

Museum, currently at Stafford; this includes both side panels with inscriptions.)

The missing front Vickers gun was replaced with an example modified from a ground use gun, which had been held in stock at Cardington, and the rear cockpit was fitted with an original control column donated by a gentleman from Ashford. Interestingly, during the overhaul, restoration team member John Chapman found a spent bullet lodged in one of the vertical struts. This has, of course, been preserved.

The difficult task of constructing new mainplanes was completed by May 1981, and the rest of the overhaul was finished by

mid-March 1983. The biplane moved to new the Bomber Command Hall at the RAF Museum London a few days later, and was displayed with its damaged original engine alongside.

Two decades later, on September 23, 2003, F1010 was moved into main aircraft hall/ Historic Hangars at the RAF Museum London for continued display, and in January 2018 it was transported into 'Hangar 1' (the former Battle of Britain Hall) as part of new *RAF-First 100 Years* exhibition. It is on show within the Bombing section, illustrating how this core role for the RAF can achieve strategic objectives, and act as a strong deterrent. 



F1010 on display in the Bomber Command Hall in 1996.

Battle hardened Spitfire

Supermarine Spitfire
Vb BL614 at the RAF
Museum London in
May 2018.
RAF Museum-Iain Duncan





One of the most impressive aircraft displays in the new RAF Stories, the 'First 100 Years' exhibition fought in the deadly skies over Dieppe in 1942. The RAF Museum's Andrew Simpson and editor Nigel Price chart the history of Spitfire Vb BL614 - a true 'warbird'

Supermarine Spitfire Vb BL614 was one of 1,000 bought in October 1940 for the RAF from Vickers-Armstrongs, although it was originally ordered as a Mk.III. Built at Castle Bromwich in the West Midlands, it made its first flight in December 1941 and was delivered to No.8 Maintenance Unit at RAF Little Rissington, Gloucestershire, for fitting with operational equipment on January 4 the following year.

Just over a month later, on February 7, it was issued to No.611 (West Lancashire) Squadron at RAF Drem, near Edinburgh, coded 'FY-'. The unit was being 'rested' following a very active period of fighter sweeps with 11 Group, and was involved in convoy escort patrols.

But although the squadron wasn't close to mainland Europe and the bulk of the fighting with the Luftwaffe, it was still very much on active service. BL614 made its first operational sortie on February 18, 1942 with a patrol over Queen May Isle, Firth of Forth, flown by Ft Sgt

W L Miller, and was scrambled to intercept possible intruder aircraft 13 days later.

It came off worse for wear during operations on March 8, suffering Category B damage which was repaired at the station. BL614's history becomes unclear at this point, as the aircraft's movement record card doesn't show any further use until June, but 611 Squadron's Operational Record Book lists six sorties between March 16 and May 23.

By early June the Spitfire had been assigned to 242 (Canadian) Squadron at Drem, coded 'KV-'; flying its first operational sortie with the unit on June 7. Over the next three months BL614 flew regularly on patrols and training flights, including night sorties, formation flying and at least one army co-operation sortie.

Dieppe - A Date with Destiny

On August 11 the fighter was transferred to No.222 (Natal) Squadron, which had moved from Winfield on the Scotland-England border

to Drem the previous day. (No.242 Squadron had moved to RAF North Weald in Essex that month, leaving BL614, coded 'ZD-F', behind.)

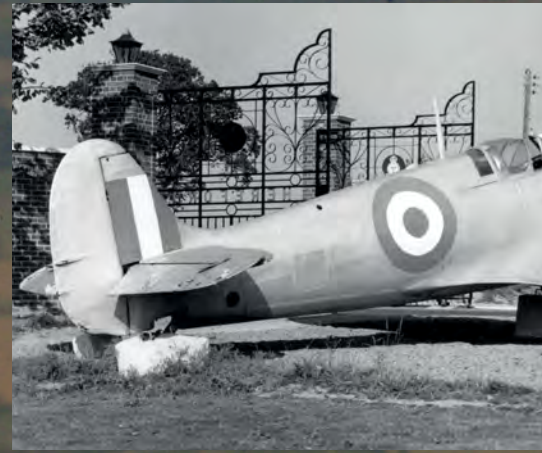
Less than a week after joining the unit, BL614 and the squadron's other aircraft moved to RAF Biggin Hill, Kent, to cover the Allied landings at Dieppe (Operation Jubilee) on August 19. 'ZD-F' flew two sorties during the disastrous raid on the German-occupied port - an early morning shipping patrol off Dieppe and another providing withdrawal cover for ground and naval forces in the evening.

Former ground crew who worked on BL614 have confirmed that during the Dieppe action the aircraft sustained damage to the wings, possibly from small-arms fire. They remember it took fire in the flaps, ailerons and the front section of the fin too. The resulting patch repairs remain visible on the fighter today. The unit flew back to Scotland the following day and returned to its convoy patrol duties for the next six months or so.

»



BL614, masquerading as AB871, on the gate of RAF Credenhill near Hereford on March 19, 1965, during the period when it was displayed in the wartime codes of 64 Squadron. Her external visual condition is pretty good considering her duties. A credit to the Credenhill squaddies! R A Scholefield



"Less than a week after joining the unit, BL614 and the squadron's other aircraft moved to RAF Biggin Hill, Kent, to cover the Allied landings at Dieppe (Operation Jubilee)"

On the last day of March 1943 BL614 was transferred to 64 Squadron, also based at Ayr, coded SH-V. The unit practised carrier landings and undertook convoy patrols, reconnaissance flights and air-sea rescue searches before moving to Friston, Sussex, on August 7, 1943 and on to RAF Gravesend, Essex, less than two weeks later.

War-Torn Skies of Europe

After a brief spell in the workshop having some damage repaired, BL614 was back over mainland Europe on September 6, escorting USAAF Martin B-26 Marauders as they attacked Amiens' marshalling yards. This, and the ensuing five sorties, were as close escort for medium bombers striking airfields and rail yards in northern France. Targets included St Omer on September 7, Vitry en Artois and Boulogne on September 8 (two

sorties) and Merville on September 9. Two days later the Spitfire returned to 64 Squadron, based at RAF West Malling, Kent, and was involved in bomber escort and coastal anti-shipping strafing attacks.

More fighter sweeps over enemy territory, bomber escort flights and combat patrols were undertaken over the next few months, with the fighter's operational base changing several times. It also changed units – being transferred to 118 Squadron, coded NK-E, on September 19.

By October 1943 the Spitfire was getting war-weary, and more advanced variants of the Supermarine fighter were becoming more readily available, so BL614's flying career was coming to an end.

On October 14 it made a dawn patrol – its last operational flight.

Ground Duties

Our Spitfire's next posting was to No.3501 Support Unit (General Duties Flight) at Royal Air Force Cranfield, Bedfordshire, on November 2, and then to No.2 School of Technical Training, RAF Cosford, Shropshire, 20 days later. It was allocated the instructional serial number 'M4354' at this time.

Again, this move was short-lived and a transfer to No.6 School of Technical Training at nearby RAF Hednesford, Staffordshire, occurred on December 6. At this point BL614's history becomes entangled with that of fellow Mk.V 'M4353' (AB871). It would appear that these non-standard maintenance serials were applied to the wrong aircraft – the real AB871 was scrapped at RAF St Athan.

On April 20, 1948 BL614 was moved to No.7 Recruit Centre, RAF Bridgnorth, Shropshire, wearing the M4353, and then M4354.



The Spitfire, without codes or serial number, on display at Hereford on August 31, 1961.

Peter Arnold Collection

A Spitfire of 222 Squadron, in the markings which would have been carried by BL614.

RAF Museum-Charles Brown Collection



Spitfire Vb BL614, possibly at RAF Colerne. A de Havilland Mosquito is in the background.



The aircraft collection at RAF Colerne in the early 1970s, with BL614 behind the HP.115 and Blériot XI.

All images supplied by the RAF Museum unless noted

At around this time it was repainted in an all-over silver livery, with no visible serial.

After seven years on duty at Bridgnorth, our feature aircraft moved to RAF Credenhill near Hereford for more gate guardian work, marked as M4354, and still painted silver overall with no serial. It was treated to some restoration in 1964 and during the strip down evidence was found of its former squadron identities, including the 118 Squadron codes NK-, but the incorrect serial AB871 and code SH-S were applied.

The Big Screen Beckons

On October 24, 1967, BL614 was one of 18 RAF Spitfires loaned to Spitfire Productions Ltd for use in the *Battle of Britain* film and taken from Hereford to RAF Henlow, Bedfordshire, by No.60 MU two days later. It was the repainted without any external identity markings,

but still had AB871 stencilled in the radio compartment. Spitfire Productions assigned the number 'T.6' to the airframe, to indicate taxi aircraft number six.

Considerable work was needed to bring the aircraft back to life for the film, so its original 1,470hp V-12 Rolls-Royce Merlin 46 was overhauled at Henlow by an RAF working party and the four-blade propeller from Spitfire Mk.XVI SL574 was fitted, the original three-blade prop being 'donated' to Spitfire Mk.XVI TE176. A radio set was installed, along with sheet metal wing tips, undercarriage doors and a new oil cooler cowl. The cannon stubs were removed.

By late April 1968 the work was complete and the fighter moved to RAF North Weald by road and was used as one of seven taxiing Spitfires during filming. On May 14 it was noted at the airfield, still without a code or

serial number. Disaster struck the following day though, as whilst taxiing around the airfield it hit a bump, left the ground, 'flew' a short distance, landed and tipped onto its nose, breaking the propeller. Thankfully no one was hurt and a replacement four-blade unit from Spitfire XVI SM411 was fitted the same day. It also gained its first film codes around this time, being marked up as N3327 'AI-O', before being transferred down the road to Duxford in Cambridgeshire.

A brief 'deployment' to the former Battle of Britain station at Hawkinge, Kent, ensued in July, with the film identity being noted as N3315 'DO-W'. It was soon back at Duxford again and over the next three months the following serials/codes were applied to the fighter: N3315/DO-N; N3315/BO-D; N3315/DO-; N3313/EQ-D/AI-D; BO-D; N3313/AI-D; N3318 and N3323.

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A port-side view of BL614 in the Historic Hangars in 2011. RAF Museum-Iain Duncan



The impressive display featuring BL614 in Hangar 1 in 2018. RAF Museum-Iain Duncan



Flt Lt Gordon Braidwood DFC flew BL614 operationally with 222 Squadron in 1943. He visited his former aircraft while it was being restored to factory fresh condition by members the Medway Aircraft Preservation Society at Rochester. He is seen trying the cockpit for size on June 5, 1997. Via Lewis Deal MBE

Back on Duty

With the end of the filming nigh, and the Spitfire returned to Henlow in September 1968 for renovation by a joint RAF/Spitfire Productions working party. The three-blade propeller loaned to TE476 and gun stubs were refitted, wing tips removed and the aircraft incorrectly repainted as AB871 without code letters. It was officially given back to the RAF on October 28, 1968 and placed in store.

In September the following year the Spitfire was taken by road via RAF Northolt to the Guildhall Yard in the City of London for the Battle of Britain display by No.71 MU. Its stay was brief though and on the 16th it had been moved to RAF Wattisham in Suffolk for more storage. It had a starring role in the station's Battle of Britain display on September 16, 1972 but just eleven days later it was transferred by road to the RAF Colerne station museum in Wiltshire to replace Spitfire P7350, which had joined the Battle of Britain Memorial Flight (BBMF).

