

HISTORY OF THE BRITISH CIVIL AIRCRAFT INDUSTRY 1945 to 1969

PREAMBLE

This review of the aircraft industry concentrates on airframe and engine manufacturers of larger civil airliners between 1945 and 1969. The military side of the industry and the role of the airlines are also mentioned, where appropriate. To provide a context and background, I have also summarised developments in the industry before 1945.

I have discussed a number of individual aircraft in detail in order to highlight the issues and problems that affected their development and ultimate success and the overall fortunes of the industry.

BEGINNINGS

There are other claimants, but it is generally agreed that the first powered flight was achieved on December 17, 1903 by Wilbur and Orville Wright at Kitty Hawk, North Carolina.

The first powered flight in Britain was made in October 1908 by Samuel Cody in a machine very much like the Wright flyer.

From the start, there was a strong emphasis on the aircraft as a potential instrument of war.

Some names were emerging from the universities – C S Rolls from Cambridge and A V Roe from King's College, London. Geoffrey deHavilland had designed his own plane and sold it to the War Office for £400.

Between 1908 and 1914 many private firms were set up to design and develop aircraft. It was a totally new technology that caught the imagination of dozens of enthusiasts who wanted to build planes. Sopwith, Handley Page,

Blackburn (there really was a Mr Blackburn), A V Roe. Many established by young engineers and aviators. Many firms diversified into aircraft production –

armourers (Vickers, Armstrong Whitworth, Coventry Ordnance), boat builders (Saunders and J S White), tramway companies (Sir George White and Bristol), newspaper owners (George Holt Thomas, owner of Daily Graphic, created the Aircraft Manufacturing Co in 1912), furniture makers (Boulton and Paul), architectural decorators (Martyn of Gloucestershire, later to become Gloster Aircraft). Fairey and Westland also came into the industry. Motor car firms were making engines and airframes – Austin, Daimler, Napier, Siddeley, Sunbeam, Bentley. All could clearly see a big opportunity in a market that, at the time, was almost entirely a military and naval one.

There was a proliferation of companies in the early days and many of these survived into the 1960s. Only have to go to Coventry Transport Museum to see that the motor cycle and auto industries also had vast numbers of small manufacturers in the pioneering days.

War provided a test bed for the accelerated development of the industry.

The Royal Aeronautical Society was formed in 1918.

BETWEEN the WARS

Post WW1, apathetic attitude of Government which at first did not regard air transport as a post-war priority.

So where was the market now that war was over?

General presumption that the civil industry was a matter for private sector. Inevitably, some firms did collapse; others were forced to make car bodies or milk churns. By mid 20s, shakeout of companies was complete and no major firm left aircraft or engine production between mid 20s and 50s. Small and medium firms continued to dominate the industry. The industry between wars was largely kept alive by military orders

In August 1919 flights started between Hounslow and Le Bourget. Only 5 tiny airlines. German and French aircraft and airline industries better developed – support and subsidies from local and central govt. National pride and prestige a key factor. Britain failed to grasp the real need and potential of civil air transport.

In 1920 Croydon established as air terminal. London to Paris. British airlines – AT and T, Handley Page and Instone – could not get subsidy. All stopped

flying by Feb 21 and Croydon was left to the foreign airlines. In 1921 Churchill established the Cross Channel Committee and somehow found some money to support airlines.

By 1923 c1000 passengers/year London to Paris, most of them on British planes.

In 1924 several small airlines merged (with promise of subsidy) to form **Imperial Airways**. Clue in the name – linking the empire by air was to dominate civil air policy for 30 years – Africa, Middle East, India, Far East, Australia. Inherited a motley collection of 15 planes. Flew as far as Berlin and Zurich. Not held in high esteem initially. Accused of having Heath Robinson planes – “laughing stock of the world” according to one Tory MP.

1930 By now Bristol Co was supplying engines to half the world’s airforces and airlines. RollsRoyce and Napier only other significant engine manufacturers.

England relied on biplanes longer than other nations. The first British monoplane airliner, the Armstrong Whitworth Atalanta, built at Coventry, was not introduced until 1932. English aero engineering between the wars was seen to be behind that of other countries, though the industry was probably at least as large as any other into the early 30s. In early 30s, Sabena was the only European airline using British planes. Imperial focussed on Africa and India routes for which slow but comfortable aircraft were preferred. This did not appeal to other operators.

