

MACH 2

Concorde magazine



Air-to-air encounters
Photographing Concorde in flight

Concorde watch
Duxford, Manchester and Orly

Issue 34
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INTRODUCTION

Our feature for this issue is a focus on air-to-air photography of Concorde. Dazzling images of the aircraft in flight proved to be not just wonderful publicity tools for British Airways and Air France, but emblems of pride and prowess for the two nations that operated Concorde. Mach 2 is delighted to welcome Rick Brewell, former Warrant Officer Photographer for the Royal Air Force, who recalls his own work in photographing Concorde for the 50th anniversaries of the Battle of Britain and D-Day.

Concorde's life after service continues not just in memories, film, and photographs, but also in a wide range of souvenirs. The British watchmakers Strond introduce a timepiece that they have created to commemorate the 50th anniversary of G-AXDN's first flight, featuring a tiny part of the aircraft's own skin.

Finally, we bring you news about the recent cleaning and other work done on F-WTSA at Orly, and the latest maintenance updates for G-BOAC at Manchester and G-AXDN at Duxford.

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AIR-TO-AIR ENCOUNTERS

One of Concorde's most important roles, for both Britain and France, was as an emblem of national pride, featuring in events to celebrate their nation's history. In this feature we look at a special collaboration between the Royal Air Force and British Airways to mark the 50th anniversaries of the Battle of Britain and D-Day.

Many of us in the UK and France still have glowing memories of Concorde heading fly-pasts on special occasions for our country, such as the Queen's Golden Jubilee in Britain in 2002. To witness the jet soar over our heads was spectacular enough. Seeing photographs or film taken from the air, though, was even more thrilling.

In this feature we hear from Rick Brewell, former Royal Air Force Photographer for the Directorate of Public Relations, who recalls two assignments to photograph Concorde from the air, to commemorate the members of the armed forces whose courage and sacrifice played such a vital role in winning the Second World War. Some of Rick Brewell's photographs have become iconic elements of the Concorde story in their own right.

Editor's note

To thank Rick Brewell for permitting Mach 2 to use his images, the editor has made a donation to Cancer Research UK at his request. If anyone else wishes to do the same, please visit the donations page on the CRUK website:

<https://www.cancerresearchuk.org>

Rendezvous with G-BOAE

British Airways Concorde G-BOAE pictured over RAF Lyneham on 5 June 1994, just before the multi-national air and sea display to commemorate the 50th anniversary of D-Day.

Photo: Rick Brewell ABIPP



Commemorating the Battle of Britain

Rick Brewell (Former RAF Warrant Officer Photographer)

ON 13 JUNE 1990, a day of celebrations was held to honour the pilots of the Royal Air Force who had given their all to defend the country in the Battle of Britain, 50 years earlier. The events centred on two legendary aircraft – the Spitfire and Concorde. To capture this historic day, I, as the Royal Air Force Photographer for the Directorate of Public Relations, was given the daunting assignment of ensuring that the special occasion was documented on film.

Speedbird salutes the Few

The celebrations began with a performance by the Band of the Royal Air Force at Heathrow, in front of the pre-positioned British Airways Concorde G-BOAA and Spitfire Mk IIa (P7350) of the Battle of Britain Memorial Flight. The band was to play a specially written orchestral piece of music composed by Peter Hope, entitled “Speedbird Salutes the Few”, in honour of the RAF pilots who flew in the Battle of Britain – famously named by Winston Churchill as “The Few”. The event took place in the British Airways maintenance area and was attended by about 40 people.

Following this performance there was to be a formation flight of the Concorde and Spitfire along the English south coast, using the White Cliffs of Dover as a backdrop. I was to photograph the flight from the air. To accomplish this task a Hawker Siddeley HS125 of 32 Sqn was afforded as a photographic platform. The HS125 is a kind of small executive passenger jet and less than ideal for taking photographs from. No pressure there, then!

Prior to the departure I managed to photograph the two pilots having a joke with each other. Spitfire pilot Squadron Leader Paul (The Major) Day, Commanding Officer of the



Sharing a joke

Sqn Ldr Paul Day, Commanding Officer of the Battle of Britain Memorial Flight, jokes with British Airways Concorde Captain Jock Lowe before their spectacular formation flight. *Photo: Rick Brewell ABIPP*

Battle of Britain Memorial Flight, was saying to Concorde Captain Jock Lowe: “It’s just a shame I have only brought with me the Mk IIa Spitfire ... if I had been flying one of our later versions I would have given you a run for your money.”

