

European Cooperation in Aircraft Manufacturing

Keith Hayward

The European aerospace industry, with some justice, can claim that it has already anticipated "1992". Where some other high technology industrial sectors have only recently begun to adapt to the prospect of the Single European Market by seeking cross-frontier links, European aerospace companies already have over thirty years of collaboration behind them.¹ They have long been led by economic factors, political considerations and the pressure of global competition to work together on highly complex and very expensive projects. It has not always been a wholly harmonious experience; in the words of an English proverb, "familiarity can breed contempt", and the current state of European aerospace displays a number of fissures caused by intra-regional competition, national rivalries and unhappy collaborative experiences. But in general, European aerospace firms have realised the absurdity of nationally based development and production in a sector dominated by large economies of scale and since 1945, by the industrial power of the US. However, European aerospace is at a point where the collaborative processes which have brought benefits now may have reached the limits of their ability to deliver an economically efficient (and technically effective) answer to the continued competitive threat presented by the US. Moreover, in the longer term, there will be challenges to meet from newer industries in the Far East and elsewhere.

The case for a substantial aerospace industry in Western Europe is based on strategic, technological and economic grounds. According to a recent

Commission document, "the aeronautical industry of the Community is a key sector of the European industrial base. Aviation makes a vital contribution to the civil life and commerce of the Community and aircraft and helicopters are indispensable elements of the military forces which contribute to the defence needs of Europe. The activities of the industry involve the continued advance of knowledge and technique over a wide range of high technologies, a process which yields important spin-off benefits to other sections of industry..."² Military aircraft and missiles represent some of the most potent weapons available for national and regional defence and, in many European states, dependence on an external source of supply has traditionally been regarded as a risky and politically debilitating position. Although the US is a major supplier to European defence forces, as well as a partner in several aerospace projects, a European capability to design and to develop key military technologies can be argued as being vital to the region's future security.³

Autonomy in aerospace, or at least a large measure of independence, has wider political-economic implications. In the space sector for example, the refusal by the US to launch European commercial satellites in 1972 was a key factor in the decision to develop the Ariane series of rockets.⁴ Arianespace, the commercial organisation responsible for marketing and supporting Ariane launches, now provides Europe with an independent and profitable access to space. A similar mix of commercial and strategic motives underpinned a European offensive in the civil aircraft market, dominated since the Second World War by American manufacturers. The Airbus programme, in particular, constitutes a long term investment in a key commercial arena and the Airbus "family" of four aircraft now commands a quarter of world sales for large civil aircraft.

More generally, aerospace is a major employer and provides a net surplus to the European balance of payments. The industry is regarded as a "technology driver", providing stimulus and "spin-off" opportunities for other European high-tech industries. Although it is difficult, if not impossible, to quantify these effects (which tend to be exaggerated when projects fail to show a commercial return), they are certainly not insignificant, nor can they be ignored. Aerospace undoubtedly provides a market for advanced electronics and an equipment industry which is a major exporter in its own right. It is also a source of management expertise in large scale systems integration and complex manufacturing.

Europe on the edge

Together, these factors have led to the conclusion in several European states that aerospace should be considered as a "strategic industry". Consequently, the various European national aerospace industries have usually held a privileged position with respect to publicly financed R&D, protected domestic markets, and other forms of official support. The result has all too often insulated European aerospace companies from the fierce winds of competition and the stringency of commercial investment criteria. Although much the same could be said of any aerospace industry, including that of the US, the European position has been more acute precisely because it has had to face the size and scale of US production.

Most industrialised countries and several third world states are capable of producing aircraft or aircraft components designed by others. The development of small airliners and less advanced military aircraft is also relatively straight forward. On the other hand, to acquire an expertise capable of designing and building more complex aerospace systems demands a heavy and long term investment in research facilities, highly skilled personnel and the development of sophisticated integrative skills. A long established aerospace capability, therefore, gives Europe an edge with respect to other regions, including Japan. It is, however, a fragile lead and could be undermined by progress in ambitious aerospace industries in the Far East and elsewhere. For the moment, however, as an earlier Commission report argued, "aerospace is one of the chief representatives of a type of employment—highly skilled, commanding sophisticated technologies and a high level of investment—toward which the Community must necessarily move in the future as the industrialisation of the Third World and a wider division of labour unfolds."⁵

The central theme of the European aerospace effort, either separately or together, has been the attempt to maintain a competitive position vis-à-vis US industry. The problem has rarely been one of technology *per se*. Although the US is credited with the world's first heavier-than-air flight, it was not until the 1930's that the US achieved technical parity with Europe. Similarly, and with the significant exception of commercial airliners, European designers were the equal of Americans throughout the interwar period and into the Second World War. Europe, through British research, led the world into the jet era, and German research formed the basis of US postwar rocket and space technology. The turning point came with the Cold War, when the combination of massive

US commitment to military and aerospace technology and the weaknesses and failings of European companies allowed a significant American lead to open up in several critical areas of aerospace.

