

# MACH 2

Concorde magazine

FAREWELL TO THE QUEEN

*Queen Elizabeth II  
and Concorde*

A life with Concorde  
*New book by BA Concorde  
Chief Pilot Mike Bannister*

Concorde Watch  
*News from Duxford,  
Manchester and France*

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# INTRODUCTION

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*We begin this issue with a tribute to the late Queen Elizabeth II and her long association with Concorde. We look back at a particular high point: the starring role that Concorde G-BOAD played in the fly-past for the Queen's Golden Jubilee.*

*That event is featured in a new book, Concorde, by Mike Bannister – former Chief Concorde Pilot for British Airways. We include an excerpt from the book, as Captain Bannister recounts his experience taking Alpha Delta on that historic flight. We also have a review of the book; as well as giving an insight into the technical aspects of flying Concorde, it provides a fascinating eyewitness testimony to this unique period in aviation history.*

*Finally, as ever, Mach 2 brings news of the latest restoration work being done on the Concordes, with updates from Manchester, Duxford, Orly, and Toulouse.*

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Editor: Katie John

Cover: Concorde G-BOAD and the Red Arrows during their flying display for the Queen's Golden Jubilee, 4 June 2002. Photo: Michael Pead / Wikimedia Commons (CC BY-SA 2.0 UK)

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# THE QUEEN AND CONCORDE

*The late Queen Elizabeth II had a connection with Concorde that lasted throughout the aircraft's life. Concorde was one of the most dazzling technological achievements to appear in the early decades of her reign, and the Queen of the Skies was a glorious feature marking state occasions for the Queen of the Realm.*

**F**ROM THE EARLIEST YEARS, the Queen was kept abreast of Concorde's development. She visited the British Aircraft Corporation site at Filton where the aircraft was being assembled, and met the heads of the Concorde development team. She and her family also had a long association with Brian Trubshaw, the Chief Test Pilot, as Commander Trubshaw had been one of the pilots for the King's Flight during the late 1940s. (Later, in 1971, he let Prince Philip, the Duke of Edinburgh, take the controls for a brief turn at Mach 2 in Concorde prototype 002.)

The Queen used the aircraft for state visits rather than for leisure. Her first journey on board was with G-BOAE, on her return from Barbados in November 1977, after her Silver Jubilee tour of Canada and the Caribbean. She would visit Barbados by Concorde again in 1987 and 2003. She would also journey to the Gulf states in February 1979 on G-BOAB, and travel by Concorde to the Middle East again in 1984, as well as visiting the United States in 1991.

There was a belief that the Queen would use seat 1A. In fact, the Queen did not travel on scheduled flights. Instead, Concorde would be chartered for her, and the front cabin of the designated Concorde would be partially re-fitted to accommodate a desk and rear-facing seats for Her Majesty.

Concorde's most notable role was in saluting the Queen on special occasions. The first fly-past over Buckingham Palace was carried out on 14 June 1969 by Concorde prototype 002, flown by Brian Trubshaw and flanked by two Lightning jets, for the Queen's official birthday. The most spectacular flight, though, was the flypast for the Queen's Golden Jubilee, on 4 June 2002. The 27 aircraft included the RAF's most advanced aircraft, such as the C17 Globemaster and the Eurofighter Typhoon, with Concorde G-BOAD and the Red Arrows providing a spectacular finale.



## Converted cabin space

HM the Queen returning from Barbados on G-BOAE, November 1977. British Airways would re-fit the cabin with seats grouped around a table, so that the Queen could work during the flight.

*Photo: BA Speedbird Heritage Centre*



## State visit to the United States

May 1991: HM the Queen and HRH the Duke of Edinburgh alight from Concorde at Bergstrom Air Force Base, Texas, to begin a state visit to the United States.

*Photo: US Air Force*

# THE GOLDEN JUBILEE FLIGHT

On 4 June 2002, Concorde G-BOAD, flown by Captain Mike Bannister, flight engineer Trevor Norcott, and Civil Aviation Authority test pilot Jock Reid, formed the centrepiece of the Golden Jubilee flypast over Buckingham Palace with the Red Arrows. In this excerpt from his new book *Concorde*, Captain Bannister recalls the thrill of the flight.



## Smoke on. Go!

Concorde G-BOAD leads the Red Arrows over Buckingham Palace at the culmination of the Jubilee flypast.  
*Photo: Bleiglass / Wikimedia Commons (CC BY-SA 3.0)*

I LOOKED UP FROM my instruments. At three hundred metres' altitude – a thousand feet – I was stunned by what I could see: so many faces, people waving flags and umbrellas; the Mall dead ahead, the Palace at the end of it.

