

MACH 2

Concorde magazine

Feature issue: F-WTSA
A trans-Atlantic pioneer

Concorde watch
News from Duxford

Issue 37
February 2023

INTRODUCTION

Between the first flights of the prototype Concorde in 1969 and the start of scheduled Concorde flights in 1976, the aircraft underwent significant developments and advances in form, systems, and capabilities. In this issue we feature the fourth aircraft to be rolled out: French pre-production Concorde 102, also known as 02 and registered F-WTSA. This was the first of the line to show the Concorde shape that we know today. F-WTSA had a very short flying life, but still managed to achieve some historic “firsts”. We follow the story of Sierra Alpha up to the aircraft’s present situation: undergoing care and restoration at the Musée Delta, just outside Orly Airport in Paris.

We end with a report from Heritage Concorde on the latest work at Duxford, in which the team continued their investigation of the nose mechanism.

IN THIS ISSUE

- | | | | |
|----|--|----|--|
| 2 | Introduction | 12 | Timeline: history of Concorde 102 (F-WTSA) |
| 3 | F-WTSA: 50th anniversary | 13 | Concorde Watch |
| 4 | 50 ans déjà ... <i>Alexandre Pozder</i> | | |
| 8 | Making it work: development of F-WTSA <i>Rowland White</i> | | Editor: Katie John |
| 10 | Testing in Alaska | | |
| 11 | Size versus speed | | Cover photo: Concorde F-WTSA during cold-weather testing at Fairbanks, Alaska. Photo: US National Archives |
-

F-WTSA: 50TH ANNIVERSARY

On 10 January 1973, pre-production Concorde 02 (F-WTSA) made his maiden flight. In this feature, we commemorate the 50th anniversary of that flight, and look at the history of the aeroplane.

SIERRA ALPHA WAS THE FIRST to embody the Concorde shape that is so familiar today. Another notable feature is that during his working life he carried Air France livery on the port side and British Airways livery on the starboard side. After spending some time in more recent Air France colours, he has now been repainted with the double livery that he carried in the 1970s.

Sierra Alpha had perhaps the shortest flying life of any Concorde – just under three and a half years. Yet he achieved some notable records: the first trans-Atlantic Concorde flight to carry passengers, and a race against a Boeing 747 in which Sierra Alpha crossed the Atlantic twice in less time than the 747 took for a single crossing. The aircraft was utilised for test flying, notably for the cold-weather tests in Alaska, and for demonstration flights to attract possible buyers for Concorde.

Following retirement in 1976, Sierra Alpha went on display, first at Orly airport and then

at a site just to the south. His history was chequered; in 1988 he faced the threat of destruction, and much later he suffered at least two graffiti attacks. However, the aeroplane has greatly benefited from the care of the volunteers at Athis Aviation Musée Delta (AAMD), and since 2015 intensive work has been going on to refurbish him and restore many of the systems to active life.

Alexandre Pozder, Vice-President of AAMD, outlines the way in which F-WTSA differed from his British counterpart G-AXDN, and recounts the story of the aircraft, from maiden flight to current restoration work. We hear from one of the airport staff at Fairbanks International Airport, Alaska, who saw Sierra Alpha during the ten days of cold-weather testing in 1974. Systems engineer Rowland White describes some of the adaptations made to the aircraft during its development. We also look back at that epic trans-Atlantic race against the 747. Finally, we include a timeline of the aircraft's history.



Promotional visit to USA

F-WTSA lands at Dulles International Airport on 21 February 1975, during a tour of Mexico and North America.

Photo: Donald Huebler / US National Archives

50 ans déjà ...

Alexandre Pozder, Vice-President of Athis Aviation Musée Delta (AAMD), the current custodians of Concorde 02 (F-WTSA), looks back at Sierra Alpha's history, from development and flights through to retirement and restoration.

Of all the Concorde aircraft, Concorde 102 (F-WTSA), known to Concorde aficionados as “102” or “SA”, had the shortest active life – just three years, but they were three very busy years.

This aircraft carried out test flights, as well as making several demonstration and presentation flights, that served to show the reality and viability of supersonic flight for passenger transport.