The blunt reality was that the US could outproduce and outsell any European national industry in virtually every major aerospace sector. The single most important reason for the US advantage was the difference in the scale of American aerospace in terms of its initial domestic market. Even in the 1980's, the US Navy had almost twice as many aircraft as the largest European airforce, and the US Marine Corps possessed more aircraft than all but three NATO European airforces. This market was virtually closed to outsiders whereas US manufacturers were able to use their cost advantage to great effect in the world defence markets. Although less closed to outside sales, US airlines also provided a solid basis for American civil production. American firms also paid more attention to marketing and providing long term support for their products, factors which helped US products to dominate world markets. Conversely, the fragmented nature of the European market and the structural limitations of nationally based European firms precluded a realistic competitive challenge. The position was often made worse by competition between European producers for sales on the European markets.

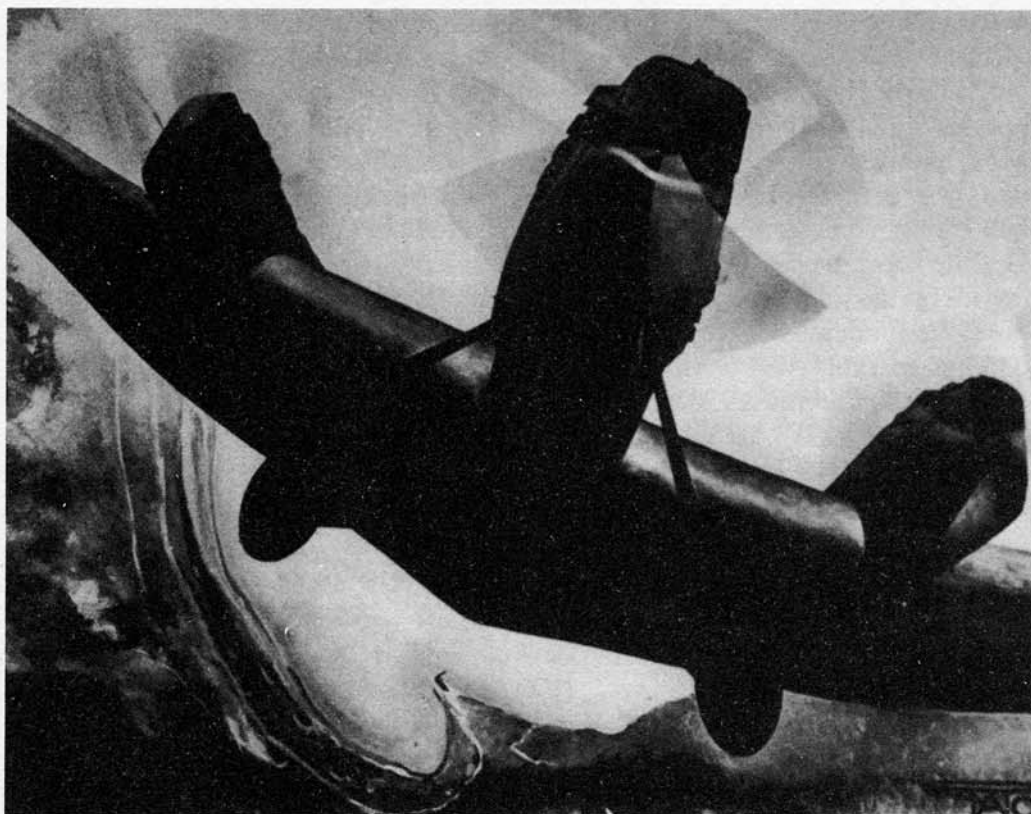
The difference in the scale of US production, combined with the higher degree of harmonisation and integration of US research, development and production enabled US firms to amortise costs over larger production runs and reduced production costs per unit by progressing further and more rapidly down the "learning curve". For example, whereas a typical production run for a European combat aircraft 20 years ago was a few hundred, 5,625 F-4's and 2,000 F-5's were built during the 1960's and 1970's. Although the French firm of Dassault was able to produce a range of fighter aircraft very efficiently and secured an extensive export market, Europeans generally found it hard to compete with the US on price and delivery.

