

MACH 2

Concorde
magazine



Champion of
Concorde
*Sir George Edwards
remembered*

Emergency service
*A medical role for
Concorde*

Concorde and
the RAF
*A dazzling
partnership*

Issue 17
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INTRODUCTION

In this month's issue we commemorate the centenary of the Royal Air Force by recalling the combined display flights in which the RAF Red Arrows flew in partnership with Concorde. These spectacular displays crowned several of the UK's most prestigious public occasions. Flight engineer David Macdonald shares his experience of one such flight – a three-way display with Concorde, the Red Arrows, and the iconic QE2. Photographer Adrian Meredith has allowed us to include the unique photograph of this occasion.

July 2018 also saw the 110th anniversary of the birth of Sir George Edwards – a giant of the aviation world, and one of the people who did most to bring Concorde into being. Alex Patterson of Brooklands Museum looks back at Sir George's life and his connection with Concorde.

Our last feature is a look at an unusual but vital role for Concorde – as a rapid transport for medical supplies and sick people. Richard Chatham gives an account of one such mission of mercy.

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FLYING WITH THE RED ARROWS

The Red Arrows have been a thrilling feature of British public events since the 1960s. On several occasions, Concorde joined them in the sky for display flights that dazzled the public. We look back at this aerial partnership, including a unique view from Concorde's cockpit.

The Concorde fleets played a dual role for their airlines and their nations. In everyday service they provided a superlative experience for their passengers. In addition, they would be shown off as a stunning emblem of power, beauty and technical excellence.

A stunning partnership

Both the British and the French Concorde aircraft performed flights on special occasions, with the aerobatic teams from their respective air forces.

In the case of the British Concorde, their association with the RAF Red Arrows began before Concorde even entered service, and lasted until almost the end of the aircraft's flying career. On the following pages, we look at the six occasions on which these two icons of the air joined forces to show off their aerobatic prowess.

Even now, 15 years since the airliner's retirement, one of the Red Arrows' best-known display formations is the "Concorde", in which they re-create the famous delta-winged shape in the air.

In another commemoration of this special relationship, on 25 April 2018 the Red Arrows donated one of their Hawk aircraft, XX308, to the National Museum of Flight in Scotland, to sit in the same hangar as Concorde G-BOAA. This aircraft, which was flown from 1985 to 2012, took part in the display flight with Concorde G-BOAE to mark the opening of the Scottish Parliament in 1999 (see p.8). This is the only Red Arrows Hawk aircraft on display in any museum.

Remembering Concorde

The Red Arrows take up their renowned "Concorde" formation in the sky during the Blackpool Air Show.

Photo © Jason Wells/123RF.com



The picture of the century

British Airways Flight Engineer David Macdonald recalls his participation in a unique photo-opportunity in which three British icons came together – Concorde, the Red Arrows, and the QE2.

My regular readers may recall that in my previous article I waxed lyrical about 1984. Well, 1985 had its excitements, too.

Highlights included Alpha Golf's return to service; two aircraft flying to Nice to promote the 'new look' crew uniform; a 'Concorde-for-a-day' for Queen Elizabeth the Queen Mother as her birthday present; planning our first world air cruise; first visit to the 10-day air show extravaganza that is Oshkosh; posing for our one and only Mach 2 picture (from an RAF Tornado); regularly shifting over 500 passengers per day, peaking at 713 on 3 November; and, of course, the photo shoot with the Red Arrows and that iconic British ship, the QE2.

There was also an intriguing event on 24 December, but that's another story. [See Mach 2, December 2015, for details – Ed.]

The plan comes together

Our charter business was maturing nicely, with a portfolio ranging from individual enthusiasts to major companies. Take Cunard, for example; during 1985 we flew over 30 trans-Atlantic round trips in conjunction with the QE2, plus long-range charters to link with the ship's World Cruise.

