

MACH 2

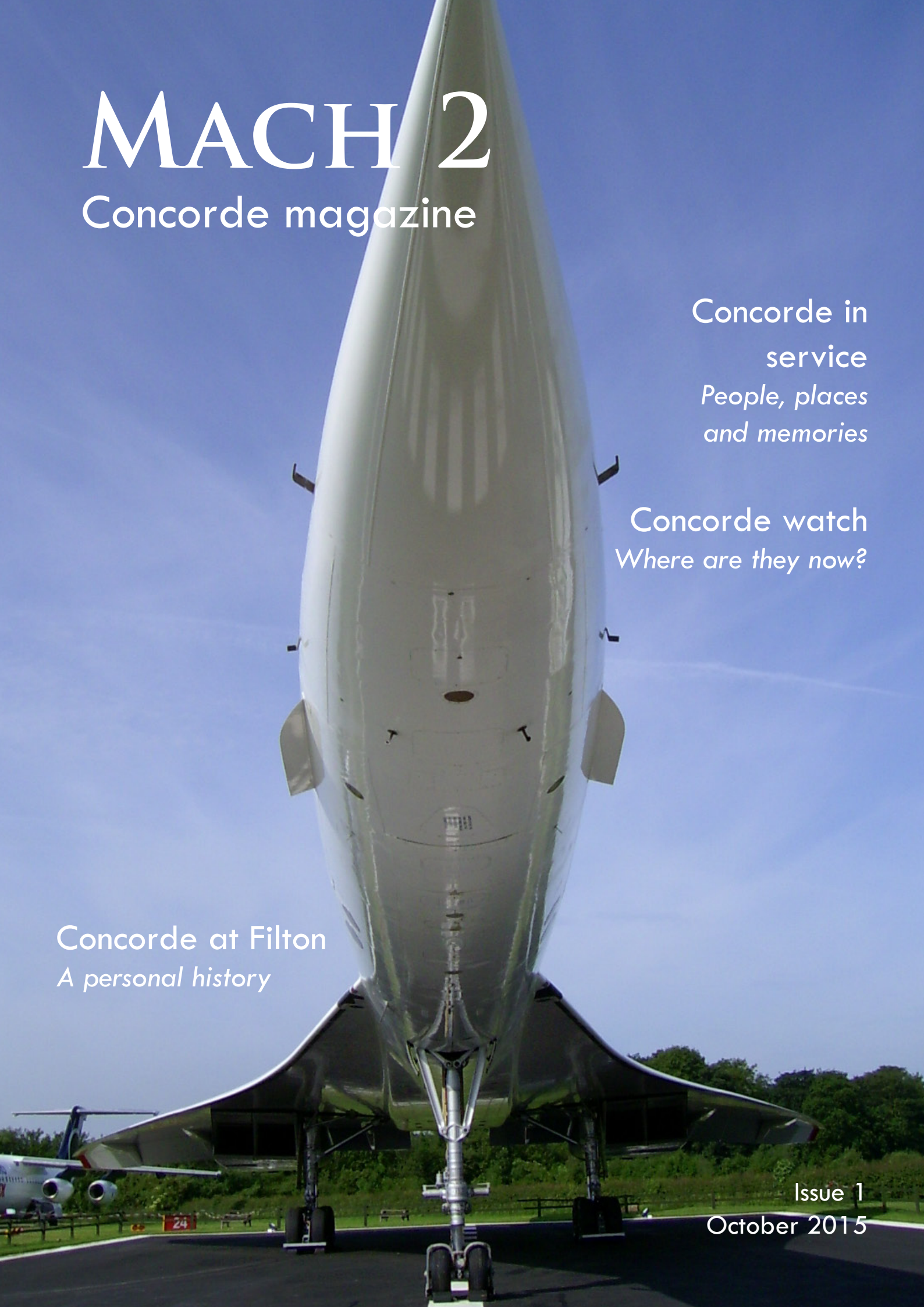
Concorde magazine

Concorde in
service
*People, places
and memories*

Concorde watch
Where are they now?

Concorde at Filton
A personal history

Issue 1
October 2015



WELCOME

Welcome to the first edition of Mach 2 – a magazine dedicated to the technological wonder that is Concorde. We offer you technical and historical facts, as well as news from the Concorde museums. Above all, we present personal accounts from those who worked directly with Concorde, from the very start of its development to the final flight and on to the present day.