The 20s and 30s was the golden age of the flying boat, with Short being the main British manufacturer

British Airways was formed in 1935. Mainly internal UK routes plus Belgium and France. Later extended to northern Scandinavia and Berlin.

According to Barnett “the British aircraft industry remained a cottage industry with obsolescent products; sleepy firms with facilities little more than experimental workshops.”

In 1938 Fairey and Short started design work on 4-engined metal airliners, both financed by Air Ministry. Both cancelled because of war.

Imperial and British Airways nationalised to form **BOAC** in 1939.

Main achievement of air transport between wars was establishment of great air trunk routes and US transcontinental services. Imperial's main task was development of services linking UK with overseas territories.

Before and during the war, Frank Whittle was working on the development of the jet engine. Meteor (1944) and Vampire(1946) introduced.

Meanwhile...in America, the industry was generously subsidised by the US government and PanAm ploughed money into aircraft manufacture. Wide network of routes, technically ahead, pioneering radio navigation for flights over the sea. USA was the world leader in commercial aviation. As a flag carrier Pan Am had no equal. The success of the American industry threw into sharp focus the demands that the British industry was to face after the war.

POST WORLD WAR II

The development and production of civil aircraft had been suspended in 1939.

In 1945 the aircraft industry was Britain's largest and most productive with 22 companies building airframes and nine manufacturing engines. The war had generated a rapid acceleration in navigation, radar and communications, and the country was the world's leading pioneer of jet aircraft. In terms of combat aircraft, it was a golden age with design geniuses dreaming up and building exciting new planes. However, whilst decentralisation and fragmentation had minimised the effects of wartime bombing on aircraft factories, the sprawling multiplicity of companies was to be a drain on the development of the industry in peacetime.

Not surprisingly, the military side accounted for most of the industry. The civil side needed reawakening after the war.

BRABAZON COMMITTEE

Recognising the importance of planning for peace, the Brabazon Committee was established in 1942. It was set up by the Government (specifically Winston Churchill) to investigate and recommend the global needs of the Empire and Commonwealth in the area of air transport for passengers, cargo and mail. Proposals for several aircraft emerged from the committee.

*Type 1 Large transatlantic airliner **Bristol Brabazon***

*Type 2A Short-haul feeder liner to replace DC3. **Airspeed Ambassador***

*Type 2B Turboprop **Vickers Viscount***

*Type 3 Large, 4 engine medium range airliner for Empire routes. Eventually **Bristol Britannia**, which served both medium and long range routes.*

*Type 4 Jet, 100 seat **deHavilland Comet***

*Type 5A 14 passenger feederliner **Miles/HP Marathon***

*Type 5B 8 seater short-haul feederliner to replace deHavilland Dragon Rapide **deHavilland Dove/Heron***

Noble aims....it was just a question of implementing it all. There were those who said civil aircraft manufacturing should have been abandoned to the USA – we were already too far behind. Whilst the industry had successfully produced combat aircraft, it was simply not geared up to design and manufacture civil aircraft. Manufacturing techniques were outdated, there was a reluctance to reorganise, factories were antiquated...Nevertheless, all of the planned Brabazon projects went ahead, albeit with varying degrees of success and often with considerable deviation from the original design concept.

1940s AIRCRAFT

In spite of technical advances made through military demands during the war, civil air transport immediately after the war was at first austere and primitive. There was a shortage of aircraft - and the money to buy them. The nationalised BOAC, BEA and BSAA (British South American Airways was soon merged with BOAC) relied very much on converted bombers and transport aircraft (Lancastrian, Halifax, York) plus some pre-war models

(Short flying boats, deHavilland Dragon Rapide and DC3 Dakota). Two “new” flying boats (again, adapted from other models), the Sandringham and the Solent, were also introduced after the war and were used by BOAC on Empire routes.

Development on two new aircraft had started towards the end of the war – the **Avro Tudor 1 and 2** and the **Vickers Viking**

The **Tudor** was aimed ambitiously at the North Atlantic market. It was a failure with serious design and safety problems, outdated tail-wheel landing gear, delays, inability to meet long-range requirements and the small matter of two aircraft disappearing over the Atlantic and one crashing in South Wales (with 80+ fatalities).