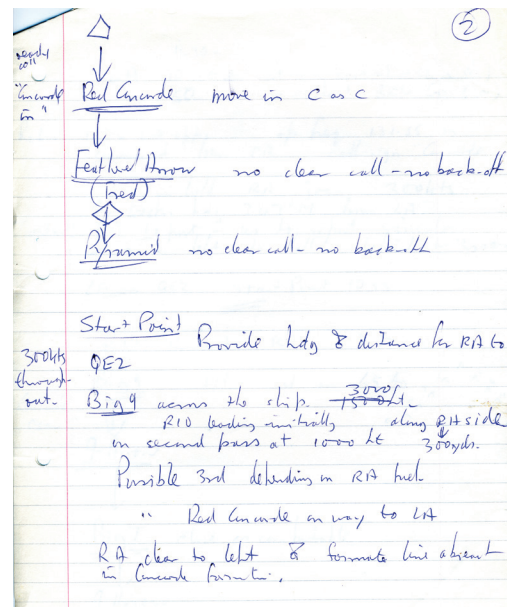
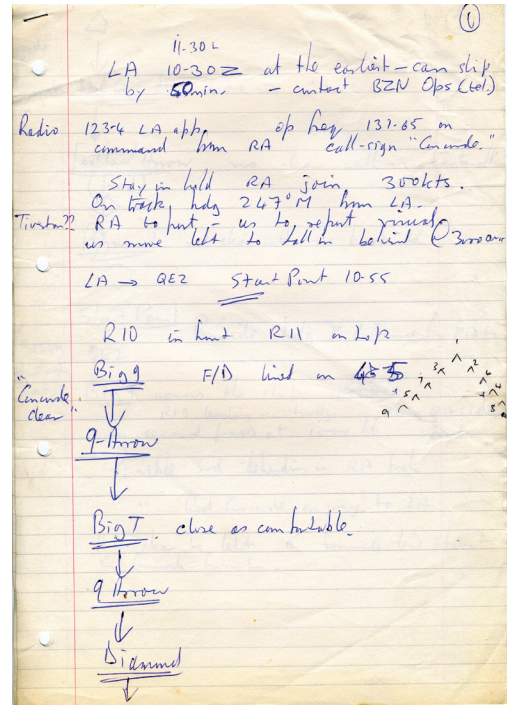
Arising from that maelstrom, there floated an idea, a proposal, then a plan: put three of the finest examples of British industry together and see what happens. What better than a meeting of the QE2, Red Arrows, and Concorde?

For a Flight Engineer coming from a civilian background the very concept of flying an airliner in close, nay very close, company with nine other aeroplanes was anarchic. Of course, the other nine did it all the time; it was their raison d'être.

They were very good to us. They described what they could do with their nine Hawks, developing through to what they would do; the formations they would fly, and how formation changes would work. Air Traffic Control (ATC) were brilliant too: present at all the meetings – so cool – as if bringing aircraft into close proximity, instead of keeping them far apart, was all in a day's work – probably was!

The game is on

On the day, the weather was perfect, good visibility – had to be. Lyneham was our Rendezvous Point, to hold as necessary at 300 knots (multiply by 1.15 to give mph). ATC radar controlled our convergence, but nevertheless we scanned the skies, searching for our new friends. There's always a bit of competition on the flight deck, to be the first to spot the runway on a dark and stormy night, first to see the conflicting traffic, but on that day it was to identify a friendly formation. And then there they were, 9 little red dots, rapidly becoming the Hawks, much bigger close up than one imagined – the game was on.



Initial planning

The author's notes, made during the planning meeting with the Red Arrows, include diagrams of the Arrows' formations.

Photo: David Macdonald

There were also two other Hawk aircraft there that day. I didn't see either of them; I didn't need to. One was filming the whole thing.

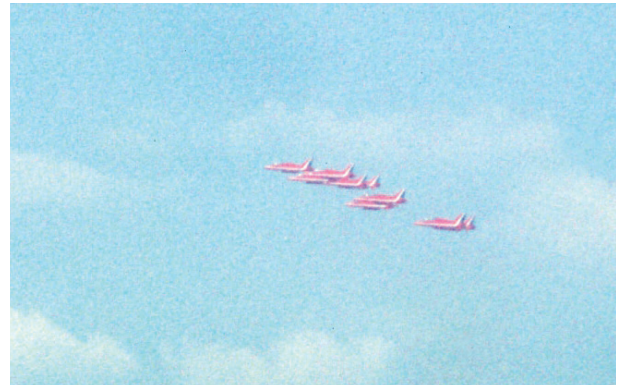
We had radio contact with the ship and were able to get her exact position, in latitude and longitude; this would facilitate Rendezvous Point 2. On these sorts of days (all these years later I can speak in the plural) we are allocated a radio 'chat frequency' where we aircraft can speak directly to one another – normally a hanging offence. This was in addition to the normal ATC frequency that we would be working at the same time.