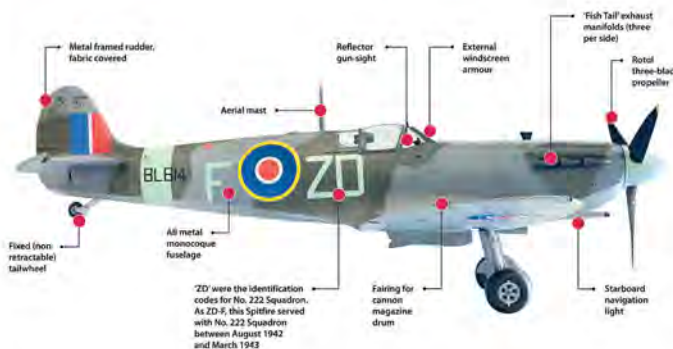
In 1974 a restoration programme began and during the work the correct serial number was discovered, and the fighter at long last reverted

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.



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



RAF Wattisham was BL614's home in the early 1970s, although the fighter was still marked as AB871. This photo was taken on August 17, 1971. Peter Arnold Collection

back to its correct identity. It was also refinished in No.222 Squadron markings with the codes ZD-F to represent its role in supporting the Dieppe raid on August 19, 1942. The work was finished by 1975 and BL614 was temporarily displayed at RAF Cosford, and then onward to the regional collection at RAF St Athan on August 28.

On January 8, 1980, BL614 temporarily moved to RAF Abingdon, Oxfordshire, to provide parts and patterns for the rebuild of damaged BBMF Spitfire Vb AB910, which had been involved in a taxiing accident during an airshow at Bex, Switzerland, on August 21, 1978. ZD-F was stripped of everything forward of the fireproof bulkhead to service AB910 and by September of the following year it had returned to St Athan.

The Road to London


The new Manchester Air & Space Museum was the engineless Spitfire's next point of call, departing St Athan by road on December 7, 1982. Some restoration work was done on the instrument panel and the cockpit area was resprayed by Museum volunteers in September 1984.

After more than a decade on show, BL614 moved to Rochester Airport, Kent, in March 1995

for restoration by volunteers from the Medway Aircraft Preservation Society. A replacement Merlin 46 powerplant was provided by the RAF Museum, and the engine bearers, wing tips, rudder, firewall and cockpit components were replaced by the restoration team.

The completed aircraft, looking factory-fresh after the Medway team had worked its magic, was formally handed over to the RAF Museum in ceremony at Rochester on September 11, 1997. Six weeks later it was transferred by road to the RAF Museum London,

replacing Spitfire I K9942 on display in the Historic Hangars. And there it stayed until November 1, 2017 when it was dismantled, and placed in temporary storage pending movement into Hangar 1 as part of the new *RAF First 100 Years* display. It was moved into its new display hall in January 2018 and mounted on a pole within the building in February.

The fighter now showcases how the RAF and its personnel protect the nation's skies, something this aircraft did on the front line during the dark days of the early 1940s. 

"More fighter sweeps over enemy territory, bomber escort flights and combat patrols were undertaken over the next few months, with the fighter's operational base changing several times"



Spitfire BL614 at North Weald during the filming of *Battle of Britain* in May 1968. Peter Arnold Collection



His Royal Highness Prince Philip, Duke of Edinburgh, touring the *Milestones of Flight Hall* in December 2003. All photos via the RAF Museum, with thanks to Andrew Renwick

Royal Connections

The recent opening of the First 100 Years exhibition by His Royal Highness The Earl of Wessex is the latest in a long line of visits by senior members of the Royal Family to the RAF Museum. Douglas Rose highlights some of these notable occasions

Members of the Royal Family were no strangers to RAF Hendon during its operational days, with King George V and Queen Mary attending the Hendon Pageant in 1921, and countless visits associated with the King's Flight in the 1930s and 1940s. The latter included a visit by Princess Elizabeth on July 17, 1945. This Royal patronage has continued during the Royal Air Force Museum's tenure at Hendon.



Her Majesty Queen Elizabeth II with Dr John Tanner, founding Director of the Royal Air Force Museum, at Hendon on November 15, 1972.



The Battle of Britain Museum being opened by Her Majesty Queen Elizabeth the Queen Mother on November 28, 1978.



RAF Museum officials being introduced to His Royal Highness The Prince of Wales at Hendon on December 2, 1975.


The fledgling museum was opened by Her Majesty Queen Elizabeth II on November 15, 1972 and the plaque commemorating this historic event has pride of place in the public reception area of Hangar 3. An extension of this building was opened by His Royal Highness The Prince of Wales on December 2, 1975.

The next major development, the Battle of Britain Museum at Hendon, was officially inaugurated by Her Majesty Queen Elizabeth the Queen Mother on November 28, 1978.

Her Majesty returned in 1983 to unveil the Bomber Command Museum.

This was followed some years later by the Milestones of Flight Hall, which was ceremonially opened by His Royal Highness The Duke of Edinburgh, on December 17, 2003 – the centenary of powered flight. The Duke (the museum's Patron) returned on December 2, 2014 to cut the ribbon of the *First World War in the Air* exhibition within the refurbished Grahame-White factory.

Between these times a host of Royal visitors have attended various functions at Hendon and the Museum's Cosford site. Prince Philip, for example, attended a special dinner to mark the museum's 25th birthday in 1997, and the Princess Royal opened the Cold War building at Cosford on February 7, 2007.

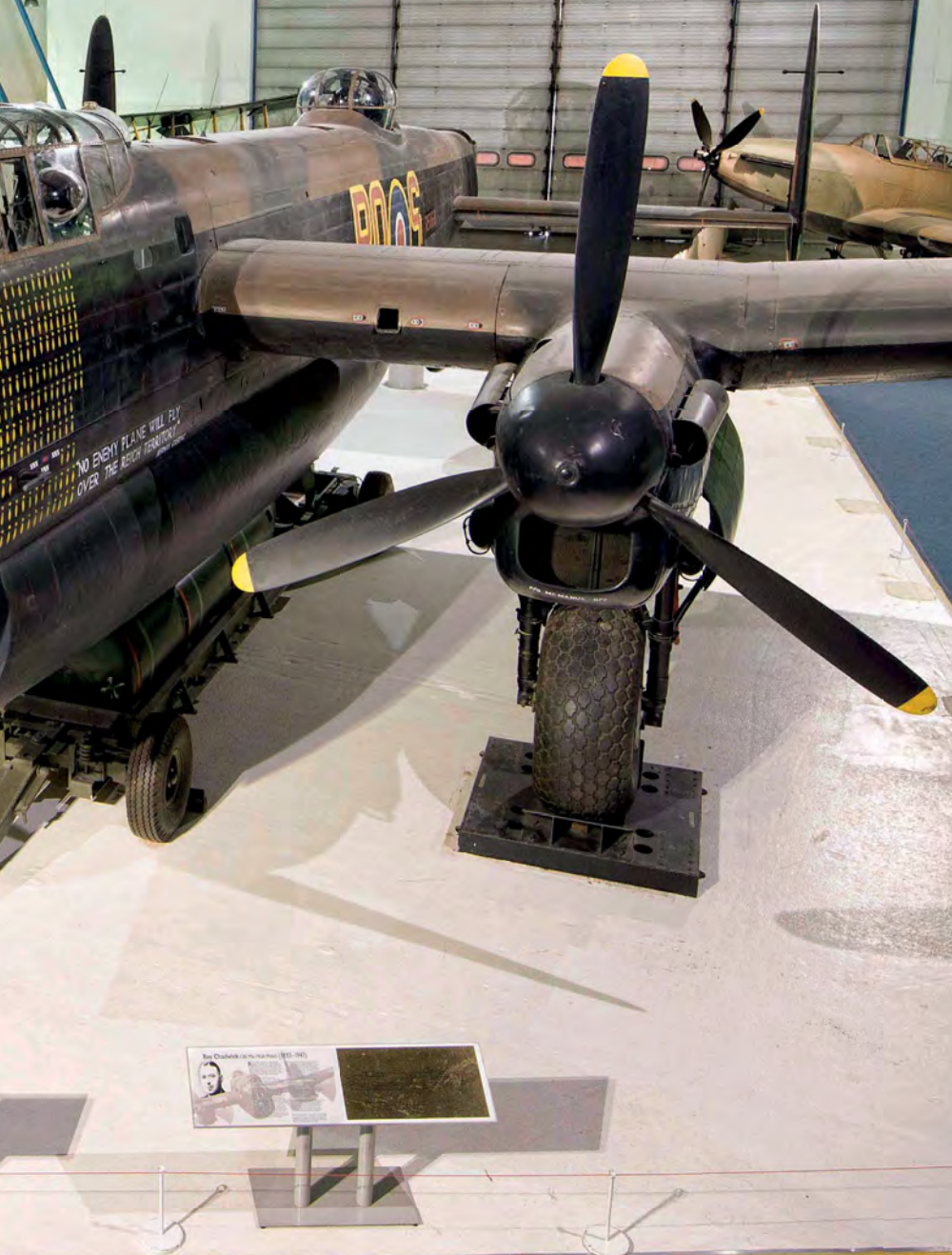
And, of course, the former Queen's Flight Wessex helicopter is on show in the Museum's Hangar 4, adding to the royal connection and linking to Hendon's past. 

Avro Lancaster
R5868 on show
in the Museum's
Hangar 5. RAFM

'S-for-

One of the most important World War Two aircraft surviving today, Avro Lancaster I R5868 has been at the heart of the RAF Museum's collection from the very start. Andrew Simpson profiles this multi-raid veteran

Sugar'



Many aircraft exhibited at the Museum have carried out combat sorties during their time with the service. Some have patched-up battle damage that's still visible, and a handful have impressively large numbers of missions to their credit. But one stands out amongst these veterans – Avro Lancaster I R5868 'PO-S', affectionately known as *S-for-Sugar*. If you go into the Bomber Command section in the RAF Museum London's Hangar 5 and look at the Lancaster's nose, you will find a quote from Hermann Göring: "No enemy aircraft will fly over the Reich territory". Also painted there are 137 bomb tallies, starkly mocking the Reichsmarschall's words. This sortie total was only surpassed – by just one 'op' – by Lancaster III ED888 'PM-M2' of 103 Squadron.

Built in Manchester by Metropolitan-Vickers at its Mosley Road plant, R5868 was originally part of a 1939 order for 100 twin-engined Manchesters – the first 43 were built as such, and the final 57, including R5868, were completed as Lancasters. After being finished at Mosley Road it was moved by road the short distance to Avro's Woodford site for assembly and flight testing in June 1942.

Bomber Command's need for new aircraft was acute and factory-fresh machines were moved to frontline units as soon as possible. Accordingly, R5868 was taken on charge by 83 Squadron at Scampton, Lincolnshire, on June 29, 1942, becoming LO-Q-*for-Queenie*. The acceptance check on the airframe was carried out by LAC Pollard who, with LAC Ron Paget and Sergeants Jim Gill and Harry Taylor, looked after R5868 throughout its time with the unit.

