Government and British Civil Aerospace 1945-64

Professor Keith Hayward

Preface

This paper is something of a trip down an academic memory lane. My first book, published in the early 1980s, carried a similar title, albeit with a longer time span. While it had the irreplaceable benefit of some first hand memories of the period, the official record was closed. A later history of the UK aircraft industry did refer in part to such material dating from the 1940s, but access to the ‘secret’ historical material of the 1950s and beyond was still blocked by the then “Thirty Year” rule. By the time the restrictions were relaxed to a “Twenty Year” rule or even more by the liberality offered by “Freedom of Information” legislation, I had moved on to the more pressing demands of analysing the world aerospace industry for the SBAC. ¹ My years at the Royal Aeronautical Society afforded a bit more scope. Discovery of an archive on the formation of the British Aircraft Corporation, and published by the Royal Aeronautical Society’s Journal of Aeronautical History ², stimulated a hankering to open more musty files on the 1950s. This led to a series of articles published in the Aviation Historian.

However much this satisfied an initial hankering to look back to a critical period in UK aerospace, there were gaps to be filled in the narrative and the analysis. With the encouragement of the Editorial Board of the Journal of Aeronautical History, I have endeavoured to provide a more coherent overview of government policy towards the civil sector. Indeed this is an unequivocally ‘political-economic’ view: there are better and more authoritative studies of all of the aircraft mentioned in this paper. It is mostly a ‘Kew-centric’ approach, with the voice of politicians and officials dominating the record.

And what did I learn? Gratifyingly my 1980s big picture was still broadly accurate. But the difference was qualitative – to hear (or at least read) the full story. I did overestimate the Ministry of Supply’s readiness to abandon prototype funding in the early 1950s – and may have found the exact origins of ‘Launch Aid’ as a funding concept. To aviation enthusiasts, Kew also accentuates the role of villainous Treasury seeking to undermine legitimate technological ambitions: or alternatively, administrative heroes defending taxpayers against the wild ambitions of an industry out of control. As ever, the truth is a bit of both – so join me in a journey to when Sir Humphrey Appleby was just a junior civil servant in the Ministry of Supply.

¹ However, Keith Hayward, The British Aircraft Industry, Manchester 1989, p.42, was able to take advantage of government papers for the late 1940s. See also D. Hickey, ‘The Atlee Government and Civil Aircraft Production’, University of London PhD dissertation, 1988

1. Introduction

The greater part of this paper deals with the first post-1945 Conservative governments led successively by Churchill, Eden and MacMillan (and not to forget Home’s brief Premiership). There were many more Ministers of Supply, Aviation, Transport and Defence and several Chancellors. The officials overseeing the industry were more constant and many careers, such as Denis Havilland at the MoS/MoA covered the whole period. Materially, the paper will cover the years of the second generation of jet airliners - the V.1000, VC.10, and Trident, as well as the birth of the SST and a sideways look to the Rotodyne and civil helicopters. Where relevant, especially when the paper reaches the period of industrial rationalization, the military sector will impinge on the narrative. But to set everything in context, we must begin with the Labour Government of 1945-51 and the Brabazon Programme designed to recreate a UK civil aerospace industry.

2. The Brabazon Programme

Following the outbreak of war in 1939, the UK government decided to abandon development of transport aircraft (where the UK was somewhat behind the state-of-the-art) and rotary wing concepts (where the UK was an early innovator) to focus resources on combat aeroplanes. To meet wartime demand, the domestic industry expanded rapidly and mightily from some 128,000 employees in 1938 to 1.7 million at its wartime peak. Clearly, an industry of this size would be unsustainable at war’s end – the Ministry of Aircraft Production (MAP) estimated that it would shrink to around 250,000. As officials began to anticipate the post-war reconstruction, the expectation was that military demand would fall, but rebuilding UK civil aviation, as well as a likely world market, should provide the basis for a healthy recovery.

However, the decision to forgo work on transport aircraft and to depend on US products meant that the earlier pre-war ‘technology gap’ was even wider, with the UK behind the US in pressurised, compound piston engine aircraft such as the DC-6, Stratocruiser and Constellation that would come to dominate world airways from 1945. In the short term, the reborn nationalised carriers, BEA and BOAC, would have to rely on converted bombers or American models grudgingly authorised by a Treasury reluctant to spend scarce foreign currency. ³

The UK had one ‘ace’ – the jet engine, either as a pure jet or as a geared turbo prop, which offered a qualitative improvement in aircraft performance promising a massive leap in the range and payload of transport aircraft. Although the US would be quick to adopt the new technology for military aircraft, American civil manufacturers had little incentive to invest heavily in a disruptive technology. This was an opportunity for the UK to leap ahead of the market leader.

³ For details of MAP’s deliberations, see AVIA 15/1915 and 15/1916 covering September 1943-March 1944
By 1943, the government was already anticipating the end of hostilities and had asked Lord Brabazon of Tara to chair a committee to consider the post-war civil aviation requirements of Britain and the Commonwealth. In due time, his committee produced two reports outlining a programme of post-war civil airliner development. The final list of nine ‘Types’ was a mixture of conventional piston engined aircraft and jet and turbo prop designs. The eponymous Brabazon long range piston engined aircraft was already obsolete at its launch 4, others such as the Ambassador, were marginally successful. In the event, the post-war ‘jewels-in-the-crown’ proved to be the Vickers Viscount and the revolutionary de Havilland Comet. But on balance, the cost of the programme was not justified by the commercial returns from its various Types – the Viscount excepted. 5 In total, government support for all civil aircraft programmes between 1945 and 1951 amounted to £40.65 million (£1.46 billion in 2016) with return to the Exchequer from levies on sales of £12.35 million (£449 million) 6. And tragically, in the 1950s the Comet would experience a number of fatal crashes that destroyed its market lead. As we will consider below, the Comet failure would continue to resonate throughout the 1950s. But as I wrote in 1989, “Although deeply flawed in concept and implementation, the Brabazon programme was of inestimable value in founding a post-war British civil aircraft industry”.

3. The Conservative Government and civil aerospace

By the time the Conservatives returned to office in 1951 under Prime Minister Churchill, the Brabazon programme had effectively run its course. While kick-starting the UK civil sector, the experience had also exposed some of the fundamental weakness of post-war UK aerospace. Several companies were found to be lacking in terms of both capital and technical capability, exacerbated by the

4 The Brabazon Mk.II was turbo prop powered, with eight coupled Proteus engines. This was not completed.

5 The de Havilland Dove was also a very successful ‘Brabazon’ product. It must be noted that the emergence of both the Comet and Viscount as viable projects owed much to industrial initiative and close cooperation with BOAC and BEA respectively. Other late 1940s civil projects included the obsolete Princess flying boat and the rather more successful long-range turbo prop Britannia.

6 Figures in brackets are inflation discounted to 2016. Data from a table in Keith Hayward, Government and British Civil Aerospace, Manchester 1983, p.211
Labour government electing not to force rationalisation on a fragmented industry. Technical failures – particular the Avro Tudor – and delays in development had also undermined the rigid ‘buy British’ policy imposed on the nationalised airlines.

These problems were detailed in an unpublished 1948 report by Sir John Hanbury-Williams, which argued for a more commercial approach to airline procurement. If government still felt it appropriate to support civil programmes, this should follow not precede orders from a major airline. This approach was formalised in the Civil Aviation Acts of 1948 and 1949. This legislation would enable future governments to intervene in both national aeroplane development and procurement: the latter, however, requiring a formal directive from the Minister responsible for civil aviation if the airline were to be expected to divert from its commercial interests - for example to be denied access to American or other foreign airliners. Legally, therefore, the nationalized airlines BEA and BOAC were free to choose their own equipment, but there was a strong expectation they would usually ‘buy British’. However, ‘Buying British’ could be costly: in addition to progress payments, the airlines would also carry the costs of ‘proving’ airliners once in service, which could be very expensive, especially if the aircraft encountered problems that affected availability.

The incoming Government was ideologically inclined to dismantle Labour’s regime of controls and nationalisation as well as generally to retreat from intervention in the affairs of private industry. In the case of the aircraft industry, while Ministers were prepared to endorse the Korean War rearmament programme on the military side, they were not impressed by the returns from the Brabazon programme. They were, however, optimistic that the Viscount, Britannia and above all the Comet would provide the basis for a self-sustaining, export rich, civil sector. In some respects, this view was shared by industry; Vickers in particular was chaffing at the restrictions applied to the Viscount and the rate of return required by the original contract with the Ministry of Supply (MoS). Vickers was certainly happy to launch a bigger turbo prop aircraft, the Vanguard, as a private venture sustained by a launch order from BEA. This would become the pattern of civil aircraft development and policy for the 1950s. It did not, however, remove politics from subsequent UK civil aircraft development and procurement.

4. The V.1000/VC.7 programme

The Vickers V.1000 military transport and its civil derivative, the VC-7, was an early test of the new Conservative Government’s determination to end the practice of directly funded civil

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7 Hayward, op cit, pp.55-6
8 For a more detailed review of the “buy British” policy, see Keith Hayward, Government and British Civil Aerospace, Manchester 1983, pp.31-34
9 The Ministry of Supply had assumed responsibility for the aircraft industry with the dissolution of the MAP in 1945
10 The Vanguard was designed to a BEA requirement. TCA of Canada was also interested in buying the aircraft, but with several changes to the aircraft. Introduction into service was subsequently delayed by engine problems.
11 Hayward, op cit, pp.55-6
airliners. The new approach would rely on a combination of private investment on the part of industry and from a launch market provided by the nationalized airlines, BOAC and BEA. Even better if a military contract could cover some of the basic development costs.

A specification for a fast, long-range military transport to support overseas deployment of the V-Force was issued on 19th May 1951, with an in-service date of 1956. Ideally the aircraft should be based on an existing design and for “reasons of economy” it should be developed concurrently for commercial operations. Several companies came up with proposals, including Vickers, Handley Page and Avro, who offered versions of their respective V-bomber designs. De Havilland also proposed a larger version of the Comet. While there were questions about Vickers’s workload, which included the build-up of Viscount production, its Valiant-based proposal offered the best balance of commercial and military features. Vickers was also felt to have the best chance of meeting the summer/autumn 1954 first flight target.

As BOAC’s future equipment plans were in flux, BOAC remained involved in discussion as an ‘interested party’ but would only “go for it if it was both technically and commercially a guilt-edged proposition”. Nevertheless, both the Ministry of Supply and the Air Ministry were very keen to go ahead with the prototype solely on the basis of the military requirement. A prompt decision would also help Vickers, which, according to the Air Ministry was “rapidly running out of work in their Project Office” - a point raised by Sir George Edwards in a brief to the company’s Design Policy Committee. “It was most important that immediate provision be made for the further development of the Viscount and the early production of a civil derivative of the Valiant”. An initial specification was therefore issued in May 1952 using Rolls-Royce Avon engines. The Ministry formally requested £12 million (£292 million) to fund the first 12 aircraft.