The Mall ... packed.

All the parks and bridges ... packed.

One-and-a-half million people, their faces angled skyward – a sea of humanity in one place, at one time and for one purpose only: to celebrate the Queen's Golden Jubilee, all eyes on the flypast – and us as the grand finale.

To my amazement, I could clearly pick out the balcony of Buckingham Palace, adorned with a golden crown on a blue banner. And, front and centre, Her Majesty in a flame-orange outfit. Flanked by her entire family. Their faces angled skyward, too, at us ...

A crackle in my headset. The voice of the Reds' team leader: "Smoke on. Go!"

I couldn't see the red, white and blue trail from the Hawks' exhausts, but something – a frisson, a blast of energy, I didn't know what – seemed to emanate from the crowd, permeate the cockpit and lift us.

As we were running in towards the Mall, Trevor Norcott, the flight engineer, had armed the afterburners by leaning between Jock and me and flicking up the four white panel switches at the back of the throttle quadrants.

No carefully graduated sequence today – the two inboard engines first, the two outboards three seconds later for when we went supersonic; the muted, sequential double-kick that ensured we didn't spill the passengers' drinks.

Today, we didn't care – we wanted those four Olympus 593s, each generating 38,000 pounds of thrust with afterburner, to give us everything they had.

As we zoomed towards the Palace, I primed the RT.

"Reds, Concorde, break in five ... four ... three ... two ... one ... now!"

As soon as we were clear of the all-important balcony, I banged the throttles open. The power went through 75 per cent, the reheats engaged and over 150,000 pounds of thrust kicked in, punching me against the back of my seat. Lots of flame, lots of noise as I eased back on the stick and that deep rumble I knew so well reverberating in my chest.



**A sea of humanity**

Concorde and the Red Arrows overfly the Mall, with one and a half million people packing its full length to witness the flypast. Photo: Chris Ison / PA Images / Alamy

The Reds peeled away in formation below us and we pulled up, up, climbing like a rocket as I'd done on my first Concorde flight, up towards 3,000 feet in the blink of an eye ...

With a lump in my throat, I thought of my mum and dad again; I thought of Chris and Amy; I thought of the extraordinary effort that had brought Concorde into being; of the people who had maintained her, the passen-

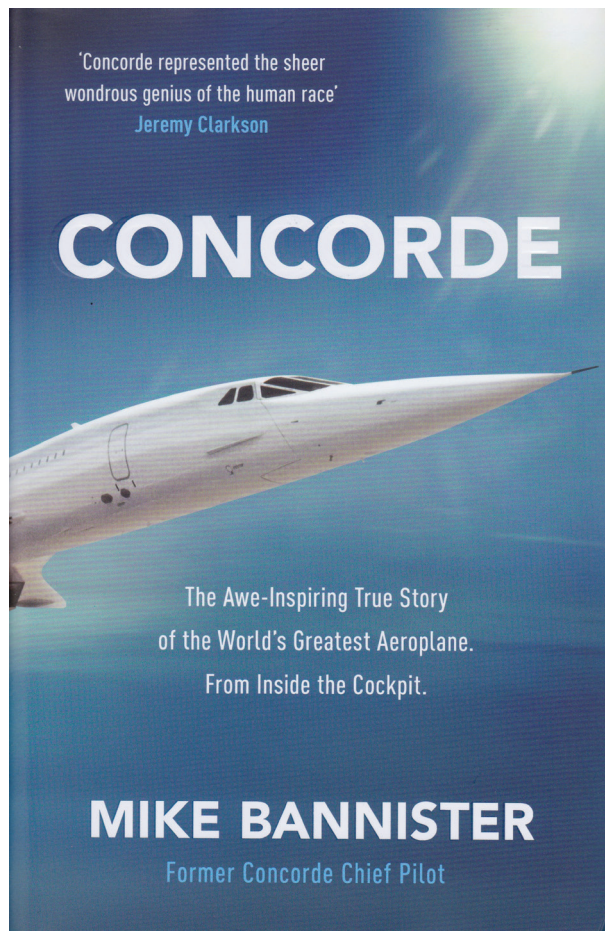
gers who had flown on her and the people in the street who always stopped and looked up. And I thought of the 113 who had died at Gonesse too.

This was for them.

Excerpt from *Concorde*, by Mike Bannister (Penguin Michael Joseph, 2022). Reproduced courtesy of the author and by kind permission of Penguin Michael Joseph.