Into Combat

Sqn Ldr Ray Hilton DFC eased R5868 off the runway just after midnight on July 9 with 1,260 four-pounder incendiaries in the bomb bay. For its debut, the 'Lanc' was bound for Wilhelmshaven on Germany's North Sea coast and it returned without incident after 4 hours, 13 minutes airborne. Hilton, commander of 'B' Flight, was on his second operational tour. From the outset he insisted *Queenie* was flying one wing low. The ground crew tried everything to rectify the fault, and they even flew on air tests, but no solution was found.

Around this time R5868 acquired her first nose art – a nude female kneeling in front of a bomb, on the port side just aft of the front turret. This was exchanged for *Devils of the Air* nose art later in the war and ultimately this was replaced with Göring's extravagant quote.

Queenie was worked hard by the unit, hitting most of the major German cities including Hamburg, Duisburg, Cologne, Frankfurt, Bremen and the 'Big City' – Berlin. In fact, R5868 attacked the Reich's capital eight times during World War Two. *Queenie* also flew with the Pathfinder Force on its first operational sortie, a raid on Flensburg on August 18, 1942, following a move to RAF Wyton three days earlier.

It tangled with Luftwaffe fighters at least twice in 1942. In the first clash, a pair of Focke-Wulf Fw 190s intercepted R5868 during a daylight raid to Essen on July 18, 1942. »

LONDON'S ICONS

A very proud crew from 83 Squadron pose with R5868 in June 1943. It had flown 58 operations at this point. All RAF Museum Collection unless noted



Thanks to the skilful flying by pilot Sqn Ldr Hilton and teamwork by his crew, the Lancaster escaped damage. In the second, which happened at 15,000ft over Duisburg during a night raid, the Lanc evaded the attentions of at least two Fw 190s and then a Messerschmitt Bf 110 nightfighter.

The trip to Essen on July 25/26, 1943 was among the more unusual sorties with 83

Squadron. The raid itself wasn't out of the ordinary, but R5868 was selected to carry the USAAF's Brig Gen Fred Anderson, commander of the US Army Air Force's VIII Bomber Command, to observe the operation, along with 5 Group's Navigation Officer, Sqn Ldr A Price.

In addition to having VIP passengers on board, the Lancaster – one of 600 aircraft in the attack – dropped a 4,000lb bomb, along

with three 1,000-pounders, and five green target indicators during the 4 hour 37 minute mission. The raid left fires visible over 100 miles away, the smoke rising to 20,000 feet - General Anderson remarking that the fires were one of the most awe-inspiring sights he had ever seen.

Soon after, the unit started its conversion onto Lancaster IIIs, and began disposing of



'PO-S' and crew in May 1944.



Lancs from 463 and 467 Squadrons, including R5868, on the Bremen raid in 1945.

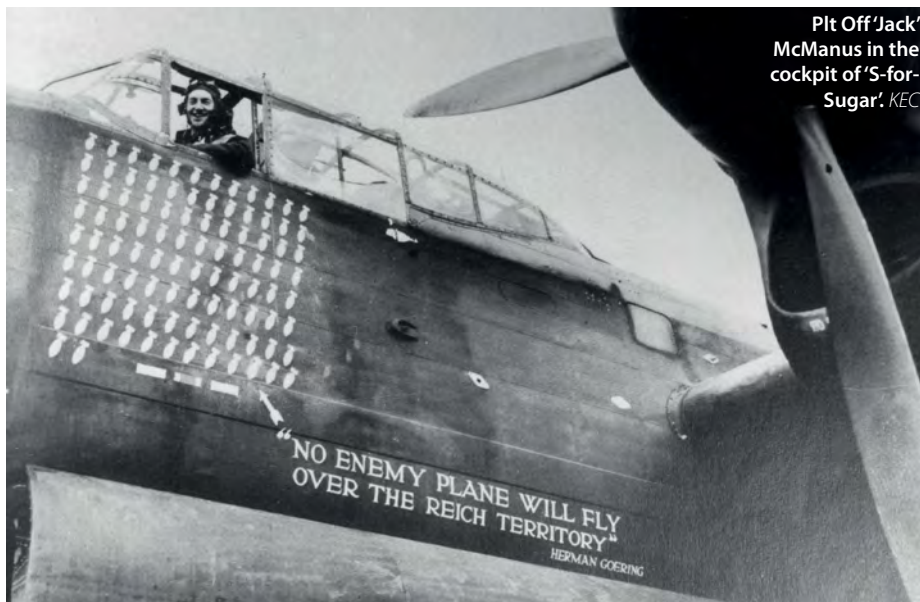
its Mk.I Lancs. After 67 sorties, on August 15, 1943, *Queenie* completed its last 'run' with 83 Squadron. At this time R5868 had 450 flying hours 'on the clock', nearly 368 of them operational.

Unit Change

In September R5868 arrived at Bottesford, Leicestershire, joining 467 Squadron RAAF as PO-S-for-Sugar. The bomber was allocated to 'B' Flight as a replacement for the previous *S-Sugar*, ED500, which crashed in Cheshire. The Museum's Lancaster made its first operational sortie as part of the unit with a visit to Hanover on the night of September 27, 1943. A load of one 4,000lb bomb, 104 x 30lb bombs and 1,260 x 4lb of incendiaries was dropped, with a flight time 5 hours 23 minutes being recorded. On returning, *Sugar* was forced to divert to Wittering due to minor defects and poor weather conditions. It was soon back in action though, being dispatched with a full war load to strike Bochum in western Germany on September 29. This was swiftly followed by attacks on Munich (October 2), Kassel (October 3) and Frankfurt (October 4).

Just a few days later, on the night of October 7, Stuttgart was the target with R5868 dropping a bomb load of one 4,000-pounder and 72 x 30lb, plus 990 x 4lb incendiaries. All 17 of the squadron's aircraft made diversionary landings due to bad weather - *S-for-Sugar* dropped in at RAF Tangmere, West Sussex, after the 6 hour 50 minute flight.

Owing to this mass diversion the crews were unable to take part in operations the following night because, after getting their aircraft home to Bottesford, they would only have got a maximum of two hours' sleep. The squadron was therefore only able to despatch four fresh crews on this next mission, to bomb Hanover, despite having serviceable aircraft. *Sugar* seems to have been lent to 207 Squadron at neighbouring Langar for this raid, together with another 467 Squadron aircraft. »



Pt Off 'Jack' McManus in the cockpit of 'S-for-Sugar'. KEC



Air Cdre Allen Hesketh watches the score being chalked up on an 8,000lb bomb at RAF Waddington on May 11, 1944, just before 'Sugar's' 100th mission.



"After 67 sorties, on August 15 1943, *Queenie* completed its last run with 83 Squadron...R5868 had 450 flying hours 'on the clock', nearly 368 of them operational"

The Duke of Gloucester (second from the right) inspecting R5868 at around the time of its 100th combat sortie.



The frantic pace of missions started to take a heavy toll on R5868, and comments such as 'recommended aircraft unreliable for ops' and 'this aircraft is only fit for a conversion unit' started to appear in her operational record book.

No.467 Squadron's stay at its Leicestershire airfield home was coming to an end and on November 11 R5868 was ferried to Waddington, Lincs, the unit's new base. The pace of ops at this vital stage of the war increased, with Berlin being R5868's target on November 18, 22 and 23rd.

Disaster was narrowly avoided during another trip to the 'Big City' with Fg Off Jack

Colpus at the helm on November 26, 1943. Just after bomb release, *Sugar* was coned by searchlights; Jack corkscrewed the aircraft and dived to throw the enemy off the scent. At 20,000ft or so, the rear gunner reported that they had collided with another aircraft. (This turned out to be Lancaster I DV311 *P-for-Peter* of Skellingthorpe-based 61 Squadron – its crew also lived to tell the tale.)

After much agonising, and not knowing the full extent of the damage, Jack put *Sugar* down at RAF Tholthorpe in North Yorkshire with 5ft missing from the wing tip. (Interesting to note the pilot, speaking after the war, said they

landed at RAF Linton-on-Ouse.) The 'Lanc' was sent for repair-in-works and it was not until February 15, 1944 that it was ready for 'ops' again.

Ton-up

As *Sugar's* mission tally approached the 100 mark, the press began to take an interest and 'higher authority' decided that the nude lady nose art on R5868 would have to go. In her place was inscribed Herman Göring's vain boast, 'No enemy plane will fly over the Reich Territory', applied by LAC Ted Willoughby, one of *Sugar's* engine fitters, assisted by

'S-for-Sugar' on display outside RAF Scampton on March 15, 1960. The Lancaster had become the station's gate guardian in September the previous year, but soon became the centre of controversy following complaints that it was distracting drivers. It was claimed that 'with its yellow illumination it is too near the road and could cause confusion'. The matter was investigated by Lindsey County Council, and the Lancaster was repositioned slightly further back later in the year. Key Collection





F/Sgt Dan Smith, in February 1944. An arrow pointed to the growing number of bomb markings and the DSO ribbon 'awarded' after the first tour of 30 missions and a DSO after 60. *Sugar* was later awarded a bar to the DFC. These also reflected awards given to R5868's crew members.

Adopted by the crew of Australian Plt Off 'Jack' McManus, *Sugar* was back over Berlin on February 15. Mechanical problems developed again, with an engine stopping over the target – a most unfortunate development over the Big City.

"The Lanc, for so long a weapon of war, played a key part in these mercy missions"

Five nights later, R5868 suffered its first abort, but carried the McManus crew safely on eight 'ops'. The last of these was again to the Big City, on March 24, but the port outer failed while the port inner leaked oil and the bombs were reluctantly jettisoned.

Sugar's 139th and last op took place on April 23, 1945 when Fg Off Laurie Baker took it to Flensburg, Germany, but he did not unleash his eight 1,000-pounders and half-dozen 500lb bombs because of the 10/10ths cloud cover over the harbour. During her combat sorties, R5868 dropped 466 tons of bombs for a flying time of 795 hours. Six days later Italian partisans killed Mussolini and 48 hours after that Hitler shot himself; the war in Europe was over bar the formalities.

Mercy Missions

From late April 1945 to May 28, 1945 the crews of 467 Squadron, and others of Bomber Command, were involved in Operation Exodus, the repatriation of prisoners of war. The Lanc, for so long a weapon of war, played a key part in these mercy missions.

For example, on April 25 she was flown by Wg Cdr Ian Hay to Brussels to finalise repatriation of allied prisoners of war. R5868 returned the same afternoon with between around 20 PoWs on board who were landed at Westcott in Buckinghamshire before the Lanc relocated to Waddington. Crew member George Wing described the trip many years later: "The memory will always be with me of those lads' faces, even though at the time I was only 20 myself, to see them sat on the floor of the aircraft, and some of them »

R5868 being bombed-up ready for another operation.





R5868's remarkably well preserved cockpit. RAFM-Iain Duncan

trying to negotiate the main spar, and the cheers when we came over the white cliffs of England. One of my happiest flights." *Sugar* was the first aircraft to undertake such a mercy flight and it went on to fly at least another three such sorties – possibly more – during early May.

On May 7, senior RAF officers were flown in *Sugar* on a tour of German cities to observe the effects of the bombing raids and check the suitability of some German airfields to accept heavy allied aircraft to fly PoWs directly out of Germany. The 6-hour 45-minute trip included Mannheim, Kitzingen, Würzburg and Frankfurt; only the pilot, Wg Cdr Ian Hay, and navigator Fg Off Reg Boys, were allowed to leave the aircraft on landing, and *Sugar* became the first Lancaster to land on an 'enemy' airfield.