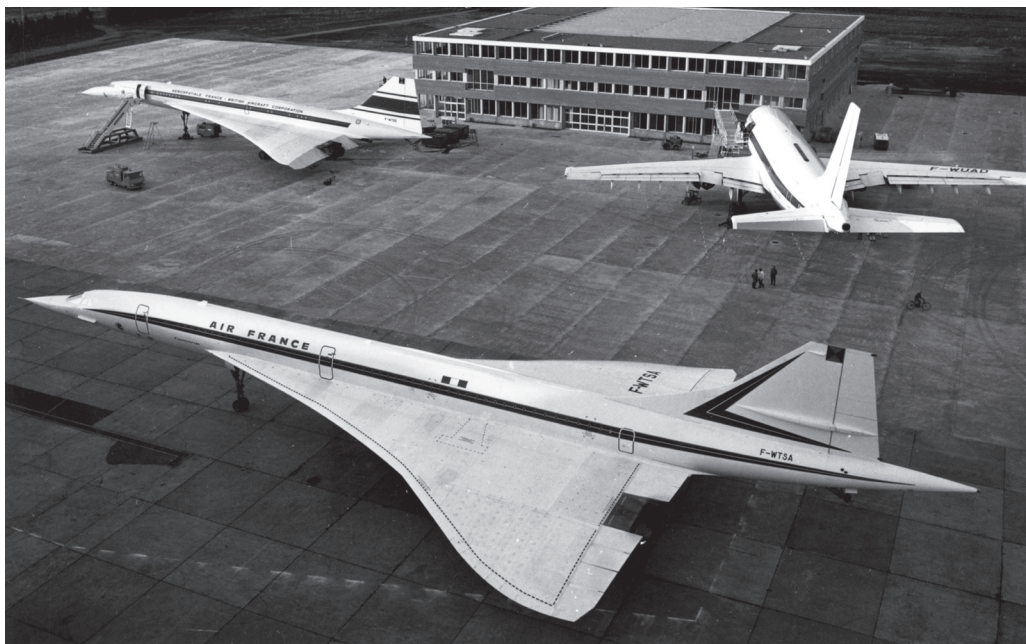
Conception and active life

At the start of Concorde's development, the two prototypes did not have a maximum take-off weight (MTOW) that would allow them to carry sufficient fuel to cross the north Atlantic with a full complement of 100 passengers on board. It thus became evident that the dimensions of the cabin and the volume of the fuel tanks would have to be increased and that it would be necessary to fine-tune the airframe.

Evolution of Concorde

French prototype 001 (F-WTSS) parked at Toulouse behind pre-production Concorde F-WTSA. (The prototype Airbus A300 is parked on the right; it would be presented to the public on the same day as SA.) The differences between the two versions of Concorde are clearly visible.

Source: unknown



F-WTSA: flying career

Maiden flight: 10 January 1973

Crew: Jean Franchi (Captain), Jean Pinet, Yves Pingret, Claude Durand, and Jean Beslon (SNECMA)

Duration: 1 hour 57 minutes

Maximum speed: Mach 0.92

Between 10 January 1973 and 20 May 1976, Sierra Alpha carried out 314 flights, comprising a total of 657 hours and 56 minutes, of which 186 flights, including 281 hours 17 minutes, were supersonic.

In March 1969, then, the French and British governments signed an accord to build two “pre-series” aircraft. These would become the British pre-production aircraft 101 (G-AXDN; see Mach 2, Nov 2021) and the French pre-production 102, or 02 (F-WTSA).

Compared with the British pre-series Concorde 101, 02 had the new geometry for the tail cone and tail fin, as well as the new design for the secondary nozzles, in addition to greater length and wingspan.

On the other hand, in terms of airframe design, the capacity of the

fuel tank, and above all the definition of various systems, this aircraft still had not reached the specification that would be achieved for the production Concordes. It was for this reason that almost all of the certification flights were carried out by the two initial production aircraft (F-BTSC for France and G-BOAC for the UK).

Testing and demonstration

The essential test flights that F-WTSA carried out during the Concorde development programme were as follows:

- Establishment of performance characteristics in supersonic and subsonic flight from the point of view of navigation.
- Development of the secondary nozzle action and research into the optimal positions with respect to noise, performance, and thrust reversal.
- Cold-weather testing including tests in extreme conditions.
- Development of the carbon brakes – a totally new technique for a transport aircraft. Two types of brakes were tested: Goodyear brakes, whose use was abandoned due to a lack of success during development, and then Dunlop brakes, which were the type selected, as used on 02 and for the production Concorde.
- Studies on the problems of water ingestion, snow, and testing of features particular to Concorde concerning the main landing gear and nose landing gear.