The Vickers **Viking** was the first successful post –war commercial aircraft. It was based partly on the Wellington bomber and became a workhorse for BEA on short-range European routes.

LONG RANGE AIRCRAFT

The USA was very much in the lead in terms of long-range aircraft. Lockheed Constellations and Boeing Stratocruisers, both introduced in 1947, dominated the medium and long-haul routes (the DC6 followed in 1951). All of these seemed to be so much more exciting and advanced than any British planes. By the early 1950s, there was an increasing demand for fast transcontinental and transatlantic aircraft. Lockheed stretched the Constellation to become the Super Constellation and Douglas produced the DC7 and DC7C. These were just about the last of the long-range piston aircraft. They had been stretched to their limit. But over a few years:

- Speed had risen from c160 to c 300mph
- Range increased to enable transcontinental and transocean flights
- Comfort increased by higher cruising levels made possible by pressurisation
- Reliability and regularity improved by radar and navigational aids
- Fares reduced
- Safety improved

Two Failed Attempts

Meanwhile, in the UK design work started in the 1940s on two long-range aircraft for the 1950s - Bristol Brabazon and Saunders Roe Princess flying boat.

Type 1 - Bristol Brabazon

The Brabazon was the large transatlantic airliner proposed by the Brabazon Committee. It was a cornerstone of Attlee's postwar plans for industrial recovery and was intended to lead the effort to recreate a UK civil aerospace industry. Pathe News boldly announced that "the Brabazon will lead the world as Queen of the Skies." As we have seen, the UK was way behind the US in pressurised, piston-engined planes. The aim was to produce a large aircraft capable of London-NY non-stop. Ministry of Supply supervised the project and Bristol was given the job, in part as they had experience of designing a long-range bomber – regrettably abandoned. The plane was built at Filton in Bristol and required a runway extension and demolition of part of a village. One prototype was built. It had eight Centaurus engines, but was grossly underpowered. It first flew in September 1949 and flew a total of 400 hours over four years. It was massive for its time – wingspan 230ft, length 177ft, height 50ft, 94 passengers (A380 Airbus 262ft, 239ft, 79ft, 500+). So big that, on landing, the wingtips almost touched the ground. The project was cancelled in 1953, by which time Bristol was well into Britannia development, an enterprise that held more commercial promise. Brabazon was a white elephant, the victim of a complete absence of market research (like many other projects) and inadequate engines (again, like many other projects). A gas turbine engine version was planned but never materialised. A wheel, displayed at the Bristol Aerospace Museum, is just about all that remains of the aircraft. The project was deeply flawed but, some argue, helped to found a post-war British aircraft industry and provided valuable experience for Britannia and Concorde.

Saunders Roe Princess

A second transatlantic airliner was planned. This was the Saunders Roe Princess flying boat. Largest all metal flying boat ever, powered by 10 Bristol Proteus turbo engines and accommodating 105 passengers on two decks in great comfort. It was designed to resurrect the 20s and 30s golden age of commercial flying boats but the requirement had largely disappeared.

Nevertheless, the Government insisted on pressing ahead with three prototypes, to be built at Cowes. There were many test flights between 1952 and 1954, with two appearances at Farnborough. It was hoped BOAC would buy, but the airline decided to concentrate on land-planes like Comet. Massive overspend. By now the world's airlines had rejected seaplanes in favour of landplanes as the standard for future high density routes. The project was abandoned – beaten by engine problems and a belated realisation that there was no market for the plane. The project had cost £11M

(c400M) and, like the Brabazon, was probably motivated more by politics than commercial considerations.

The Brabazon and Princess were only two of several failed projects. One cynic observed that “much of the history of post war aircraft industry is the history of R and D programmes rather than the history of the production of aircraft” and that civil aircraft development was often “a technical leapfrog into a commercial abyss.”

With the cancellation of Brabazon and Princess in the early 1950s, there were no immediate British replacements or competitors in the fleet for the American planes. However, three were at the design stage – deHavilland Comet, Vickers V1000, Bristol Britannia. All were due to come into service in mid/late 50s – and all had their problems.

Three 1950s Projects

Type 4 Jet - DeHavilland Comet

The Comet, along with the medium-range Viscount, was seen as the basis for a self-sustaining, export rich civil sector.