Enduring Tribute

Lancaster R5868 was earmarked for preservation in the summer of 1945 after Air Cdre Thomas Fawdry, a staff officer at Bomber Command, wrote to the Air Historical Branch reporting that R5868 was surplus to requirements. He said that 'due to its number of sorties, should any special disposal arrangements be required' and that 'the aircraft itself is in very good condition and suitable to carry out exhibition flights if necessary'. This suggestion was accepted by the Air Ministry Librarian who then had responsibility for historic aircraft. The AHB replied on July 30, 1945 requesting the aircraft be retained in storage. *Sugar* was subsequently dismantled and transported to Wroughton, Wiltshire, in August that year for storage.

On gate guard duties at RAF Scampton in the markings of 83 Squadron in 1965.

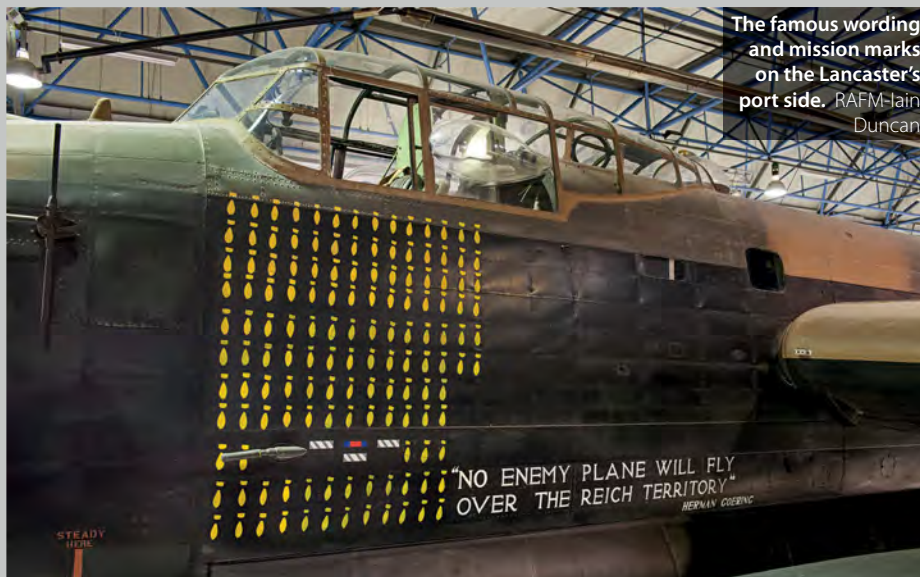


"All of this makes R5868 very special indeed; but its importance pales against the bravery of the crews who flew and fought in *S-for-Sugar*"

In 1959, R5868 returned to its first operational base, Scampton, and was noted as still wearing its wartime colours and 'PO-S' code in mid-May of that year. After a starring appearance at the station's Battle of Britain Weekend in September, was put on display at the station's main entrance.

On July 7, 1970 Jack Bruce, Deputy Keeper of the RAF Museum, and Fg Off R M Forder of the Bicester, Oxfordshire, based 71 Maintenance Unit surveyed the 'Lanc' and estimated that it would take 2,000-man hours to externally restore the aircraft for display. It was vital that such an important machine was preserved and so it was formally allotted to the RAF Museum on August 26, 1970.

On November 23/24, 1970 *Sugar* was moved to 71 MU on eight Queen Mary trailers. It was heavily corroded, especially in the wings, and needed much work to bring it up to display standard. The restoration team was led successively by Chief Tech Henry, Sgt Thomason and Chief Tech Stanley. The Lanc was paint-stripped by a team from St Athan and given anti-corrosion treatment and the interior repainted. The control surfaces were recovered by staff from the Shawbury-based 27MU. The engines were steam washed and new Perspex panels made for the canopy and turrets. A replacement astrodome was 'donated' by an Avro Shackleton and a mock-up H2S radome was produced and fitted. Interestingly, during restoration work the front turret yielded a clip of three bullets dated 1941.



The famous wording and mission marks on the Lancaster's port side. RAFM-Iain Duncan

To the RAF Museum London

The move to Hendon by road (which needed six Queen Mary trailers) was completed on March 12, 1972, after an overnight stop at Northolt. It was then reassembled and repainted as 'S-Sugar' of 467 Squadron as it was at the end of the European war, by a team from St Athan. The aircraft had to be assembled in the open due to height restrictions in the hangars and painted when moved inside - the Lanc was winched inside minus one outer wing with just 2 ½ inches clearance from the tail and the side of the building. This was completed by March 25, 1972

and by August 8 all the final external restoration work had been finished. A ceremony to mark the end of the internal restoration and fitting out was held in June the following year and was attended by many people involved in *Sugar's* wartime service. Some equipment continued to be fitted after this date, however. In April 1982 R5868 was moved into the newly constructed Bomber Command Hall (now known as Hangar 5) where it remains to this day. All of this makes R5868 very special indeed; but its importance pales against the bravery of the crews who flew and fought in *S-for-Sugar*. 🕒



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Objects and Stories



One of the many new display cases holding precious items from the RAF Museum collection. This one focuses on the RAF's spirit and values.

LiveSideMedia



We focus on some of the smaller items that help to tell how people have shaped the Royal Air Force from its inception in 1918 to the current day

The Royal Air Force Museum London's new exhibitions – physical and online – feature a number of key themes, each one highlighting personal RAF stories alongside objects from across its collection. Over 500 artefacts have been brought out from long-term storage to create the displays and many of the items on show haven't been on view to the public before. The RAF stories include those of serving personnel, veterans, cadets and reservists and come from times of war and keeping the peace – at home and abroad. The RAF Museum is, of course, a place of storytelling and sharing – visitors are encouraged to discover these stories throughout the museum and online – and perhaps contribute their own.

The items on show are presented in glass cabinets, supported by information supplied in a variety of different media, including panels and audio recordings. The displays reflect the service's diversity, and highlight the dedication of the men and woman that have given, and still are giving, their all in the Royal Air Force. »

Left: The new RAF: First to the Future display in Hangar 1 contains an impressively large number of scale wind-tunnel models to show the development of aerodynamics. Many of these items haven't been on public view before.

All images RAF Museum unless noted

Noor's Bravery of the Highest Order

Assistant Section Officer Noor Inayat Khan GC joined the Women's Auxiliary Air Force (WAAF) in 1940 after escaping to Britain following Germany's defeat of France. Although she was a pacifist, she volunteered for the WAAF and became a skilled radio operator.

Noor later joined the Special Operations Executive and was sent to occupied France in June 1943. There she helped the Resistance by transmitting information under the code name 'Madeleine' until she was betrayed and captured by the Gestapo. Noor refused to co-operate under interrogation and was executed at Dachau concentration camp in Germany on September 13, 1944, aged just 30. In defiance, her last word was "Liberté".

The citation for the posthumous award of her George Cross in April 1949 said: "Inayat Khan displayed the most conspicuous courage, both moral and physical [for] more than 12 months". She truly showed the spirit and values of the RAF, putting herself in great danger and ultimately giving her life while carrying out her duty.

2ND PILOT, PUPIL OR PASSENGER	DUTY (INCLUDING RESULTS AND REMARKS)
TWO PASSENGERS	TOTALS BROUGHT FORWARD
	TO FANGHREE
	AIR TEST
TWO OUT TWO IN	OPERATIONS AS ORDERED
	60. FINE
	AIR TEST
TWO OUT THREE IN	OPERATIONS AS ORDERED
	61. MISSES
ONE IN	AIR TEST
GROUP CAPTAIN CARRISON	OPERATIONS AS ORDERED
	62. BAD
	TO LYNNAN AND RETURN
	LOCAL FLYING
	AIR TEST
	TO TEMPESSO.
TWO PASSENGERS	TRAINING



Inset: Squadron Leader Frank Rymills of No.161 (Special Duties) Squadron flew Noor to near Angers, France, in a Westland Lysander on the night of June 16, 1943. His flying logbook shows his record of the successful flight, marked Operation 61. Above: Noor Inayat Khan in 1940. After her death, she became the first Muslim woman to receive the George Cross. © RAF Museum

Esprit de Corps

After its formation in 1918, when the Royal Flying Corps and Royal Naval Air Service were merged, the new Royal Air Force was keen to develop an identity and an esprit de corps among its personnel. It strongly promoted unit identities through symbols and rituals, while maintaining a distinct character of light-hearted professionalism which is still shown today. In 2008 the values of the RAF were defined as Respect, Integrity, Service and Excellence – standards that have, in fact, been embodied by RAF personnel since its earliest days.

Below: Unit badges and patches have been used by the RAF since its creation to build a sense of belonging for its men and women. This fine selection of unit patches is on show in Hangar 6.



Prepare – Recruitment and Training

Recruits are drawn to the RAF for many reasons - it might be the opportunity to fly or to see the world. Selection is demanding and requires applicants to demonstrate intelligence, aptitude and determination.

When the RAF was formed, training was prioritised to provide the service with a core of expert personnel from a diverse range of backgrounds. Excellence in flying training was ensured through the Central Flying School. A hundred years later, the RAF employs cutting-edge training techniques, both physical and synthetic, to ensure its personnel are well prepared for duty. Illustrated is one of the special displays on training within the RAF.



Attack – Bombing

Bombing is a core RAF role, enabling it to strike the enemy's forces directly and reach beyond the front line to economic and industrial targets. Just the threat of aerial attack can be a strong deterrent. The RAF demonstrated this strategy in the policing of British colonies between the First and Second World Wars; and the carrying of nuclear weapons during the Cold War. Whether through the area bombing raids of World War Two or the precision delivery of modern weapons, the RAF has shown it can deliver devastating force when required.

On show in the *RAF Stories, The First 100 Years 1918–2018* exhibition is a tribute to Squadron Leader Philip Louis Ulric Cross DSO, DFC. Ulric was born in Port of Spain, Trinidad, on May 1, 1917 and joined the RAF in 1941. After training he was commissioned and joined No.139 (Jamaica) Squadron at RAF Marham as a navigator. His unit was part of Bomber Command's Pathfinder Force, which had the difficult and dangerous task of identifying and marking targets for bombing raids during World War Two. Ulric completed 80 operations, twice refusing to be rested. In June 1944, he was awarded the Distinguished Flying Cross and, in November, the Distinguished Service Order, for his devotion



to duty and outstanding navigational ability. He later said: "The world was drowning in fascism... so I decided to do something about it and volunteered to fight in the RAF".

Ulric left the RAF as a squadron leader in 1947 and practised law in Ghana and Tanzania. He later became a High Court Judge in his

native Trinidad. In 1990, he was appointed High Commissioner for Trinidad and Tobago in London. He passed away at the age of 96 on October 4, 2013.

Above: **Part of the Squadron Leader Ulric Cross display in Hangar 1.**

Founding Father

Any overview of the RAF's history would not be complete without a display on Marshal of the Royal Air Force Viscount Trenchard of Wolfeton GCB, OM, GCVO, DSO, the 'Father of the RAF'. Accordingly, the new exhibition on Hangar 1 has several artefacts and information sections on this inspirational gentleman. After joining the army in 1893, he fought in the Second Boer War in South

Africa in 1900, being badly wounded in action. In 1910 he learnt to fly and rose to command the Royal Flying Corps in France during the First World War. Lord Trenchard was the first Chief of the Air Staff, appointed shortly before the formation of the RAF. He became convinced of the need for an independent air force



and a core of personnel who could operate its increasingly complex technology. His belief in 'the extreme importance of training' resulted in three training institutions: RAF College Cranwell, RAF Halton and the Staff College, which delivered apprentice and officer training. He famously said: "I have laid the foundations for a castle; if nobody builds anything bigger than a cottage on them, it will at least be a very good cottage". He passed away on February 10, 1956 and is buried in the RAF Chapel in Westminster Abbey.