In addition to the test flights, F-WTSA was utilised for demonstration flights, for presentations to official organisations and potential clients. While the front of the fuselage was taken up with test equipment and instruments for registering various parameters of flight, the rear was fitted out as a luxurious cabin for passengers, comprising 32 leather seats.

In the course of these flights, F-WTSA would perform the first trans-Atlantic passenger flights ever carried out by a Concorde. (For further details on these flights, see Mach 2, June 2019.)

By the start of 1976, Concorde had received its type certification, and scheduled Concorde passenger

Arrival at Orly

26 September 1973: Crowds of spectators gather at Orly as Sierra Alpha arrives after the first trans-Atlantic passenger flight from Washington back to Orly. The crossing took just 3 hours 33 minutes, and the aircraft carried 32 invited passengers.

Photo: Collection AAMD/DR



Cold-weather testing

February 1974: F-WTSA undergoes “cold soak” testing at Fairbanks, Alaska. Winter temperatures here could drop as low as -44°C.

Photo: Collection AAMD/DR



Potential client for Concorde

French Prime Minister Pierre Messmer and King Faisal of Saudi Arabia take a flight on board F-WTSA, in the luxuriously fitted rear cabin.

Photo: Collection AAMD/DR



Wooden mock-up

June 1967: the full-scale mock-up of Concorde, known as “Woody”, is exhibited at the airshow at Le Bourget. This model would be displayed at Orly until it was destroyed by fire in 1976.
Photo: Jacques Guillem

flights had begun. At this point, the decision was taken to retire F-WTSA and place him on display at Orly airport.

Display at Orly

In 1969, a full-scale wooden model of Concorde had been installed at Orly as part of a display for guided tours, beside the prototype of the Caravelle, but following a fire on board this model was replaced in 1976 by Sierra Alpha.

On arrival at Orly, F-WTSA was decommissioned, the engines were dismantled, and a great number of components were removed for use in the Air France production Concorde. The equipment bay, situated on the left-hand side between the forward cabin door and the flight deck, was also removed to enable visitors to get closer to the plexiglass screen that closed off the flight deck and to see the pilots’ stations more clearly. The missing instruments on the flight deck were replaced by photographs.

Athis Aviation

At the end of 1986, Aéroports de Paris (ADP), the authority having control at Orly, decided to review the infrastructure at the airport. Sierra Alpha and the Caravelle were not included in their priorities. Caravelle 01 (F-WHHH), unfortunately, was scrapped. By contrast, F-WTSA was saved from this fate. Thanks to the tenacity of a great many volunteers and elected officials from the town of Athis-Mons and the commune of Paray-Vieille-Poste, Monsieur Bernard Lathière, President-Director-General of ADP, proposed to cede Sierra Alpha to the town of Athis-Mons for a symbolic price of 1 franc.



Airport parking

1976: Sierra Delta, now carrying Air France livery, is moved on to his display position at parking stand P7 at Orly airport.
Photo: Collection AAMD/DR



In 1986, under the impetus of Nicolas Roland Payen, René L’Helguen (Mayor of Athis-Mons), Gaston Jankievitch (Mayor of Paray-Vieille-Poste), and a team of volunteers, the association Athis Aviation was founded.

F-WTSA arrived at Musée Delta on 12 April 1988, to be put into the charge of the volunteers of the Athis Aviation association, reunited around their founding president, Nicolas Roland Payen. Monsieur Payen had actually designed and built the world’s first delta-wing aircraft, which first flew at Etampes in April 1935.

Concorde 02 today

Sierra Alpha has been repainted several times during his life as a display aircraft. Today, he carries the former livery of Air France on the port side and the British Airways Negus livery on the starboard side, as seen during all of his test flights.

Restoration

The original cabin layout having been removed, the forward cabin comprises an exhibition space showing technical material and photographs. The rear cabin has been recreated with 32 modern passenger seats bought from Air France.