## An eyewitness to aviation history

*Although Concorde retired nearly 20 years ago, fascination with the airliner is still as strong as ever, and the collection of books, photographs and films continues to grow. The latest addition is Concorde, by British Airways' Chief Concorde Pilot Mike Bannister. Mach 2 editor Katie John reviews his unique account of life at the controls of this extraordinary aircraft.*



### CONCORDE

Mike Bannister

Penguin Michael Joseph 2022

ISBN: 978-0-241-55700-6

£20.00 Hardback

**M**ANY CHILDREN DREAM of becoming a pilot. Some have even dreamed of becoming Concorde pilots. One person who achieved the dream was Mike Bannister, who became Chief Concorde Pilot for British Airways. His life with this exquisite machine would encompass the glories of Mach 2, outpacing the Earth's rotation, and looking upwards to the dark of space. But it would also see Captain Bannister accompany Concorde through the depths of a nightmare.

At just 28 years old, Mike Bannister became the youngest Concorde pilot on British Airways' fleet. He takes us from his first solo flight in a Cessna, aged 17, through the rigours of training for the British Overseas Airways Corporation (BOAC) and learning to fly the magnificent VC10. And then the overpowering, visceral thrill of taking Concorde into the air. As someone who had received full technical training but was experiencing his first journey on board, the author shares with us the thrill of meeting Concorde for the first time – the smell of the electronics on the flight deck, the overwhelming rush of power as she started her take-off.

### Foundations of understanding

Captain Bannister outlines the history of British aviation in the jet age, and the cultural change from the daring "seat of the pants" pilots who had earned their spurs on World War II missions to the more technologically-minded 1960s generation. He takes us through the challenges of the Concorde training course, with its daunting final exam. He also touches on the less definable aspects of pilot training: the "foundations of understanding" of what you could or should do with the aircraft and what should not be done, and why certain rules existed, to build up a firm knowledge of "good practice". He describes another important pilot quality, "capacity" – the ability not just to stay on top of what is happening at each moment, but to think several moves ahead at all times. "Capacity" was especially important for those who flew Concorde, to keep up with the aircraft's speed and complexity.

We follow the author through the processes and sensations of a flight from London to Washington, and stories of some of the notable passengers who travelled with Concorde. Captain Bannister describes the chilling



### The retirement

24 October 2003: Concorde G-BOAE, the first of the three final scheduled BA flights, comes in to land at Heathrow. Photo © Don Gilham / *geograph.org.uk* (CC BY-SA 2.0)

effect of the terrorist attack on the Twin Towers in New York – followed by the high point of flying for the late Queen Elizabeth II’s Golden Jubilee in 2002 (see pp.4–5 for excerpt).

### The storm clouds gather

Even at that point, however, we see the storm clouds gathering over Concorde. Captain Bannister describes the first intimations, late in 2002, that some elements in France, and here in the UK, were planning to put an end to Concorde. As Chief Concorde Pilot, he determined that the retirement of the British fleet would be “a celebration, not a wake”. Yet after the crowds gathered to admire the last scheduled flights, and the guests departed from the retirement party on 24 October 2003, he recalls the grief of turning back before leaving, to look at “five perfectly serviceable Concordes” that would never again carry passengers. And he recounts the experiences of the very last day, 26 November 2003, when he and his fellow pilots realised that, for Concorde, “this really was it – there was no tomorrow”.

This account includes some of the darkest points of the jet age – the terrible, and sometimes fatal, crashes involving jet airliners. Mike Bannister recounts the causes of these accidents, ranging from

mechanical failures to unforeseen weather conditions to communication problems between flight crew members. All of this knowledge feeds in to the subject that occupies the last part of the book – Captain Bannister’s role in investigating the Concorde crash at Gonesse.

The author conveys his horror on standing at the crash site just 36 hours after the tragedy on 25 July 2000, staring at what remained of Concorde F-BTSC. Seeing “a pilot’s seat. The section of the aeroplane that had been my workspace – the ‘office’ ...” reduced to “little more than a smoking assemblage of tiny, molten bits”. He recalls listening to the cockpit voice recorder relaying the final few seconds of his Concorde colleagues’ lives.