The Brabazon Committee proposed the construction of a civil airliner powered entirely by jet engines. In the jet engine, Britain seemingly had an

ace up the sleeve. It could and should have given us a major advantage, especially as the USA were so successful with their long-range prop airliners that they had little incentive to invest heavily in a new disruptive technology. By 1945, Britain was the leading pioneer of jet aircraft and potentially was in a strong position to develop an aircraft for the North Atlantic route. In December 1945, BOAC placed a definite order for ten aircraft with deHavilland who, with the Vampire, already had experience in developing jet aircraft. The maiden flight was in 1949 and the Comet entered regular service on 2nd May 1952. Here was the opportunity to make up for other failed projects and break the US domination of long haul routes. The Americans themselves thought they would require six years to catch up. The Comet was faster, quieter and smoother than Constellations and Stratocruisers.

However, disappointment and tragedy were not long in coming. There were accidents in Oct 52, March 53, May 53 and in early 54 two aircraft disappeared at sea off Italy. The plane was withdrawn from service. The

disasters led to the biggest air-accident investigation ever and, arguably, to a down turning point in British civil aviation. The cause was eventually identified as metal fatigue in the corner of the windows.

The Cabinet authorised £10M to help deHavilland develop a new Comet. This was done in isolation as the Air Ministry had refused to allow its designers to work in the private sector. With redesigned rounded windows and a strengthened airframe, the plane resumed service as Comet IV with BOAC in 1958. Unfortunately, the technological lead was lost. The Boeing 707 had appeared – and it was bigger, faster, cheaper to operate and safer as the engines were in pods rather than buried in the wings. The inaugural PanAm 707 NY-London flight took place in Oct 1958.

Type 3 – Large medium range for Empire routes - Bristol Britannia

Five firms tendered for the Britannia contract and it was Bristol that was successful. The development programme started in 1947 and went ahead with close cooperation from BOAC. The maiden flight was in August 1952 but there were landing gear and the usual engine problems. Also, BOAC constantly changed its mind about the size of plane it wanted and repeatedly postponed acceptance until the American big jets were due to enter service. At the same time, Bristol was considered to have poor top management and Sir Peter Masefield had been brought in from BEA in 1956 to make the

Britannia competitive with the 707 and DC8 that were in development. These factors meant that it was not put into service by BOAC (on the S Africa route) until February 1957. A Long range version was used on the transatlantic route from December 1957 – 10 years after the first sketches. BOAC was expected to fly British but, by this time, probably wished it could buy American. The development of the plane almost made Bristol bankrupt. The aircraft only ever found a limited foreign market and no US airline ever bought the plane – TWA and Eastern were interested but Bristol could not meet orders by the required date. It did have the distinction of being the first aircraft to carry 100 passengers non-stop both ways across the Atlantic but, like Comet IV, was soon superseded by US jets – Boeing 707 in October 1958 and Douglas DC8 in September 1959.

A note on numbers - Outside Soviet Union and China, world air passengers had increased from 21M in 1947 to 88M in 1958 (note that Heathrow passengers/year now greater than 80M) and aircraft were carrying more transatlantic passengers than did ships.

Vickers V1000/VC7

The Vickers V1000 was a development of the Valiant V bomber. It was conceived as a transport aircraft for the RAF with scope for development as the first ever jet engined 100 passenger, six-abreast civil airliner for North Atlantic and Empire routes (re-designated VC7). It was bigger than the Comet but it was much heavier than anticipated and there were problems with the RR Conway engines (not unusual). Vickers had limited resources and chose to concentrate them on Viscount and Valiant. BOAC decided they had no requirement for it and RAF budget cuts meant that they also lost interest. Both the military and BOAC chose to use Britannias in the short-term and BOAC had put their faith in the re-developed and enlarged Comet.

The project turned out to be another glorious failure and was cancelled in November 1955. The unfinished prototype was quickly broken up and all jigs were destroyed. The decision was announced in the Commons by Reginald Maudling (was he really around that long ago?) the Minister of Supply. The Ministry of Supply blamed the Air Ministry who blamed the Treasury who blamed Vickers who blamed BOAC..... Maudling claimed (disingenuously?) that the lack of a British-designed long-range jet “would not seriously damage the British civil aircraft industry.” George Edwards (MD of Vickers and later BAC and who had helped to design the plane) called it the “most serious cancellation that had taken place in a whole series of cancellations.” Derek Wood, a leading aircraft journalist said it was “the point at which British airline development really began to go wrong and there has never been a full recovery.” BUT BOAC were soon asking for government permission to buy an American plane for the North Atlantic route and ordered 15 707s in October 1956. Strangely, the 707s were to be powered by uprated Conway engines – the very engines BOAC had previously said could not be uprated.