Technical challenges

Following the event at Heathrow, I headed to RAF Northolt (together with Rolls-Royce photographer Jack Titley) to board the HS125 camera-ship. The flight’s duration was 45

minutes, 20 minutes of which were spent trying to achieve the optimum formation between Concorde and the Spitfire.

After take-off, positioning myself in one of the windows, I realised this was not going to be an easy task. First of all, there were two layers of glass plus a Perspex screen on the windows, which made it very awkward to photograph through. Unless the camera was pointing directly through the layers, the image immediately distorted and fell out

Photography platform

ZE395 (HRH Queen Alexandra), the HS125 business jet operated by No. 32 Squadron of the Royal Air Force. *Photo: Milborne-One / Wikimedia Commons (CC BY-SA 3.0)*



of focus. Secondly the weather had deteriorated and had become dull and slightly misty with low cloud. However, these problems paled into insignificance after I found out in flight that I had no direct communications with any of the pilots, including the pilot of my camera-ship! No communication, that is to say, short of running back and forth to the cockpit to give instructions to manoeuvre our aircraft into the right position and distance from the two subject aircraft. Additionally, I needed to direct the Spitfire into the right position while forming

Mission accomplished

Right: Spitfire P7350 Mk IIa of the BBMF in formation with British Airways Concorde G-BOAA over the south coastal town of Deal in Kent.
Below: The iconic shot of Spitfire P7350 Mk IIa of the BBMF in formation with British Airways Concorde G-BOAA over the Dover Patrol Memorial St Margaret's Bay near Dover.
Photos: Rick Brewell ABIPP

on the Concorde. Not an easy task in itself, given the great difference in performance – just trying to get these two aircraft in the same bit of sky at the same time would be hard enough, let alone to have them formate in a particular position.

We rendezvoused with the two legendary aircraft along the south

coast. Once we managed to get them both into the right position we were able to capture the shot we wanted, even though the Concorde's nose was high, due to it having to fly at such a slow speed, whereas the Spitfire was going as fast as the old airframe was authorised.



The 50th anniversary of D-Day

Rick Brewell, *former RAF Warrant Officer Photographer*, describes his experience photographing Concorde G-BOAE air to air as part of Concorde's involvement in commemorating the 50th anniversary of D-Day.

THE SECOND OCCASION I flew with Concorde was as part of the commemorations for the 50th anniversary of D-Day, in 1994. I travelled to what was then HMS *Daedalus* (Lee-on-Solent) airfield, with the shoot scheduled for 5 June. The assignment was to photograph a British Airways Concorde over the ships from the nations that had gathered for the anniversary.

Two 100 Squadron Hawks had flown from their base at RAF Leeming in North Yorkshire, with one of them to act as my camera-ship. Unlike my previous shoot of Concorde from a Hawker Siddeley HS.125 (see previous article), this time I would not be restricted with having no communications nor be limited within the constraints associated with a passenger aircraft forming on an airliner.

The flight and the flotilla

We initially headed towards RAF Lyneham in Wiltshire, where we rendezvoused with a British Airways Concorde, G-BOAE, over the base. We transited in formation over Portsmouth (from where the ships had sailed) out into the English Channel, with the flotilla heading towards Normandy. The ships were sailing in two lines and we flew with Concorde on our port side, capturing it over many of the ships below. After this pass we broke right and headed west, and I managed to capture Concorde with all of the ships in the distance.

We routed along the south coast and I took the opportunity to photograph Concorde from various angles and distances between us, while making the most of the backgrounds as they presented



Coming alongside

A close-up shot of G-BOAE in mid-air; as well as taking the official photographs for the day, there were opportunities to focus on Concorde herself.

Photo: Rick Brewell ABIPP

themselves, including some landmarks and military bases: Durdle Door rock formation, the former RAF Mount Batten, Plymouth Hoe and the nearby Her Majesty's Naval Base Devonport (HMS *Drake*).

The second 100 Sqn Hawk had accompanied us (out of shot), and I took the opportunity to get photographs of this aircraft with the airliner in the distance.