Captain Bannister describes fighting to bring Concorde back into service, and attending test flights at the French test centre at Istres, with M. Henri Perrier, the “father of Concorde” who headed the French side of the Concorde development programme at Aérospatiale. He describes how the knowledge so painfully won from the crash is applied to modifying the fleets so such an accident could never happen again. And, two years after his own retirement, he participates in the investigation into the crash, as an expert witness – to unravel the truth

about that day and clear the names of the five accused, who included M. Perrier. After a protracted trial and an appeal, the accused men are absolved of all criminal responsibility. Sadly, M. Perrier died before this final verdict was delivered, but Captain Bannister’s account stands as an exoneration of his old friend.

Many of us have ever-expanding libraries of books and films on the beautiful white bird. This forms a welcome addition – rich in detail for those who want the nitty-gritty, but told in an engaging, accessible style for those of us who are not technical experts. Captain Bannister also dispels some myths concerning the retirement and the crash. In particular, he sets out the evidence that he and the other investigators collected on the tragedy, and presents his conclusions in a clear-eyed, level way – but, as a fellow Concorde pilot, he applies his knowledge and understanding to think himself into the place of those men who suffered such an appalling death at Sierra Charlie’s controls.

This book is not just a salute to an extraordinary aircraft. It also attests to the kinaesthetic knowledge held by Concorde’s pilots and engineers – which is as much of a national treasure for the UK and France as the aeroplanes themselves. As a record of what Concorde was and is, and an insight into a unique period of technological history, it will endure for decades to come.

### In Memoriam

**Henri Perrier** 1929–2012

And all those who perished with Concorde F-BTSC

# An evening with Concorde G-AXDN

Katie John, editor, Mach 2

*On Monday 3 October, Duxford Aviation Society hosted a talk by former British Airways Chief Concorde Pilot Mike Bannister. This was the second of a series of events to promote Captain Bannister's new book, Concorde (see review, p.6) – the inside story of his life flying Concorde and his role in the aeroplane's history.*

## A tour of the Hermes

The evening began with the guests being invited to explore the AirSpace hangar. Chrissie Eaves-Walton of the Duxford Aviation Society (DAS) took me to view the updated exhibition on board the Handley Page Hermes. Smart new display panels, with text written by DAS volunteer David Norman, gave the history of the Hermes – the fast, luxurious “Concorde of its day” – as well as of the other airliners in Duxford's collection. There was a display case showing models of the British Airliner Collection's aircraft, all to the same scale, from the tiny De Havilland Dove and the Britten-Norman Trislander up to the VC10 and Concorde. David Norman outlined some of the innovations that the aeroplane manufacturers had brought in for certain airliners – for example, that the Dove was the first airliner to have its airframe joined together with Redux glue.

Restoration work had also been done on the Hermes' cockpit. In addition, there were seats from the various airliners, including Concorde, as well as a section devoted to Concorde, complete with cabin fittings.

This was a chance to catch up with DAS volunteers, and with familiar faces such as Concorde captain John Hutchinson, as well as to meet new people involved with Concorde's history, such as a former steward who worked on the aircraft in her earliest years of service.

## Captain Bannister's talk

The talk took the form of questions posed by aviation journalist Nick Cook. Mike Bannister's answers covered his long involvement with aviation, beginning with his wish at age 7 to become a pilot. He started at the British Overseas Airways Corporation (BOAC) in the late 1960s; he was aware of Concorde from the first beginnings of the project in 1962, and on seeing British prototype 002 take her first flight in April 1969 he wanted to become a Concorde pilot.

Captain Bannister outlined the challenges of the 6-month Concorde training course, for which there were up to 50 applicants for each place and the pass marks for the examinations were extremely high. Interestingly, he pointed out that flying Concorde did not appeal to everyone; it was not the first choice for pilots who wanted to see the world or earn lots of money – but it was ideal if you loved flying aeroplanes.

He described the thrill of flying Concorde, the extraordinary complexity of the aircraft (“four aeroplanes in one – a high aircraft, a low aircraft, a fast aircraft, a slow aircraft”) together with the ease of handling her – you could fly her with just two fingers. He recalled leaving Concorde after flights and turning back to look at her, thinking “gee whiz – they let me do this!”. He also shared a few stories about the famous passengers, including royalty; he said that Prince Philip flew on Concorde at every opportunity, but, surprisingly, the Queen felt it was not appropriate for her to be seen using the aeroplane too often. However, Concorde played



## Colleagues reunited

Former Concorde captains John Hutchinson (left) and Mike Bannister (right) pose in front of Concorde G-AXDN.

Photo: Katie John





### Command performance

Spectators watch a special nose-lowering demonstration by G-AXDN, with a commentary by DAS volunteer Bob Wright.