In response, the Treasury preferred to wait final decisions on a wider defence policy that was pending before proceeding to full V.1000 production. In its view, it seemed “rather optimistic to suppose that the Air Ministry will ever be able to finance a worthwhile force of these

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12 For a detailed description and analysis of the official studies, see James Jackson, “The Genesis of the Vickers V.1000”, Air-Britain Aeromilitaria, March 2015, pp. 40-3. Shorts also proposed a civil development of the Sperrin bomber
13 Report of Ministry of Supply (civil) working party; November 1951, AVIA 65/306
14 Robin Higham, Speedbird. London 2014, p.134
15 Memorandum from Air Vice Marshall G.W Tuttle (Assistant Chief of the Air Staff) 19th June 1952, AIR 20/7734; Derek King, “The Vickers V.1000”, Aviation World, Autumn 2005, pp. 111-12
16 Figures in brackets are in 2015 money. “A history of the V.1000”, Air Ministry memorandum 16th July 1953, AIR 20/7734; Significantly, BOAC never at any time formally committed itself to the project, although it showed an interest throughout its development, See AIR 2/13080
extremely expensive machines”. The Treasury noted that the cost could imply cuts to other fighter, bombers and guided weapons programmes. It would also like to see further progress by the manufacturers “before placing an order which would mortgage so high a proportion of available resources in 1956-57 and presumably subsequent years”.  

In May 1954, the Air Ministry re-iterated its commitment to the V.1000. The need for a fast transport had not diminished; indeed an adequate long-range force offering short notice air mobility was even more important. The V.1000 was “the only aircraft in sight that would meet the strategic need for a transport aircraft to match the performance of the V-bombers”. However, in the face of economic stringency, the Ministry was prepared to cut its order to eight as a “rock bottom” initial requirement and six would be enough to get production going. Rather ominously, however, BOAC remained lukewarm. Although the airline would be “disappointed if the development were abandoned, it was really only a ‘valuable insurance’ from the Corporation’s point of view”. For its part Air Ministry stated that might find it hard to support V.1000 if there was no civil user, and might have to rely on Britannia for fast transport requirements “despite its relative strategic inferiority for the task”.

4.1 The Comet disaster and the de Havilland bailout

Early in 1954, a second fatal crash of a BOAC Comet 1 grounded the fleet pending an exhaustive investigation of the cause. The resulting ground-breaking RAE investigation revealed that metal fatigue had been the cause of the accident and the Comet was effectively out of the market, pending a remedial redesign of its fuselage. De Havilland was left with £15 million (£385 million) worth of unsalable aircraft, useless jigs and tools. The loss threatened one of Britain’s leading civil, and more immediately relevant, military manufacturers with bankruptcy. The Treasury was, however, prepared to see the company go under; but the government was not. In order to ‘safeguard the public interest in the Comet and other projects’, the Cabinet authorised what would eventually amount to a £10 million (£256 million) rescue package that included direct monetary assistance to ease cash-flow and orders for modified Comet 2s for the RAF. However, the price for De Havilland was a commercially fatal delay in developing a trans-Atlantic Comet 4 that would have beaten the American Boeing 707 and DC-8 into service by several years. The Comet disaster was a blow to UK industry generally, but combined with growing doubts about the future of the V.1000/VC.7, the UK civil sector was shortly to suffer a major and in retrospect a decisive blow.

17 Treasury letter to the Air Ministry; 31st July 1953, AIR 20/7734
18 Memorandum from Air Ministry to the Treasury, 1st May 1954, AIR 20/7734
19 Minutes of the Transport Aircraft Requirements Committee, 19th March 1954, AVIA 63/4
20 Although the Comet 4 would beat the Americans into trans-Atlantic service, the sales battle had already been lost. The Comet 4B would also provide BEA with an interim medium range pure jet airliner, see section 6.
4.2 Cancellation of the V.1000

By September 1954 the Ministry of Supply’s confidence in the V.1000 was shaken by persistent developmental problems. Its design weight was now out-growing the thrust available from available engines. This was almost entirely due to the need for an aircraft capable of flying civil routes across the Atlantic. In January 1955 discussions with Vickers led officials to doubt that there would be an easy solution and the in-service date had now slipped to early 1960. In June 1955, a full programme review revealed that the aircraft would still not meet its payload and take-off requirements.21

All was not well at Vickers either: Ministry inspectors felt Vickers’ design organization was “not what it used to be”.22 Priorities were assigned by the Chief Draughtsman and the designers of the various aircraft under development; this situation tended to result in a continuous state of conflict and argument. The absence of George Edwards, who had been promoted out of the design office, may not have helped, but “the organization never really worked with clockwork precision during his reign as Chief Designer, but his personality and perception were such that difficulties were surmounted relatively easily and adjustments made in time to prevent chaos or confusion”. Vickers also faced problems associated with building-up towards production of the Valiant and Viscount. Staff who had been allocated to the V.1000 were under pressure from work on the Viscount.23 It was evident that the March 1955 target for first flight would not be met unless urgent action taken. In short, the firm’s commercial success with the Viscount “has had an adverse effect on the military transport and the delay cannot now be retrieved”.24

By now BOAC’s lukewarm interest had disappeared entirely: the V.1000 lacked “sufficient economic advantage over types now on order, to justify the placing of a production contract.”25 With BOAC declaring that it had no interest in the V.1000, and in the absence of any other confirmed airline customer, the V.1000 was now a very expensive option for the RAF, beset by threats to other frontline programmes.26 As much of the strategic and tactical

21 “A history of the V.1000”, an Air Ministry memorandum, 15th August 1955, AIR 20/7734
23 A young Vickers apprentice in the late 1950s was told that “the design team on the V1000 was the second team; the first team was involved either with the Vanguard or with getting the Viscount into production.” E-mail to the author.
24 AVIA 65/306
25 Letter from Sir Miles Thomas, Chairman of BOAC to the Chairman of the Transport Aircraft Requirements Committee, 18th April 1955, AVIA 63/6. The airline was also under political pressure to stay with the Britannia, which was also encountering problems, in order to protect employment at Shorts, a major Britannia sub contractor.
26 The Canadian airline TCA expressed some interest and George Edwards claimed that Vickers were close to landing an order when cancellation was announced, but this was not enough to save the VC.7. Gardner, op cit, p.120
rationale for a dedicated fast long-range transport had also vanished, in July 1955 the Air Council decided on cancellation. 27

The Chancellor of the Exchequer, ‘Rab’ Butler, had no doubts that the correct decision had been reached. Writing to the Air Minister he said, “I am sure that you have reached the right conclusion and that the V.1000 should be allowed to die”. 28 Reginald Maudling, as Minister of Supply came to the same conclusion. “We are thus clearly in a dilemma. Without the V.1000 we have nothing to offer (as a new jet transport), but to go ahead, there is a real danger that we would have a white elephant on our hands. The conclusion I reach from all of this is that we have no alternative but to allow the V.1000 to die”. 29 Total airframe costs were put at £7 million plus matching costs for the Conway, with additional costs for twelve production aircraft estimated to be £22 million (£526 million). Cancellation would save some £18 million (£430 million). 30

The question now was how exactly was the decision to be announced? The Government had already faced a turbulent period over its record for developing combat aircraft and another embarrassment would be difficult to present. 31 This was also a matter that would affect both the Air Ministry as customer and originator of the requirement and the Ministry of Supply responsible for developing and procuring the aircraft; the latter also had a wider responsibility for the health of the British aircraft industry. In July, the Ministers, Lord De L’Isle and Reginald Maudling respectively, met to discuss tactics. They agreed that both Ministries had to have same story. “It was equally important to recognize that it was the failure of the firm to produce an aircraft to meet the specification which had caused the cancellation and not any changes in the specification as it was first drawn up”. It was also important to express failure in “such a way that it did not cast too much doubt on the ability of the British aircraft

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27 “A history of the V.1000”, an Air Ministry memorandum, 15th August 1955, AIR 20/7734
28 Letter to Air Minister from Chancellor of the Exchequer, 21st October 1955, AIR 20/7734
29 Note by the Minister of Supply (Maudling); 14th October 1955, AIR 20/7734
30 Letter to Chancellor of the Exchequer from Air Minister; 18th October 1955, AIR 20/7734
31 See Keith Hayward, “The Supermarine Swift & Britain’s First Post-war Procurement Crisis”, The Aviation Historian, Issue No.11, 2015, pp.15-22
industry particularly in the light of recent American developments in the transport field”. 32

However, the decision triggered a spat between the two Ministers: in a note circulated to fellow members of the Cabinet, Maudling stated that while the Air Ministry had decided that they did not want the six aircraft they have ordered because Vickers had failed to meet their requirement, he also blamed the Air Ministry for changing its requirement. 33 The Air Ministry was quick to challenge this view of events: Vickers had clearly failed to deliver on the contract, especially in terms of curbing weight growth, which had reached or was approaching 30% more than originally estimated. “This was”, the Ministry, argued, “the primary and fundamental reason why the Air Ministry has asked the Ministry of Supply not to proceed with the prototype or with the order”. In order to justify accepting what for so long had been described as a vastly inferior alternative, the Air Ministry felt that now strategic needs had been “relaxed somewhat”, the Britannia was now capable of meeting future long-range transport requirements for long-range. “But again this was only a mitigation of the unfortunate consequences which flowed from the failure of Vickers to meet the specification”.34

To back up its version of events, the Air Ministry assembled a detailed history of the V.1000 programme. The result, however, had a salutary effect on the Air Ministry’s position. According to one senior RAF officer, there were two separate aspects to the cancellation: in service date and performance. In respect of the delay, Vickers should take some of the blame: they had underestimated the difficulties in completing the project. But the Ministry of Supply had also been too quick in accepting the firm’s estimate. There was certainly a degree of over confidence that a Valiant-based design would be a simple conversion job. In May 1952 Vickers admitted, “the V.1000 was virtually a new aircraft from the design aspect”.35

In November 1955 a report by Air Chief Marshall Baker reported that the procurement process had not followed normal procedures, with a very short (five month) design submission period and also that OR.315 had been drafted around the second Vickers design. Baker concluded that had a more detailed OR been drafted, Vickers might have developed a “more refined” design that more closely matched the requirements sooner. “Similar errors had been at the root of the problems that dogged the Supermarine Swift”. But the internal history written by a member of the Air Staff felt justified in criticizing Vickers: “This is the second time that Vickers have let us down within 12 months, and the firm ought to be left in no doubt as to the Air Ministry’s opinion”. However, as James Jackson notes in his study of the formulation of the V.1000 OR, this was “rather unfair given that both aircraft had been selected without the benefit of proper Operational Requirements to guide their development”. 36