The École Boule (a college of fine and applied arts in Paris) has scheduled the recreation of a table that was missing in the cabin, in homage to the late Captain Pierre Dudal, a former pupil at the school who went on to become an airline pilot, test pilot for Concorde, and the first head of the Concorde division at Air France.

The restoration is still ongoing today. The cockpit is gradually being re-fitted with the recovery of original instruments, of which some have been offered to us by our British friends at Brooklands, Duxford, Manchester, and Heritage Concorde. Some of the instruments

that are no longer available have been replaced by highly realistic replicas created by our friends and fellow Association members Boramy, Maxime Grégoire, Laurent, Tamas, and others.

Today, we have almost no photos of the cockpit from before the missing instruments were restored. In addition, the cockpit lighting and the landing lights have been restored to functional life. The presence of a radio broadcasting live from the control tower at Orly airport reinforces visitors' immersion in the feeling of F-WTSA as he was in his operational life.

Finally, the refurbishment of the nose and the visor is in progress.



The flight deck today

Restoration has involved sourcing and re-fitting some of the original instruments, and returning certain of them to life.

Photo: Collection AAMD/DR

Restoration of the nose and visor

Sierra Alpha in 2019, during initial work on the nose and visor, with the nose lowered to 17.5 degrees. The nose and visor are not currently operational, but work is being done to reactivate them. *Photo: Collection AAMD/DR*

Musée Delta

Situated to the south of Orly airport, in the commune of Athis-Mons, the Musée Delta enables the public to discover aircraft that have made aeronautical history, focusing on one aspect: the delta wing. The Museum currently has six aircraft, from the PA-100 – the racing plane of delta-wing pioneer Nicholas Roland Payen – to the supersonic airliner Concorde.

Technical and historical explanations allow visitors to understand the technological advances made with delta-winged aircraft, such as the Dassault Mirage and Concorde. Regarding Concorde, visitors can learn more about the sound barrier, on-board equipment, Concorde's trans-Atlantic flights, and the development and design of an aeroplane.

To learn more about the Museum and its work, visit the Musée Delta website:

<https://museedelta.wixsite.com/musee-delta>



Delta-winged fighter

The Dassault Mirage III – one of the other delta-winged aircraft on display at Musée Delta.

Photo: JP/AAMD



Making it work: development of F-WTSA

Although F-WTSA was a French Concorde, British engineers from the British Aircraft Corporation (BAC) worked with their French counterparts at Aérospatiale, in Toulouse, to develop the aircraft. BAC support engineer Rowland White recalls a couple of the challenges involved in preparing Sierra Alpha for flight.

I had worked in the summer of 1968 in the engineering office at Filton, but in the early spring of 1969 I was transferred to Toulouse. From then on I was no longer involved in the design of the aircraft; my job became to “make it work”.

It was almost four years later that F-WTSA, the second pre-production aircraft, was handed over from the design office to us, the systems development team in Toulouse. Now, on January 10, 1973, it was our task to complete the development work.

A new form of Concorde

This aircraft was really something new. It incorporated all of the technical and systems lessons from the first three aircraft, but it was a striking departure externally. It showed us a new grace beyond that of its predecessors. New shape, new dimensions, new jet nozzles, and a longer tail. In appearance, F-WTSA was the most production-like of the first batch of aircraft. Following its maiden flight, it soon began a series of visits that highlighted this issue.

Anti-collision beacons

The old anti-collision beacons, which had retracted into the fuselage on previous aircraft, were replaced with flashing xenon tube units, and here came my first problem. After only a few flights, the tail-mounted beacon failed. I had it removed, and found it to be in bits. So it was replaced, and after another couple of flights, this unit was also found to be in bits.

I contacted the manufacturer, and (not for the first time in the programme) I was accused of sabotaging their product! The cause?



Variations on a theme

Three forms of Concorde on the tarmac at Toulouse: French pre-production aircraft 02 (front, right); his British counterpart 101 (front, left); and production Concorde 201 (F-WTSA) in the background. Some differences between the British and French pre-production aircraft, especially regarding the tail, are evident. *Photo: Rowland White*

The longer tail cone of this aircraft meant that the beacon was now in the “noise cone” of the afterburners for engines 2 and 3. The cure? Move the electronics further back into the aircraft’s tail.