We begin with glimpses of life on board Concorde – on the flight deck with Christopher Orlebar, and in the cabin with Gilly Pratt. We are honoured to have a guest article from Dr Helen Davey, a former flight attendant with Pan Am, who tells of her own exciting encounter with Concorde in Tehran in the 1970s. She is just one of many people across the world whose lives have been touched by Concorde, and we plan to feature more of these personal views in future issues. Co-Editor Nigel Ferris gives his unique insight from a life spent working at Filton, seeing Concorde from the first day right up to the present; Concorde is still a major part of his life. Finally, there is a “Concorde watch” news section for the aircraft today, and a “Tech log” where former Senior Flight Officer Ian Kirby answers readers’ questions.

This magazine is available free to all members of the current Concorde groups on the internet, as well as to former Concorde personnel and anyone else who is passionate or intrigued about the beautiful birds and their story.

Welcome aboard – and I hope you enjoy the journey!

Katie John, Editor

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Cover photo

Concorde G-BOAC, Manchester Viewing Park, 2004
Craig Sunter / Wikimedia Commons



The pilot's view: Singapore service

Christopher Orlebar, former Concorde pilot with British Airways

Christopher Orlebar describes the Concorde service jointly operated by British Airways and Singapore Airlines; he also recalls how the skill of the flight crew averted a serious but extremely rare instance of engine failure on a BA Concorde.

On 21st January 1976 Concorde started service with British Airways (BA). As entry into the US was not permitted, the only feasible destination from London was Bahrain. Later it was hoped to fly onto Australia, refuelling in Singapore.

Improving performance

In 1975, during "route proving", Concorde had been allowed to fly over the Indian peninsula at Mach 2. This permission was withdrawn for scheduled flights on account of the sonic boom.

Then Concorde did not have the range for the BAH-SIN leg of the route over the ocean south of Sri Lanka. However, a short time after entry into service, modifications were made to increase the range. The lower lip of the intake was sharpened, so reducing the fuel used during the supersonic cruise. The aft limit of the centre of gravity for take-off was moved rearward. This increased the allowable take-off weight by about a tonne, but within the structural limit of 185 tonnes.

The improved performance was due to the elevons (flying control surfaces) giving "flap effect" since they now maintained the angle of pitch around a lower datum point. Instability sets in if the centre of gravity is too far aft. This can be corrected with a foreplane and/or "active controls" (they move automatically to make the aircraft seem stable) as on modern delta-winged fighters. Concorde has active controls; but the aircraft was never flown unstable – with the centre of

gravity behind the centre of lift.

These improvements gave Concorde sufficient range to reach Singapore from Bahrain via the south of Sri Lanka with an 80% payload.

Sharing G-BOAD

British Airways (BA) flew the service jointly with Singapore Airlines. The cabin crews alternated on each sector; but the flight was always crewed by BA. Concorde G-BOAD (21*) was done up on the port side with Singapore livery.



Dual identity

G-BOAD at Heathrow, showing the Singapore Airlines livery.

Photo: Chris Knott collection

On this Concorde on 11th December 1979 we suffered an engine failure. We started our take-off run on runway 02 at Singapore: "three, two, one, now". The throttle levers were advanced more quickly than the engines could "spool up" – standard practice for us. Then "100 knots" from me; "power checked" from the Flight Engineer; "V1" from me; "CONTINGENCY!!" from the engineer; "rotate" from me; "positive" from me; "gear up" from the Captain.

There were no warning lights on, so I asked what was the problem; "look at the number 2 EGT

and N1", replied the engineer. The number 2 engine was getting hotter and slower; we thought we had better shut it down. The "contingency" call meant that extra thrust had been selected on the un-failed engines.

We dumped fuel to reach the maximum landing weight. We discussed what might have caused the failure. Earlier in 1979 an Air France Concorde had suffered a burst tyre at "rotate" speed, typically 190 knots, and a hole had appeared just above the landing gear bay, caused by debris from the disintegrating tyre and wheel rim. They were lucky not to have sustained worse damage.

Had a tyre exploded in our case? Should we put the gear down and asked for an assessment from observers on the ground? We decided that, as we felt no violent failure, we would land as planned.