*Photo: Katie John*

a major part in marking royal occasions; Captain Bannister described flying G-BOAD down the Mall towards Buckingham Palace, during the Queen’s Golden Jubilee in 2002 (see p.4). He mentioned how he had deployed a lot of technical “details” to persuade the Royal Air Force to let Concorde lead the Red Arrows in formation, and to pull off that memorable finale in which Alpha Delta soared away from the Reds.

Nick Cook asked which experiences stood out as the pinnacles of his career flying Concorde. Captain Bannister replied: the first time, the Golden Jubilee, and the last scheduled flights. He recounted the thrill of his first full-power take-off from Shannon during his initial training. As a sad contrast, he recalled that last day of scheduled service – 24 October 2003.

Lastly, Captain Bannister looked back at the difficult final years of Concorde’s life in service – the crash in July 2000, the year of work to return Concorde to service, and the retirement. He stressed the importance of getting Concorde back in

the air following the crash, while the crews’ flying and engineering expertise remained current, and paid tribute to the cooperation between British Airways and Air France in returning Concorde to the sky. Concorde’s Certificate of Airworthiness, withdrawn just after the crash, was reinstated exactly one year later.

Regarding Concorde’s retirement, Captain Bannister said the aircraft could technically have continued in service for another 10–15 years, but the decision to retire Concorde was made for commercial reasons. He explained that the decision to stop was initially made by Air France, and once they had withdrawn British Airways would have been liable for the full costs of maintaining Concorde, then running at around £60 million a year – and, on top of that, Airbus increased the maintenance costs to £100 million per year. British Airways was unable to take on that expense, in a uniquely challenging environment including the aftermath of 9/11, the Gulf War, foot and mouth, and other challenges.

Captain Bannister finished by touching on his life today, which still includes Concorde – giving lectures about the aeroplane, and being involved in the years-long investigation of the crash. He said supersonic air travel would return, and mentioned Boom Technology’s proposed new Overture aircraft – not as fast as Concorde, but designed to be carbon-neutral. He took some questions from the floor, and directed people to his book for further details.

### Nose move by G-AXDN

The evening ended with a nose move by Concorde G-AXDN and the DAS volunteers, with volunteer Bob Wright talking the spectators through a full flight cycle and the nose and visor movements involved.

Many thanks to the Duxford Aviation Society for putting on such an enjoyable evening. For information on DAS and their restoration work, see their website:

<https://www.duxfordaviationsociety.org>



# CONCORDE WATCH

## Concorde F-WTSA

French pre-production aircraft

**Location:** Musée Delta, Orly, France

**Reporter:** Alexandre Pozder

**Date:** 3 October 2022

The activities involving Sierra Alpha have slowed down a bit in the last few months because we have been working on the challenge of rebuilding the radome of the ground radar from the control tower at Orly.

This geodesic dome that covered the control tower, manufactured in 1982 by the Irish company Essco Collins Ltd, was dismantled by the Direction Générale de l'Aviation Civile (DGAC), the French civil aviation authority, on 19 September 2019 and was entrusted to us in 2020. Unfortunately, the pandemic stopped us from rebuilding it before now. For this reason we took the decision to finish the work of putting it up again by 19 September this year. Our mayor decided to organise a small ceremony to celebrate the end of the work, in the presence of representatives of the DGAC who helped us as well as representatives from the town.

### Visual highlight

The radome from the ground radar at Orly Airport, now reassembled and on display. It can be seen here just beyond the nose of F-WTSA. Photo: Musée Delta

### Olympic star

One of the original insignia on F-WTSA is this red symbol. This is the logo for the 1976 Summer Olympics in Montreal. The airport to be used for the event, Montréal-Mirabel International Airport, opened for service on 4 October 1975. The inaugural event was opened by an Air Canada Boeing 747-200, which was the first passenger aircraft to land at Montréal-Mirabel. The next day, Concorde F-WTSA made a star appearance, flown in by André Turcat. The Olympic logo was added to commemorate F-WTSA's part in opening the airport for the Olympics.



This year, 19 September coincided with the end of the European Heritage Days. For our association this was the realization of the promise that we made to our mayor on the occasion of his election.

In addition to F-WTSA, this radome makes a lovely visual highlight for the museum site. Furthermore, it has given great satisfaction to the

administration of our town, which has observed that since the end of the pandemic we have received increasing numbers of visitors.