Above: **These medals, on show in Hangar 1, belonged to Marshal of the Royal Air Force Viscount Trenchard. The medal bar includes the Distinguished Service Order, six campaign medals, a Jubilee and two Coronation medals, the Belgian Croix de Guerre and the US Distinguished Service Medal. Several other awards are displayed along Lord Trenchard's in the exhibition, including an Air Force Cross, an Air Crew Europe Star, a Long Service and Good Conduct Medal, plus a Medal Ribbon Bar.**



Lord Trenchard inspecting his men. © RAF Museum

Window Bundle 1943–1945

Also in the Attack section of the new exhibition in Hangar 1 is a small display on 'Window', the code name for a radio countermeasure made from strips of aluminium foil. Used extensively by Bomber Command from 1943 onwards, the bundles of strips were ripped open using the string attached and thrown out of the aircraft. The cloud of foil created a false return on enemy radar screens, meaning that radar controlled searchlights and anti-aircraft guns were unable to easily lock on to the RAF bombers. The modern-day equivalent is known by the American code name 'Chaff'.



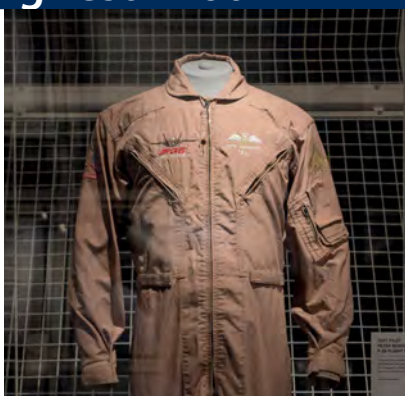
Gulf War PoW

Some of the more poignant items on display in the *RAF in an Age of Uncertainty 1980 – Today* hall (Hangar 6) tell the story of Squadron Leader Robbie Stewart's time as a prisoner of war in the first Gulf War. Panavia Tornado GR.1 navigator Robbie and his pilot Dave Waddington were shot down by an Iraqi surface-to-air missile while attacking Tallil Air Base at low level on the night of January 19/20, 1991. The pair ejected, were taken prisoner and badly mistreated. Thankfully they survived and were released at the end of the war. Robbie's PoW suit is on show, along with other Gulf War survival equipment.

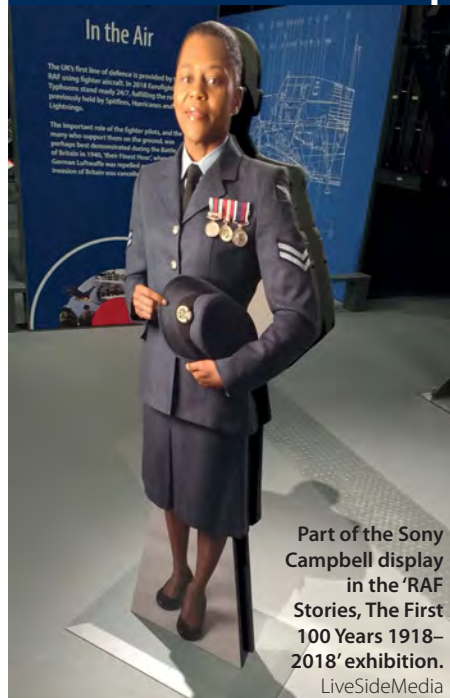


F-35 Lightning Test Pilot

Personal artefacts associated with the RAF's latest fighter, the Lockheed Martin F-35 Lightning, are also on show in Hangar 1. They include the flight suit worn by test pilot Peter 'Kos' Kosogorin during the F-35's development in the USA. The first operational F-35Bs for the RAF arrived at RAF Marham, Norfolk, on June 6, 2018.



Air Defence – A 'Scopie' on Guard



Part of the Sony Campbell display in the 'RAF Stories, The First 100 Years 1918–2018' exhibition. LiveSideMedia

The primary aim of the new exhibitions is to focus on the whole RAF story, including vital areas that are often overlooked. One such display highlights the work of Corporal Sonia 'Sony' Campbell. Sony, who joined the RAF in 1999, is an Aerospace Systems Operator, or 'Scopie', who uses extremely sophisticated sensors, computer information systems and communications to search the skies for potential threats. Asked about her role, she said: "While you sleep, I watch the skies". Sony has served all around the world, including tours of Afghanistan and the Falkland Islands. She 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's bible, which provided comfort to her on deployment in Afghanistan, is also on display in the new *RAF in an Age of Uncertainty* exhibition in Hangar 6.



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

On Today's Front Line



The Typhoon pilot's flying clothes display in the RAF in an *Age of Uncertainty 1980 - Today* exhibition.

Defence has been one of the key roles of the Royal Air Force since its formation in 1918. Today the RAF's Quick Reaction Alert force is on standby 24/7, ready to intercept any unauthorised intruder into UK airspace. It can be airborne within a few minutes.

Fast jets and their pilots form part of a wider network of personnel, radar and supporting aircraft that defend the UK. The RAF can also deploy these capabilities overseas when needed as part of coalition North Atlantic Treaty Organisation (NATO) or United Nations operations.

Representing pilots on the front line are items belonging to Wing Commander Richard Patounas. Universally known as 'Dicky', he received an RAF sixth form scholarship and was commissioned into the RAF after passing his A-Levels in 1989. On completion of his flying training he was posted to RAF Valley on Anglesey in North Wales as a flying instructor. He was then posted to No.54 Squadron flying SEPECAT Jaguars, which he flew on operations over the Balkans.

In 1998 he joined the Red Arrows display team for three seasons and returned again in 2006 as their leader. Dicky commanded No.3 Squadron when



Above: Dicky Patounas while commanding No.3 Squadron in 2012. © MOD

it deployed to southern Italy flying Eurofighter Typhoons over Libya during the type's first operational deployment.

In September 2011, he commented: "The key thing in all of this is the Libyan people – we've been acting in support of them".

Paving the Way

In addition to the new physical displays, the Museum has introduced online and printed material that supports the new exhibitions. A story that catches the eye is that of Flight Lieutenant Julie Ann Gibson. Up until the end of the 1980s, the opportunity to fly operationally as a pilot in the RAF was restricted to men, but this changed when Flight Lieutenant Gibson earned her wings.

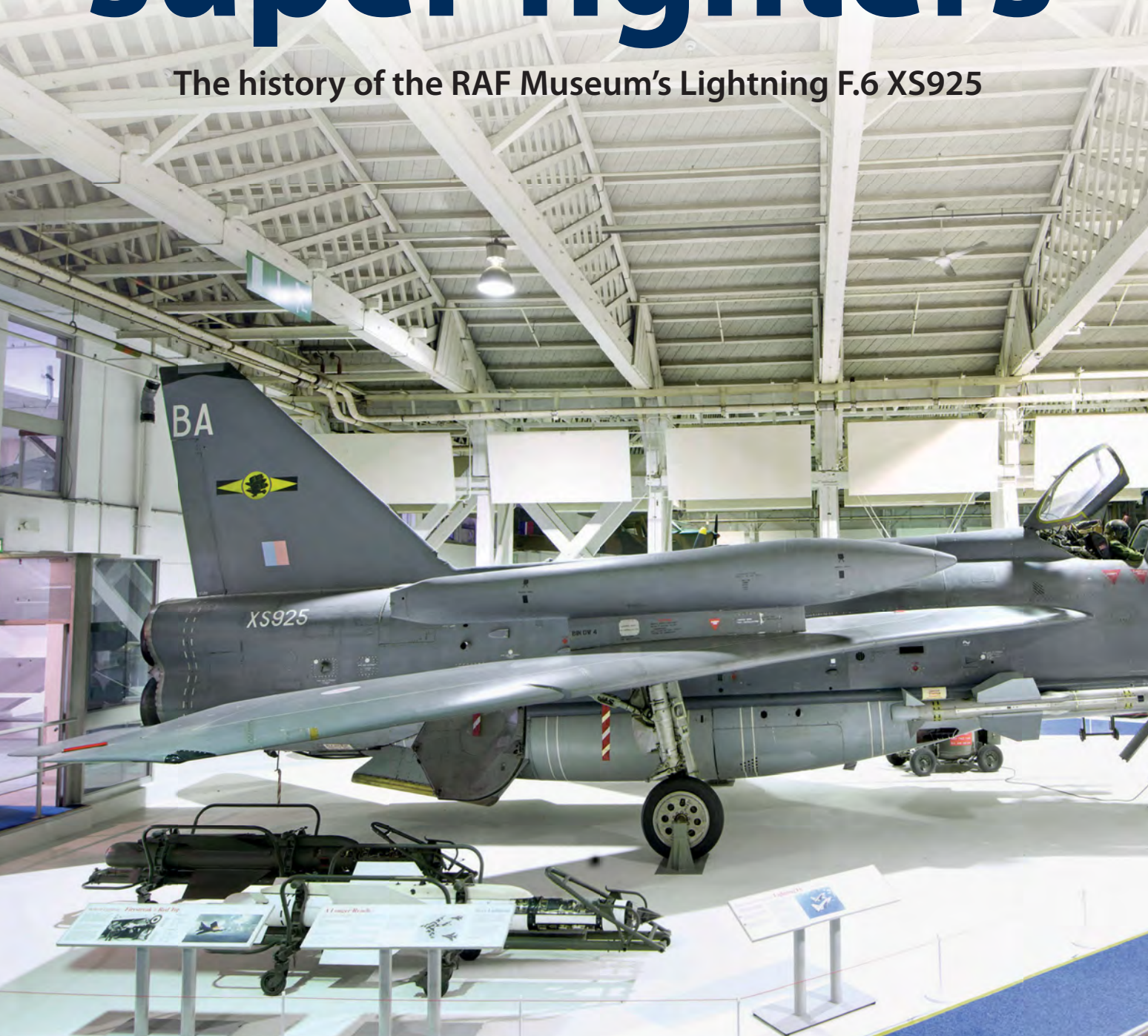
She joined the RAF in 1984 and when the service began recruiting female pilots in 1989, engineering officer Julie sent in her application on the very first day it became possible. In 1991 she was the first female regular officer to graduate as an RAF pilot. Julie specialised in flying multi-engine aircraft and became a Captain on Lockheed Hercules aircraft, based at RAF Lyneham in Wiltshire. She delivered personnel and equipment to locations around the world and says: "If you have a dream or passion, don't let anybody put you off it and don't let anybody say you can't do something because you're a girl."

Right: Flight Lieutenant Julie Gibson.
© RAF Museum



Last of the **all-British** super fighters

The history of the RAF Museum's Lightning F.6 XS925





ABOVE: Lightning F.6 XS925 'L' during its service with 5 Squadron. Note the deployed airbrakes. All images by or via the RAF Museum

BELOW: English Electric Lightning F.6 XS925 at the RAF Museum London.