During the approach to land I reminded the Captain to disconnect the autopilot as an automatic landing was not an option. His handling of the aircraft had been so smooth that it had given the impression of being flown by the automatics.

Later, we climbed into the intake of the number 2 engine. The tips of the first compressor stage were in contact with the intake wall. It was impossible to rotate. A bearing supporting the low pressure shaft (N1) must have failed. We returned to the swimming pool at the Tanglin Club while our 60 passengers had to reschedule their return to Europe.

I believe that was the only occasion of such a failure with a BA Concorde during its service life.

A TRIBUTE TO CONCORDE

Our very first guest article comes from Dr Helen Davey, a former flight attendant with Pan Am and now a writer and psychotherapist. One highlight of her long career with Pan Am was seeing the Concorde prototype at Mehrabad Airport, Tehran. She tells the intriguing story here.

It was a brilliant sunny morning in 1972 at Mehrabad Airport in Tehran when I got my first glimpse of the magnificent Concorde. It was an airplane so beautiful that it took my breath away. Against a backdrop of the snow-covered Alborz Mountains stood this gleaming machine that resembled a bird so much that it seemed almost alive. I remember thinking, "How can a machine look so glamorous?" I wish I had a photograph, but then, I don't really need one because the image is so indelibly imprinted in my mind.

"... an airplane so beautiful that it took my breath away ..."

I was a Pan Am flight attendant from 1965 to 1986, and when I was hired, we were all told that within a few years Pan Am would be flying the incredible SST. In flight, we attendants distributed children's coloring books that showed our Pan Am aircraft, including

the futuristic image of the SST. Imagine our disappointment when for multiple reasons, Pan Am never got this supersonic "super" airplane. Instead, the airline went on with Boeing to develop the 747.

Therefore, that day on the tarmac in Teheran, my Pan Am crew was witnessing a fantasy that came true – but not for us. Barred from going inside, we walked slowly around the plane, marveling in awe at its perfection. The pilots in particular were extremely envious, because what pilot in the world wouldn't be salivating at the thought of flying that magnificent supersonic aircraft?

Thinking of that day, none of us could have imagined that these pinnacles in aviation, Pan Am and Concorde, would ever be gone – relegated to the annals of history.

Pan Am and after

When I left Pan Am in 1986, I became a psychotherapist, and then a psychoanalyst, and have been in my new field for almost 30

Attracting admiration

Concorde G-BSST awaits a visit from local dignitaries at Mehrabad Airport, Tehran.

Source: still from "Concorde in Iran 1972", YouTube.



years. Deeply affected by the profound despair of my fellow Pan Amer's when the company went out of business, I specialized in the study of trauma. I wrote my dissertation for my Ph.D. in psychoanalysis (An Exploration of the Fall of Pan American World Airways), a study of the trauma to our employees of the loss of Pan Am. It was so profoundly heart-breaking, some people have never recovered.

Friendship in adversity

Katie John, the co-editor of a new Concorde magazine, and I have been corresponding for several years. She got in touch with me after reading my writing about the trauma that Pan Am employees endured. As she began telling me about the story of Concorde, I identified strongly with what you all went through. I too was shocked that such a magnificent aircraft could be gone from the skies.

Historically, Pan Am encouraged the feelings we all had of belonging to the Pan Am "family." We shared a profound bond that stretched all around the world – a bond that has turned out to be unbreakable. Despite

"... the feeling of family is as strong as ever."

the fact that the "parent" died, we siblings continue to celebrate the family through various means, such as continuing reunions all over the world, publications and books, internet sites, employee groups, and even a television show. We learned the importance of grieving and sharing memories together. It's an amazing phenomenon that almost twenty-five years after Pan Am's demise, the feeling of family is as strong as ever.

To make this happen, many Pan Am employees stepped up to contribute their special talents. Various individuals and groups are busy writing and recording our collective memories for posterity. For example, Captain Tommy Carroll and his wife Jean made a beautiful documentary about our Pan Am world that was shown at our Aloha Reunion in Hawaii in 2014. You can view this video at his website, 747skygod.com, under "The Legend Lives On." I think anyone who loves aviation will find this fascinating.