Ground power unit (GPU)

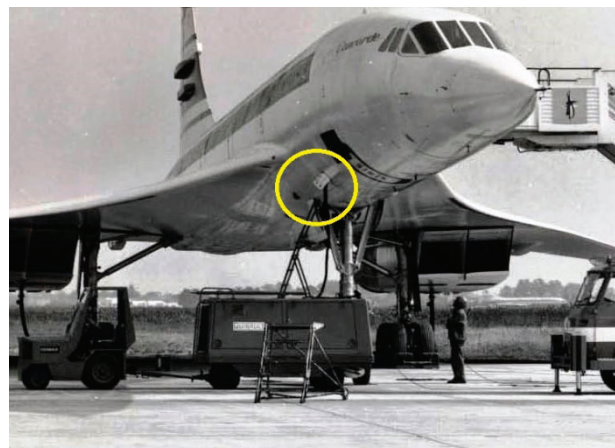
Unlike the production aircraft, the two prototypes, and the first pre-production aircraft, SA has an additional electrical connection for

the parking GPU. During visits to airports with French prototype F-WTSS, and early visits with F-WTSA, the airport ground crews were often not prepared for the location of the electrical ground power receptacle on the aircraft. This was on the fuselage, as it always is on an airliner. On conventional aircraft, with their short nose landing gear, this is easy to reach. However, Concorde’s long nose leg meant that the

The site of the problem

The location of the ground power receptacle on Sierra Alpha’s fuselage is shown here, ringed in yellow. The receptacle could only be accessed by ladder.

Photo: Collection AAMD/DR



fuselage was too high to reach unless ground support crew used a ladder to access it and connect the power. Many airports were not prepared for this, and often there was considerable delay whilst someone went to search for a suitable ladder.

Consequently, Aérospatiale decided to add a second ground power receptacle on the nose landing gear itself, to allow a ground generator to be connected even in airports that were not equipped with service steps high enough for connection on the right side of the fuselage.

Engineering challenges

Designing this receptacle was not a simple matter, as by definition the landing gear moves, contracts, folds, etc. Additionally, we had to position the receptacle so that it would not get blocked or showered with snow, ice, or heavy rain. Since electrical power supply was a BAC responsibility, the task of engineering the fitting fell to me, supported by my draftsman Pete, who had to produce the detailed drawings of the scheme.

The first issue, rather obviously, is that whatever we designed had to avoid interfering with the function of the landing gear, including retraction. It made sense, therefore, to fit the receptacle at the bottom of the nose leg, above the steering unit. We would make a machined aluminium



The additional GPU receptacle

Left: The protective coverings created for the cables running up the nose leg.

Right: The new, lower GPU receptacle proves its worth in icy conditions.

Photo: Collection AAMD/DR

enclosure, to go on the right-hand side of the gear, facing right. This orientation and location would mean that the receptacle was on the same side as the existing fuselage receptacle (which would remain fully functional). Additionally, the new receptacle would not face directly forwards, thus protecting it from debris and weather during take-off and landing.

The cables could not extend to or beyond the oleo, to avoid fouling the movement of the landing

gear. However, they would need to run up the front of the nose leg, in order to be clear of potential contact with any metalwork, especially when closed. Therefore, a system of protective shrouds was designed to protect the cables at all times.

The receptacle that we made was located approximately 1.70 m from the ground on right side of the nose gear strut. This modification was never used for the production aircraft, due to the addition of totally unnecessary weight.

A one-off solution

The two GPU receptors remain in place on Sierra Alpha today. In the image below, they are ringed in yellow.

Photo: Collection AAMD/DR



Testing in Alaska

On 7 February 1974, F-WTSA flew from Toulouse to Fairbanks, Alaska to carry out cold-weather testing. The tests took 10 days, and F-WTSA performed perfectly.

The flight to Fairbanks took less than 6 hours, even with a refuelling stop at Keflavik in Iceland.

Once on the ground, the aircraft was left standing in the open overnight, experiencing air temperatures of -45°C ; inside the cabin, temperatures reached -27°C .

Over the next 10 days Sierra Alpha was put through a series of system tests, which he completed with no problems. The only issue encountered during the tests was a pin stuck in a tow bar; this was addressed by re-boring the hole.

During his flight back to France, on 17 February, F-WTSA flew directly over the North Pole.



Cold-weather transport – fast and faster

A dog-sled team encounter F-WTSA during the testing. The dogs were naturally adapted to the gruelling conditions, but Concorde also acquitted himself well.

