

Under the Skin

As the RAF Museum London prepares to lose its dedicated Battle of Britain Hall as part of a major redevelopment, conservation staff and visitors alike have the chance to inspect its exhibits in more detail

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As it prepares for 2018, and celebrations to mark the 100th anniversary of the founding of the Royal Air Force, the RAF Museum London at Hendon is going through a significant period of change. Since this will entail the moving of many airframes, the opportunity is being taken now, in advance of the redevelopment, to carry out detailed condition surveys on the aircraft housed in the Battle of Britain Hall.

The extent of this operation became apparent when talking to Ian Thirk, the RAFM's head of collections, and senior technician John O'Neill. As part

of the museum's regular inspection and maintenance programme, all of the Hendon aircraft exhibits are examined by a small technical team led by John — no mean feat, with 104 aircraft there. He leads this work with the assistance of two full-time apprentices and 32 part-time volunteers. John is a highly experienced historic aircraft engineer, having spent a memorable part of his career in 1967-68 working for Simpson Aero Services, looking after the fleet assembled for the 'Battle of Britain' film. During that time he was involved in the restoration to airworthiness of Spitfire Ia AR213 at RAF Henlow.

Today, each airframe at Hendon has a scheduled inspection every three months followed by a more extensive annual inspection but, by their very nature, these do not involve any major dismantling of the airframe. However, as the 2018 RAF centenary programme will involve all the aircraft in the current Battle of Britain Hall (except the Sunderland) being moved to new locations, this provides the ideal time to undertake internal condition surveys.

As part of the wider plan, what is now the Battle of Britain Hall will be reconfigured into an exhibition telling the story of the first 100 years of the RAF. This will represent the first stage of a transformation to the visitor experience at Hendon, also including a new entrance to the museum. By the end of 2016, the Battle of Britain exhibits will have been moved, but the history of the Battle will still be told across both the Hendon and Cosford sites. It is planned to keep the Spitfire I, Hurricane I, Bolingbroke IVT, Messerschmitt Bf 109E-4 and Bf 110G-2, Fiat CR42, Heinkel He 111H-20 and Junkers Ju 87G-2 at Hendon, with the fighters being displayed together. The Ju 88R-1, Defiant I, Gladiator I and Tiger Moth will be transferred to Cosford for display, and the Lysander III will enter the Michael Beetham Conservation Centre (MBCC) at Cosford for remedial work.

An in-depth project plan has been produced in order to successfully manage this year's sequence of aircraft moves. This process will involve temporarily opening up the side of the Battle of Britain Hall to remove the exhibits.

The hall was opened in November 1978, so most of the aircraft in it have been in place largely un-moved for almost 40 years. The chance to see them in a dismantled state during the condition surveys — which are being done while the aircraft remain on public view — adds a very interesting new dimension for the visitor to Hendon today.

'The aircraft in the Battle of Britain Hall will all be moved to new locations by the end of 2016'

One might assume that very little maintenance and conservation work needs to be carried out once an aircraft has been prepared and put on display inside a heated and dry environment. That, however, would be quite wrong. A comprehensive, long-term conservation plan is implemented for each exhibit and the surveys now under way form part of that process.

OPPOSITE: Hurricane I P2617, in its original No 607 Squadron markings from 1940, has had its outer wings taken off. In the background here is He 111H-20/R1 Werknummer 701152.





ABOVE: Defiant N1671 with cowlings removed – an opportunity to view yet more of the Medway Aircraft Preservation Society's work.

BELOW: Among the aircraft due to leave Hendon for Cosford is Gladiator I K8042.

For example, any airframe corrosion has to be closely monitored and tracked, while fabric-covered airframes and control surfaces have a very clearly defined life, Perspex canopies deteriorate, and tyres, filters and rubber seals all degrade over time. Having said that, Ian and John were both very impressed by the completeness and authenticity of what they found once the dismantling began.

Ian Thirsk said: "At Hendon, wherever possible, we place much emphasis on the need to conserve

all our aircraft in the condition and configuration in which they completed active service. For example, the Spitfire I X4590 ceased flying in the RAF in 1944, and while it is a Battle of Britain combat veteran with No 609 Squadron, during its post-1940 service life it received further modifications that are not authentic to a 1940 MkI Spitfire. Most enthusiasts will be well aware that it has a later-mark integral armoured windscreen, but this nevertheless forms part of this particular aircraft's history and

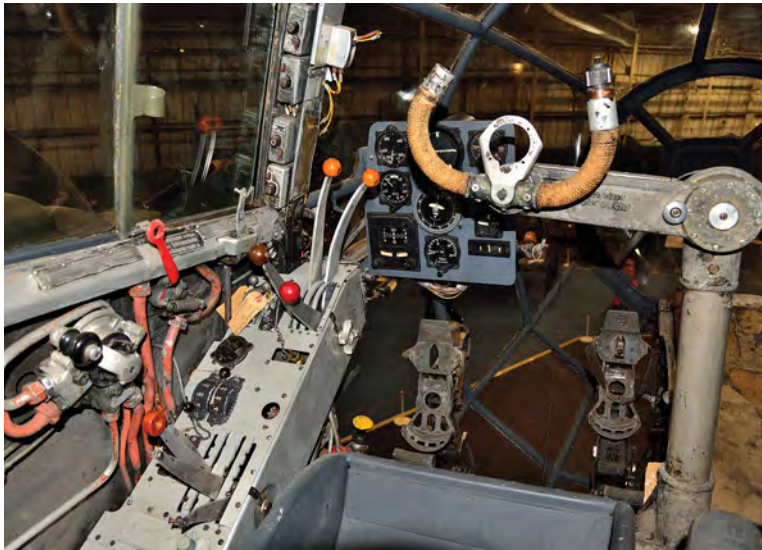
therefore this will be retained. We don't believe it would be appropriate to revert X4590 to its 1940 configuration — we are conserving it almost exactly as it was, up to the latest modification status, when it finished active service. We aim to apply this conservation ethic to all of our exhibits.