Because I suspect that you who worked for Concorde have similar feelings of justifiable

The Persian connection

Pre-revolutionary Iran was just one of many countries keen to buy the new SST. In 1972 the British prototype, G-BSST, made a visit to Tehran as part of a sales trip. Iran Air placed an order for two Concorde aircraft; later, however, as the economics of Concorde operation proved too challenging, they withdrew this bid. The Iranians did lease one Air France Concorde for the route between Paris and Kish Island, but this ceased after a few flights. There is, however, still a reminder of the Iranian connection in Iran Air's London offices; their former office in Piccadilly featured a model of Concorde in Iran Air livery.

familial pride, I'm particularly glad to hear that Katie John and Nigel Ferris are starting this magazine. Hopefully, it will unite former employees and provide a touchstone for continuing connection. After all, you are the only ones who lived the experience of working for and sharing your lives with Concorde, and relate to the common sorrow of losing it.

In case you would like to know what happened to Pan Am and how the employees coped, I invite you to visit me via The Huffington Post/ Helen Davey. I wrote a 4-part condensed version of my dissertation titled "Orphaned By Job Loss", as well as an autobiographical book review ("Counting My People") of my mentor Robert Stolorow's book on trauma (*Trauma and Human Existence*). My article is meant to be a primer to help people delve into their own feelings of trauma regarding the loss of their company.

I wish you great luck with your new magazine, and I hope that it inspires many of you to contribute and connect with each other. Your Concorde story is one of great triumph and tragedy, and the product of your work was magnificent. You have every right to be very proud.

Nobody can take that away from you.

Dr Davey's articles on Pan Am are available at <http://www.huffingtonpost.com/helen-davey/>.

MY CONCORDE LIFE

In this singular slice of personal history, co-editor Nigel Ferris gives his eye-witness account of working alongside Concorde at Filton, from the first days of construction to the touchdown of the last flight.

At the tender age of sixteen, I got my first job at the then British Aircraft Corporation Filton, at the start of the Concorde project. I was a junior clerk; my boss was the Chief Project Engineer for the BAC 221 research aircraft (developed from the Fairey Delta 2), investigating high-speed flight on a wingform very similar to that of Concorde. Then I moved to another department, located in the main aircraft assembly hall, directly overlooking the Concorde prototype construction area.

Concorde takes shape

I was able to see the very first section arrive and be placed on the jig, all the others following, then final structural assembly, systems installation, hydraulics, wiring (miles and miles), undercarriage, power up and electrical testing, and movement of all the hydraulically operated items. This I did most days, somehow managing to avoid being missed in the office with various excuses. At that time, the security was not what you would expect to see with a highly sensitive project under way. In fact, clutching a folder or clipboard, with attached paper (with only scribble written on it to look official) I was able to wander at will underneath and inside the aircraft and watch the work going on!

I consider myself lucky in being able to see the progress in full, including the test flying of the 221, and the Vulcan Flying Test Bed. The Vulcan had a prototype Olympus 593 strapped on underneath, and as the angle that her own Olympus engines were fitted in the airframe compared with that of the test engine, she could not have all 5 engines running at any level of high power – there could have been a drastic coming apart! From the office in the central bay, I could see the runway, and a not uncommon sight was to see the Vulcan take off on the Concorde engine only – this evidenced by one trail of black smoke. Very impressive. As a young man, keenly interested in aircraft, and the superb engineering that goes into building them, my time at BAC was very fulfilling. I still have this passion for aircraft, flight, engineering – and

of course, Concorde. That somebody in the sixties should have said ‘let’s build an aircraft that flies at Mach 2, carries 100 passengers in shirt-sleeve luxury, sipping champagne’ almost defies belief. But it happened – the technology was so far ahead of its time.

“I was able to glean so much information about the aircraft...”

During my years at BAC, I was able to glean so much information about the aircraft – my subsequent job was in the purchasing department, dealing with everything ordered from suppliers. There were two types of equipment – non-coded (items that could be bought off the shelf, nuts, bolts, rivets etc., and coded – those items that were designed for and unique to the project – fuel pumps, circuit breakers, and so on. This gave me a good understanding of what went into the aircraft.

‘Smokey Joe’ flies

I was present for the roll-out of 002 – and for the first flight. The Chief Inspector at the time was a chap, Freddie Price, I believe, whose responsibility it was to sign off the aircraft as fit for flight. Some people said this was a particularly onerous decision – but then he was a highly experienced and qualified engineer, and such a task would be routine for him – if you can call the first flight of a UK built SST routine!