Photo: Collection AAMD/DR

An eyewitness account

Mach 2 thanks Theresa L. Harvey, Division Operations Manager at Fairbanks International Airport, for the following eyewitness account of F-WTSA's time in Alaska.

During the month of February, 1974, as I was working in the Accounting Office at Fairbanks International Airport, cold-weather testing was being performed on the Concorde in the old Wien Hangar, located on the West Ramp of the airport and in close proximity to the terminal building.

The Airport Manager was a local businessman and aviator by the name of William Lavery. As such, he was back and forth to the hangar to observe the cold-weather testing on the Concorde. At that time, there was limited security nationwide, so the testing crew offered to take Mr. Lavery and his staff onto the Concorde for a tour to see the inside workings of the aircraft.

First let me say, I recall it being extremely cold, maybe 30 or 35 below outside. We all boarded the plane up the outdoor stairway in front of the hangar, and were escorted into the cockpit and passenger area of the Concorde. The aircraft was very long and very narrow, two passenger seats in gray leather, as I recall, on each side and a fairly narrow aisle. What I remember the most was the huge instrument panels on each side in the

front of the aircraft in addition to the one directly in the front of the plane. I hadn't ever seen so many controls and instruments on an aircraft.

I remember feeling so fortunate to have been able to be in that aircraft and always dreamed of being able to take a trip somewhere in it. But alas, that never came to fruition. Many years have passed since then, so my memory only retains so much. But I do remember the excitement all of us experienced when walking through that aircraft.



SIZE VERSUS SPEED

As well as carrying out test flights, Concorde 02 was used for some spectacular promotional trips. In one epic flight, Sierra Alpha crossed the Atlantic twice in one day, beating a Boeing 747 as it made just one flight from Paris to Boston.

F-WTSA MADE THE FLIGHTS on 17 June 1974, to mark the opening of the new John A. Volpe terminal at Logan International Airport, Boston, USA. Commanded by test pilot Gilbert Defer, and carrying 32 government officials and airline representatives, the aircraft left Boston at 08:22 local time. At almost the same time, an Air France Boeing 747 took off from Paris Charles de Gaulle (CDG) airport on a flight to Boston.

Once clear of Cape Cod, F-WTSA reached his cruising speed of 2,150 km/h (1,340 miles per hour). Two hours into the flight, Concorde passed the Boeing 747, which had travelled just 1,000 km (620 miles) from Paris.

Concorde touched down at CDG at 16:32 local time – taking just 3 hours 10 minutes

for the flight. He had to wait in Paris for 68 minutes to refuel and to wait for a missing passenger, then left Paris at 15:50 local time.

The return flight to Boston took 3 hours 8 minutes, during which F-WTSA once again overtook his subsonic rival. After a total of 7 hours 29 minutes, of which 6 hours 18 minutes was flying time, Concorde landed at Boston at 15:50 local time, a full 11 minutes before the 747 arrived. The aircraft was met by a crowd of more than 100,000 people, as well as one of the largest traffic jams ever seen around Logan airport.

The passengers enjoyed a luxurious flight with meals and cocktails. One traveller, a member of the US Civil Aeronautics Board, expressed his admiration of the aircraft: “It’s great; it’s here to stay.”



A visit to Boston

F-WTSA pays a visit to Boston as part of a promotional tour of North America. The previous year, this aircraft publicised the opening of the new terminal in spectacular fashion, by racing a Boeing 747 across the Atlantic.

Photo: US National Archives

Timeline: history of Concorde 102 (F-WTSA)