"The internal condition of most of everything we have seen so far is reassuring. Thankfully the RAF applied liberal quantities of PX32 preservation fluid to all major areas on these aircraft, and as a result structurally they are excellent. The majority are 'time capsules', with all their internal fixtures and fittings both complete and in sound condition. A couple of issues have been revealed — the Spitfire I has a badly-damaged port upper spar boom stub and the Hurricane P2617, a Battle of France veteran with No 607 Squadron, a corroded starboard undercarriage down-lock. The damaged Spitfire spar stub is not a problem for a static display aircraft, but nevertheless this was first identified and logged by the Hendon technical team in 2002, and it is intended to be repaired. We believe the damage to the spar stub probably occurred when X4590 was regularly being dismantled and moved around as a travelling RAF static display aircraft.

"As a matter of course we maintain very regular contact with many of the world's other major aircraft museums in order to compare notes on conservation processes, to network new ideas and understand how others have coped with similar problems. A great example of





CLOCKWISE FROM ABOVE: A privileged glimpse into the highly original cockpits of three current Battle of Britain Hall exhibits: the He 111, Bf 109E and Spitfire I. As can be seen, all are in virtual 'time capsule' condition.



this is that when we commissioned the recovery of the Do 17 from the Dover Straits in June 2013 [...] we needed to take the very best advice as to how to manage, conserve and look after a World War Two airframe that had been submerged in salt water for 70 years". In this, consultation with experts from the Norwegian Air Force Museum, "who had a lot of experience of salt water recoveries", proved extremely beneficial.

"We were aware", Ian continued, "of previous sea recoveries where the aircraft was essentially lost very quickly due to exposure to the air after salt water submersion and we took a lot of advice on how to deal with the Dornier in the immediate hours following recovery. This enabled us, after appropriate anti-corrosion treatment, to actually undo and free eight out of 10 bolts which attach the wings to the Dornier after 70 years in salt water — something we never imagined it would be possible to do."

John O'Neil added: "For the Hendon condition surveys we are working very closely with our colleagues from the museum's conservation centre at Cosford and their expertise has been invaluable. The surveys are looking at and assessing the condition of a multitude of different areas including the aircraft's primary structure, fabric, paint, rivets, etc. All fabric-covered surfaces such as fuselages and control surfaces have a finite life, and therefore some of the exhibits may require fabric replacement if considered necessary.

conservation centre having this addressed and is going through a very detailed conservation and corrosion control programme. When this is complete the Lysander will follow.

'The internal condition of most of what we have seen so far is reassuring'

"Over time, aircraft fabric and dope dries out, causing circular cracking to appear which is known as oystering. When this occurs the fabric becomes brittle and easily damaged. Our Wellington is currently in the Cosford

When old fabric is removed, it also allows the primary structure to be inspected to ensure it is sound and free from corrosion, and appropriate long-term conservation work can be undertaken.

BELOW: Spitfire I X4590 will be conserved with the airframe as it was upon leaving RAF service.



ABOVE: A close-up view of the damage to the Spitfire's port upper spar boom stub, which will be repaired. This is believed to have been sustained while X4590 was a travelling static exhibit from the 1950s to the 1970s.



RIGHT: The next port of call for Lysander III R9125 – itself a veteran of operations during the Battle of Britain – will be the Michael Beetham Conservation Centre at Cosford.

BELOW: Bf 109E-4/B Werknummer 4101 is marked as 'Black 12' of 2./JG 51, the scheme in which it force-landed at Manston on 27 November 1940. Engaged in a fighter sweep over Kent, it had been attacked by a Biggin Hill-based Spitfire. Behind it here is Junkers Ju 88R-1 Werknummer 360043, destined to move to Cosford.



“The Luftwaffe aircraft are in good, authentic condition. For example, the Ju 88 is much as it was when flown to Dyce and surrendered by a Luftwaffe crew in 1943. The aircraft

knocked about in the post-war years, but this is not the case with our Ju 87, Bf 110 or Ju 88. They are all good examples of authentic WW2 German aircraft. The original engines,

systems have been untouched since installation here.”

It is comforting to see such a positive and pro-active approach to aircraft preservation and conservation. Many enthusiasts may well — understandably — mourn the loss of a dedicated Battle of Britain Hall at Hendon, but things have moved on a great deal since it was opened nearly four decades ago. The focus now is being placed on how the museum can secure the long-term conservation of its aircraft exhibits in an environment that will excite and attract visitors in the future.

‘Most of the German aircraft have been untouched since coming here’

was evaluated at Farnborough for a short period before it was preserved for museum use. Many captured enemy World War Two aircraft were modified, damaged or generally

hydraulics, fuel systems, electrics and instrumentation are all very much still in place. Most of these aircraft came to Hendon from St Athan in 1977, and in terms of their structure and primary