32 Notes of a meeting between Air Minister and Minister of Supply on the V.1000; 19th July 1955, AIR 20/7734
33 Note by the Minister of Supply (Maudling); 14th October 1955, AIR 20/7734. There are fiercely applied pencil marks questioning this interpretation on the Air Ministry copy in the National Archives.
34 Letter to Chancellor of the Exchequer from Air Minister; 18th October 1955, AIR 20/7734
36 Jackson, op cit. For a study of the Swift procurement see Keith Hayward The Aviation Historian, op. cit.
On the other hand, the cause of the performance failure was to some extent a matter for debate. Vickers contended that they could have met the military specification if they ignored the civil requirement and if they could count on the availability of an improved Conway. In general the V.1000 may not have failed to meet performance requirements “but as a whole the aeroplane is marginal as regards meeting the specification, and it is late”. But the Ministry could not say unreservedly that Vickers’ failure to achieve the specification as the sole cause of cancellation: if this would be the official case for cancellation, the firm would “react violently and publicly”. 37 After some reflection it was agreed that Vickers would be in a very strong position to claim official responsibility for some critical failings in the requirement process. It was agreed that the public announcement should refer only to the time slippage, as “this line could not be disputed by the firm and it should carry conviction to the general public”. 38

From the Ministry of Supply’s perspective, if the V.1000 was to go ahead, it must now be purely on its merits as a civil aircraft; as the VC-7, it could be in service earlier, but with an inferior performance to the Americans. Further modifications were possible, but the Ministry decided, “that the chance of success would be small, and the time needed for the entire work would mean the loss of any advantage of early delivery.” As Maudling put it, “Vickers can’t fund it; BOAC don’t want it and no other airline likely to risk an untried aircraft”. 39 As a result the UK would temporarily have to concede leadership to the Americans. There were hopes that the qualities of Rolls-Royce engines would deliver commercial gains, but as far as aircraft were concerned, the UK would need a show a “clear technical advantage”. The Ministry would ask industry for a series of design studies for a fast trans-Atlantic jet to be available around 1965, but may be to wait until “we can re-enter (the market) with a true supersonic aeroplane not before 1970”. 40

4.3 Was the V.1000 a lost opportunity?

The V.1000 cancellation and the consequent loss of the VC-7 was seen by some commentators as damaging to Britain’s long-range airliner prospects. 41 Sir George Edwards would later describe it as “the most serious cancellation that had taken place in a whole string of cancellations … the biggest blunder of them all”. 42 Derek Wood had no doubts either “this decision marked the point at which British airline development really began to go wrong and

37 Note from Air Chief Marshall Sir John Baker, to Permanent Under Secretary Air Ministry; 15th October 1955, AIR 20/7734 and AIR 2/13080, passim
38 Note of meeting between AM and Minister of Supply: 21st October 1955, AIR 20/7734
39 Note by the Minister of Supply (Maudling); 14th October 1955, AIR 20/7734.
40 Note by the Minister of Supply (Maudling); 14th October 1955, AIR 20/7734. It should be noted that the RAE was beginning its study of supersonic transport at around this time.
42 Sir George Edwards quoted in Robert Gardner, op. cit, Chapter 14.
there has never been a full recovery”. Contemporary Ministry evaluations were uncertain: the VC-7 might have been “reasonably placed to compete with the Boeing 707 and DC-8, but if the Boeing Company was allowed to have Conway engines the position would be different” – implying that if Boeing were to adopt the Conway, any performance advantage possessed by the VC.7 would have been eroded. And indeed, when BOAC came to place its order for 707s, the order was predicated on a Conway engined version. 

So could the V.1000/V-7 have taken on the American jets? One authoritative study of the development of modern aircraft describes its prospects as marginal. On balance while “the orders placed for the American jets before and after the V.1000 cancellation made this act seem an error of commercial judgment, but there is little reason to believe that the V.1000 would have been commercially competitive with the American airplanes.” If Vickers had been convinced of its merits they might have developed it as a private venture - as they did with the Vanguard. The V.1000 was likely to be slower than either of the US jets. Had BOAC bought it instead of the 707, “the most likely outcome would have been that this airline would have found itself operating a less efficient airplane than its competitors.” Peter King is also somewhat sceptical of the aircraft’s prospects. He argues that despite the “apparent down to air qualities of George Edwards” the bid to launch a long-range airliner on the back of an RAF and a BOAC order was a “supreme example of [a] lack of realism.” As the most expensive item on the RAF’s transport requirements, its vulnerability to Treasury attack was evident from the outset.

A key factor would have been in meeting what was a challenging in service date: on the basis of the in initial development schedule, a first flight in 1956 would have given it a slight lead over the long range Boeing 707 and DC-8. This would have depended on Vickers delivering the aircraft on schedule, which might have been difficult given the problems at Vickers identified by ministry inspectors in 1954 and the demands posed by the Vanguard, launched in 1953 as a private venture.

One important consideration was the question of lifetime costs and especially those of airliner maintenance, especially the difference in engine installation between the American podded designs and the buried wing approach of the V.1000. At the time, the Air Ministry felt that the British approach was superior, offering a “cleaner wing” and superior aerodynamic performance. Sir Peter Masefield of BEA begged to differ: “studies had shown V.1000 to be marginally worse than the two American designs, and substantial work would be needed to improve it, which by then would put it well behind the competition. Moreover, airlines

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43 D. Wood, *op. cit*, BOAC is often seen as a villain in this saga, with an emerging preference for US aircraft: but in 1955 alone it spent some £85 million (1.7 billion) on orders for British aircraft. Higham, *op. cit.* pp. 135-143
44 Air Ministry Memorandum 1st March 1955, AIR 20/7734
46 See Barry Jones, “Opportunity Lost”, *Aeroplane*, May 2008, pp.31-5. This was not the first or the last time that Shorts’ workload would influence UK civil and military procurement decisions.
47 Air Ministry Note, 28th February 1955, AIR 20/7734
were already showing a preference for podded engines; and the chances for of commercial success for the V.1000 were so small that it would be better to stop development at once than to throw away more of our scarce resources upon an enterprise that would probably be a failure”.  

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The military relevance of the V.1000 is perhaps equally hard to determine. Much of its initial value as a design concept was contextually defined by what was still an uncertain strategic environment. Specialized jet transports for strategic deployment were soon substitutable by more or less ‘off-the-shelf’ jet airliners (or as transpired in this case, by the turboprop Britannia). The insistence on short field performance for a strategic transport, especially in the tropics, was also a specialized requirement – as Sir George Edwards put it “it was something the Americans never seem to be unduly worried about”.  

49 Given the growing financial crisis affecting RAF procurement in the 1950s, a dedicated fast long range transport was an over expensive luxury, and as the single most costly item in the equipment programme at the time, the V.1000 became an easy target.

On balance, the failure to develop the V.1000 as a long-range airliner was less significant than the failure to press ahead as planned with the Comet 4. At the time the understandable need to justify a very large public investment in De Havilland took priority over civil aerospace development. This might have also have been fuelled by hopes that indeed the V.1000 would assume the role of national champion and an over sanguine view of the competition posed by the US contenders. In general, the V.1000 story underlined the inherent contradictions in the Conservative Government’s approach to civil aircraft development. Without a direct military requirement – and all subsequent general RAF transport aircraft (but not heavy lifters) would be based on civil designs – UK companies would have to rely on orders from either BEA or BOAC. This would lead to the tailoring of aircraft to the detriment of wider sales. This in turn would strain company resources to the point that the Government had to reconsider its civil aerospace policy as part of a package to encourage rationalization in 1960. These weaknesses would not be fully evident until the late 1950s, and in the interim would not deter the government from pressing ahead with its private venture policy.

5. The VC10 procurement decision – private venture vindicated

Announcing his decision to cancel the V.1000 to the House of Commons in November 1955, Maudling claimed that the lack of a British-designed long-range jet, he said, “would not seriously damage the British civil aircraft industry”. Others expressed amazement that the Government was allowing BOAC to reject the V.1000 when airlines were beginning to order US jets in quantity. One Conservative backbencher called it “one of the most disgraceful, most disheartening and most unfortunate decisions ever taken by a Minister responsible for

48 Transport Aircraft Requirements Committee, minutes of meeting 23rd September 1955, AVIA 63/11.

49 Gardner, _op cit_ p.118
Aviation”; he confidently predicted that BOAC would soon be asking for Government permission to buy an American aeroplane.  

Which is precisely what happened.

Following the Comet disaster and the politically sensitive cancellation of the V.1000, BOAC had thought it could rely on the Britannia and eventually the Comet 4 to remain competitive on the key north-Atlantic routes. Initially, both the airline and the government felt that this was a sound strategy. However, by the summer of 1956, with its competitors flocking to order the Boeing 707 or Douglas DC-8, BOAC found it necessary to look across the Atlantic to meet the challenge. While there was some official scepticism about the performance promised by the Douglas DC-8 and the Boeing 707, BOAC was given permission in the summer of 1956 to order 17 (later reduced to 15) Boeings powered by Rolls-Royce Conway engines at a cost of £44 million (£1 billion). However, as a condition of the deal, BOAC was required to look at a British built solution to its ‘Eastern’ or ‘Empire’ routes.

Ideally, this was to be undertaken as a private venture in order to conform to the government policy aimed at reducing and ultimately ending direct public support for civil aerospace development. Buoyed by profits from the Viscount and the promise of a large launch order from BOAC, Vickers - and as it was soon apparent, only Vickers - was prepared to tackle the project under these terms. As a BOAC chairman later observed “There was only one company prepared to embark upon such an aeroplane and that was Vickers. We now get to the stage where you could have any colour so long as it was black. You have got to have a British aircraft, and there is only one possible aircraft. I am quite sure that the Corporation were quite free to make any choice they liked”. As the Treasury later noted “Whether the VC10 was the best aircraft available for BOAC was not questioned at this time”.

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50 HCD 546, 28th November 1955, cols. 1921-4; HCD 547, 8th December 1955, cols. 665-81
53 Sir Mathew Slattery, Evidence to House of Commons Select Committee on the Nationalised Industries, (1963-4), BOAC, HC 42 Q431; Slattery had just been sacked, blamed for the huge deficit that BOAC had run up partly as a result of its aircraft ordering policy.
54 A History of Aircraft Purchasing for the Air Corporations, T319/141 1963-64.This is an internal summary of documents by a Treasury official.
This did not mean that the two were dragooned into partnership: Vickers and BOAC had been discussing this requirement for some months. An outline specification produced by the airline’s planning staff called for a design optimised for ‘hot and high’ airfield performance and, given the lower passenger density of these routes, with a capacity smaller than the American jets, this would “best serve the needs of the Corporation”. Vickers said that it could produce a suitable aircraft for BOAC at £1,750,000 (£43 million) a copy, but on condition that the airline ordered 35 aircraft - later increased to 42 when a trans-Atlantic version was added. BOAC had hoped to place a smaller initial order, increasing numbers as demand grew. In January 1958, BOAC announced an order for the VC10 in a contract worth £68 million (£1.7 billion), at the time the most expensive single order for a British airliner.