An amazing half hour

Formating with Concorde along the coast from just south of the Isle of Wight to Plymouth lasted for about 30 minutes, feeling like the shortest half hour in my life – such an amazing experience!

One of the Concorde pilots came over the radio to check we had everything we needed. I confirmed we had and thanked them and then he said: "Right, good day to you." At

that point he put the power on and left us as though we were standing still. I was surprised to hear the roar

"he put the power on and left us as though we were standing still"

from the four Olympus engines over the noise of our own jet. It was an incredible sight to see Concorde accelerate away and then climb into the distance. The sortie lasted around 45 minutes, with 35 of those alongside Concorde.

Although I have amassed many hours of flying and photographing military aircraft, this will always be among my most notable, and these chances to see the supersonic airliner close up in its natural environment are memories I cherish.

Highlights from the D-Day flight

Shown below are some of Rick Brewell's photographs from the commemorative event on 5 June 1994, with Concorde G-BOAE overflying the Royal Yacht Britannia and ships representing the Allied fleets as well as landmarks in south-west England.



Commemorating the Allies

Above: G-BOAE overflies a multi-national flotilla of ships representing the Allies who took part in the D-Day landings. These included HMS *Edinburgh*, HMS *Fearless*, and HMS *Avenger* for the Royal Navy; USS *Doyle* and the US Coast Guard cutter *Dallas*, representing the United States; HMCS *Toronto*, representing Canada; and HNLMS *Abraham van der Hulst* for the Royal Netherlands Navy.

Royal attendance

Overflying the Royal Yacht, HM *Y Britannia*, as she carries Queen Elizabeth II, the Duke of Edinburgh, US President Bill Clinton, French President François Mitterrand, and other heads of state from Portsmouth to Normandy for the celebrations.



Landmarks of the south-western coast

Top: G-BOAE overflying Durdle Door in Dorset. Above: Overflying Plymouth, with HMS Sheffield visible below the aircraft.

A memento of Concorde

Although it is nearly 19 years since the Concorde fleets were retired, souvenirs from the aeroplanes are still highly sought after by collectors and enthusiasts. One of the more recent and unusual items of memorabilia is a new timepiece from British watchmakers Strond, incorporating a piece from Concorde 101 on the dial.

The watch has been created to mark the 50th anniversary of the maiden flight by British pre-production Concorde 101 (G-AXDN).

This unique Concorde first flew on 17 December 1971; in her 6 years of flying she accomplished 574 hours 49 minutes in the air, of which 387 hours were flown supersonic.

After making her first supersonic flight on 12 February 1972, Concorde 101 was put through a rigorous programme of test flying from March 1973 to May 1975 (see Mach 2, May 2021 for further details). On 26 March 1974 the aircraft reached a then-record altitude of 63,700 ft (over 12 miles) and a top speed of Mach 2.23 (1,480 mph) – the fastest speed ever reached by a Concorde.

In August 1977 Concorde 101 made her final flight, to the Imperial War Museum at Duxford, where she would be retired and put on display. (The story of her arrival and years at the museum is covered in Mach 2, November 2021.) The aircraft is now under the care of the Duxford Aviation Society (DAS). She has undergone major restoration work, carried out by Heritage Concorde,



Commemorating 101

Left: The timepiece made to mark the 50th anniversary of 101's first flight. Above: Details of the watch face. The dial tag made from 101's skin, and marked "G-AXDN", can be seen in the 4 o'clock position. A symbol of Concorde, originally designed by Katie John in 2004, is visible just beneath the minute hand.

Photos: Strond Timepieces

including re-lighting of the cockpit and cabin instruments and reactivation of the famous droop nose.

As a tribute to Concorde 101 and the preservation work done by DAS and Heritage Concorde, Strond has dedicated their new SSC-101 watch to Concorde. The dial tag attached to the face is made from a tiny portion taken from the bottom panel of the air intake. Strond will also honour the aircraft

by donating a portion of the profits from each sale to DAS for the upkeep of 101.

Concorde 101

Concorde stationed outside at Duxford in 2005, while the new AirSpace hangar is being built. The area from where the dial tags are taken is the lower lip of the intake, just visible under the red engine covers.

Photo: kitmasterbloke / Wikimedia Commons (CC BY 2.0)





Concorde F-WTSA

French pre-production aircraft

Location: Musée Delta, Orly, France

Reporter: Musée Delta

Date: 27 March 2022

With the aid of a high-pressure jet and a rotating brush, the aeroplane has been carefully cleaned.