The Arrows took up their 'Big 9' formation with ourselves tucked in, close behind. We set off in a west-south-westerly direction, tracking 247 degrees magnetic, heading for Start Point, the South Coast headland to the south of Dartmouth. Our job was to hold a height, a heading and a speed whilst the Arrows performed their choreography around us, running through a pre-planned sequence of formations. We found there to be a 'sweet spot' – a little lower and it wasn't right visu-

Rendezvous

The Red Arrows appear off Concorde's starboard side, seen from G-BOAG's flight deck (right); a unique close-up of the nine in formation just in front of Concorde (below).

Photos: David Macdonald



ally, whilst a little higher put us into the Adour engines' exhaust stream and that was noisy (a loud ripping noise across the top of our cockpit)!

Running up to Start Point we picked up an updated position from the QE2; setting it into our INS navigation system gave an accurate heading, distance and time to target. Passing this data to the Arrows kept us all 'on the same page'.

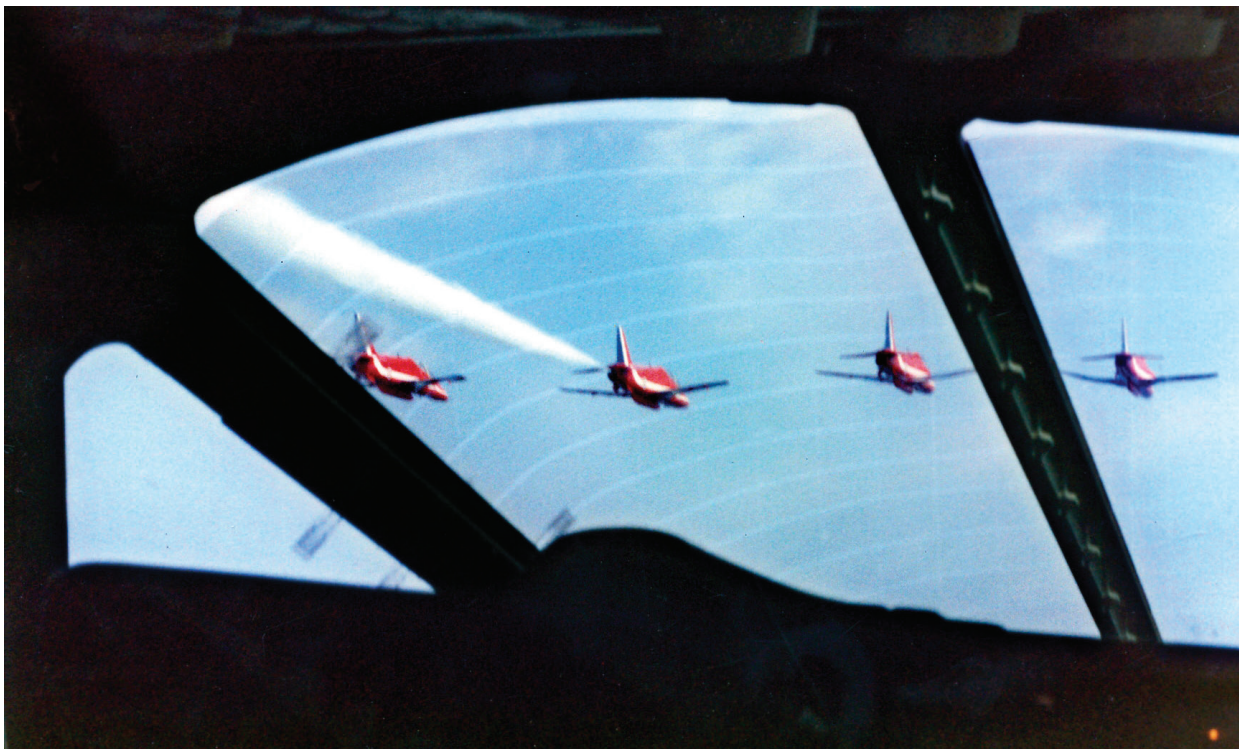
And there she was, the QE2, a stately sight steaming west; her first voyage was in 1969, the year of Concorde's first flight. The shot was taken at 300 knots, 1,000 feet above the sea at about 300 yards to the right of the ship. Wonderful!