For information on the work at Musée Delta, please see the website: <https://museedelta.wixsite.com/musee-delta/home>



## Concorde simulator      Air France training simulator

**Location:** Aéroscopia, Toulouse, France

**Reporters:** Laurent Dupessey, Jacques Talvard    **Date:** 31 October 2022

This report is based on the latest news from Virtu'Ailes, the association that has been maintaining and restoring the Air France Concorde simulator. The simulator is housed at Aéroscopia, the aeronautical museum in Toulouse, next to Concorde F-WTSB. The goal is to return the simulator to operational status for visitors in the near future.

This week the Virtu'Ailes team found themselves with more than six people to work on the Concorde simulator. The purpose of this work was to set up and test the new electrical force feedback actuators to replace the old hydraulic actuators. As a reminder, the objective is to replace the three old hydraulic actuators with three electrical actuators, all interfaced with the original position and force sensors, controlled by the original analogue computer.

We began with the pitch axis, which is the most notable. With Jean, our specialist from Lyon, we assembled the first electrical actuator with its mechanical part as well as the position, speed and force sensors, then the assembly was mounted on the pitch axis.

The mechanical part has been the subject of studies in collaboration with the Mechanical Engineering department of the University of Toulouse at Rangueil. The electrical part of the actuator has also been modified to adapt it to the new hardware.

We took advantage of this week of work to partially integrate sub-distributors and new backplanes as well as update rack 9 of bay G.

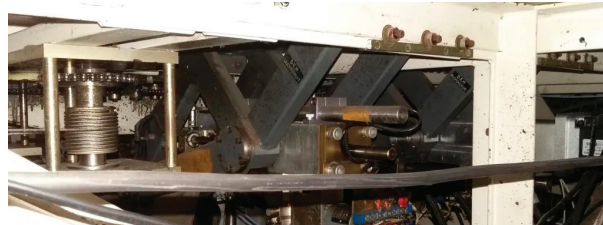
In our workshop, Jean has installed a dual-boot PC with Windows and Ubuntu, which will be used to test the simulator versions



### Exterior view of the simulator

The simulator in the museum, with Concorde F-WTSB.

*Photo: Virtu'Ailes*



### Work on the actuator

Top: the actuator for the pitch axis, removed for the renovation work.

Above: view under the floor of the simulator; the actuator is the grey box partially visible at the right of this image.

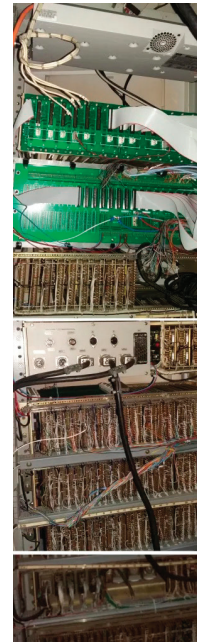
*Photos: Virtu'Ailes*

and to test the boards and instruments on the work bench. This testing has revealed a bug in the simulator, which will be investigated.

At the end of this week, the results are encouraging; another part of the simulator has become functional. The concluding tests

will make it possible to restore the controls for the other actuators and associated electronic cards.

For updates on the work of Virtu'Ailes, please visit their website: <https://virtuailes.fr/>



### Electronics

Rear view of bay G; the green components are the new cards.

*Photo: Virtu'Ailes*

## Concorde G-BOAC

British production aircraft

**Location:** Runway Visitor Park, Manchester, UK

**Reporter:** Graham Cahill      **Date:** 2 November 2022

We visited G-BOAC on 9 August and 1 November 2022. The team for both visits was John Dunlevy and myself – lean and mean. Airliners Live were also there on 9 August to get some footage of us working – nice to see Martin and team.

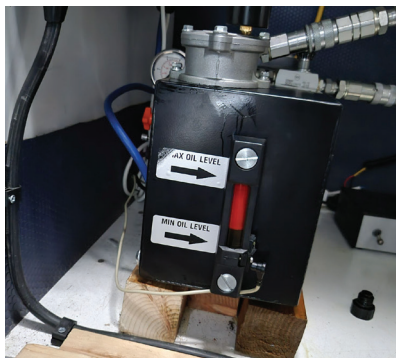
Visits have been a little lighter recently due to commitments with the team; however, we intend to visit more often once the festive period is over. Work completed on both visits was as follows.

### 1. Landing light

A faulty landing light was repaired and it now works very well. We traced the problem back to a faulty ground, which goes via the weight switches on the nose landing gear. When in service the lighting was switched between 600- and 400-watt filaments via this ground, meaning that the lights were brighter when the aircraft had landed.