Vickers VC10 – The last all-British long-range airliner

Hopes for the next generation depended on the VC10, Vanguard and Trident.

As a condition of being permitted to buy 707s, the Government required BOAC to look at a British plane for its Eastern or Empire routes. Ideally, this was to be undertaken as a private venture to conform to government policy aimed at reducing public support for civil aircraft development. The project was accepted by Vickers on these terms who said they could produce a suitable aircraft for £1.75 M (£43M). In Jan 1958 BOAC announced an order for VC10 of £68M - at the time the most expensive order for a British airliner.

Vickers made it clear that this was the minimum order needed to launch the plane as a private venture. It was designed with a rear engine configuration, suitable for “hot and high” shorter airfields. Vickers knew that the BOAC order alone would make a loss. Therefore, they were expected to make it up through exports – a total of 80 VC10s were needed to break even. BUT by 1959, the VC10 project was in trouble with Vickers close to ruin.

Vickers told BOAC that the costs of developing VC10 had escalated and BOAC would have to cover the difference. Vickers suggested that matters would be improved if BOAC changed its order to a stretched VC10 to compete with US jets on N Atlantic. But BOAC did not want to take on an even heavier burden. Others argue that it was BOAC who kept changing mind about the specification and number of aircraft, just as they had done in the case of the Britannia.

Vickers had grossly under-estimated the costs of developing the VC10. The Government realised that they had to help if the aircraft industry was to survive – but rationalisation was the price. Duncan Sandys admitted that

“VC10 was hardly a promising civil project” and that government support was essential to prevent Vickers going out of the civil business.

Restructuring BOAC/VC10 Order

BOAC was under strong pressure to reshape the VC10 contract. The airline agreed to take 35 Super VC10s and 12 standard aircraft. To help convince BOAC, Sandys suggested that they would lose £6M on lost progress payments if Vickers went bankrupt. BOAC had concerns about VC10 operating costs against 707 and DC8. We see here the vague and ambiguous “Buy British” policy in operation. BOAC commercial interests were not necessarily in line with government policy.

The VC10 put an extra burden on BOAC’s parlous financial position. Julian Amery (Minister of Aviation) rejected any cuts to the VC10 order (as demanded by the Treasury), indicative of the differences within government on the aircraft industry. In 1963 the BOAC deficit topped £80M (£1.5B). Some losses could be attributed to bad luck (Comet and Britannia delays) but the Government thought it was essentially down to bad management and sacked the top management team. Sir Giles Guthrie was appointed to put BOAC back on its feet. Like his predecessors, he felt constrained by the “buy British” policy that required BOAC to buy uneconomical British planes and he believed that BOAC had ordered 23 too many VC10s and wanted to cancel them and order seven more 707s. Some said that BOAC had orchestrated a

campaign against the VC10. Eventually, the Government directed that BOAC should take 17 Super VC10s over and above the 12 Standard VC10s already delivered or on order. BOAC also obtained capital reconstruction and Vickers received retrospective launch aid.

In the event the VC10 proved to be very popular with passengers and pilots and turned out to be cheaper to fly than the 707. It also gave many years of good service as a tanker/transport for the RAF. But between 1964 and 1970, when the production line was closed, only 54 airframes were built (cf 1010 707s and 556 DC8s.)

The “Buy British” policy was relaxed after 1963 – and BOAC/British Airways did not purchase any more British planes until 1999.

1957 SANDYS DEFENCE WHITE PAPER – PUSH FOR RATIONALISATION

Defence Minister Duncan Sandys published the Defence White Paper in April 1957. As a cost-saving device, it advocated wide-scale culling of military programmes and the replacement of manned aircraft with missiles. Several projects were cancelled. Some saw it as a “gross strategic blunder.” It was eventually partially reversed but, in the meantime, much damage was done to the industry and to morale.

Employment was set to fall from 268000 in 1957 to 60000 in 1964, unless there was a major shift to civil production. To achieve this, an export-led civil business was essential. UK had only 14% of the world civil market.