The day arrived, just about every employee gathered by the runway as she was rolled out, systems testing began and the countdown began. I was very close to the turning circle where she was waiting, and after engine start, taxiing out, the colleague I was with said we should stand back a bit to avoid the jet wash. No – I wanted to feel the rush and smell the kerosene. As it turned out, there was not a great deal, with the engines on taxi idle, and I didn’t get blown over (which would have been quite a talking point for the rest of my life). She turned onto the runway, the crew



First view of the prototype

British prototype G-BSST is rolled out before the Brabazon hangar at Filton.

Photo: James Nelis

(with BAC Chief Test Pilot Brian Trubshaw in charge) went through their final checks. We had been told that the intention was to do a fast taxi, then come back for take-off. However, Trubshaw felt that everything was ok to go, and ‘Smokey Joe’ took to the skies. She flew to Fairford which was to be the base for all test flying of the prototypes, with a Canberra as chase plane, and on approach the two radio altimeters failed, so Trubshaw had to make a visually sighted landing. With typical British unassuming Test Pilot-speak, he announced afterwards that had landed “half a second early” – his description of a slightly hard and fast landing.

There was another office in the hangars which dealt with the flight test reports, and I would often go there to ‘see another colleague’ but in truth to be able to have a peek at the reports. Fascinating reading (again, probably forbidden), and one of the memorable ones was where two engines on one side were shut down at a certain Mach number (gradually), and there was no noticeable or uncontrollable yaw during this test! Tributes again to the remarkable design and systems that the designers anticipated and built into Concorde.

A lifelong love affair

The ‘love affair’ with Concorde was well and truly set in my psyche. While I was living in Australia for 2 years, Concorde made its round the world sales tour, and landed at Tullamarine (Melbourne airport); the press made comments about other aircraft be-

ing left with their engines running to drown out the noise of the mighty Olympus 593s. Complete rubbish – she passed all her tests to enable her to eventually being granted landing rights at JFK, developing the ‘Canarsie manoeuvre’ after take-off. Captain Brian Walpole, who was instrumental in achieving this permission, gave a press conference with his French counterpart after the first landing – then as he was addressing the audience, Concorde was towed into the hangar, and so many jaws dropped to the ground it was almost audible, at the sight of this beautiful, breathtaking aircraft. America’s love affair with Concorde began.

I have followed this icon ever since. It is said that if something looks right, it is right – no truer word was ever spoken. She looks as though she is going fast even when standing still. The technical challenges faced to develop this aircraft were quite monumental – even in this electronic age, with all kinds of aids for pilots, Concorde cannot be surpassed for her design and construction. Another apposite saying is ‘form follows function’; the designers did not set out to make a beautiful looking aircraft – it just happened, because it was the only shape that could possibly fulfil the potential.

In the next issue, Nigel describes the after-life of Concorde as a museum exhibit, and recalls his work as a tour guide on the “Concorde at Filton” exhibit.



Life in Concorde's cabin

Gilly Pratt, former cabin crew member on Concorde, British Airways

Former BA cabin crew member Gilly Pratt remembers the unforgettable smell of Concorde's interior, and gives us a glimpse of the hard work that went into the smooth supersonic service.

They say that the human brain recognises and remembers about 10,000 smells. There is one smell I would dearly love to experience again but unfortunately never will – the smell of Concorde when you first boarded her before a flight. Even if they manage to get one flying again, the smell will never be replicated. I think it was the combination of smells – leather, expensive perfume and aftershave, champagne, gourmet food, alcohol, coffee, etc. It was unique to Concorde and the strange thing is that all seven aircraft smelled exactly the same!

Grace under pressure

Apart from the smell, I miss the love/hate relationship we had with the galleys. Concorde was originally designed for a sandwich service, not the First Class meals we served (sometimes against the odds). There were two galleys, one at the front (very small) and one at the rear. When I was flying her, in the 1980s, there were only boilers with a rapid-boil function (which had to be constantly refilled) for the beverages. It was not unknown for the front galley operator to be interrupted during this process and the boiler to overflow and the galley to be flooded (luckily the water was still cold). Mopping up was a mammoth, time-consuming task which did not fit comfortably with the time constraints on the service!

Concorde G-BBDG cabin

A BA Concorde cabin with the 1980s layout – it looked and smelled glamorous but there was not a lot of room for manoeuvre.