### 2. Hydraulic power pack

The float switch on the hydraulic power pack was replaced. The float was sinking randomly and causing a false low oil alarm; the power pack is



#### Oil level sight

The new oil level sight in position on the power pack.

*Photo: Heritage Concorde*

used to operate the nose, so it was a small but annoying fault. Hydraulics Online Limited had replaced the oil level sight some months ago for free and this is the first opportunity we have had to fit it.

We tested the nose several times during the day and it worked fine. We found the oil was in good condition and little sediment was apparent in the tank. The float switch had probably failed due to excessive heat, so we will install the same overheat system that we have on G-AXDN to prevent it happening again.

### 3. Tyres

The tyres were inflated. This is a regular and time-consuming job.

We have had several offers to make a set of axle stands and are trying to obtain drawings so they can be made. If we can't obtain the drawings, we will engineer a set similar to those used at other locations by measuring.

### 4. Nose leak

We mopped up a small nose leak on the first visit, then repaired the leak on the second.

### 5. Cabin air flow

We installed a larger fan to try to get some fresh air into the cabin. This is an ongoing project, but the fan is now installed and it works. The cabin gets extremely hot in the sum-



#### Inflating the tyres

Heritage Concorde engineer John Dunlevy inflates the tyres on the main landing gear. Heritage Concorde are looking to install axle stands to protect the tyres.

*Photo: Heritage Concorde*

mer, so we will work over the winter to solve the issue for next year.

### 6. Nose hydraulics

Annoying tiny leak solved on the swivel unit, which sends hydraulic power through the nose hinge to all hydraulically operated fittings attached to the moving part of the nose. It was such a tiny leak that we have delayed and delayed tackling this issue. It's the only leak we have had on G-BOAC for the nose. We were losing about half a small can of oil over a 2-month period, so it was not serious.

It took most of the day to remove the swivel unit. We replaced six O rings on some of the bobbins for the green supply of 5 degree jacks. We could not find correctly sized original square O rings, so we fitted slightly over-sized round rings, which give a great seal.

### 7. Fuel service panel light

We have completed the activation of the fuel service panel light. We will finalise wiring this permanently next time, but it works for now. We had previously reinstated all the service lights except this one, which was slightly more complicated.

### 8. Cockpit lighting

Regular replacement and testing of caption bulbs in the cockpit (around 20 in all).

We carried out four full nose tests throughout each of the days. In all a fantastic couple of visits.

Thanks to the Runway Visitor Park (RVP) and The Aviation Society (TAS) for supporting our work. Book a tour and go to see Alpha Charlie – she is fantastic!

For information on Concorde tours, see the RVP website:

<https://www.runwayvisitorpark.co.uk/bookings/book-a-tour/>

Details on TAS can be found here:

<https://www.tasmanchester.com>

### Swivel unit

Left: the unit removed for work. Right: one of the bobbins with old O rings removed and new ones fitted.

*Photos: Heritage Concorde*



### Replacing the unit

John Dunlevy fits the refurbished swivel unit back into the nose hinge.

*Photo: Heritage Concorde*

### In position

The refurbished unit fitted back into its normal place in the nose mechanism.

*Photo: Heritage Concorde*



### View of Alpha Charlie

G-BOAC in the hangar after a successful day's work by Heritage Concorde.

*Photo: Heritage Concorde*

## Concorde G-AXDN

British pre-production aircraft

**Location:** Imperial War Museum, Duxford, UK

**Reporter:** Graham Cahill

**Date:** 2 November 2022

Heritage Concorde visited G-AXDN on 16 August, 16 September and 18th October. The team was John Dunlevy, Peter Ugle and myself, with James Cullingham joining us on 16 September.

The work accomplished on these visits was as follows.

### 1. Nose mechanism

We are trying to track down a small fault on G-AXDN's nose. The fault does not affect the use of the nose; however, it is more noisy and slightly slower than other noses we have restored. We are working through the system starting at the visor valve and working forward.

Investigations have proved that the visor valve is working correctly. We have completely removed the visor valve and bypassed it with custom-made hoses (manufactured specifically for this test). This test and the work around this test took one complete day. Concorde had many exclusive hydraulic connections not found on any other aircraft and they cannot be bought, so we have to make these connections by machining fittings that we can buy so they fit. The visor valve on this aircraft has been proved to be working correctly now.

We then moved on to test nose actuators for correct operation of the 5 degree side. We directly connected the actuators by bypassing all pipe-work in line. This is a lengthy and messy task; however, the actuators performed admirably. We have now proved that the 5 degree actuators are working correctly; they are quiet and move perfectly.