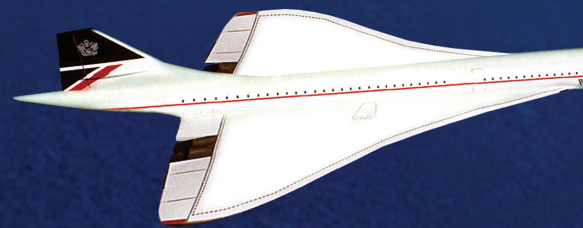
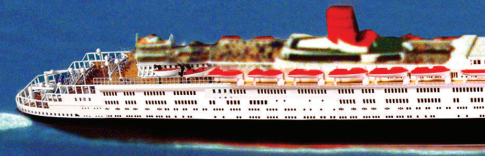
And so back to Lyneham, au revoir to our new friends and a quiet, lonely flight back to normality.

Epilogue

We had a film pro with us in the flight deck and I have a feeling, a faint recollection that at the end, when he said "that was the picture of the decade", Captain John Hutchinson disagreed, saying, "No, that is the picture of the century!"

Ed: This instance was captured on film, which can be seen on YouTube: <https://www.youtube.com/watch?v=AsGPO8qE2zg>







Capturing the moment

Aviation photographer Adrian Meredith describes how the three-in-one shot on the previous pages was taken, by renowned photographer Arthur Gibson.

This iconic photograph was taken by Arthur Gibson from Red Arrow Hawk number 10.

The pilot had to fly upside down so that Gibson could get this shot. He only had two attempts. Unfortunately the first flight pass didn't work, but during the second pass he did manage to capture this image.

I worked with Arthur Gibson, and British Airways have allowed me to hold the copyright to this photograph; this was arranged by Jock Lowe, who was the Concorde Captain for this flight.

Prints of this image are available at: <https://www.concordephotos.com>

The display flights

British Concorde flew with the Red Arrows on six occasions in all, starting with the pre-production 01 (G-AXDN) in the early 1970s, and ending with the aerial extravaganza for the Queen's Golden Jubilee in 2002, just one year before the British and French Concorde fleets were finally retired. Katie John describes these events.

1973

Concorde 01 (G-AXDN) performed the first ever display flight with the Red Arrows. The aerobatic team flew the Folland Gnat, the trainer jet that they would use until 1979. At the time G-AXDN was based at Fairford for the test flight programme, while the Red Arrows were stationed nearby at Kemble.

1980

Concorde 202 (G-BBDG) flew with the Red Arrows' Hawk jets for the first time. During this period, G-BBDG had had the British Airways livery removed, although she still retained the 'cheat stripe' along the fuselage.

1985

During a programme of combined display flights for the Royal International Air Tattoo, Concorde 214

Salute to Heathrow

Concorde G-BOAA and the Red Arrows overfly the airport (including a fellow Concorde) to commemorate Heathrow's 50th anniversary.

Photo © Tony Harris/PA Images

(G-BOAG) and the Red Arrows performed a special display in co-ordination with the QE2 off the south coast of England (see pp.4-7). G-BOAG was the first aircraft in the Concorde fleet to carry the Landor livery.

2 June 1996

To mark the 50th anniversary of the opening of Heathrow Airport, Concorde 206 (G-BOAA) and the Red

Arrows performed a flypast over the airport as a salute.

1 July 1999

Concorde 212 (G-BOAE) and the Red Arrows performed a flypast to mark the opening of the Scottish Parliament. The aircraft was already in Edinburgh, having been chartered by the UK government to fly dignitaries up from London, and it was decided that G-BOAE – carrying





the Saltire flag of Scotland on board – would perform a joint display with the Red Arrows, who had already been booked for the occasion. The formation overflew central Edinburgh and the Firth of Forth, as well as appearing over Loch Lomond and Glasgow.

4 June 2002

After a rehearsal flight on 29 May, Concorde 210 (G-BOAD), commanded by Captain Mike Bannister, accompanied a mass fly-past of RAF aircraft to mark Queen Elizabeth II's Golden Jubilee.

The flypast involved 27 RAF aircraft, headed by a C-17 Globemaster, and followed by a TriStar, Tornados, a Boeing E3 Sentry (AWACS) aircraft, a VC10, Jaguars, Canberras, and a Eurofighter Typhoon. The aircraft took up their formation over the North Sea off Great Yarmouth, and came in over Suffolk and Essex, before flying down the Mall and over Buckingham Palace at a height of 1,500 ft. Watched by the Royal Family and over 1 million people thronging the Mall, Concorde and the Red Arrows provided a spectacular finale.