The Paper also pushed the case for rationalisation in the industry. There had been one or two mergers in the early 50s and the top six firms accounted for more than 80% of output. Hitherto, the government had assisted in the development of new aircraft through total or shared development costs and civil development had always required a massive commitment of public money. In 1958 the government’s annual spend on all aeronautical basic research was £368M, though this was offset in part by levies on civil programmes. In future the Government would only sign contracts with large groups of manufacturers and not with individual companies, a policy that extended to the civil business. Sandys saw room for only two aircraft manufacturers – and these larger, stronger firms should create a self-sustaining, export-led civil sector by financing their own civil development programmes and designing aircraft to specifications established by their

principal customers, BEA and BOAC. (On this basis the Trident was to be designed for BEA and the VC 10 for BOAC). Tighter financial control was imposed in an effort to encourage mergers.

The Government would continue to support RandD for special projects like SST (Concorde) and a proposed large helicopter (Fairey Rotodyne).

There was indeed a flurry of mergers and acquisitions and by 1960 the industry had reduced to two major airframe groups. BAC was formed from Vickers and English Electric (plus Bristol and Hunting) and Hawker Siddeley Aviation was created from Hawker Siddeley, Folland, deHavilland and Blackburn. Future projects could apply for launch aid.

There remained a small number of specialist firms (Shorts, Westland, Scottish Aviation, Handley Page). Sir Frederick Handley Page was particularly reluctant to lose independence and thought small firms were more creative. The company went bankrupt in 1970.

There were some fairly clear arguments for rationalisation in an industry that had become more complex, competitive and hungry for money:

- Financial risks associated with major projects
- Big scale production needed to spread costs and achieve economies of scale
- R&D essential in high tech industry- small companies unable to finance
- Limited domestic market
- Intense competition from USA (5x market) where longer production runs enabled companies to benefit from non-recurring R&D costs. Also being affected by reawakened European competition e.g. SudAviation Caravelle v Vanguard
- Larger firms may find it easier to commercialise an invention
- Duplication, poor market research and customer support

MEDIUM/SHORT HAUL AIRCRAFT

The Brabazon Committee had called for three short/medium haul aircraft. One of these, the Britannia, eventually was used more for long-haul and is discussed above. The other two – Type 2A and Type 2B – finally emerged as the Airspeed Ambassador and the Vickers Viscount

Type 2A Replacement for DC3.

Airspeed Ambassador/Elizabethan

The versatile and ubiquitous Douglas DC3/C47/Dakota had been in service successfully since the 1930s in civil, military and transport roles. The Brabazon Committee specified a British-built medium/short haul plane as a replacement for the DC3.

The Ambassador first flew for BEA in 1952. It was not a great success as equivalent turboprop planes were becoming available and only about 20 Ambassadors were built, used mainly by British airlines. It was an Ambassador that crashed at Munich in February 1958.

A number of other aircraft were introduced later as "**replacements for the DC3**"

Handley Page Herald

The Herald was a short-range regional turboprop with high-mounted wing. It was bought by BEA, Air UK, Jersey Airlines and several smaller operators. A late decision to use turboprop engines delayed its introduction and, by the time it first flew commercially in 1959, the Fokker Friendship had secured much of its potential market and only 48 were built. There was also competition from the far more successful Avro/BAe 748. Handley Page, founded in 1909, had remained independent, resisting all government attempts to merge it into BAC or Hawker Siddeley. As mentioned above, the company collapsed in 1970.

Avro 748

Avro traditionally had manufactured military aircraft but, with the publication of the Sandys Defence White Paper, decided in 1958 to venture once again into the civil market – whilst hoping for rather more success than it had had with the ill-fated Tudor.

It was a wise decision, as the Avro 748 turned out to be one of the most successful British aircraft. It was a two engine turboprop for up to 50 passengers. In the DC3 tradition, it was robust and was also capable of short take-off and landing. It first went into service with Aerolineas Argentinas in April 1962 and was bought by civil and military operators around the world. About 380 were built over a period of nearly 25 years

Type 2B - Turboprop.