Our work has proved that there is a small restriction in the pipework between the visor valve, through



#### Visor valve

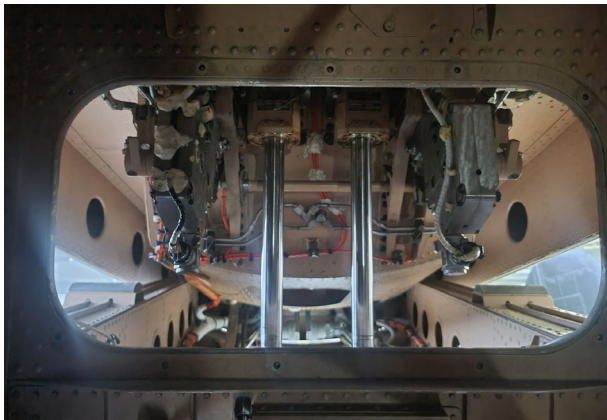
Clockwise from top left: valve in place; removed for work; Peter Ugle manufacturing new fittings; inset showing machined fittings. Photos: Heritage Concorde



#### Valve test

Above: new pipes fitted to bypass the visor valve. Right: Location of the valve. Photos: Heritage Concorde





**View inside nose mechanism**  
Interior of the nose hinge with the nose at 17.5 degrees.  
*Photo: Heritage Concorde*

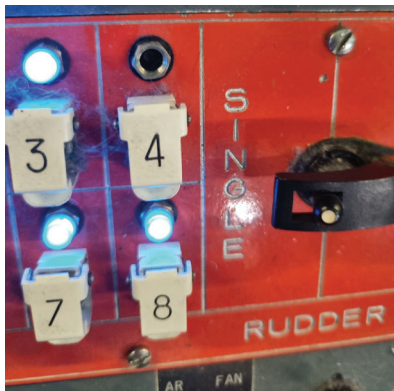


**Working on the mechanism**  
Peter Ugle at work on the interior of the nose hinge.  
*Photo: Heritage Concorde*

**Panel caption**  
The caption from the observer's panel, repaired by John Dunlevy.  
*Photo: Heritage Concorde*



**Bonkers lights**  
The control panel for the bonkers. The new LED will be fitted into the empty socket.  
*Photo: Heritage Concorde*



**Observer's station**  
The central console of the observer's station in the cabin; the perspex cover has been removed so that work can be done on the bulbs and captions.  
*Photo: Heritage Concorde*

the swivel unit. This is likely to be dried fluid blocking the pipework, which goes like hard earwax; we have found this in other areas of the aircraft, especially where pipes have been left open to the air. On our next visit in mid-December we will investigate where the restriction is in this now small length of pipe.

## 2. Repairs to lights

John Dunlevy removed a rogue caption from the observer's panel in the cabin and has repaired it in his workshop at home. We can't replace these units as we have no spares, so

repair is the only option. The caption is now returned and works great. We also replaced a bulb holder on the "bonkers" control that we removed last time, which required an LED replacement to be made.

## 3. Ice desk monitors

We repaired a small fault on one of the three ice desk monitors. These are CRT units, so rather old. I'm surprised the units have lasted this long as they are used every day to display footage of Concorde ice tests. When the units eventually inevitably fail, we will need to find



## Ice desk in cabin

The set of three original monitors on the ice desk. These still work, but the cathode ray tube units will eventually need to be replaced.  
*Photo: Heritage Concorde*

an alternative way of displaying the information while still retaining the look of the ice station.

#### 4. Cabin lighting

We replaced some bulbs in the passenger cabin and cleaned the light diffusers, which are only powered when the cockpit is powered; this is an ongoing task and will be used to fill any spare time we have.

#### 5. Lift training

We underwent training in the use of the lift. The brand new lift is a two-man unit, and the Duxford Aviation Society (DAS) allowed three of our team to be trained on its operation (the training is expensive but our team will use the lift rather a lot). Certification for use of the lift lasts for 2 years and the licence can be used at other locations. Many thanks to DAS for this training.

For more information on DAS, please visit their website: <https://www.duxfordaviationsociety.org>

#### Training exercise

James Cullingham of Heritage Concorde, beside the VC10, undergoes training to operate the lift while John Dunlevy looks on. The team thanks DAS for this opportunity.

*Photo: Heritage Concorde*



#### Successful nose move

G-AXDN with her nose lowered to 17.5 degrees as engineer John Dunlevy (left) discusses the aircraft with a visitor.

*Photo: Heritage Concorde*