As soon as the flypast was over, G-BOAD climbed to 2,500 feet and returned to Heathrow, while the Red Arrows returned to their base at Scampton.

This flight was notable for being the first display flight since Concorde was grounded after the Paris crash in 2000; it was also the last Concorde display until the retirement flights in October 2003.

Ed: Videos of G-BOAD's Jubilee fly-past can be seen on YouTube. Here is one example (you may need a hanky!):
<https://www.youtube.com/watch?v=2mwZvKaXRxs>

View from the ground

Concorde G-BOAD and the Red Arrows overfly London to create a dazzling finale for the Jubilee fly-past.

Photo: Joe Bridge (<http://www.joebridge.co.uk>)

One million people

The huge crowd in the Mall cheers for Concorde.

Photo: concordesst.com



A champion of Concorde

The fact that the Concorde project began at all, and that it finally succeeded, was due in large part to the influence of George Edwards, head of the British Aircraft Corporation. Alex Patterson, Director of Collections, Interpretation and Heritage at Brooklands Museum, looks back at Edwards' unparalleled contribution to the SST.

From humble beginnings, Sir George Edwards rose to be a leading figure in Britain's aviation industry following the Second World War.

Rising star at Vickers

Edwards joined Vickers as a draughtsman in 1935, and by 1940 was promoted to Experimental Department Manager. During the war he was involved in a series of projects to support Britain's war effort, leading him to work with Barnes Wallis. While this relationship was not the easiest, Edwards provided solutions to help Wallis with the bouncing bomb – most famously utilising his cricket knowledge to develop a reverse spin, which eventually led to the success of the weapon on that infamous raid.

However, it was his post-war work that really saw Edwards rise to prominence. He was appointed Chief Designer at Vickers in 1945, working closely with his mentor, Rex Pierson. However, Pierson became ill, eventually passing away in 1948. During this time Edwards took on an increasing amount of design work related to new civil and military aircraft. He played a significant role in the successful development of the first turboprop passenger airliner, the Viscount, which helped transform air travel. George Edwards also became increasingly involved with running the company.

BAC and Concorde

Britain's aviation industry faced a series of challenges after the war. There were more companies looking to win government contracts for the latest specifications for jet fighters than potential orders. This was against a backdrop of an economy that was



A modest home

George Edwards was born on 9 July 1908 in Highams Park, Essex, in a flat above what was then a toy shop. The council have put up a blue plaque (above) to commemorate him.

Photos: Katie John

depleted after the war. Edwards had repeatedly lobbied government in the 1950s to say that Vickers had to have a balance of military and civil aviation projects in order to be viable. By 1960 the government put pressure on a number of companies to merge; this eventually led Vickers, English Electric Aviation, the Bristol Aeroplane Company, and Hunting Aircraft to come together as the British Aircraft Corporation (BAC). George Edwards became Executive Director, laying the foundation for making Concorde a reality.

By the late 1950s, prototype designs for a supersonic passenger aircraft were being developed by the Bristol Aeroplane Company and were carried across to the newly created BAC in 1960. Edwards, in his role of Executive Director at BAC, would become ultimately responsible for the new project and became a most enthusiastic supporter.

Complex design decisions

On review of the Bristol prototype, known as the Bristol Type 198, Edwards quickly identified that the design's planned six turbojets



would not be sustainable. He later commented: "I always said that the only contribution I made that was worth making was that I took two engines out. I just banged on the table and said the operational costs of the aeroplane were not dependent on the power of the engine, but were dependent on the number of engines. No airline could stand such complications and cost."

Edwards eventually won the first of many complex design decisions that saw a reduction in engines to four, making the aircraft lighter – from 380,000 lb to 250,000 lb.

Building partnerships

As development of the prototype supersonic aircraft continued, so did the costs. The British Government stated that a partner was required to ensure that the work could continue. George Edwards was asked by the then Minister of Aviation to lead a delegation to America to discuss a potential collaboration. The Americans, however, were not interested to pursue an aircraft that could travel at Mach 2; they were more interested in achieving Mach 3. A small trial

Working with the French

At the start of the Concorde project, relations between the British and the French were rather stilted. In addition, each side had ways of working that they took for granted but were rigorously questioned by the other side. However, in Edwards' view, "the hammering out between two sides ... was more likely to get it right".