The advantages of US civil producers were especially pronounced. The US was and still is the largest single market for civil aircraft; the world's six largest airlines are American. As Sir Austin Pearce of British Aerospace (BAe) put it: "For an American manufacturer, if he gets only 20 per cent of the home market, he is well down the learning curve. But for the British manufacturer, even 100 per cent of the home market leaves him with cost problems relative to the US manufacturer."⁶ The result was that between 1958 and 1975, the US

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was responsible for 83 per cent of all jet airliner deliveries and in the long haul market the domination was even more pronounced.

The larger scale of operations attendant on longer and more assured production runs usually justified more extensive application of advanced process technology and brought small but cumulatively significant saving in costs (for example, the use of specialised power hand tools). Although in general, European production techniques are now equal to those of the US, these differences continue to produce a cumulative advantage over a long production run which may help to explain why "learning" still appears to flatten out quicker in Europe than in the US. Similar positive gains for American



Heading up

manufacturers were obtained throughout the supplier chain and encouraged the growth of subcontractors specialising in airframe components such as doors and tail-planes which in Europe tended to be built less efficiently by the prime contractors. US firms were also better able to exploit their position as bulk purchasers of materials and components to achieve higher priority, quality and cost savings. Finally, US firms had the advantage of greater labour flexibility, a euphemism for "hire and fire". Although this was balanced to some extent by lower European labour costs, it meant that US firms could match workforce to demand and carry lower overheads. Recently, the greater stability of the European workforce has been seen as an advantage in terms of maintaining production quality, but historically the overall advantage has been to the US firm.⁷

The European aircraft industry was clearly not helped by the dislocation and destruction caused by the war. In 1945, Britain was the only country with an intact industry and even that was worn out by the efforts of wartime production. The postwar period in Britain was also marked by a series of lost opportunities and poorly judged decisions by government and industry alike. Most important of all, rationalisation and the creation of stronger industrial units was delayed until the early 1960's. French policy was more coherent and had greater consistency, but its industry had to come from a lower base. Despite some success in both the military and civil sectors, especially when driven by the requirements of the French nuclear force, French industry shared the same fundamental weaknesses of the British—limited capacity and a small national market. West Germany, of course, was only allowed back into aerospace in the mid-1950's and was hardly a factor in the European industry until the late 1960's. It, too, had to face a protracted period of rationalisation and consolidation. Italian firms produced several useful designs, but long-term development was hampered by the limitations of the Italian market and the national technology base. Much the same could be said of Holland.⁸ Significantly, the German and Italian revival was based on collaboration, initially to produce US military aircraft and missiles under licence. By the early 1960's, most European governments and firms realised that a sustained challenge to the US needed a more concerted European effort.

The basic aim of European collaboration has been to recreate some of the conditions which have underpinned American competitive strength without surrendering national control over the aerospace industry. By pooling national resources and avoiding mutually destructive duplication of effort, sharing costs

and broadening initial markets on individual projects, European governments and firms have endeavoured to resist US domination of the world aerospace industry. The result has been to bind European firms in a network of collaborative agreements and projects which, while increasing the interdependence of European aerospace, still falls short of an optimum solution. Collaboration in Europe has also had to come to terms with a legacy of competition within the region and extra-regional linkages, primarily with the US, which may or may not advance the cause of a more united or integrated European aerospace industry.

European aerospace collaboration began in the mid-to-late-1950's with co-production of the US F-104 and Hawk missile, as well as the NATO sponsored Fiat G-91 and Breguet Atlantic. However, collaboration came of age with the development of the Franco-German Transall military transport and the Anglo-French Concorde and Jaguar fighter programmes launched in the early 1960's. These were followed by the ventures and the beginnings of a European space programme.⁹ The initial experience of collaboration was neither easy nor harmonious with national and corporate rivalries, disputes over work shares and project leadership and problems stemming from fluctuating political support, providing a continuous backdrop to development. However, the ever-present competitive threat posed by the US forced governments and industries alike to accept that collaboration with its attendant compromises was the only way to maintain a comprehensive aerospace industry in Europe. The act of collaboration itself helped to break down barriers between firms and to overcome national suspicions. The experience of collaboration also led to better ways of managing joint ventures. In some cases, most notably in civil aero-engines, European companies chose to work with the Americans

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and in others, particularly where Dassault was concerned, a national approach predominated. But by the late 1970's, European cooperation had become routine and centred upon several long-term industrial and commercial consortia.¹⁰

Although European aerospace firms have been cooperating for a long time, the practice of collaboration has never been simple. Whereas some difficulties may have eased over the years, intrinsic problems continue to affect European aerospace development.