The size of the order was subject to both external and internal questioning. Outside analysts felt that BOAC had an optimistic view of the market; Ministry of Aviation officials later conceded that “35 may have been a bit high”, but Vickers made it clear that this was the minimum needed to launch the aircraft as a private venture. The size of order was “agreed with equal haste.” The most important factor from the government’s point of view was that it vindicated the government’s private venture policy and the size of the order and Vickers’ willingness to pay for development “were clearly tied together”. Even the Treasury could not later find direct evidence of undue government pressure “history suggests that much of the original discussions took place as unrecorded meetings between Chairman and Minister of Transport and Civil Aviation. The first the Treasury knew of the order was a letter to Chancellor dated 2nd May 1957, which explained the innovative nature of the design, that it was competitive with the American aircraft and that Vickers would develop it as a private venture”.

However, in the Treasury’s view this was in retrospect a very ill-judged step and based on a very narrow assessment of future development potential; “the Government’s insistence on a private venture led to a thoroughly uneconomic purchase by the Corporation, by no means fulfilling their earlier stated requirements, and at a time when the Corporation, guaranteed with Government funds, was already running at a loss; it was the smallest number for which

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56 Robin Higham, op cit. pp.210-1; The Times, 15th January 1958. The costs introducing the aircraft into service (proving), amounting to £10.7 million p.a. (£208 million) in early years falling to £7.5 million (£156 million) as the aircraft became more established. T319/141 1963-64
57 Paper by Minister of Transport and Civil Aviation to Cabinet 13th September 1956, T319/141 1963-64
Vickers would undertake as a private venture”. Neither the Ministry of Supply nor the Ministry of Transport and Civil Aviation seemed to be too bothered that the design would need further development to be competitive on North Atlantic routes.  

In the haste to confirm the deal, Vickers held to a rear-engined clean wing concept that was the best answer to the Empire requirement for ‘hot and high’ airfields that might also have less than perfect runway surfaces, a risk to any podded (under-wing) engine. Sir George Edwards later admitted that if they had produced a design for the North Atlantic from the outset, it would have looked like the cancelled V.1000. Soon after the original specification was defined, BOAC accepted some changes to give the aircraft a better overall performance. The BOAC Board also overruled a last minute challenge to the whole project from its Engineering Department. Even with such a large order, Vickers assumed a considerable risk with development costs initially put at £6.25 million (£165 million); the £1.7 million (£38 million) unit price of first order of 35 aircraft implied an immediate loss of £3 million (£67 million), which Vickers was expected to make up through exports (Vickers estimated that it needed to sell a total of 80 VC10s to break even).

For its part, the Ministry of Supply was very pleased with the outcome: “This represents a major step forward in our policy of encouraging the private sector financing of civil aircraft and I think that the Government will be able justly to claim great credit for it”. The combination of private venture development supported by a large domestic order seemed to have worked; it was certainly used as leverage in the debate over BEA’s order for a new medium range jet, the DH121 (Trident), which also ended up being funded on the same basis as the VC10. While the Trident launch attracted much controversy, development of the VC10 moved on without too much initial trouble. This was soon to change; by 1959, the VC10 programme was in difficulty with Vickers close to ruin, and resolving problems posed by the BOAC’s VC10 order would become crucial in implementing fundamental changes in policy towards the aerospace sector.

6. BEA, the Trident, ‘tailoring’ and industrial rationalization

At the time, BOAC’s order for the VC10 appeared to be a vindication of the private venture policy. The government was certainly pleased to see a major project launched on the back of a BOAC order; BOAC seemed reasonably satisfied that they had got a design that would suit its specific requirements. The government felt that this formula would work equally well with BEA’s emerging mid 1950s requirement for a short haul jet. By 1957, BEA’s order would also form part of a wider industrial policy designed to nudge the industry into larger and more powerful groups. However, although BEA’s requirement would indeed form the basis for a

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58 ibid
59 While the clean wing did produce more lift, the choice of a rear engined configuration added weight and reduced cabin length. Robin Higham, op cit, pp. 210-11
60 Report of, HC240 (1963-4), paras.50-2 and Vickers evidence, Q.1547
61 Letter from Minister of Supply 6th May 1957 to Chancellor of the Exchequer, T319/141 1963-64
62 ibid
private venture, it would demand an even harder price in terms of ‘tailoring’ the resulting design to its needs and singular view of the market. In some respects, more than the V.1000, this was to be the ‘lost opportunity’ for Britain’s civil aerospace sector.

6.1 Launching the Trident - BEA as hero

By the mid-1950s, BEA’s business plan centring on a fleet of turbo prop aircraft was under pressure from competitors ‘rushing to jets’, namely the French Caravelle. Britain had no immediate answer, although de Havilland offered a Comet derivative. Concerned about the competition from jet operators, BEA rapidly adjusted its fleet planning to include the Comet and a future new medium range jet airliner.

At an April 1957 meeting of the official Transport Aircraft Requirements Committee (TARC), BEA’s chairman, Lord Douglas of Kirtleside presented the airline’s view of the future. In addition to six Comets as an interim jet, it wanted 24 advanced jets. BEA’s preference was for a 70-seat aircraft: four companies had submitted designs to the BEA outline; the Bristol Type 200, the Avro (Hawker Siddeley Group) 740, Vickers VC11 (derived from the VC10) and the de Havilland 121. The notion of buying the Caravelle, despite its British content, was dismissed out of hand. Development costs were estimated to be in the region of £20 million (£400 million).

The MoS wanted a speedy decision “otherwise the thing will drag on indefinitely, with the risk of our losing the opportunity of repeating the ‘killing’ which we made with the Viscount”. The Ministry was prepared to fund a prototype and a suitable engine, “in order to have adequate control over development”. The Treasury was less impressed: they were unprepared for the ‘bombshell’ request for two types of aircraft, and dismissed the “Caravelle bogy” as the usual Ministry of Supply hankering after the old days of direct government funding. At the end of August 1957, under considerable pressure to approve funding so that the news could be announced at the SBAC Farnborough airshow in September, the Treasury agreed to the Comet 4 purchase, but not to the new jet or its engine.

63 Minutes of TARC meeting, 2nd April 1957, AVIA 63/14.
64 Ministry of Supply memoranda to the Treasury 1st and 7th August 1957, T 228/587
65 MoS memorandum to Treasury 15th August 1957, T 228/587
66 Treasury memorandum, 12th August 1957, T 228/587
67 Treasury memorandum, 29th August 1957, T 228/587
6.2 BEA’s formal request for a new jet airliner

On the 4th September, BEA formally requested Treasury permission to acquire a new jet aircraft, the de Havilland 121. BEA had wanted to stay with Vickers, but sadly the company “was not prepared to develop the type of aeroplane required”. The same applied to the Bristol/HSG proposal and initially to de Havilland. However, having lost the BOAC order to Vickers, “de Havilland have accepted the views of the Corporation about the best type of aircraft to meet the Requirement and the Company have now submitted proposals which are closely tailored to the BEA specification”. (Author’s emphasis) The Ministry of Supply was asked order a prototype at a cost of £2.5 million (£45.3 million). The Treasury felt that the cost estimates of £1 million per aircraft (£22.3 million) was not unreasonable based on the Comet experience; however, “none of the reasons listed for preferring de Havilland as the manufacturer of the new aircraft touches on the cost of development or the ability of the manufacturer to bear this cost”. Officials were puzzled by the rejection out of hand of Avro, which as part of the HSG “represents one of the wealthier firms in the industry and also one which has a dire need of a new project to keep it alive as an aircraft firm”.

The Treasury felt that an initial order of 24 aircraft should be large enough for de Havilland to develop as a private venture; officials saw no reasons to buy a prototype, although they were attracted to the novel idea advanced by the Ministry of Supply that a proportion of the estimated development costs of the engine - £5 million (£112 million) - could be repaid by a levy on sales. “This is the first time the Ministry of Supply have proposed assistance for the development of an engine for a civil aircraft in this particular form, and whatever one may think of it, or of the whole question of government assistance to the aircraft industry, it is an improvement in any rate on the old fashioned open-ended commitment of total or shared development costs”. A more astringent official also noted that “This is probably none of our business, but I wonder how long the Ministry is going to play shove-million with the taxpayers’ money? A ray of hope appeared when BOAC and Vickers got together on the VC10 without looking for subsidies; why cannot BEA and de Havilland do likewise?”

By November, the bones of a deal was coming together; the Ministry of Supply had moved away directly funding a prototype, Rolls-Royce was prepared to risk £22 million (£492 million) on the engine with £5 million from public sources and a launch order of 24 aircraft should be sufficient to cover costs. The Treasury was well aware of the importance of the order to Rolls-Royce and especially de Havilland: “It is scarcely an exaggeration to say that de Havilland’s future depends upon it.” But “the Ministry of Supply has drawn our attention

68 BEA memorandum to the Treasury, 4th September 1957, T 228/587
69 BEA memorandum to the Treasury, 4th September 1957, T 228/587
70 Treasury note on the re-equipment programme, 30th October 1957 and Treasury memorandum 6th November 1957, T 228/587
71 This may well be the first formal manifestation of the Repayable Launch Aid (now Launch Investment) scheme. Treasury note on the re-equipment programme, 30th October 1957 and Treasury memorandum 6th November 1957, T 228/587
72 Treasury memorandum 4th November 1957, T 228/587: Vickers had launched the VC.10 on the back of a BOAC order, by 1959 the cost of development would have taken the company close to bankruptcy
to the fact that both firms will have to stretch resources even with limited government help. They are aware that it is the policy of HMG to withdraw from the financing of the aircraft industry as quickly as practicable. But if the axe is brought down too quickly the industry will collapse”.  

Although BEA wanted the de Havilland design, HSG/Bristol were still in the race, and increasingly favoured by the Ministry of Supply and the Treasury on the grounds that the contract should be used to encourage rationalization and that de Havilland appeared to be financially the weaker contestant. Treasury officials felt that “it would be desirable that the Government should seek to influence BEA, so far as possible, to place their order with Bristols rather than de Havillands”. The Treasury was hopeful that the Minister of Transport would “do his best to prod BEA in the direction of (the HSG/Bristol) consortium, because such unions are what the Government are trying to encourage in the British aircraft industry”. However, a closer examination of the financial position of the companies revealed that in some respects de Havilland was in a far better financial state than was initially evident: “I would pause before arguing that de Havillands do not compare on the grounds of financial strength”. 

In December 1957 BEA reported that having “tailored their design” to BEA requirements, de Havilland was now in the lead “by a fair margin”. The specification was very tightly drawn: although de Havilland stated that they generally concurred with BEA, its management also stated that the terms were “more onerous than anything D.H. had previously undertaken”. But as de Havilland was already producing Comet 4Bs for the airline, and was in a desperate financial state following the earlier Comet disaster, it was keen to protect its position as BEA’s preferred supplier. A formal decision was delayed while the company found financing for a private venture, but de Havilland refused to look for a group option until the DH121 contract was confirmed.