Vickers Viscount – a major success

The Viscount was the world's first turbo-prop passenger aircraft. It used hot gas inside the engine to drive propellers, giving greater power and speed than a piston engine, but much better fuel economy than contemporary turbojets. Its first commercial flight with BEA was in April 1953. It challenged US planes as it was faster, smoother, quieter and more economical than all comparable US aircraft. It ran on kerosene which was safer than aviation fuel. BEA was closely involved in the original design and it became a mainstay of their fleet. At the end of the 1950s the Viscount accounted for more than a third of the entire air transport of Europe and had made major inroads into the American market. It had been the practice to allow BEA to specify their requirements for new aircraft without regard to the requirements of prospective foreign customers. As a result aircraft had struggled to find a market outside the UK. However, the Viscount was a very successful plane with a wide range of international customers. Vickers were prepared to make many modifications to the original model to meet the needs of individual airlines. With one fell swoop amongst western nations it enhanced the reputation of the British aero industry. It was Britain's most successful aircraft, with over 440 being built. (It was hoped that Britannia would be similarly successful for BOAC.)

Several aircraft were built as “**replacements for the Viscount.**”

Vickers Vanguard

This was a short/mid-range airliner introduced in 1959 and designed as a replacement for the Viscount. It arrived just before the advent of the large jets and never found a market. It was purchased only by BEA and TCA (Canada) and only 44 were built. It was relegated to transporting cargo.

BAC 1-11

A short-haul airliner, intended to replace Viscount on short routes. Similar rear mounted engine design to Caravelle. It entered service in April 1965 and sold rather better (230) than Trident as an effort was made to give it greater universal appeal and not be dictated by demands of British airlines. There were several American operators (Braniff, Mohawk, American...) and about 60 other operators across the world. Compared with many other British aircraft, it was a modest success.

De Havilland/Hawker Siddeley/BAC Trident

By the mid 1950s BEA was under pressure to introduce a medium-range jet, particularly for use on its Western European routes. They thought about buying the French Caravelle – but it was only a thought!

There was considerable infighting in government in regard to the relative merits of a Hawker/Bristol design and deHavilland. Harold Watkinson, Transport Minister, said the decision should be BEA's and they preferred deHavilland. BAC received retrospective launch aid for the Trident. The aircraft first flew in Jan 1967. Three rear engines and T-tail. Engine development was part government funded. It was scaled down from the original specification as BEA believed that a bigger aircraft would not sell. In the process, its wider attractiveness was reduced and limited export business meant that it was not a commercial success. It first flew with BEA in April 1968. Only 117 were built. This was minuscule when compared with the US equivalent but bigger Boeing 727 that was introduced shortly before the Trident. It appealed to a far wider market, sold 1831 and is still flying.

A local curiosity - Armstrong Whitworth Apollo

This plane is of interest because it was built at Baginton. It was a 4-engine turbo-prop ordered by the Ministry of Supply as a would-be competitor for the Viscount. Only two were built. The prototype flew in April 1949 but, as was the case with so many ventures, there were engine problems and the project was abandoned in June 1952

AN EARLY HYBRID – THE FAIREY ROTODYNE

The Rotodyne was a large winged helicopter designed for inter-city routes. It had a 4-bladed rotor with engines on wings to provide forward propulsion. It was seen as an exceptional advanced project and as such attracted drip-feed government funding. First flight November 1957. There was interest from airlines in America, Canada and Japan and also from the US military. But there were complex design problems and noise proved to be an insurmountable issue. A military version was abandoned on cost grounds. BEA was not prepared to continue with the project as possibly the sole customer and Westland, now running the project, decided to withdraw. Project cancelled in February 1962.

1964 WILSON GOVERNMENT

The 1964 Wilson Government was committed to cutting defence spending and slimming down the aircraft industry, civil and combat. The Ministry of Aviation was merged into the Ministry of Technology. It argued that spending on aviation was far more than the nation could afford: the industry was using 25% of UK RandD budget. Three major projects were cancelled – TSR2, HS681 and P1154. The Plowden Enquiry was set up to review the industry.

1965 PLOWDEN ENQUIRY

The Plowden Enquiry into the industry reported in 1965. It asked some fundamental questions like, “Why should Britain have an aircraft industry at all?” After all, it argued, defence requirements could be bought abroad, employees could be easily redeployed and “lost” technology could be transferred to other industries. The report meant that firms could not start another major project and expect any greater subsidy or protection than other industry sectors. Plowden said, “There is little prospect for substantially increased sales for the British industry standing on its own.” The volume of production was not capable of supporting the high initial costs of developing and producing aircraft and government finance was always likely to be needed to launch new projects. More collaboration was required (over and above the rationalisation that had already occurred) even if it meant looking abroad for partners. This had already started with the SST(Concorde) project.