10 Jan 1973	Maiden flight.
23 Feb 1973	Non-stop flight from Toulouse to Iceland and back (slightly longer than the distance between Paris and New York); F-WTSA covers the 6,000 km (3,728 miles) in 3 hours 27 minutes.
3 Mar 1973	Return flight from Toulouse to just beyond Madeira (to replicate a flight between Paris and Washington, or between Frankfurt and New York); total distance of 6,300 km (3,915 miles), covered in 3 hours 38 minutes.
17–26 Sep 1973	F-WTSA crosses the Atlantic to carry out a promotional tour of airports in South and North America (for further details, see Mach 2, June 2019). The return journey from Washington to Orly, on 26 September, is the first trans-Atlantic Concorde flight to carry passengers.
7–17 Feb 1974	Sierra Alpha flies to Alaska to carry out cold-temperature trials.
17 Jun 1974	F-WTSA races an Air France Boeing 747 across the Atlantic – taking off from Logan International Airport, Boston, at the same time the 747 leaves Paris, and then completing two journeys across the Atlantic to return to Boston 11 minutes before the 747 arrives.
20 Oct 1974	F-WTSA makes a trans-Atlantic sales tour including Mexico City, San Francisco, Los Angeles, and Las Palmas.
30 May 1975	F-WTSA is displayed at the Paris Air Show, Le Bourget.
4 Oct 1975	F-WTSA visits Montreal to participate in the opening celebration for Mirabel International Airport (see also Mach 2, November 2022).
20 May 1976	Final flight, from Toulouse to Orly. The aeroplane is then decommissioned and goes on display at parking stand P7.
12 Apr 1988	After being purchased for a symbolic 1 franc, Sierra Alpha is installed at the Musée Delta, Athis-Mons.
2015	The latest cleaning, maintenance, and restoration work begins; this is still ongoing today.



Flying two flags

F-WTSA during cold-weather trials at Gander, Newfoundland. For the test flight programme, Sierra Alpha carried dual British and French livery. This 1970s livery has now been restored by the team at Athis Aviation Musée Delta.

Photo: Collection AAMD/DR





CONCORDE WATCH

Concorde G-AXDN

British pre-production aircraft

Location: Imperial War Museum, Duxford, UK

Reporter: Graham Cahill **Date:** 7 February 2023

We visited G-AXDN at Duxford on 7th February. The team for this visit was lean and mean – just John Dunlevy and myself.

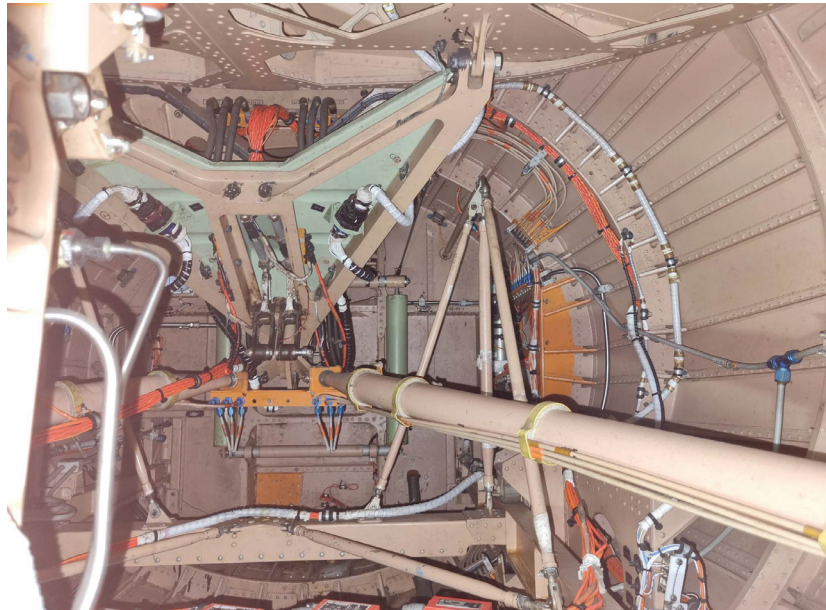
1. Nose system

We continued the investigation of the nose 5-degree system and disassembled the supply pipework running from the swivel units to the 5-degree portion of the jacks. This took most of the day. We found all the pipework to be clean and clear of blockages; the pipework was in fantastic condition. We have been worried that the hydraulic pipes may have deteriorated over time, and this is the case with some alloy pipes in other areas of the aircraft and on other aircraft we have inspected; however, the forward nose pipework on XDN is entirely stainless steel, so our concerns were unwarranted. We reassembled the pipework, topped up the oil, and ran through several nose tests.

We will continue with the work next visit; we will inspect the swivel units and carry out tests to further diagnose noisy movement at 5 degrees. There are some areas where a small amount of fluid is seeping through O rings on the nose system; we will tackle these tiny issues over the coming months.