### 6.3 The Ministerial dispute

At this point the Ministry of Supply and Ministry of Transport and Civil Aviation began to diverge, belying their ostensible unity in public. If BEA had settled on the de Havilland 121 design, Aubrey Jones, the newly appointed and harder line Minister of Supply, thought otherwise. This difference of perspective set the scene for a brief but intense debate within the government, with BEA briefing heavily in support of the DH121.

Jones was forthright about the need to use the power of contract to push industry into stronger units, the better to compete with the Americans: “To have pursued this policy through mere
enthusiasm would have been profitless; to have resorted to compulsion would have been undesirable, and impossible without legislation; the only other course was to use the power of contract”. 79 BEA’s requirement for a short haul jet airliner was the first civil contract available for such “manipulation”: “Short of legislation, Her Majesty's Government have no effective method of bringing this policy to fruition other than the power of contract, though economic forces will also play their somewhat slow part. We have therefore been considering whether it is possible to combine the objectives of meeting the BEA requirement and at the same time laying the foundations for the rationalization and redeployment of resources of the aircraft industry.” 80

In January 1958, the Cabinet met to discuss the issue. Aubrey Jones and Harold Watkinson the Transport Minister fought their respective corners for industry and airline: the Cabinet was unable to resolve the issue and decided to wait for further advice. 81 Jones felt that a grouping of HSG/Bristol “alone among British airframe constructors, would come within some distance of matching the strength of the present American competition”. HSG was also part of stronger diversified concern and had by far the most extensive R&D facilities in the country. 82 It was essential that these would be put at the disposal of civil industry. The HSG/ Bristol design also had a wider market in mind and could meet a Pan American Airlines (Panam) requirement for a larger aircraft. Unless HSG/Bristol got the nod, “We are only too likely to see continued therefore our post-war history of seeking the prizes that are obtainable in the field of civil aircraft but without an industrial organization capable of realizing them”. 83

This induced an immediate response from Harold Watkinson, Panam’s requirement had no bearing on the issue and he had no power to force BEA to take the HSG/Bristol aircraft “nor would I wish to”. BEA had a statutory requirement to act in its best interest and could see no reason why the de Havilland design would not go to “wider commercial success”. 84 De Havilland also moved quickly to shore up its industrial position; on 30th January 1958 it announced the formation of Airco, a group consisting Fairy and Hunting to build the DH121. The Ministry of Supply was still not convinced that Airco’s capitalization of £100 million

79 Minister of Supply Memorandum to Cabinet 4th February 1958, T228/587; The MoD’s OR339 (TSR-2) contract would soon become an even more powerful “carrot”
80 CAB 129/91/19
81 AIRCRAFT FOR BRITISH EUROPEAN AIRWAYS: Joint Memorandum by the Minister of Transport and Civil Aviation and the Minister of Supply, 23rd January 1958, CAB 129/91/19
82 Debatable, English Electric probably had the more modern facilities
83 Minister of Supply Memorandum to Cabinet 4th February 1958, T228/587
84 Minister of Transport and Civil Aviation memorandum to Cabinet 4th February 1958, T228/587
(£1.7 billion) would be enough. Watkinson was more confident: the Airco consortium appeared to have a solid financial and technical foundation and that an order of 24 aircraft from BEA would enable de Havilland to finance development. The de Havilland group was also felt to be more experienced in the export business.  

Jones felt that the Government still should not be rushed into a decision just because there was “public clamour for an announcement”. He felt the Airco offer was too vague and contained the future risk of “rescue operations of some magnitude”. HSG had been hard hit by the 1957 Defence White Paper, and Jones feared that it might go “out of the aircraft business altogether”. The prospect of wider sales was also in Jones’ mind “it may well be that while BEA who are in many ways a uniquely situated airline, incline their preference one way, world demand may incline a different way. If this were to turn out to be so and we had prematurely opted for the aircraft of BEA choice, exports would prove to be limited and the promise of private venture would be nullified.” Jones went further “In the past it had been the practice to allow BEA to specify their requirements for a new aircraft without regard to the requirements of prospective foreign purchasers. The future prosperity of the British aircraft industry, however, would depend increasingly on its success in the export market. It would therefore be important to give greater weight to export prospects in determining the types of civil aircraft to be manufactured in this country. For this reason the present initiative of the Hawker-Bristol consortium should be encouraged.”

The dispute did not go unnoticed by the press; Hawker Siddeley was forced into issuing a public statement “Let there be an end to this ill-informed gossip that the product we are offering is technically inferior to that of our competitors, and that we are engaged in some form of plot with the connivance of Ministers of the Crown to force an inferior product on a reluctant customer”.

### 6.4 BEA gets its bespoke aeroplane

However, Lord Douglas of Kirtleside was determined to have the DH121: it was exactly the design BEA had specified, and he was confident that de Havilland had the resources to launch the programme on the back of the BEA order. Watkinson threw his weight powerfully behind the BEA position, stating categorically that he had “no power to require BEA to take the Hawker/Bristol project against the Corporation’s own wishes. Nor, if I had the power, would I wish to do so. Whatever might go wrong with the project during development, whether delay in delivery or technical difficulty or misadventure of any kind whatever, would be attributed by BEA and by outside critics as my fault and that of the Government who had

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85 CAB/129/58  
86 Letter from Minister of Supply to Chancellor Heathcote Amory 11th February 1958, T228/587  
87 CAB 129/91/19  
88 CAB 129/91/19  
89 Memorandum by the Minister of Supply, CAB/128/32, 24th January 1958  
90 Flight, 17th January 1958, p.69
forced the Corporation to take an aircraft not of its own choosing.” 91 He could not “refuse to allow BEA to place its order where it wants. I have gone as far as I can to help the Minister of Supply with his plans for the future of the aircraft industry. To go further would make me a party to the principle that, in connection with this order, which is being placed by the Corporation and not by the Government, BEA can, in a fashion which they believe to be contrary to their own best interests and to their statutory duty, be used as an instrument of Government policy for bringing about a reorganization of the aircraft industry.” 92 Both groups of companies were offering their designs as private ventures and both were concerned to achieve overseas sales and he could not see “on what grounds we can base a refusal to allow B.E.A. to exercise its technical judgment”. 93

The UK clearly could not afford to see two aircraft going forward, as this would only increase the risk of financial failure and a “substantial risk that the Exchequer would have to rescue both of them before the end of the day”. Politically, it was also desirable to avoid a public split with BEA, where there was a risk of wholesale resignations from BEA Board “if they did not get their way”. There was no legal power to stop BEA from choosing the de Havilland product. 94 This broke Jones’ resistance. On February 12th 1958, with little further debate, the Cabinet agreed to allow BEA to buy the DH121 - now named Trident - subject to detailed negotiations. 95 In August Airco was awarded a contract for 24 aircraft worth £574 million (£10 billion).

6.5 The Padmore Committee

Taken together, the launch of the VC10 and the DH121 was a massive commitment of public money, albeit indirectly, to the UK civil aerospace industry. This was all the more important given the radical changes in the funding of military aircraft between 1955 and 1957. Confidence in military aircraft development had been rudely shattered by the Swift crisis of 1955, which had revealed persistent problems in the development of several fighter aircraft. This was followed by a fundamental shift in policy towards guided weapons and a nuclear-
based defence policy. This culminated in the 1957 Defence White Paper - the ‘Sandys’ White Paper - that confirmed a wide scale culling of military aircraft programmes. This would have a massive impact on the industry and underlined the importance of sustaining a successful civil sector. The industrial implications of these cuts would require more detailed consideration. After a Cabinet level review of options, Prime Minister Macmillan concluded that given the complexity of the issues, they would have to be the subject of a “special inter-departmental enquiry”. This committee would focus on the prospects for industrial concentration and the level of R&D that government should continue to provide for civil programmes. It was accepted that increasingly industry would have primarily to look to world markets for its future welfare. Sir Thomas Padmore, Permanent Secretary to the Treasury, was chosen to chair what became the Aircraft Industry Working Party (AIWP), which started work in the late summer of 1957.

The AIWP comprised officials from the Ministry of Supply, Ministry of Transport and Civil Aviation (MTCA), the Board of Trade as well as the Treasury. Its remit was to examine how best to manage the reduction in the size of the UK aircraft industry, whether the government should continue to provide financial support, and if so, at what level? The working party spent some time reviewing past policy (including the 1939 decision to suspend civil development and production and the post 1945 Brabazon programme of civil aircraft) and the level of current government funding for the industry. Crucially, in 1956-7 £4.5 billion of the industry’s total £6.6 billion was derived from defence work, mainly business from the MoD. Since 1951 Government had spent some £2.8 billion on R&D and capital equipment for research and £1.8 billion in support of Korean War production. Government also still owned most of the industry’s facilities.

Looking to the future, the affects of the 1957 Defence White Paper would be “severe”. Industry employment, then 268,000, was set to fall to 160,000 (the pre Korean level) by 1961, but without a successful shift to civil production, this could drop to 60,000 by 1964. Work on guided weapons would not fill the gap, and much of it would go to electronics companies. If the worst predictions were fulfilled, by the early 1960s, the UK defence industry would be below a size sufficient to sustain any major new programme. In short the late 1950s and early 1960s would be critical time for industry as it made the transition from dependence on the UK. As the report noted ominously, “any company which does not in the near future hold a Government development contract or has no private venture of its own will know that its days in the aircraft industry are numbered”.

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96 AVIA 65/1084, 10th July 1957, Notes of Cabinet meeting, July 1957
97 AVIA 65/1084, 18th April 1958, First Report by the Aircraft Industry Working Party
98 AVIA 65/1084, 18th April 1958, First Report by the Aircraft Industry Working Party
The AIWP dismissed industry diversification as a viable option for most of the UK aircraft manufacturers. Vickers, English Electric, Hawker Siddeley, Hunting and Westland were diversified to some extent, and many others were looking to diversify either by acquisition or using current factories for new business. However, the former was only possible for the few well-resourced companies, and in the second “companies are experiencing difficulty in finding products which they can make and others want to buy”. Some degree of contraction was therefore inevitable, “but since there will still be a continuing need for a variety of military aircraft, the Government will have a direct interest in ensuring that the industry is re-organised efficiently to meet the changed conditions so that these continuing military requirements are met, and met economically”.  

The solution was to focus energies on an export-led civil business. The civil market was predicted to grow at a fast rate into the 1960s. Air traffic was doubling between 1955 and 1961 and again up to the end of 1967. This translated into a market for up to 8000 aircraft, worth an estimated £162 billion. The UK was already pre-eminent in aero-engines; but “a comparable status has not been won for British civil aircraft”. UK aircraft comprise only had about 14% of market. Of the three leading of current British airliners, the Comet 4, the Britannia and the Viscount, only the latter was proving to be successful; the others were dogged by “ill luck”. Hopes of next generation would depend on the VC10, the Vanguard and the D.H.121, but international competition would be tough, the small home market was a disadvantage, and the RAF was unlikely ever to buy transport aircraft in sufficient numbers to form a solid launch order. 