The paint applied on the aeroplane easily gathers dust, so it is necessary for us to carry out this cleaning operation each year. The work being done on the surrounding area had also stirred up a lot of dust, which built up on the aeroplane and made the livery unattractively dull.

At a later date we will have to look at a less restrictive option when it is time to repaint the aircraft.

Cleaning vehicle

A mobile platform provided by LOXAM was used for the cleaning work.

Photo: LOXAM



Status report: repairs and refurbishments

As of April 2022, the following works have been completed or are being planned for F-WTSA.

Remedial works

- Removal and repair of the PFCU fairings, which will include removal of corroded parts and fitting of replacement parts, creation of a drainage system for rainwater, and verification of tooling for maintenance of the elevons

Improvements

- Reorganisation and refurbishment of the cabin (fittings, displays)
- Return of the landing lights and the anticollision and navigation lights to working status
- Finishing the painting of the exterior (to be done in summer)

Tasks currently being addressed

- Finding a permanent solution for the issue of water inside the cabin windows
- Continuing to work on the cockpit to return the instruments to life (backlighting of the

instruments, reactivation of cockpit sounds and alarms)

- Work to restore the nose and visor to completely functional status

Tasks completed

- Full cleaning of the aeroplane
- Updating the cabin lighting (replacement of neon lights with LED lights)
- Maintenance of the “piano” connection on the starboard wing
- Fitting of video screens in the cabin
- Retouching of the paintwork
- Replacement of one broken visor panel and cleaning of the interior of the nose
- Refurbishment and return to function of the gangway
- Exterior lighting of the aeroplane (spotlights and interior lighting at night)



French livery

F-WTSA bears the old Air France livery on the left side, including the famous winged sea-horse logo (above), which dates from the formation of the airline at Le Bourget in 1933.

Photo: LOXAM

Pressure wash

Above right and right: A pressure hose was used to dislodge the dirt and reveal the livery at its best.

Photo: LOXAM



Cleaning the starboard side

Left and above: The cleaning set off the unique combination of British Airways Negus livery and French registration.

Photo: LOXAM

Concorde G-BOAC

British production aircraft

Location: Runway Visitor Park, Manchester, UK

Reporter: Graham Cahill **Date:** 22 March 2022

This is a summary of the work we completed on our latest visit. In all, a productive day!

Final commissioning of 115v supply

As discussed in previous articles in Mach 2, we have purchased a small 115v aircraft power supply, installed it and activated certain circuits on the aircraft including lighting for the cockpit. The first stage of this work is now complete; we now have instrument lighting, anti-collision lights, and navigation lights active for tours. (Landing lights will be added in the near future once all work is complete.) We have run various tests over the last few visits and this system all checks out fine.

We have listed all breakers to be closed on this aircraft and updated the list that the Runway Visitor Park uses so they can safely check prior to operation. We have a master sheet of breakers for all production aircraft that we are working on, so it is important that the records remain up to date. (G-AXDN is excluded from this master sheet because she is so different from the others.)

Cockpit instrument lighting

We investigated lack of lighting on two instruments in the cockpit. We found that one had been unplugged and the other had its plugs chopped off. We suspect this was done back in 2003 when lighting was installed for display at Manchester; the

instruments were not illuminated during Project Flagship in 2011, so this fault was apparent then too. We insulated the loose wires and re-connected the lighting wires; we will look further into restoring this instrument in the future.

Navigation lights

We installed the new nav light replacement bulbs, which are LEDs; the old ones were corroded and had fallen apart. LEDs will give longer life for the museum.

Cockpit lighting check

John Dunlevy on the flight deck, after successful completion of all external lighting and cockpit lighting checks.
Photo: Heritage Concorde



Nose hydraulics

We serviced the nose hydraulics and inspected a small ongoing leak on the swivel units. This will be repaired this year, preferably this summer.

On the day of our visit, we were filmed by Airliners Live. Martin and his team plan to do a small feature on our work along with that of the other aircraft restorers at the park. I'm pretty sure they got some great footage of the work we are doing, and we look forward to continuing work with them. For details on Airliners Live and their videos, see their YouTube site:

<https://www.youtube.com/c/AirlinersLive>

Thanks to the Runway Visitor Park (RVP) for their continued support in this project along with TAS (The Aviation Society). For more news from the RVP, visit their website: <https://www.runwayvisitorpark.co.uk>

Circuit breakers on G-BOAC

Reference photo taken to show the circuit breakers that need to be set for the circuits that we are powering (see also following article, on G-AXDN), specifically the ones marked green and white.