Photo: Kurkoe / Wikimedia Commons

On boarding the aircraft, after checking our emergency equipment, one of the galley operator's first tasks was to check the catering. Unfortunately, due to HMC regulations, we were unable to open the bars to check them until the aircraft had pushed back from stand. Believe me, one thing I do not miss is that dreadful sinking feeling on discovering that the red-wine bar was nicely chilled by the dry-ice whilst the champagne and white-wine bar was lovely and warm! When faced with a full flight it became like a military campaign to warm and chill respectively because the doors were closed and we were preparing for take-off.

Thrills and spills

During the years Concorde was in service, the meal routines were changed. In the early 1980s the cheese was served after the main meal, before the dessert tray was given out. The Cabin Service Director

(CSD) and the Purser would serve the cheese and the Cabin Operator would follow with a small tray laden somewhat precariously with liqueur glasses, a bottle of red wine and a bottle of port.

On one flight I was standing in the aisle, following the CSD, who was leaning over serving the passenger by the window. The gentleman sitting on the aisle in front decided he needed something from the hat-rack. He stood up and caught his shoulder on my tray – the bottle of red wine took off (I swear in slow motion) and deposited its contents all over the ceiling, passengers, seats and floor and also dripped down the neck of the CSD. Copious amounts of towels, serviettes, etc. were needed to mop up and passengers given the address of British Airways' insurers for any claims. Not long after this incident, the meal routine was changed and the port and red wine were safely stored on top of a trolley!





CONCORDE WATCH

Concorde F-WTSA

French pre-production aircraft

Location: Musée Delta, near Orly Airport, Paris

Reporter: Graham Cahill **Date:** 15 October 2015



F-WTSA – which was used during pre-certification flight testing, and which made the first Atlantic crossing carrying passengers – has been outside for many years now. A combined team from Heritage Concorde, the Duxford Aviation Society, and Brooklands Museum visited the aircraft and offered to help with restoration.

Upon retirement in 1976 this aircraft was completely stripped of his test equipment by Air France and re-vamped to look like a production aircraft with false toilets and false luggage bins. The LHS equipment racking and breakers were removed completely, as were all the instruments from the cockpit, possibly for the Air France flying fleet for spares.

When the aircraft was handed to the town of Athis-Mons, the cockpit had just one instrument in it; over the years instruments have been donated to the museum for restoration, and some instruments are dummies, which have been made by committed volunteers. On this visit Brooklands museum donated 14 instruments for the cockpit of F-WTSA, and Heritage Concorde will supply extremely detailed images of AXDN's cockpit panels so restoration can continue.

Flight deck

F-WTSA's instruments; the instrument panel is currently being restored.

Photo: Graham Cahill/Heritage Concorde



F-WTSA exterior

This photo, taken during the recent Heritage Concorde/ DAS/ Brooklands visit, shows the aircraft in good condition. *Photo: Graham Cahill/Heritage Concorde*

Various groups have been involved with the restoration of the aircraft, and all have done a good job with what they have. Volunteers at the museum are aware of some issues with the aircraft, such as water ingress and a broken visor panel; these are currently top priority for the restoration team.

Photographs were posted on the internet last year of F-WTSA being in a dangerous state of decay – I can quite categorically say this is not the case. In fact, most of the damage to the aircraft is superficial and is only paint deep. The aircraft has been treated in areas of concern using anti-corrosion paint, and these areas have since been touched up with white paint. Ideally the entire underside of the aircraft could do with a paint, but for the time being it is ok.

The landing gear and gear bays have been treated with paint, and the wheels are off the ground as the landing gear is on axle stands.

Overall, considering this airframe has been outside since retirement, we find his condition to be good. Although we could not get up for a close inspection of all the hatches, he seems to have been looked after well by his custodians. Both Heritage Concorde and Brooklands will (if required) be in regular contact with the staff at Orly to help with restoration and improvement.

One thing is for sure – F-WTSA is loved by his local town and the museum are extremely proud to present him to the world.



Landing gear and bay

These areas have been painted and appear to be in satisfactory condition for the time being.

Photo: Graham Cahill/Heritage Concorde



Wheels supported

The landing gear has been mounted on axle stands, to hold the wheels off the ground.