Edwards got on particularly well with former military pilot General André Puget, head of Sud Aviation from 1962 to 1966. Although there was some degree of creative tension, the two men liked, supported and trusted each other.

Puget's successor, Maurice Papon, was more of a challenge; as Edwards explained, "His English was non-existent and his technical knowledge was non-existent". Edwards thus had the

"interesting job" of trying to explain technical challenges to Papon in two languages at once.

By 1968, though, Papon was replaced by General Henri Ziegler, another military pilot, and in Edwards' view "an orthodox Frenchman", with whom BAC enjoyed a very cordial relationship.

Pierre Gautier, who oversaw the manufacture of the Concorde prototypes, remembers Edwards with respect: "If it were not for the friendly and confident co-operation between the four teams for airframes and engines, Concorde would not have been successfully achieved. In that respect, I would like to pay homage to Sir George Edwards, the chief executive of BAC, who was paramount in ensuring the success of Concorde and the integration of the two teams."

aircraft built at Bristol to explore the effects of kinetic heat beyond Mach 3 quickly identified this goal as unachievable. Edwards turned to the French and Sud Aviation.

Sud Aviation had been developing their own version of a supersonic aircraft, although only intended to travel at Mach 1. A meeting at Weybridge between George Edwards and his opposite number at Sud, Georges Hereil, in 1961 paved the way for future collaboration and a government-backed agreement in 1962. The next few years were plagued by the issues of two international companies collaborating, both pursuing their separate designs while sharing knowledge; an air of mutual suspicion did not help, either. George Edwards played an instrumental role in smoothing these relationships over, learning French so he could express his opinions better, which helped build a partnership of trust.

By 1964, with the election of a new Labour Government, the whole project appeared to be at risk, as the Wilson administration did not like Concorde and they were ready to cancel the programme. George Edwards spent much of his energies lobbying government, citing potential job losses as well as the

damage to Anglo-French relations. This went on for several years until 1966, when the government decided not to cancel – not least out of fear of the potential compensation payments they would have had to make to the French Government.

Concorde reaches the sky

By the time Concorde came to her maiden test flight on 2 March 1969, George Edwards had overseen the development of a project that had been through at least one complete redesign and numerous revisions. His passion for the project can only be underlined by the fact that he became the first non-member of the flight test team to take the controls of Concorde, under the watchful eyes of Brian Trubshaw, the British Chief Test Pilot for Concorde.

When the test flying and route proving were completed, Edwards (now Sir George) formally received the Certificate of Airworthiness for the British Concordes from the Civil Aviation Authority, remarking, "This is probably the most expensive piece of paper ever written".

It is a testament to Sir George Edwards' strong leadership and pragmatism, balancing ingenuity with the need for commercial success, that he shepherded the project

through some truly troubling times that nearly saw Concorde never reach the skies.

One last note: Sir George Edwards was on the first passenger flight to Bahrain, on 21 January 1976. Another passenger commented to him that flying at Mach 2 felt no different from being on an ordinary aeroplane. "Yes," Edwards replied; "that was the difficult bit".



Royal flight

George Edwards (left) with HRH the Duke of Kent (right) and Brian Trubshaw (centre), 28 October 1971, at the BAC Flight Test Centre at Fairford.

Photo: Brooklands Museum

EMERGENCY SERVICE

Concorde's speed was more than simply an asset for businessmen in a hurry, or a feature to thrill enthusiasts. On some occasions, the aircraft's supersonic speed could mean the difference between life and death. We look back at some of these missions of mercy.

Airliners are often called upon to transport materials that need to reach their destination within hours. As the fastest airliner ever, Concorde was ideal for this task.

The aircraft was pressed into service to carry diamonds, bank notes, and other high-value items. Most importantly, Concorde was used to transport medical supplies and, on at least one occasion, a seriously ill passenger.

- A French Concorde carried a rare antivenom to Africa to help a snake bite victim who had only a couple of hours to live; the patient received the treatment in time, and survived.
- BA Concordes were regularly called on to transport human organs for transplant.

- In 1977, Concorde G-BOAA carried time-sensitive medical isotopes to the USA for testing (see box, below).

- Concorde was used to transport a man who had suffered a heart attack, as explained opposite.

- After the bombing of Pan Am flight 103 over Lockerbie in December 1988, one of the deceased victims (who had been cremated in the UK) was flown back to the USA on board Concorde, courtesy of his former employers. When it was revealed that the aircraft was carrying a Lockerbie victim, those on board toasted the dead man with champagne.