2. Observer's desk in cabin

Regular display maintenance was completed on the observer's desk; 15 to 20 filaments were replaced and other captions checked. Further maintenance on other demonstration areas will be completed this year, so look out for updates.



Views inside the nose

Top: View inside the nose, looking forward towards the nose pitot.

Above: One of the visor rails inside the nose, used to guide the visor when it is being lowered or raised.

Photos: Heritage Concorde

3. Hatches on fuselage

All of the hatches were opened and will remain open until our next visit in March. G-AXDN has always been displayed with the lower hatches closed, as this keeps the aircraft looking streamlined and at its best for display. However, this also means visitors rarely get to see inside the workings of the aircraft. We will see how the feedback goes and may repeat this move again in the future. If you are interested in seeing inside the hatches of this aircraft, then February is the month.



Opened hatches

Above: An open hatch giving access to the hydraulic system.

Right: All of the hatches left open on the underside of the aircraft.

Photos: Heritage Concorde



Observer's desk

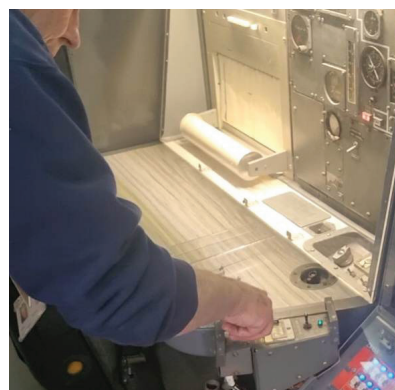
Heritage Concorde engineer John Dunlevy carries out repair work on the light fittings and captions for the observer's desk.

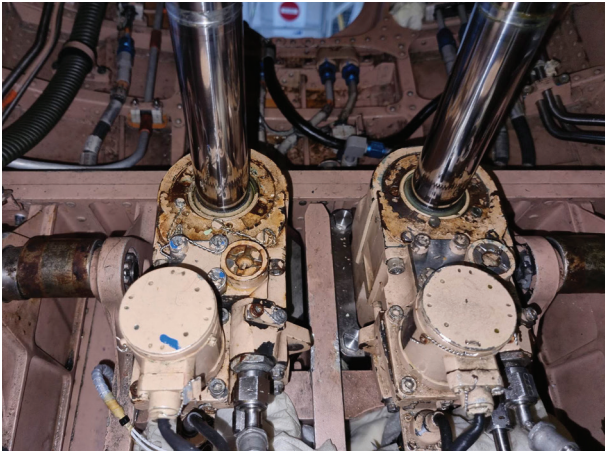
Photo: Heritage Concorde

Repairing lights

Above right: Filaments being replaced. Right: The red light is a rare custom unit of which John Dunlevy happened to have one spare. We will have to make these in the future.

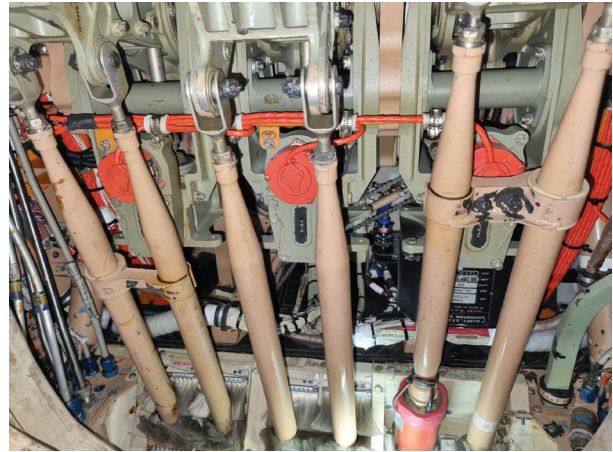
Photo: Heritage Concorde





Nose-lowering system

Five-degree jacks and valves for the nose system.
Photo: Heritage Concorde



Flight control systems

View inside one of the nose hatches, showing the flight control systems.
Photo: Heritage Concorde



The nose system in action

One of the numerous nose-lowering tests carried out on the day.
Photo: Heritage Concorde

Maintaining G-AXDN

Heritage Concorde and G-AXDN's custodians, Duxford Aviation Society (DAS), appreciate any support and donations to help maintain the aircraft.
For information on the work of Heritage Concorde, see: <https://www.heritageconcorde.com>
To learn about DAS, see: <https://www.duxfordaviationsociety.org>