A fundamentally political arena

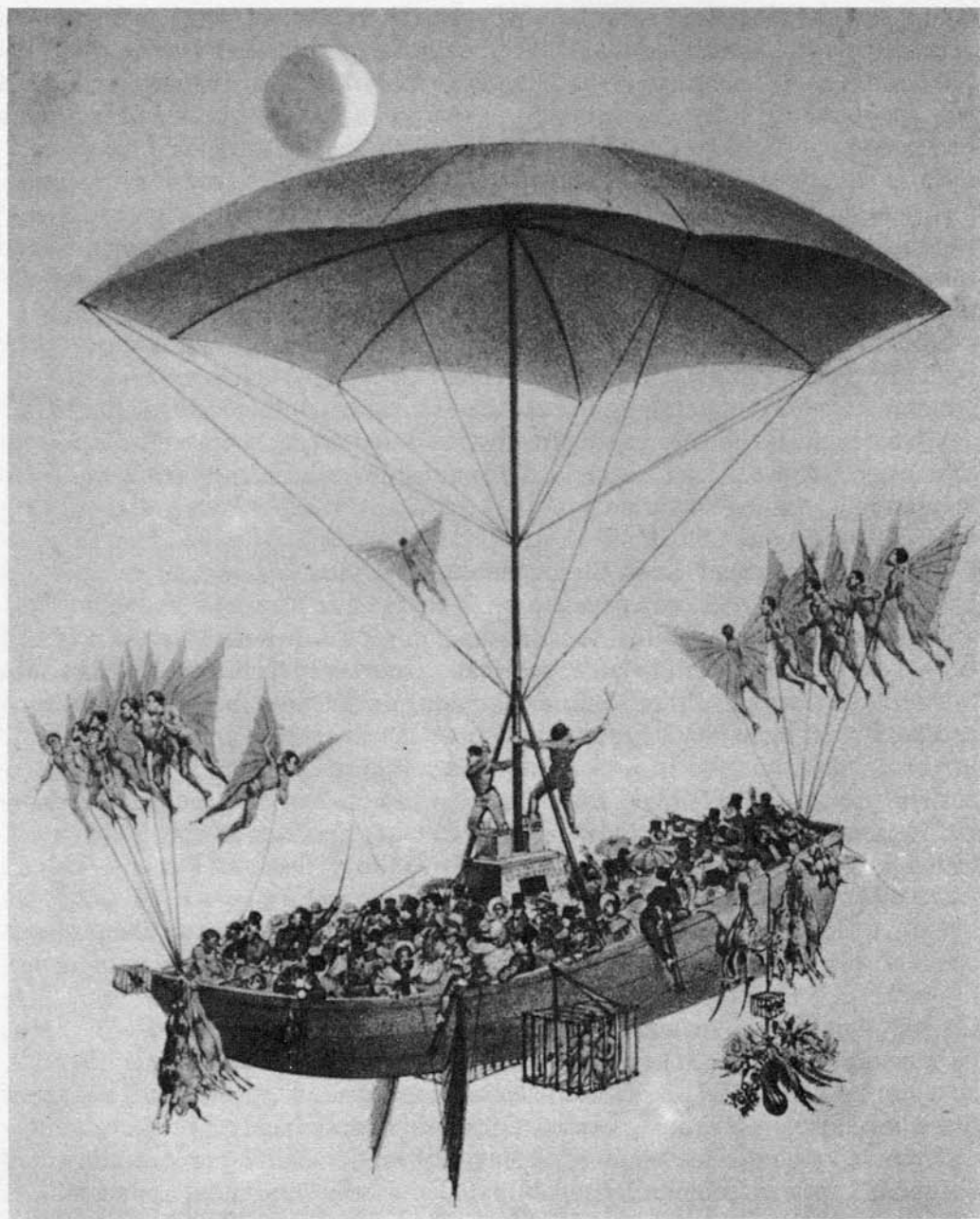
Collaboration can lead to increased costs through duplicated development and production. The exact premium is difficult to calculate, but estimates put it at between 10 and 50 per cent. However, the data do not take account of the growing continuity of the collaborative programme and of "learning" how better to collaborate. The Airbus Industrie consortium, although it still falls short of the ideal, was a clear advance on the collaborative programmes of the 1960's. Indeed, in the case of Airbus there was a deliberate attempt to learn from the Concorde experience and to avoid an overly elaborate decision-making system and heavy-handed governmental involvement which had reduced industrial efficiency and increased costs.¹¹ Firm conclusions about the "cost of collaboration" are impossible due to a limited number of comparable examples, but one authoritative RAND study suggests European collaborative ventures have been no worse than national programmes! The recent Independent European Programme Group (IEPG) report *Towards a Stronger Europe* suggests that the Panavia Tornado has cost more than a comparable national programme, but that this is "more or less balanced by the benefits in term of reduced unit price through increased production runs"¹² The Eurofighter consortium, although not directly connected to Panavia, intends to learn from the Tornado experience to improve further the efficiency and cost control of international aircraft development and production.