Photo: Graham Cahill/Heritage Concorde

History: the genesis of Concorde

Work to build a supersonic transport (SST) – an airliner capable of breaking the sound barrier – began in earnest in the 1950s. Nigel Ferris looks at some of the experimental aircraft and precursor designs that led eventually to Concorde.

The Chief Designer at Filton, Dr. Archibald Russell, studied a number of variations under the generic Type 198 label. Using RAE wind tunnel data, he concluded that a Mach 2 transatlantic machine was the only one worth building. At the same time Russell started a parallel study on a similar-sized but higher-speed design, as Type 213. The Bristol Type 188 was an all stainless steel aircraft designed for high-speed flight research – and the SR71 Blackbird was a very similar shape and design.

In March 1959, the Supersonic Transport Aircraft Committee (STAC) recommended that the UK build two supersonic designs: a long-range 150-seat aircraft to cruise at Mach 2 for the London to New York route, and a shorter-range aircraft to cruise at Mach 1.2 for use in Europe. On 1 January 1960, several British aerospace companies merged to form the British Aircraft Corporation, or BAC. Hawker Siddeley had also been working on the transatlantic version of the STAC designs, but the Bristol design was considered clearly superior.

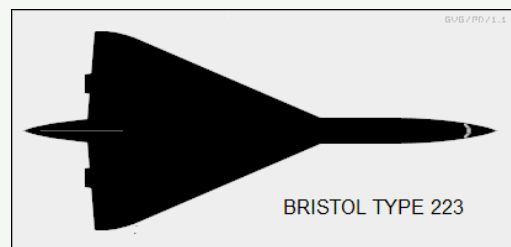
However, Russell soon started having second thoughts about the 150-seat sized version, and in 1961 started parallel work on a smaller design known as Type 223, of about 110 seats and with four engines, but otherwise similar to the low-wing version of the Type 198. This design was remarkably similar to the eventual futuristic shape of Concorde.



Pioneering design

The Bristol 188 XF923 landing at the SBAC show at Farnborough, 1962.

Source: RuthAS/Wikimedia Commons



Bristol 223

Silhouette of the Bristol 223.

Source: Greg Goebel/Wikimedia Commons

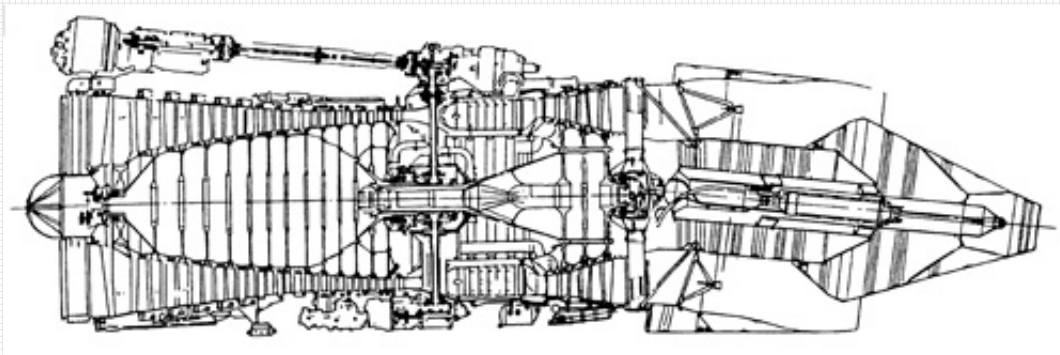
TECH LOG

Q Why do the engines for the Tu-144 [Soviet supersonic airliner] have cones at the back and Concorde's engines don't?
Jetinder Sira

A Ian Kirby replies:

Below is a cross-section of the Koliesov RD-36-51A, only used in the later TU-144 aircraft. The cone appears to be the convergent/divergent nozzle required to get air out the back of the engine at supersonic speed. It seems to have a screw jack up the centre to move the cone forward and aft.

Concorde used a rather more sophisticated system that not only provided the convergent/divergent nozzle but also allowed control of the ratio of speeds between the two spools of the Olympus engine and provided the reverse thrust; this was never fitted to the TU-144.



Source: <http://www.tu144sst.com>

Concorde crew articles: further information

Earlier articles by former Concorde crew members Christopher Orlebar, Ian Kirby, and Gilly Pratt can be seen in the Save Concorde Group (SCG) newsletter, available on SCG's Facebook site: [Save Concorde Group - The Official Facebook Site.](#)

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