Making medical history

26 July 1977: Concorde G-BOAA carried a generator for Krypton-81, a radioactive isotope used to produce scans of the insides of the lungs, from the UK to Baltimore, USA. The gas is derived from a generator substance that itself has a half-life of only 4.7 hours; this generator must be made available on the same

day that the scan is scheduled. When the Johns Hopkins Medical Institute in Baltimore wished to conduct tests with the generator, which was being produced at the Hammersmith Hospital in London, Concorde was the ideal solution for fast, safe transport.

Time-sensitive cargo

British Airways loading supervisor John Fitzpatrick with the krypton gas generator ready to be loaded on to Concorde.

Photo: Nick Rogers / Associated Newspapers / REX / Shutterstock



Rapid response

Aero enthusiast and long-time Concorde devotee Richard Chatham recalls a fascinating meeting with a retired aero engineer, which included an account of how Concorde was used to get a seriously ill colleague safely back to his family.

When I was rebuilding a Concorde model, I went to a very small local hardware store in a Bishops Cleeve, home of Smiths Industries – now G.E. Aviation – three miles up the road from where I live, to buy two small micro switches for the interiors and wing tip lighting circuits.

The store man asked what they were for. I told him I was redoing the lighting on Concorde. This was overheard by a lady who asked me what connection I had with Concorde. I naturally explained my devotion and enthusiasm for the iconic bird (well, why not – I had a captive audience) and that I was rebuilding an 8ft long scale model that had once been in Heathrow.

She invited me to interview her father, George Wood. He was 96, and his daughter warned we might not be able to get on very well as he suffered from memory loss; I think that is the kindest way to put it.

Calling for Concorde

When we finally met in his apartment at his home in Cheltenham in 2016, it was some 6 months later as he had not been well. From the minute we started speaking, though, he did not miss a beat.

He was, at the time of the Concorde incident in which he was involved, in a senior management position at Dowty. The story was that he had flown to America with a colleague from Dowty on a sales mission to offer a new helicopter landing aid for aiding safe landing on a ship's deck. On arrival in Washington, his friend suffered a heart attack and was confined to hospital. His wife could not fly to him for medical reasons, so asked the consultant if he could be flown back to the UK. The answer was that



Meeting of minds

George Wood (left) with Richard Chatham (right) and a model of the Boeing SST.
Photo: Richard Chatham

he was not to be subjected to a long-haul flight; however, Concorde was suggested as a possibility and the surgeon accepted.

George Wood rang his CEO, one Peter Wall, for permission to fly his colleague home by Concorde. At this point I said that I had met Peter Wall as he was a friend of my father. George could not believe it and when I described where Peter had lived; he was very excited, and it obviously unlocked more of his memory. Peter Wall gave permission for both of them to fly back to the UK by Concorde and I believe sent a nurse to accompany them back home ... all arriving safely.

A life with SSTs

George then went on to recount that while he had not actually worked on Concorde, he had been over her end to end. In addition, when attending a small German air show, because of his position in Dowty, he was invited to board the Tu-144 and have a look around. Accompanied by the four pilots, he visited the flight deck and they discussed the layout.

Aware they wanted to know how it compared with Concorde, he said he was amazed how closely it followed the Concorde layout. You can draw your own conclusion on that.

Later, he was seconded by Dowty to work with Boeing on the supersonic B2707. He showed me a scale model of the Boeing presented to him by Boeing at the end of his secondment, and a photo of the Tu-144 signed by the four pilots who had accompanied him on the flight deck. After an hour, his daughter closed the interview as she was concerned about her father's health and did not wish to tire him out.

George wanted to go on as he had worked earlier with Supermarine and he wanted to talk to me about it. I explained that some of my Hampshire family were involved with Hubert Scott Paine and the 1929 and 1931 Schneider Trophy and I hoped to chat about those days. Sadly, he died some months later, before I had the chance to continue. However, it was an honour to meet George and one more benefit of my interest in Concorde.