The future patterns of civil development were hard to identify, but would undoubtedly imply substantial technological change, accompanied by very high technical and financial risks. This further underlined the need for larger and more capable industrial units. To raise sums need for civil development, companies would have to be seen to be technically and financially sound. “For reasons of history and because of the multiplicity of the military requirements which have hitherto been its main business, the aircraft industry at present consists of many units, most of which are too small and too weak to carry unaided the great costs and risks in the development of new aircraft.” 

The AIWP noted that some rationalisation had occurred already, but the aim was now to create no more than two airframe and two engine groups. It was hoped that the Airco consortium would lead to a full merger of de Havilland, Hunting and Fairey. Existing links between Hawker-Siddeley group and Bristol Aeroplanes “may possess the seeds of further growth”. The growing ties between Vickers, English Electric and Shorts also pointed the way to a strong balanced group. Helicopters could be swept up into a third airframe company. Rolls-Royce and Bristol Siddeley were obvious candidates to lead the two engine groups.

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99 AVIA 65/1084, 18th April 1958
100 AVIA 65/1084, 18th April 1958
101 AVIA 65/1084, 18th April 1958
102 AVIA 65/1084, 18th April 1958
However, it was felt that encouraging the process further through contract manipulation alone might have reached its limits. 103

The AIWP noted that the SBAC, the industry trade association, had lobbied for a continuation of government aid for civil programmes. While the government should accept need for some support, especially given the continued need for military programmes and its role in promoting R&D, aviation must be part of a technology led exporting strategy. The report concluded; “an efficient and profitable aircraft industry would be a good national investment; but the reverse would be a poor national investment”. 104 Therefore government should support a comprehensive civil R&D programme in the region of £200 million, focusing on exceptional projects such as an SST or an advanced helicopter. But this should still be dependent on industrial re-organisation and that industry would progressively take over the expenditure required for future development. 105

In 1958, the government’s annual spend on aeronautical basic research was still running at £368 million, although it was hoped that this would fall to £147 million as the defence budget shrank. The government was also spending between £117-147 million on civil development work, offset by £74 million from levies on civil programmes. With full implementation of the private venture policy for civil aircraft, the government expected to see this figure fall in time; but on current estimates, there was a risk that continuing commitments to civil aircraft could still exceed £294 million, absorbing nearly all the budget for other non-defence research. In the Treasury’s view, this was hard to justify. 106 Nevertheless, the government and the Treasury looked forward to a smooth transition from an aircraft industry over dependent on government subsidy, either through the defence budget or support for civil programmes. The MoS felt that the Treasury had failed to take account of the close links between civil and military research, and felt that the Treasury was really looking for a means to cancel or curtail activity, describing the Treasury’s tactics as “divide and conquer”, wanting to see a scramble so that “unnecessary” projects “brought to light for them to cancel”. 107

The AIWP report formed the basis for the government’s first comprehensive statement on its strategy towards the aircraft industry delivered to Parliament on 13th May 1958. The minister’s statement closely followed the arguments outlined in AIWP report, and underlined the government’s determination to create a self-sustaining industry. Aubrey Jones told the House of Commons that while the government would continue to support the industry generally in terms of R&D – he again specifically mentioned civil supersonics and a large helicopter, the Rotodyne – the main thrust of policy was to encourage the emergence of larger, financially and technically stronger companies that could continue to finance their own civil programmes. Despite the AIWP’s growing doubts about contract manipulation as a means to force rationalisation, Jones reiterated that the primary approach would still be government control

103 AVIA 65/1084, 18th April 1958
105 AVIA 65/1084, 18th April 1958
106 AVIA 65/1084 Memoranda from Treasury to Ministry of Supply, 5th and 13th June 1958
107 AVIA 65/1084, MoS note, 3rd July 1958
or influence over contract allocation. This, he said, was to be “something intermediate between full government authority and complete laissez-faire. What we need is a combination of impulse from above compelling the assumption of responsibility on the part of industry itself.”

The two projects that Jones singled out as exceptions to the general policy on support for civil aviation projects, the Rotodyne and the supersonic transport, are considered in section 8.

7 Policy begins to unravel – 1959-61

Jones’ confident assertions expressed in the spring of 1958 were rapidly undermined by a series of events affecting both the DH121 and the VC10. Combined with problems in delivering the Bristol Britannia to BOAC and the Vanguard to BEA, by early 1959 the civil sector, rather than leading the industry into an export-led self-sustaining future was contributing to massive financial crisis in several key companies. There was also a growing belief that while advanced civil programmes like the SST and the Rotodyne were attracting government support for R&D, the neglect of ‘bread and butter’ airliners was sapping the industry’s market potential.

7.1 BEA’s loss of nerve and the DH121 specification

There is no evidence that de Havilland had any qualms about acceding to BEA’s original specification. While the design team regarded some of the requirements rather onerous, the basic size was consistent with the company’s views about wider market requirements. The initial airframe design could seat 111 passengers and the Rolls-Royce Medway provided plenty of “stretch” potential. But early in 1959, BEA had second thoughts about its requirement. BEA’s Commercial Division predicted a sharp drop in demand, which would have led to over-capacity in its planned fleet of Trident and Vanguard airliners. BEA asked de Havilland to cut the Trident design to a maximum of 87 seats, with a less powerful engine, the Spey. BEA paid de Havilland £200,000 (£3.5 million) for the change, but at a stroke reduced the wider attractiveness of the aircraft and added six months to the development schedule. There were objections from within the company, but they were overruled by Aubrey Burke, de Havilland’s Managing Director, who vetoed discussion with other airlines until the changes were made.

The Ministry of Supply was not happy with the changes. “The aircraft is evidently tailored to meet the needs of BEA with a predominantly short-stage network. Other operators may well require longer stages, which would necessitate an increase in gross weight. BEA is unusual

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108 Keith Hayward, Government and British Civil Aerospace, op cit, pp.30-1
109 Hayward 1983, op cit, p.33
110 At BEA’s suggestion, Boeing and de Havilland discussed the possibility of a joint project. Nothing came of this, but it did entail revealing key aspects of the Trident design. Hayward 1983, op cit, p.34; based on 1981 interviews with a former senior de Havilland designer.
among large operators in having no stages longer than 1,400 nm and a preponderance of stages under 1,100 nm”. Wider sales would depend upon efficient operation over longer stage lengths and “it is not known what steps the firm intends to take in developing the DH121 range capability, or the extent they have sought overseas requirements in this matter, but evidently this could be an important consideration affecting the sales prospects of this type”. BEA disagreed, arguing that 70% of the world stage lengths were under 1,000 nm and “operators would recognize the advantages of an aircraft specially tailored to short ranges.”

Kirtleside was quick to defend the Trident downsizing, citing the fact that Viscount had been optimized for same sector lengths, and it sold very well to other operators. BEA also claimed that de Havilland’s own market research had been weak and denied responsibility for blighting the Trident’s prospects. Given that BEA was funding the programme, there was little that the Ministry of Supply could do to affect the outcome.

Inexorably, Aubrey Jones’ pessimistic forecasts were borne out by events. In 1959 Boeing launched the 727 designed from the outset for 130 passengers and with scope for further ‘stretch’. BEA’s market forecasts were soon proven over-pessimistic and the Boeing 727 ran away with the market, selling over 2000 copies to the Trident’s 115. To add salt to the wound, BEA would eventually want to buy an189 seat version of the Boeing 727, a request that was turned down in favour of developments of the Trident. In 1965, a Treasury official reviewed the history of the Trident “BEA, for whom the Trident was tailor made, have changed their minds about the version they would need for future orders with bewildering rapidity. In terms of equity however the party that should really suffer is BEA who have got everyone into this muddle”. (Author’s emphasis)

7.2 The Vickers financial crisis of 1959 and industry rationalisation policy

By mid-1959, Vickers warned BOAC that the costs of developing the VC10 had increased and that the airline would have to find the money to cover the difference. Vickers suggested that matters would be improved if BOAC could change its order in favour of a stretched (Super) VC10 more able to compete with the U.S. jets on the North Atlantic route, but the airline was reluctant to take on an even heavier burden of supporting a larger and

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111 TARC briefing on history of the Trident May 1967, Avia 63/41
112 TARC minutes 16th September 1959, T225/1635; Hayward 1983, op cit, p.34
113 Treasury Memos, 26th September 1963, 15th October 1963 and 2nd January 1964, T225/2318
114 Treasury Memo 21st June 1965, T319/149
115 Vickers and the government also preferred to avoid a direct comparison with the American jets. Robin Higham, op cit, p. 212
more expensive version.  

A 1959 Cooper Brothers audit for the Ministry of Supply revealed an underestimate of losses on the BOAC order, which were now put at £15 million (£312 million). In June 1959, Vickers warned of difficulties without direct government aid. Speaking at the Vickers AGM, its chairman Lord Knollys argued that:

“The Government had to appreciate and to ease the great and disproportionate financial burden borne by Vickers and other companies in private ventures … Without firm and early support by the Government … this country is more likely sooner rather than some people might expect, to find itself without a real aircraft industry at all.”

Vickers’ problems had emerged very rapidly; it had grossly underestimated the costs of developing both the Vanguard and VC10. According to Sir George Edwards this was not uncommon in the industry, but in this case the estimates “proved wrong by quite a bit”. Boeing and Douglas had also launched a price cutting campaign, and a fourth competitor - the Convair 880/990 - had entered the market.

The solution to Vickers’ problem, as well a more general crisis affecting the aerospace industry was to encourage rationalisation as the price for government aid. Vickers was already in discussions with de Havilland about a merger when the new and energetic Minister of Aviation Duncan Sandys opened his industrial “marriage bureau”.

By December 1959 Vickers and English Electric were close to forming what would become the British Aircraft Corporation. However, such was the parlous state of Vickers’ finances that a full merger depended on the government giving support to new airliner development - the VC11- and helping out with the costs of VC10. Not only had the price agreed with BOAC for the VC10 been too low (£1.2 million (£26 million) per aircraft instead of a more realistic £1.4 (£29 million)), the non-recurring costs for development had “reached astronomical figures
despite the most stringent controls”. This was on top of the Vanguard losses, now put at over £7 million (£147 million).  

Vickers wanted some £15 million (£309 million) from the government for both the VC10 and the VC11. Vickers’ contribution (new and sunk costs) would total £21 million (£441 million). Government would get its money back at a 10% rate if respectively 85 VC10 and 110 VC11 aircraft were sold.  