The year 2018 will go down in history as the time when the highly acclaimed Lockheed Martin F-35 Lightning fighter joined the Royal Air Force's UK-based operational forces. Exceptional performance, cutting edge technology and a leap forward in the nation's defence capability, the new jet is sure to be the tip of the RAF's spear for decades to come. But it's not the first time this name has been used for a fighter jet employed by the service. In the 1950s the Lancashire firm English Electric manufactured its Lightning super fighter for the RAF, and like the F-35, it offered performance that was truly ahead of its time.

The first order for the English Electric Lightning was placed in November 1956 and a total of 262 examples were bought for the RAF.

The EE Lightning was the RAF's first aircraft that could truly go supersonic in level flight and its introduction immediately doubled maximum speeds in Fighter Command. Production deliveries to the Central Fighter Establishment began in December 1959 and the first operational squadron received its aircraft six months later.

The Lightning served in the air defence role for 28 years, being officially retired from the front line on April 30, 1988. This remarkable service life lasted longer than any other fighter used by the service.

The Museum's Lightning was part of a batch of 33 F.6s ordered by the RAF under Contract KD/2T/0139/CB7a and built by the British Aircraft Corporation at Preston. The jet made the first of its six pre-delivery flights – from Samlesbury to Warton – on January 26, 1967, in the hands of experienced test pilot Roland Beamont.

It was received by its first unit, 5 Squadron at Binbrook, Lincs, in March of that year, tasked with policing UK skies. Finished in natural metal, it was coded 'L'. It was also detached to Beauvechain, Belgium, in March 1968 and Luqa in Malta five months later.

Back to Warton

The jet suffered a landing accident at Binbrook on September 14, 1968 when it engaged the hydraulic arrestor barrier on landing, having touched down in the undershoot area, bounced twice and collapsed the nosewheel oleo and strut. It was taken back to Warton for repairs the following month, but the nature of the damage meant that it was transferred to the nearby Samlesbury facility for more in depth work. Its flying hours at this point were recorded as 465.48. It made a successful return to flight from Samlesbury on February 24, 1970 and was back with 5 Squadron the following day.

On December 11, 1970 it again suffered severe damage, this time in the form of a bird strike to the No.1 (lower) engine. It's thought the repairs were undertaken at Binbrook and it was made airworthy again at the fighter station.

The well-used XS925 was transferred to 60 Maintenance Unit at Leconfield, Yorkshire, for overhaul on June 28, 1972, with its total flying hours being recorded as 1,386.15. Four months later it was back with 5 Squadron, still carrying its 'L' code letter and silver finish. Its next major service came on April 16, 1975 when it returned to 60MU – its flying hours at this point were 2,103.45.

Although XS925 returned to Binbrook on August 15, 1975, it was transferred to 11 Squadron, and initially gained the code 'H', »

LONDON'S ICONS

By mid-1985 XS925 had become 'BD' of 11 Squadron, and was later assigned to Sqn Ldr Terry R Adcock.



which was changed to 'J'. It was soon back with 5 Squadron, however, and even regained its 'L' code in the process!

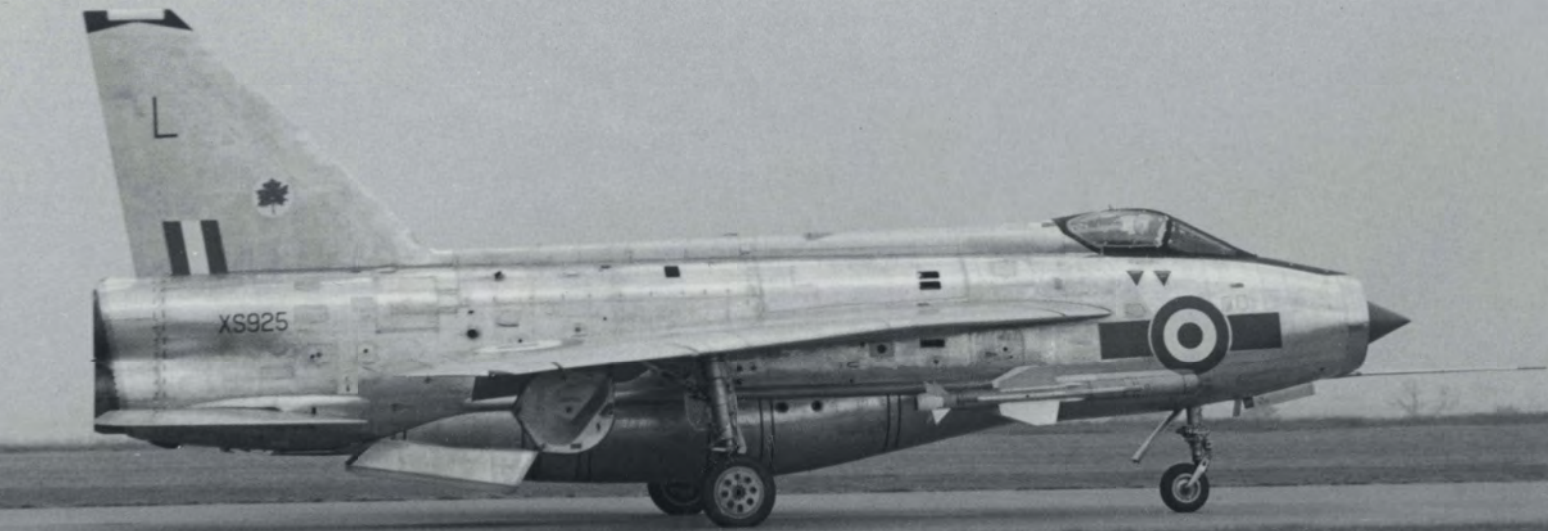
Its appearance changed dramatically in December 1976, when a grey/green camouflage scheme was applied. This toning down was common to all of the fleet and reflected the Lightning's increasing low-level interceptor role. There then followed a routine of storage interspersed with usage by No.5 and No.11 Squadrons. Codes used between 1976 and 1982 included 'D' and 'AD'.

In July 1984 another change of livery was applied when XS925 was resprayed in an air defence dark grey colour scheme at RAF St Athan, Wales. It still carries these colours today.

Another Lease of Life

The Lightning force had been slowly replaced in frontline use by the McDonnell Douglas Phantom and by the 1980s just two fighter squadrons – 5 and 11 – were operating the all-British jet. These were to be axed once the Panavia Tornado F.2/F.3 entered service in significant numbers. But the timescale for the latter's introduction slipped, and it was clear the Lightning would have to soldier on, so an airframe life extension modification was devised and carried out on 35 examples, including XS925. This programme, conducted by British Aerospace, gave the aircraft another 400 flying hours each. (The wing roots had also been subjected to a strengthening modification in the early to mid-1980s.) XS925 underwent the wing/airframe enhancements from November 1984 until mid-1985 and was back on the front line as 'BD' with 11 Squadron by June 14, 1985. »





The Museum's Lightning while with the RAF's 5 Squadron, circa August 1967.



By the end of 1975 XS925 had been transferred to 11 Squadron, and was coded 'J'.


"The future looked bleak until it was acquired by the RAF Museum for preservation"



More service with 5 and 11 followed, but the end was nigh for the Lightning and XS925 made its last flight on July 21, 1987 with just over 4,015 flying hours to its credit. It was withdrawn from use as 'out of hours' three days later.

Allocated the maintenance serial 8961M, it was then stripped for spares and placed into storage. The future looked bleak until it was acquired by the Royal Air Force Museum for preservation at its London site.

The fighter was dismantled and transported by road to its new home in north London, departing Binbrook on April 26, 1988.

Once on site it was lovingly put back together by engineers from 11 Squadron and was formally handed over to Museum Director Dr Michael Fopp by Binbrook's commanding officer, Group Captain John Spencer on June 7, 1988. It is displayed as 'BA' of 11 Squadron, although it actually flew in its later years as 'BD'. 

Above: In December 1976, XS925 gained a grey/green camouflage scheme, and it had moved back to 5 Squadron, and was coded 'D' in the process.

Below: XS925 'AD', assigned to Flt Lt Peter R Wild of 5 Squadron.





RAF to the Rescue



Among the many fascinating objects within the Support section in the redeveloped Hangar 1, is a helicopter with a special Royal connection. Daniel Ford profiles Westland Sea King HAR.3 XZ585

Sea King HAR.3 XZ585 on display as a key part of Hangar 1's *RAF Stories: The First 100 Years* exhibition.

“Twenty-two Squadron ops, Flight Lieutenant Wales.” On the other end of the phone line, the caller realised he was talking to His Royal Highness Prince William, Duke of Cambridge. On the Prince’s flying suit was a patch emblazoned with his pilot’s wings and the name ‘Will Wales’. With 22 Squadron at Valley on Anglesey, and with his RAF training behind him, there was no special treatment for Flt

Lt Wales. He did all that was expected of a member of the unit, including answering the phone. The call was to finalise the details of a search and rescue (SAR) demonstration that a Westland Sea King of ‘C’ Flight of 22 Squadron was due to give at a North Wales seafront airshow later in that year, 2013.

Flt Lt Wales joined ‘C’ Flight at Valley in early 2010 and began learning the challenging and intensive work of an SAR



unit. His first rescue took place that October, picking up a man who had suffered a heart attack from a gas rig in Morecambe Bay. During this time, Flt Lt Wales was a co-pilot, but in December 2012 he qualified as PIC (pilot in command) to captain the large twin-turbine helicopter.

The Prince flew his last sortie with 22 Squadron in September 2013, bringing to a close what had clearly been a very

happy and rewarding operational career. He went on to use his skills

with the East Anglian Air Ambulance until June 2017.