1969 ELSTUB REPORT

The **Elstub Report** (Oct 1969) was a spin-off from Plowden. (Elstub was MD of IMI). It compared UK productivity with that of USA, Sweden and France. In terms of value added Britain fell 32% below EC average. Despite rationalisation and mergers the UK aircraft industry had failed to benefit from economies of scale. US projects were long-term e.g. 737 and 747. Elstub argued that the most important step in raising productivity is to make each type of aircraft in much greater quantities. Critically, the ratio of Rand D to total production costs had to be reduced. Once again, international partnership was seen to be the only way forward.

SST

In April 1969 the first UK built Concorde flew for the first time. It had taken 10 years to reach this point since it was in 1959 that preliminary work had established the basic outline for a Mach 2.2 airliner and all concerned felt this was the obvious direction for air travel and a chance for the UK to regain its position in the civil market. But international collaboration was essential and the partner turned out to be France. Final agreement was signed in November 1962. That's a separate story.

AIRBUS

In September 1967 the British, French and West German governments signed a Memorandum of Understanding to develop a 300 seat Airbus. BAe officially joined Airbus in 1979. This, too, is another story.

LAST OF THE BREED

VC10, Trident and HS146 (1983) were the last medium and long-range airliners to be built independently in Britain.

WHY THE DEMISE? WAS IT AVOIDABLE?

Many bemoaned the fact that by the 1960s the designers, pilots and the legendary companies they worked for were gone and that Sandys, the Wilson Government, Plowden, Elstub...had all contributed to the destruction of the industry. Others said that this was simply a nostalgic, sentimental harkening back to the romantic old days and that the industry had inherent problems that inevitably meant it could not survive in its old form. There were plenty of possible reasons:

1. The **plethora of companies** diluted talent and RandD. Small companies were too weak to carry unaided the great costs and risks in the development of new aircraft.
2. Too much **dabbling** in numerous military and civil projects, without technicians and engineers to support those projects. Many turned out to be expensive failures, as evidenced by the Bristol Brabazon, Saunders Roe Princess, Vickers V1000/VC7, Fairey Rotodyne, Armstrong Whitworth Apollo.

3. **Duplication**, with several firms being asked to tender for same operational requirements – tied up manpower and financial resources. Work was often deliberately spread over several firms to keep them in work and prevent firms over-expanding e.g. the Canberra was built by EE, Avro, Handley Page and Shorts. The allocation of government work to all and sundry had kept some companies going artificially.
4. **Conservative attitudes** of founders and aero executives – proud, old fashioned, traditional, strong personalities, reluctant to relinquish control. As a result the industry was slow-moving and took too long to develop aircraft. Hamilton-Paterson "for two decades Britain maintained a vigorous, if grossly mismanaged, output of aircraft" that "crossed our skies in gloriously uneconomic profusion."
5. **Government vacillation** - in deciding if Britain should build civil aircraft at all, degree of financial support, contradictory policies, cancellation of projects, "Buy British" expectation.
6. **Small home market** and the illusion that the UK market alone could sustain increasingly complex and expensive aircraft programmes. There was often a resulting failure to research or understand the requirements and potential of the international market.
7. Massive **competition from USA** with a big home market and a lead in transatlantic routes.
8. There was a "**Buy British**" **expectation** on airlines. In return, BOAC and BEA pushed to specify their requirements, and hence restrict export potential. Airlines' statutory duty to act in a commercial manner was compromised by appeals from the aircraft industry to do the "patriotic thing" – between rock and hard place. Buy British policy disappeared with creation of British Airways.
9. **Union practices** – full shift of overtime for working beyond end of shift.
10. **Sandys Defence White Paper** sounded the death knell for the aircraft industry, military and civil.

SOURCES

Empire of the Clouds – James Hamilton-Paterson
Government and British Civil Aerospace 1945-1964 – Prof Keith Hayward
England and the Aeroplane – David Edgerton
Reaching for the Skies- Ivan Rendall
Aviation, The Story of Flight- Bill Gunston
The World's Worst Aircraft – Bill Yenne

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