Sandys was well aware of the need for speed. If matters were left hanging until February 1960, Vickers’ problems could reach breaking point. The Ministry felt that a package worth £17.6 million (£368 million) would suffice. At a crucial meeting with the Minister and his officials, Sir George Edwards suggested that BOAC might be persuaded to drop its Boeings in favour of the Super VC10. The RAF could also be encouraged to use a mixed VC10 and Super VC10. However, officials challenged Edwards’ assertion, especially given BOAC’s obligation to act commercially, and estimated that the total financial call (including cost of Boeing sales) would amount to £28.2 million (£588 million). However, Sandys agreed to include some direct support for the Super VC10 in the new arrangements for civil aircraft support, which were agreed by the Cabinet in January 1960. Sandys admitted that the VC10 was hardly a “promising civil project”, but the decision to support the project was taken “mainly on the ground that it is necessary to tide Vickers over their present difficulties in order to prevent them going out of the civil business and in the hope of greater success with future civil projects, when a group of sufficient strength has been created”. The new policy would include a launch aid scheme for civil developments and concentration of contracts on the merged groups. BAC and a second group, Hawker Siddeley Aviation (including de Havilland) would now form the core of the UK airframe industry and future civil aircraft could apply for government launch aid.

7.3 Restructuring the BOAC order

BOAC was now under strong pressure to help the rationalisation process by reshaping the VC10 contract. This entailed taking at least ten of the longer range Super VC10s at £2.7 million (£58 million) per aircraft. Duncan Sandys implied that a Vickers bankruptcy would cost BOAC £6 million (£125 million) in lost progress payments. The in-coming BOAC

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123 SCMS/165/1/1/2; Case for Maximum Aid for VC10 and VC11, 11th November 1959; Vickers Papers, op cit
124 Vickers Papers, op cit
125 AVIA 65/1084, MoA meeting with Vickers and English Electric, 15th December 1959
chairman, Sir Matthew Slattery asked for some time to consider the options, but was forestalled by his predecessor Sir Gerard d’Erlanger who agreed to a new contract for 35 Super VC10 and 10 standard aircraft before the hand-over. 127

There is no direct evidence of the pressure Sandys applied to d’Erlanger, but BOAC leaned “over backwards to meet the Minister’s wishes”, and a Treasury official learned in the strictest confidence that below Board level there “was considerable doubt within the Corporation as to the wisdom of ordering the Super VC10”. 128 Treasury officials were left in no doubt that the Minister “will not accept that this order for Super VC10 is in any degree open to question”. 129

The RAF was less of a push over when asked to take on the VC10 as a military transport. The Air Council was not as “amenable” as BOAC, and took their decision to buy “independently and in their own time”. 130 Sandys claimed that he was equally concerned about the financial health and welfare of both the airline and the aircraft industries, but as a House of Commons Select Committee later reported, “BOAC’s confidential documents show that the rehabilitation of Vickers and their merger …. was constantly on the minds of BOAC’s Board, and particularly of their Chairman Sir Gerald d’Erlanger, in the discussions that followed”. The new team of Sir Basil Smallpiece and Sir Matthew Slattery admitted that it was “a bit of a gamble”. 131

In April 1961, despite internal concerns about the aircraft’s unfavourable operating costs compared to the Boeing 707 or DC-8, BOAC agreed to a restructured order for 3 more 707s, 15 standard and 30 Super VC10s, now a scaled down design. This would cost an additional £6.3 million (£131 million) taking the total VC10 cost up to £101.4 million (£2.1 billion). The Treasury sourly noted that BOAC case seemed to indicate, “an expansion of traffic was planned to meet the problems created by the delivery of new aircraft rather than the other way round”. Press reports argued that BOAC might already have to sell DC-7s and Britannia’s to match falling demand, and to justify the new orders the airline had to assume a doubling of the current growth rate to 14% p.a. 132

128 Treasury Minute 21st January 1960, T2251635.
129 T2251635
130 T2251635
131 HC240 (1963-64), para. 240
132 T2251635
7.4 BOAC’s financial crisis

However, the growing burden of the VC10 order on BOAC’s own increasingly parlous financial performance soon came to a head. With the April 1961 contract hardly dry, the Treasury demanded cuts to the Super VC10 order. The Minister of Aviation, now Julian Amery, rejected this out of hand. In October he wrote to the Treasury:

“I would remind you that the VC10 project was closely considered by Ministers in 1959 when Vickers were saying they would have to go out of the civil aircraft business altogether if this programme was not further supported. It was out of this situation that the Government decided must continue with the further support represented by the BOAC order for 10 Super VC10s, and additional support for development, and this additional support was one of the considerations which led to the formation of BAC. To go back on all of this at the present stage, would be quite unthinkable. To continue the uncertainty at this stage would cause enormous difficulties with Vickers, with the inescapable implication that the VC10 order might be substantially reduced or even cancelled. A fundamental reassessment at this stage, with all the delay it would incur, the doubts that it would cast on the only big British jet in prospect and the uncertainty it would create in BOAC, would be a major calamity”. 133

To the Treasury it seemed as if the newly formed BAC was “not much better able to bear the setback of a cancelled order that Vickers alone would have been”. But in view “of the general policy considerations in relation to the aircraft industry and of the fact as we understand it, BOAC are firmly committed to Vickers up to the figure of £151 million (3.1 billion), we agree we cannot press this point further”. The Treasury had accepted from the outset that while the aircraft would not be exported in numbers, and that it was not a productive investment for the Government, because of the importance of Vickers, and BAC’s importance as perhaps the better of the two recently reorganized groups of manufacturers of civil aircraft, the view was taken in the Treasury that BOAC’s interest must of necessity come second to those of the industry at this juncture”. 134

In 1963, BOAC’s deficit topped £80 million (1.5 billion) with the prospect of further losses taking it to £90 million (£1.7 billion) by March 1964. The crisis forced the Minister of Aviation to appoint an outsider, John Corbett, to review the Corporation’s finances. 135 BOAC’s problems had been caused primarily (but by no means only) the cost of its fleet planning. Some of the losses were attributed to bad luck, such as the Comet I disaster and the delays of the Britannia programme. But the size of the VC10 order was the largest single drain on BOAC’s resources and BOAC should have simply walked away from the contract. BOAC also contended that the VC10 fleet would cost around £7 million (£133 million) a year more to operate than a comparable fleet of Boeing 707s. The other half of the losses was due to bad management (some £15 million (£286 million) was lost in unsuccessful

133 Letter to the Treasury, 2nd October 1961. T2251635
134 T2251635
135 His report delivered in May 1963 was not published, but formed the basis for a White Paper published in November 1963, Cmnd. 5, op. cit.
The Government sacked the current BOAC senior management team of Sir Matthew Slattery and Sir Basil Smallpiece and a new chairman, Sir Giles Guthrie was asked to produce, “within a year, a plan for putting B.O.A.C. on its feet financially. This will involve a review of the organisation of the Corporation, of its route structure and of the composition of its aircraft fleet.”

Guthrie would also receive clarification on the “Buy British” policy, which would define the circumstances and the compensation open to the airline if it was directed by the Minister to act contrary to its own commercial interests in support of government policy.

On appointment, Guthrie hinted of cancelling a large part of the VC10 order, at a cost of £20 million (£380 million) in cancellation charges. This, according to Treasury calculations, “would appear to be many times the cost in development assistance which would have been required by the manufacturers of the VC10 (had a private venture not been insisted on when the aircraft was first ordered) to avoid the necessity for an inflated first order by BOAC.”

Guthrie felt that BOAC had ordered 23 too many VC10s and wanted to cancel them and order seven more Boeings. Caught between its pledge to maintain Guthrie’s freedom of action and responsibilities towards the aircraft industry (and with an election pending) the Government temporized. Eventually, the Government directed that BOAC should take 17 VC10s; the RAF would take three more, and the remainder “suspended without prejudice”. BOAC also obtained a capital reconstruction.

In the event, the VC10 proved to be a very popular aircraft with passengers, attracting 10% higher load factors than the Boeing 707. It would go on to give decades of stalwart service as a tanker/transport for the RAF. But the commercial data are unyielding: a total of 12 Type 1101 VC10 were purchased in 1964–65, followed by 17 Type 1151 Super VC10s in 1965–69. After the last aircraft was delivered in February 1970, the production line closed, 54 airframes having been built. On the other hand, 1010 Boeing and 556 DC-8s were sold internationally. Even the loss-making Convair 880 had 65 sales. The VC10 as originally conceived was built to a narrowly drawn specification: later attempts to broaden its appeal and to improve its economics had marginal effect. Even the advantages of short field performance from high altitude airports were largely negated as runways were lengthened to take the American jets (often helped by U.S. aid programmes).

BOAC, so often seen as the villain in the post-war history of UK civil aircraft, was between a rock and a hard place. Statutory requirements to act in a commercial manner could be and often were compromised by appeals to patriotic duty to do the ‘right thing’ by the domestic aircraft industry. This could be costly; it had overcome the aftermath of the Comet crisis as

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136 Financial problems of the British Overseas Airways Corporation, Memorandum by the Minister of Aviation, CAB 115/4, 12th November 1963
137 Financial problems of the British Overseas Airways Corporation, Memorandum by the Minister of Aviation, CAB 115/4, 12th November 1963
138 CAB 115/4, 12th November 1963
139 T2251635
140 Hayward, Government and British Civil Aerospace, op cit. pp.51-3
141 Robin Higham, Speedbird, op cit, p. 213-14
well as a difficult period with the Britannia. The nineteen months delay in bringing the Britannia 102 into service had entailed a net loss to BOAC of some £3 million (£67 million). Delays in the 312 series cost the airline at least £2 million (£45 million) in the current financial year and every month's delay thereafter added over £500,000 (£11 million) to their losses. 142

In some cases, the quid pro quo was to demand aircraft “tailored” to its special requirements. This also applied to BEA, but which seems to have been better able to drive harder bargains with both industry and ministers. 143 Sir Matthew Slattery tried and failed to get a clear mandate from the Minister of Aviation (at the time Julian Amery, who had succeeded Sandys in 1961). In his view, past chairmen had held “elastic” views on what were BOAC’s best commercial interests. 144 In truth, as one authoritative review of post-war jet airliners observes, neither Vickers nor BOAC seems to have shown much judgement of its commercial needs. 145

The Trident programme was also the beneficiary of Sandys’ more direct approach to industrial policy. With De Havilland absorbed into Hawker Siddeley Aviation (HSA), the newly formed company received retrospectively what was now described as “launch aid” for the Trident. 146 This was not without some official doubts; “critics are already beginning to say that it is ridiculous of us to put money into aircraft such as the DH121 which will be out-dated by the time they come into service”. 147 But as Vickers was also to receive help for its proposed medium range VC11 and the ailing VC10 programme, equity alone meant HSA should receive comparable backing. 148

In 1961, the government was also approached for help in developing a larger version of the Trident, the Trident 2. This was largely motivated by HSA’s growing financial problems and the Ministry of Aviation sympathetically supported the request. The Trident 2 also had better sales prospects than the Trident 1. 149 HSA believed that it could secure 140 sales out of a forecast world market of 300 aircraft and asked the Government for £7.5 million (£131 million) out of a total project cost of £27.5 million (£479 million). 150 The Treasury was not impressed; “This proposal is less than half-baked and it is highly doubtful whether any development of the Trident can be called a promising project”. 151 But by this time the Treasury appears to have given up the will to resist; “unless we help HSA improve the

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142 Cabinet minutes, 14th October 1957, CAB/129/89/33
144 HC 240 (1963-4), Appendix 19 and Q.1173
146 Now known as repayable launch investment. The scheme was more or less the format proposed by the Ministry of Supply for funding Trident in 1956-7.
147 Memos 10th, 18th, 20th May, 19th July 1960, 17th, 19th January, 13th February 1961, Avia 63/40
148 Although denied by Vickers, the larger VC11 was effectively a competitor to the Trident. Failing to win orders, the project was terminated in 1962.
149 Note by the Ministry of Aviation, Position of the Hawker Siddeley Aviation Group, 29th November 1961, Treasury T225/2318
150 Letter from D.I. Havilland, Deputy Secretary Ministry of Aviation to A.D Peck, Treasury 29th May 1962, T225/2318
151 Treasury memo 4th December 1961, T225/2318
aircraft to attract more customers, we can say farewell to our £5 million (£87 million)”. Rather despairingly another official asked, “is it worth spending another £4.25 million (£74 million) in “the hope of getting some of our money back?”