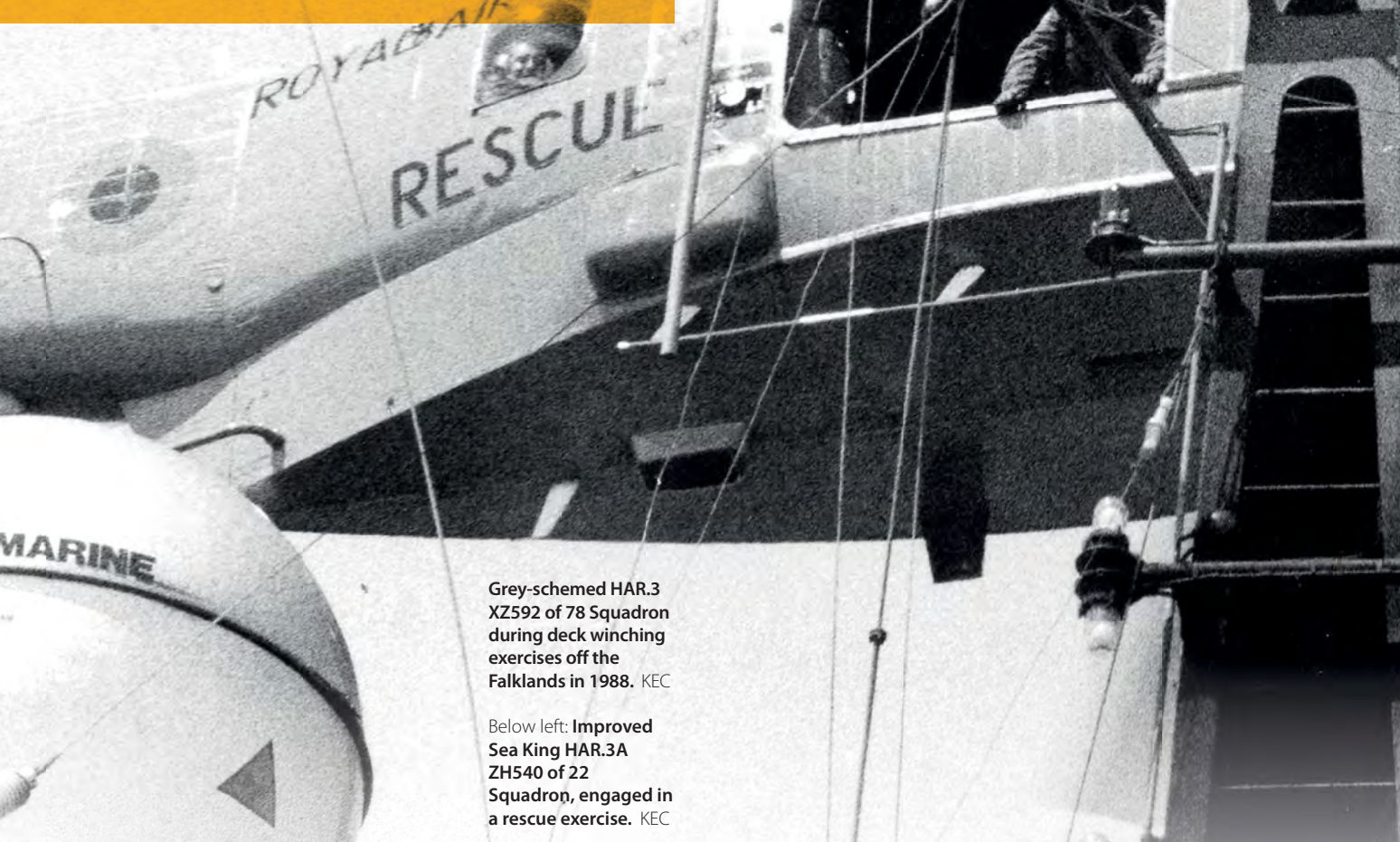
Today, Sea King HAR.3 XZ585, once of 'C' Flight 22 Squadron, can be viewed in the RAF Museum's impressive First 100 Years exhibition in London. Should Prince William visit the Museum, he'll no doubt be pleased

to see an old friend – he flew XZ858 a number of times with 22 Squadron.

Yellow 'Birds'

The RAF's first dedicated SAR unit was 275 Squadron at Linton-on-Ouse, Yorkshire, which began operating Bristol Sycamore HR.13s and, later, HR.14s from April 1953. Although the primary task was the rescue of downed aircrew, the RAF's SAR helicopters were available to »

"Although the primary task was the rescue of downed aircrew, the RAF's SAR helicopters were available to respond to civilians in distress, and this became their main role"



Grey-schemed HAR.3 XZ592 of 78 Squadron during deck winching exercises off the Falklands in 1988. KEC

Below left: Improved Sea King HAR.3A ZH540 of 22 Squadron, engaged in a rescue exercise. KEC



respond to civilians in distress and this became their main role.

The Sycamore, short on range and its cabin restricted to three passengers, was always envisaged as interim. From then on British-based RAF SAR was the domain of Yeovil-based Westland Helicopters (now a division of Leonardo Airborne and Space Systems) with a trio of re-engineered and refined Sikorsky designs.

At Thorney Island in Hampshire, 22 Squadron introduced the much larger, piston-engined Whirlwind HAR.2 and HAR.4 from 1955. Derived from the Sikorsky S-55, the Whirlwind was developed at Yeovil into the much improved and turboshaft-powered HAR.10 in 1961. The yellow-painted Mk.10s became very familiar

along Britain's coasts, estuaries and mountain regions for nearly two decades.

Westland carried out the same process with the S-58, which had been introduced as an anti-submarine platform for the Royal Navy. Rethought with a twin, coupled, turboshaft, the Wessex became the standard transport helicopter for the RAF and the Royal Navy. A SAR version, the HAR.2, began flying with 22 Squadron in the spring of 1976, greatly enhancing the UK-based rescue service.

King of SAR

The designers at Yeovil turned their attention to the big twin-engined, amphibious, Sikorsky S-61 to replace the Royal Navy's Wessex fleet.



A trio of Boulmer-based Sea King HAR.3s of 202 Squadron over Durham Cathedral. In the middle is the RAF Museum's example, XZ585. Crown Copyright-Sgt Rick Brewell

They came up with an exceptional machine, the Sea King, a stalwart of the Fleet Air Arm and RAF and a great export success.

The HAR.3 for the RAF took on board all of the lessons learned from the Whirlwind and the Wessex: more power, nearly three times the range and room for up to 12 passengers. The winch cable was four times longer than that carried by the Whirlwind and Wessex; this made lifting people from the decks of vessels cluttered with masts or derricks, or from cliff-side rocks, far less hazardous.

After 14 years of faithful service, 202 Squadron traded in its Whirlwind HAR.10s and took delivery of the RAF's first operational Sea King HAR.3s in August 1978. The other

UK SAR unit, 22 Squadron, stayed loyal to the Wessex HAR.2 for 21 years, adopting the Sea King in 1997. Both units worked as a series of detached flights, covering all of mainland Britain.

Two other Royal Air Force squadrons have flown the Sea King. Following the Falklands Conflict, Sea Kings provided SAR and inter-island transport and, in the summer of 1986, No.78 Squadron was re-formed to carry out these tasks. The grey-painted Sea Kings of No.78 were finally stood down in December 2007.

At St Mawgan in Cornwall the Sea King Operational Conversion Unit (OCU) was reborn as 203 Squadron in October 1996.

With the winding down of the RAF's Sea King fleet, the unit closed down in 2015.

As its 'customers' were almost exclusively civilian, the decision was taken to privatise the SAR service in the UK. In 2013 it was announced that Bristow Helicopters had won the contract. Today, a mixture of S-92s and AgustaWestland (now Leonardo) AW189s are employed by Bristow, taking over from the veteran Sea Kings completely in 2015.

First of The Breed

As the 62ft (18.8m) diameter rotor blades slowed and the 1,660shp (1,238kW) Rolls-Royce Gnome H1400 turboshafts spooled down on the helipad at Gosport, Hampshire, on »



Backbone of RAF SAR from 1961 to 1997 - a Whirlwind HAR.10 (foreground) and a Wessex HAR.2. The Whirlwind, XP229, has been part of the RAF Museum's inventory since November 1981. KEC



The 202 Squadron badge on XZ585's starboard side. LiveSideMedia

April 23, 2015, the ground crew got ready to prepare HAR.3 XZ585 for storage, pending disposal. The flight crew completed the paperwork, signing off the last of a total of 14,472 flying hours, which had included 533 winch lifts.

Westland did not refer to XZ585 as a prototype, but it was the first HAR.3, taking its maiden flight from its birthplace at Yeovil on September 6, 1977. It was retained for trials by its manufacturer and acceptance by the Aeroplane and Armament Experimental Establishment at Boscombe Down, Wiltshire. By December 1980, XZ585 had joined the Sea King Training Unit (later OCU) at Culdrose, Cornwall, before entering service with 22 and, later, 202 Squadrons.

A gearbox failure on January 28, 1989 nearly brought the helicopter's career to a close. The crew made a forced landing on high ground near Fort William in Scotland and XZ585 skidded wildly along, plummeted into a gully and turned over. All nine aircrew survived but became the focus of a large emergency exercise themselves.

Sea Kings were renowned for their robust construction and XZ585 was roaded to the Royal Naval Aircraft Yard at Fleetlands in Hampshire for a long and painstaking rebuild. By the end of 1997 he helicopter was earning its keep again, with 22 Squadron at Valley.

The RAF's Sea Kings worked hard and shuffled around the detached flights, meeting fleet needs whenever they cropped up. Accordingly, XZ585 also served at times with 202 and 203 Squadrons the latter including a stint at Akrotiri, Cyprus. It had returned to Valley and 22 Squadron by 2007, moving across the apron to 203 Squadron for its last sorties.

Headquartered at Boulmer, in Northumberland, No.202 disbanded in September 2015. It fell to No.22 to carry out the RAF Sea King's last-ever operational flight, on October 4, 2015, from Chivenor in Devon, ending 37 momentous years.

Meanwhile the staff at the RAF Museum had been mulling over which example to accept for its collection. The combination of being the first of the breed, and flown by Flt Lt Wales, was attractive and XZ585 was gifted by the Ministry of Defence in September 2015. It was delivered to Hendon by road on December 6, 2017 to await the opening of the *RAF First 100 Years* exhibition, and hopefully a reunion with the Prince in the future. 🍷



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Royal Appoi

After six years of research, planning and countless hours of hard work, the transformed RAF Museum London was officially reopened by His Royal Highness The Earl of Wessex on June 29. Prince Edward arrived in a 32 (The Royal) Squadron Leonardo AW109SP GrandNew helicopter at 12.07 precisely and was met by Her Majesty's Deputy Lieutenant of Greater London Martin Russell. He presented Chief of the Air Staff, Air Chief Marshal Sir Stephen Hillier, Museum CEO Maggie Appleton, Chair of RAF Museum Trustees, Air Chief Marshal Sir Glenn Torpy and Museum Director of Content and Programmes Karen Whitting.

After meeting some of the Museum staff, volunteers, and supporters, the Earl was given a guided tour of the new Hangar 6 *The RAF in an Age of Uncertainty 1980–Today* exhibition before being shown the impressive redeveloped grounds. His Royal

Highness was then invited to view inside Hangar 1, with its two new exhibitions. Along the way various members of the Museum's staff, volunteers, sponsors and contractors were presented to Prince Edward, who took a great interest in people's roles within the project team. The Earl spent time examining the exhibits and was given a demonstration of the interactive debating board in the *RAF – First to the Future* section.

A formal lunch followed for His Royal Highness and invited guests. Speeches were made by the Museum's Maggie Appleton, Sir Peter Luff, Chair of the Heritage Lottery Fund, and Sir Roger Carr, Chairman of »

His Royal Highness Prince Edward, The Earl of Wessex, being welcomed to the Museum by its CEO, Maggie Appleton on June 29.



ntment

His Royal Highness The Earl of Wessex reopened the refurbished RAF Museum London on June 29. *Salute* went along to witness the historic event

During his speech, HRH The Earl of Wessex gave his congratulations to the team that had made the transformation possible.



Members of the Museum team, sponsors, supporters and contractors being presented to Prince Edward. All images via the RAF Museum unless noted

Air Chief Marshal Sir Stephen Hillier, Air Chief Marshal Sir Glenn Torpy and RAF Museum Director of Content and Programmes Karen Whitting view one of the new displays with The Earl of Wessex.





The Earl of Wessex sharing a moment with wartime Lancaster pilot Air Cdre Charles Clarke of the Bomber Command Association and RAF Ex-PoW Association.

BAE Systems. Prince Edward then gave his congratulations to the team that had made the transformation possible. He also forwarded best wishes from his father, His Royal Highness The Duke of Edinburgh, the Museum's Patron, who has taken a keen interest in the Museum from its earliest days.

The formal proceedings concluded with the unveiling by Prince Edward of a special commemorative plaque. His Royal Highness then departed by helicopter, after spending around three hours at the Museum.