Photo: Heritage Concorde



Replacing the nav lights

John Dunlevy in the process of removing one of the access panels on the wing, to replace the original navigation lights with the new long-life LED type.

Photo: Heritage Concorde



New lighting in action

The main landing and land/taxi lights, plus the navigation and anti-collision lights, undergo a function check after fitting of the replacement long-life LEDs.

Photo: Heritage Concorde

Concorde G-AXDN

British pre-production aircraft

Location: Imperial War Museum, Duxford, UK

Reporter: Graham Cahill **Date:** 5 April 2022

The team for this visit was James Cullingham, John Dunlevy and Graham Cahill.

Nose landing gear

Final commissioning and inspection of the nose landing gear (NLG) hydraulic system and fine adjustment of operating temperature.

Because we have reduced the size of the tank to just 5 litres, which is ample for our needs, we have fine-tuned the temperature setting so that the oil runs at 55°C. The oil is more than capable of working at this temperature as it is original M2V Concorde oil, but with safety always in mind 55 degrees is a reasonable temperature. The power pack, when it is not operating the nose, heats the oil up because the oil is not circulating through the system; when the nose is operated, the aircraft pipes and actuators cool the oil down.

We had a crossover of fluid between the green and yellow hydraulic fluid return lines. We were aware of the issue and solved the problem on the last visit; however, James and Graham wanted to investigate why this was happening and found it to be the normal operation of a valve on the system when the yellow pressure is unused.

Nose hydraulic system

We inspect and test the nose hydraulic system at least every 6 months as a matter of course, but in this case James and Graham were working to solve some small issues and leaks. We hope to quieten down the operation of AXDN's nose; as we now have four working noses in the UK and G-AXDN was the first one to be restored, we can now spend time fine-tuning and improv-



Nose landing gear bay

A view inside the bay, facing aft, showing the main doors and part of the hydraulic system.

Photo: Heritage Concorde



Hydraulic pump for the nose

Interior of the NLG bay, facing forward; the pump has now been located inside the NLG bay so that it can operate the nose and visor without any visible trailing cables.

Photo: Heritage Concorde



Visitor's view

The cockpit lighting before the latest round of adjustments. Heritage Concorde thanks Mark Wiles for alerting us to this issue and supplying this photograph.

Photo: Mark Wiles

ing the performance of this nose, which has always been noisier than the others. G-AXDN is significantly different from the other three restored noses, using different jacks to lower the nose – not to mention that G-AXDN's nose lowers to 17.5 degrees rather than the production 12.5 degrees. This will be an ongoing work in progress.

Cockpit lighting

We continued with fitting the lighting in the cockpit for general guests. We get to see the cockpit lit up each time we visit, but we rarely look to see what general guests see; when a photo of the cockpit was posted by one of our forum members (Mark Wiles), we realised that significant improvements could be made to the lighting inside the cockpit. John Dunlevy has taken the bull by the horns and is installing lighting to improve the view from the tunnel for general guests. As you can see, the improvement is significant. This project should be complete by our next visit.



Improved cockpit lighting

New lighting has made the cockpit area and instrumentation brighter and more attractive for visitors.

Photo: Heritage Concorde

We recorded all of the breakers that should be in on G-AXDN (see also previous article) and will be updating paperwork for nose operation in the coming weeks. In addition, we are recording some engineering notes; this is something we intend to do to ensure that future generations of restorers will understand what we have done at this time, ensuring ongoing nose operation.

On a separate note, Graham noticed that DAS (British Airliner Collection) were very active in giving guests a great experience while visiting Concorde in AirSpace. They are now using the spill door actuators, engine demos and closing the reverse thrust buckets for guests on several occasions through the day; they also have a plan in place to do tours of the aircraft very soon, so watch out for that one.



Latest view of G-AXDN

Ready for display and operation, with no visible cabling.

Photo: Heritage Concorde

News from Duxford

For details of coming events, including nose moves, see the Duxford Aviation Society site: <https://www.duxfordaviationsociety.org>