It was soon apparent that these estimates were optimistic and that in its eagerness to bail out HSA in 1960-1, the Ministry of Supply had been somewhat economical with the truth. “Our main concern at the time was the financial soundness of the manufacturing company. It was, to say the least, very remiss of the Ministry (of Supply) to present a proposition to us in this way. You may feel that it would be flogging a dead horse to complain about this now, but it is very relevant to the proposals which we shall get in due course to add (more) to the existing order”. By January 1964, the Trident had secured only 44 sales, 33 from BEA and the Treasury was already writing off its investment.

The VC10 and the Trident were very nearly the last of a breed – the final series of commercial airliners to be built independently in Britain (the HSA 146 would be the last, and even this had American engines). With the singular exception of Concorde, subsequent programmes (airframes and engines) would be supported at various times by government ‘launch aid’ (later ‘repayable launch investment) agreements - private venture replaced by public/private investment. The ‘Buy British’ doctrine requirement imposed on BOAC and BEA was slower to die. BOAC would have to order Concorde, and BEA, despite a preference for two BAC projects, would have to buy the Trident and, while the UK was an official partner in Airbus, it too was a required purchase. However, the government would accept that the nationalised airlines should not be financially penalised if they were ‘directed’ to buy a particular airliner. By the 1970s, and the merger and privatisation of British Airways the ‘buy British’ policy would fade away completely.

The future would largely be based on collaboration with Britain’s European neighbours; pioneered by the Concorde and followed by the Airbus (although not without a final flourish, if ill-fated, of two all-UK competing projects). ‘Tailoring’ to a narrow domestic requirement disappeared, and while the collaborative future was hardly to be free of political intervention, commercial criteria would increasingly shape project launches. In retrospect, the 1950s was a period when the Government adopted a pernicious and short-sighted doctrine, injurious to airline and manufacturer alike. The former might have the immediate advantage of tailoring designs to their requirements, but this meant nothing if operating the aeroplane cost it millions. Tailoring carried the risk that other airlines would not buy the aircraft. In truth, the strategy was essentially conceived as a means for government to avoid supporting directly the civil aircraft industry. Instead, billions of pounds were wasted on an illusion – that the UK market could alone sustain increasingly complex and expensive aircraft programmes. The answer – anticipated by the Concorde - was to join forces with other countries to develop aircraft, spreading the costs of development and expanding the base market for the product.

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152 Treasury memo. 8th August 1963, T319/149
153 Treasury memo. 8th August 1963, T319/149
154 Treasury Memos, 26th September 1963, 15th October 1963 and 2nd January 1964 T225/2318
8. The exceptions: Rotodyne and the SST

8.1 The Rotodyne

The two projects singled out by Jones in the 1958 statement had very different subsequent histories. The Rotodyne was a compound helicopter with wings and propellers for forward flight and a rotor driven by tip jets for vertical flight. It was something of a Cinderella from its inception, never really capturing a decisive following from its potential customer base, civil or military. It staggered on with a drip feed of funding until 1962 and cancellation. It had been regarded as a ‘revolution’ in rotary wing technology on which an independent helicopter industry might be founded. As Jones stated, while civil projects generally had to be funded by private venture, advanced projects would be considered “on merit” and assistance should be given in “exceptional circumstances”; the Rotodyne, Jones felt, was “pre-eminently a case for such treatment. It is a new conception of flight and may on that account prove a winner; but its’ very novelty involves unusual technical and financial risks.”

It was also a test of the government’s 1958 policy. “The Rotodyne is the first test case of our publically professed determination to maintain our position in the aircraft field by means of Government assistance for advanced projects. If we fail to support it, that failure will be publically regarded as an indication that having willed the end we are not prepared to will the means and that our policy is not in fact what we said it was.”

However, Treasury officials were consistently more dubious, especially when the companies involved in the project were reluctant to increase their financial contributions. “One must be tempted to feel that the Rotodyne, the Brabazon of helicopters, is like the Baird television, i.e. it works but it is fundamentally unlikely to provide the answer to the long term problem.” There were also doubts that anybody was likely to fund the infrastructure necessary to support the aircraft in service.

The mergers of 1960 might have provided a boost to the Rotodyne’s fortunes, but Westland as the helicopter champion was not enthusiastic, and despite some renewed interest by both the Services and BEA, other defence priorities undermined military interest. Also, persistent technical issues (primarily noise) deterred BEA from placing a significant launch order. The 1962 Defence Review delivered the coup de grace: the Chiefs of Staff “reluctantly” judged

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155 See Mathew Uttley, Westland and the British Helicopter Industry 1945-60. Abingdon: Routledge, 2013. A fine archive based study of helicopter policy during the 1940s and 50s.
156 Minister of Supply note to PM, 10th November 1958, PREM 11/3640
157 Memo from Minister of Supply to PM 14th November 1958, PREM 11/3640
158 Report of internal Treasury report, 29th October 1958, T225/1608
that the Rotodyne’s priority was insufficiently high to justify its inclusion in their plans for British Strategy in the Sixties”. 159

In short the Rotodyne was certainly an ‘advanced project’ consistent with the Government’s policy towards aeronautical research expressed in the late 1950s, but it ultimately lacked the ‘end-user’ endorsement and industry commitment that would justify heavy public investment, a factor which helped to give the contemporary SST proposal its impetus and political support taking it through to a well-funded launch. As one Treasury official concluded, “No aircraft has proved a more difficult subject than the Rotodyne”. 160

8.2 The supersonic transport

The SST had an entirely different history and would eventually point to a very different industrial future. British work on SST concepts had begun in 1954 with the Supersonic Transport Aircraft Committee (STAC). By 1959, preliminary work had established the basic outline of a Mach 2.2 aluminium alloy airframe design, and all concerned felt that this was the obvious direction for air travel and an opportunity for the UK to regain its position in the civil market. It was also clearly too expensive to be undertaken by industry alone and would exceptionally require government support. To move things along, Bristol (BAC from 1960) was awarded a design study contract based on its Type 198. Costs of full development were estimated to be £60-100 million (£1.3-2.1 billion), about twice those of the VC10. 161 The Minister of Supply Aubrey Jones was rather less confident about the cost estimates and came to the conclusion that international collaboration would be necessary. But that crucial question remained, with whom?

In the event, this turned out to be France. Although there was considerable interest in working with the Americans (particularly from the Treasury, believing this offered a more commercial option), fundamental design differences left collaboration with the French as the most realistic alternative. 162 Sealing the deal was not easy, reconciling differing views of the market and national industrial rivalries proved hard going. The French were also rather more realistic about the need for government funding and were reluctant to accept, as the British government urged, some degree of cost recovery to be built into any contract with industry. The General Election of 1959 would provide a new imperative to press ahead with the SST and to confirm the link with France. The MacMillan government decided to apply for membership of the European Economic Community (EEC) and as President Charles de Gaulle might be something of a barrier to entry, working with the French on an SST achieved a wider political salience. This rang alarm bells in the Treasury; “There is a clear danger that HMG will be confronted with an Anglo-French project commanding the enthusiastic support of both industries and both ministries. It will undoubtedly be represented as a striking example

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159 Brief to Minister of Defence, 12th February 1961, DEFE 7/1336
160 Treasury official, 4th March 1960, T225/1609
162 Meeting with Minister (Jones) 29th April 1959, AVIA 63/30
of European or Common Market co-operation, and may be a great deal harder to resist than any purely British programme”.

The final agreement – underpinned by International Treaty – was signed in November 1962. Unlike the Rotodyne, the SST, soon to be christened Concord (e), became central not only to the future of the UK civil aerospace sector, but pointed towards a more radical approach to coping with rising developmental costs. As Julian Amery, the Minister responsible for aerospace stated at the press conference announcing the agreement “Even more significant may be the lessons which France and Britain will learn from working together on every aspect of a joint project of this size. Our two countries were pioneers in the early days of aircraft production. Then, they were also rivals. But now the time has come to join forces, if we are to hold a leading position in the air routes of the world”. By then, the UK had already learnt some hard truths about developing civil airliners on a limited domestic market sustained only by orders from the national airlines.

9. Summary and Conclusions

The 1950s delivered some hard and harsh lessons to British industry and government alike. The post-1945 Brabazon programme had relaunched the civil sector, but was an expensive and poorly judged means of building competitive civil airliners. It had helped to prove key technologies, but the UK did not in the end capitalise on innovative leadership. From 1951, the Conservatives believed that the answer lay in encouraging industry to assume more of the financial risk of launching new projects. This might have implied a more commercial approach, but relying solely on the judgements of the national customers proved equally problematic. In the end, in order to secure the future for the UK civil aerospace industry, the government would again have to support projects more directly. It would also increasingly require British companies to work in tandem with their European neighbours. This was not to be an easy transition: the introduction of launch aid in its early format possessed a dangerous ambiguity that would contribute in some measure to the Rolls-Royce bankruptcy of 1971. The collaborative approach would bring its own difficulties and over 20 years would pass before it finally delivered commercial success.

163 Treasury memoranda, 31st July 1961, T225/1743
164 Flight, 6th December 1962
The author

Professor Keith Hayward FRAeS, FAAEF

Professor Keith Hayward was Head of Research at the Royal Aeronautical Society until January 2015. Before that, he was Head of Economic and Political Affairs at the Society of British Aerospace Companies and Professor of International Relations at Staffordshire University. Professor Hayward has been a consultant to the UK House of Commons Trade and Industry Committee, the US Congress Office of Technology Assessment, the UK Ministry of Defence and the Department of Trade and Industry. He has written extensively on defence and aerospace industry issues, and has published over fifty books and articles on the subject. Professor Hayward is a Fellow of both the Royal Aeronautical Society and the French air and Space Academy.

Since his retirement from the Royal Aeronautical Society, he has continued to write on aerospace and aviation subjects, with a particular emphasis on archive-based historical studies of post-1945 UK aerospace industry and procurement policy. He is currently working on studies of the ‘Anglicized’ F-4 Phantom and the near cancellation of the P1127.