A Day to Remember

Speaking afterwards, Maggie Appleton said: "It was a pleasure and an honour to have The Earl of Wessex open our transformed London site in the RAF's Centenary year. Our new exhibitions not only explore the Royal Air Force's extraordinary history and people, but also give visitors the opportunity to look ahead into the



RAF Museum team members and volunteers being presented to His Royal Highness in Hangar 1.



Many special guests were invited to the opening. These included His Excellency Mr Khaled Al-Duwaisan (Ambassador of Kuwait) and Viscount Trenchard (grandson of the RAF's founding father). Illustrated are well-known aviation artist Michael Turner (left) and former Director of the RAF Museum, Michael Fopp.

Above right: His Royal Highness taking a keen interest in the debating table interactive exhibit in the 'RAF – First to the Future' section.

Below: The Prince viewing a special display that shows a model of a Eurofighter Typhoon, constructed entirely from engineer's tools.

“Along the way various members of the Museum’s team were presented to Prince Edward, who took a great interest in people’s roles within the project”

cutting-edge future of the service.

The Museum’s transformation is a celebration of the RAF’s breadth and diversity – and we look forward to welcoming visitors from London and beyond to experience it with us.”

Sir Roger Carr, the Chairman of BAE Systems, Founding Partner of the RAF Museum’s RAF Centenary Programme said: “The histories of the Royal Air Force and BAE Systems have been inextricably linked since the foundation of the Royal Flying Corps. Since 2014 we are proud to have been a Founding Partner for the regeneration of the RAF Museum. The Museum plays an important role inspiring the next generation of airmen, airwomen and engineers.”

Sir Peter Luff, Chair of the Heritage Lottery Fund, one of the programme’s leading supporters, said: “As a pioneer and leader of international aviation, and in its Centenary year, the Royal Air Force deserves a world-class museum. Now, thanks to National Lottery players, visitors can explore the powerful, inspiring and often surprising stories of the world’s oldest independent air force in a dynamic new setting.”

»





Chief of the Air Staff Air Chief Marshal
Sir Stephen Hillier making his impassioned speech.

The Inspirational Museum

Speaking at the Museum later in the day, Chief of the Air Staff, Air Chief Marshal Sir Stephen Hillier gave a poignant insight into why the RAF Museum is special to him. "On behalf of the Royal Air Force, it's a pleasure to be here today in such a wonderful setting.

"I'd like to tell you what this location, and the Royal Air Force Museum, mean to

me personally. In the 1920s, Royal Air Force Hendon was the venue for air pageants, the very earliest air displays. It was the opportunity for the Royal Air Force, that fledgling service, to show itself to the nation.

"In the early 1930s, a young boy, a Londoner, came with his father to this place, watched those air pageants and was inspired. He was so inspired that he joined

the Air Training Corps in 1941, becoming one of its founder members. He was inspired to join the Royal Air Force in 1943 aged 18 and served in Burma and India as a wireless operator in the Second World War. That man was my inspiration - he was my father. I'm absolutely certain that I would not be here having the privilege of talking to you this evening if it wasn't for his personal journey.

"That journey continued when I was a young man, a teenager, in 1978. I first came to the Royal Air Force Museum, which at that time had only been open for six years. I looked around and I was inspired by what I saw. Just a month or so after my first visit to the Royal Air Force Museum, I went for my flying scholarship selection as an Air Training Corps cadet. I passed, and got my private pilot's licence and for me, the rest is history, as they say.

"The Royal Air Force and the Royal Air Force Museum have that close and unbreakable bond together. This museum is an inspiration. It captures so much of our history, and our heritage, and it does it through the artefacts and wonderful aircraft on show. But it also does it through the spirit, character and ethos of people of the Royal Air Force. You can see that going back to our earliest days, you can see it through our history, and you can see it today.

"I offer my congratulations to Maggie, to Sir Glenn and to all at the Royal Air Force Museum for doing so much, so well. It is indeed a magnificent achievement that everybody can be justly proud. To echo what a fellow speaker said earlier today, we have a world-class museum for a world-class air force." The RAF Museum London fully reopened to the public on June 30 – Armed Forces Day. 🇬🇧

"He also forwarded best wishes from his father, His Royal Highness The Duke of Edinburgh, who has taken a keen interest in the Museum from its earliest days"



Prince Edward
departing shortly
after 3pm in a
32 (The Royal)
Squadron AW109SP
helicopter.



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 **ROYAL
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What's next?

After delivering the most ambitious and comprehensive modernisation programme in its history, the Royal Air Force Museum is already planning the next stage of its evolution. In the best traditions of the RAF, the Museum is constantly looking to improve, inspire, inform and educate in more effective ways.

So, what's next? The first element, after the development work at London has settled down, is to update the Museum's long-term strategic

masterplan. Once this far reaching proposal is set, it can be prioritised and broken down into 'bite-sized' chunks that can be delivered over the next three to 15 years.

The next major project will almost certainly be at Cosford, as the last extensive overhaul there – the incredible National Cold War Exhibition – has been open for well over a decade. There have, of course, been smaller updates and new displays since that time.

We take a look at what could be the next major redevelopments at Cosford and London

Part of the storage site at Stafford in June 2018. All photos via the RAF Museum unless noted

There's a chance the Museum's storage facility and reserve collection, currently located on Ministry of Defence land at Stafford, could relocate to Cosford. This offers the mouth-watering prospect of regular public access to gems that haven't been seen by the public for many years, if at all. It must be stressed that no timeline is set yet for moving the store, but it makes good sense to have the reserve collection, and the many thousands of artefacts it holds, close to a main Museum site and the Michael Beetham Conservation Centre. As hangar space at the Cosford site is at a premium, should the move happen it's likely that a new building would be needed, which would push costs up significantly.

Also, the traditionally laid out Hangar 1 at Cosford - while interesting - is ripe for updating and is sure to be on the team's radar. This may take the form of introducing interactive displays and information boards until a more comprehensive refurbishment can take place. A similar, interim, overhaul of London's Hangars 3, 4 and 5 (previously known as the Historic Hangars) will probably be on the agenda before long too. »



Cosford's Hangar 1 is prime for updating.

"Could the buildings even be returned to their original external appearance, or something akin to it?"



Hangar 2, which contains the Test Flight exhibition, at Cosford.

Long-Term View

Longer term, it's safe to assume that a large exhibition dedicated to the RAF in the Second World War will be created in London's Hangars 3 to 5 at some point. It could focus on the activities of Bomber, Fighter, Coastal and other Commands, and how they interacted with each other during the conflict. There are certainly many fascinating stories to be told, and with the technology now available, and the Museum's expertise and experience in

bringing award winning projects to fruition, it makes a most exciting prospect. Could the buildings even be returned to their original external appearance, or something akin to it? It's food for thought.

Funding for any projects is, of course, a major consideration. Businesses have been supportive over the years and the Heritage Lottery Fund has been instrumental in many of the major projects completed so far. But the backing of the public has been vital in the past

and is sure to be needed again going forward. Please visit the Museum or its website for ways that you can help this great work.

The next stage of the Museum's masterplan will be announced in due course, and we'll have to wait and see what exciting developments we can expect in the future. One thing is certain, in the best tradition of the Royal Air Force, the Museum will not stand still and will continue to develop, for future generations. 🕒



Avro Lancaster and Supermarine Spitfire on show at the RAF Museum London.

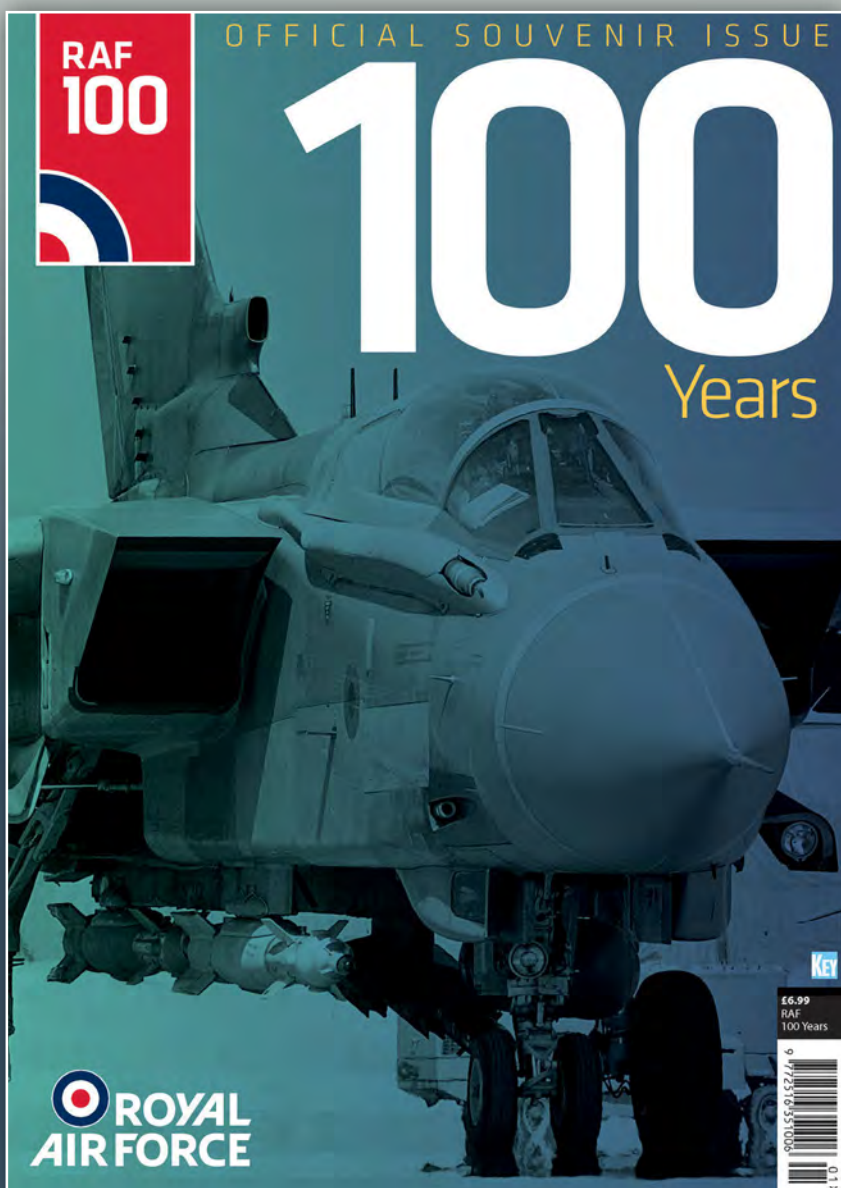
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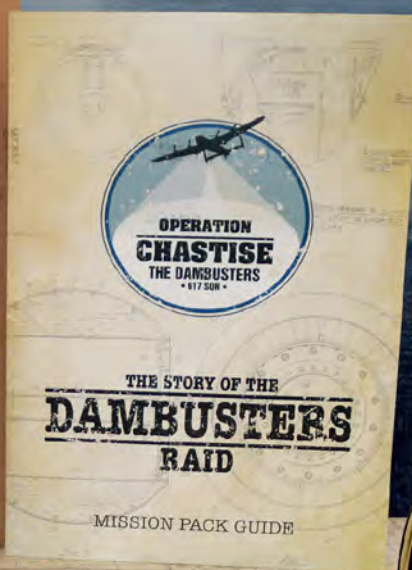
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