CONCORDE WATCH

Concorde G-BOAE

British production aircraft

Location: Grantley Adams International Airport, Barbados

Reporter: Katie John

Date: 31 July 2018

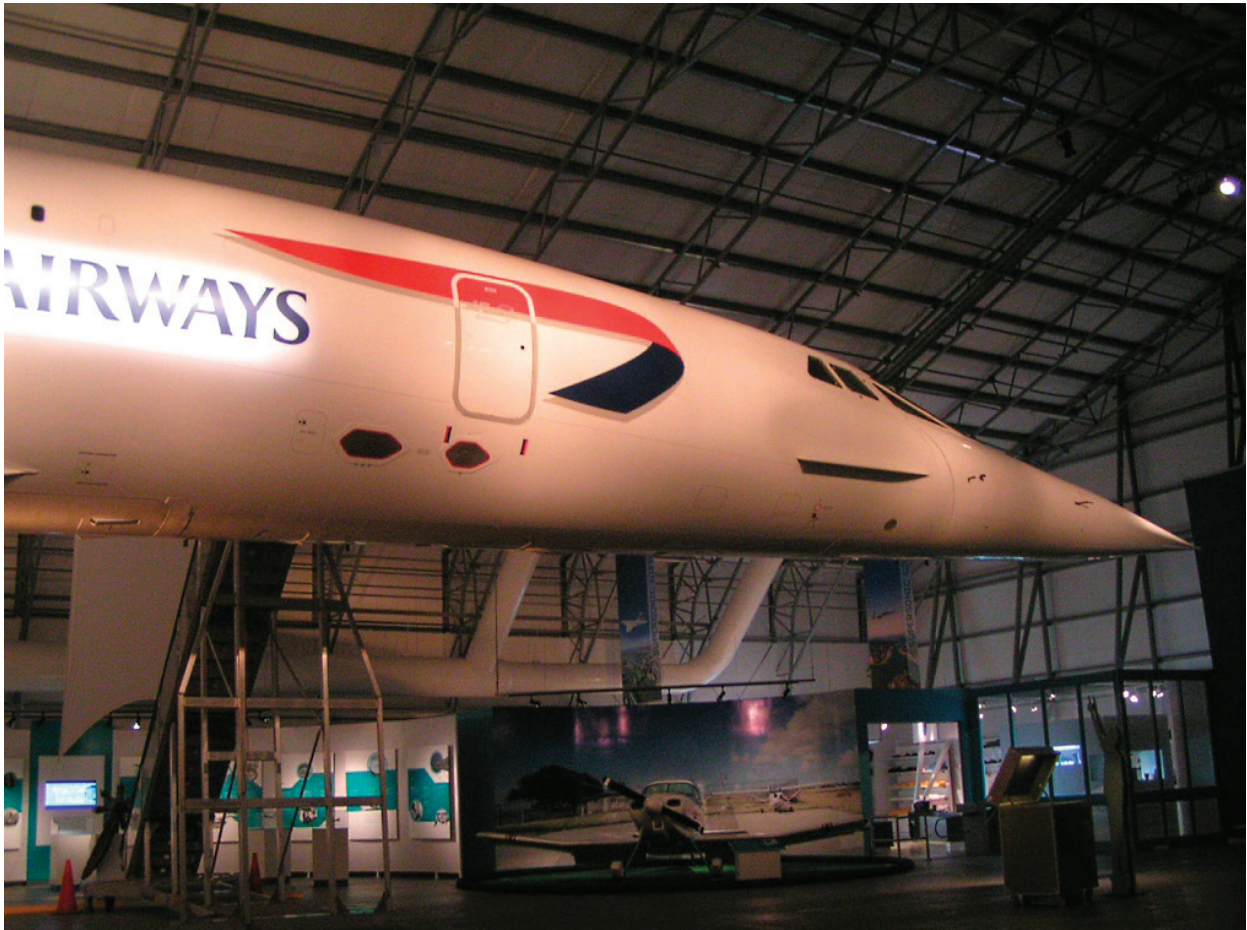
The Barbados Concorde Experience at Grantley Adams airport on Barbados closed on 1 July “until further notice”. This is a shame since Concorde G-BOAE seemed to be popular with local schoolchildren as

well as tourists, and the venue has also been used for events such as the recent viewing party for the UEFA Champions League.

I have contacted the team in Barbados and they say the facility

is still closed. They have not heard when the exhibition will re-open, but will share any new information on their Facebook page:

<https://www.facebook.com/BarbadosConcorde/>



Local attraction

Concorde G-BOAE (Alpha Echo) on display at the Barbados Concorde Experience exhibition. Although popular with both tourists and locals, the exhibition is currently closed; it is hoped that the facility will re-open soon.

Photo: Simon Boddy / Wikimedia Commons