Industrial inefficiency, especially the notorious principle of *le juste retour*, where firms and/or states expect a return in terms of workshare proportionate to the money they invest in the programme regardless of their expertise or efficiency, has often been viewed as an unfortunate corollary of joint ventures. Amongst the European prime contractors, this has become less a problem as standards have levelled up. But it can still cause trouble in the area of

equipment and component suppliers where workshare agreements and not necessarily technical and industrial competence determines contractor selection. This problem was especially acute in the Tornado programme and is an issue in the EFA radar competition. A mature programme such as Airbus has increased the efficiency through prime contractor specialisation and the recent reforms introduced by Airbus Industrie should increase the level of competitive tendering for subcontracts. However, there are still limits to the degree to which the organisation can let major subcontracts outside the broad margins set by national worksharing agreements. Further improvement in the efficiency of the Airbus programme may require more fundamental changes in the multinational production system. In the most recent military programmes, such as the European Fighting Aircraft (EFA) and the PAH-2 helicopter, governments have imposed tighter contractual terms on the industrial partners, a move which should help to contain costs and to increase programme efficiency. But in the final analysis, the application of efficiency criteria will inevitably be diluted by national industrial and technological interests.

Collaboration can lead to a loss of technology to potential competitors. Undoubtedly, several European equipment companies have used collaboration to build up their technological capabilities. The German engine firm MTU deliberately chooses collaborative projects to match gaps in its capabilities. The French have been particularly successful in this respect, but both the German and the Italian industries have seen collaboration as a means of reaching international standards. Spain is now following these examples in using participation in projects like EFA to build up expertise in electronics, materials and engine technology.¹³ Rolls-Royce has certainly felt that it has stood to lose technically through collaboration, especially in the civil sector. Equally, with the most extensive and capable equipment industry in Europe, the UK has been a relative "loser" in many joint ventures; but without collaboration, its absolute position would have been far worse.

On the other hand, BAe and Rolls-Royce have successfully protected "leadership" positions in key European military projects. Aérospatiale has built up a similar position in the Airbus and European space programmes. The larger firms have also seen national ventures or a mix of collaborative projects with different technological responsibilities as ways of maintaining an overall design and systems integrating capability. Conversely, the absence of such "integrating" competence has handicapped the West German industry. One of the motives behind the consolidation of German aerospace under the Daimler-



Explorers retournng from the Moon

Benz umbrella and the promotion of projects such as the Saenger advanced space vehicle, has been to enhance German influence in collaborative programmes and to strengthen German claims to the most demanding aspects of aircraft development and production in future joint projects.¹⁴

Collaboration, where several national requirements may have to be reconciled and where it may be necessary to obtain financial support from a number of governments, can lead to increased uncertainty and delay at the outset of a programme. This was evident in both the EFA and PAH-2 cases and can be seen at work in several current European helicopter programmes. This can lead to increased costs and provides opportunities for governments and companies to "bail out" of a collaborative programme. But in the longer term, most European firms have recognised that collaboration has brought stability and some protection from changes in national policy and budget cuts. Differences in national policy towards arms sales can also complicate collaborative ventures. Both the British and the French have found working with the West Germans problematic in this respect. However, German industry has benefited from the fact that their more stringent national position on arms sales is diluted where collaborative programmes are concerned.¹⁵ However, the overall position in Europe is probably no worse than in the US where Congressional pressure and Federal policy has limited the freedom of US firms to sell abroad, and where the procurement process often encourages an adversarial relationship between the US government and the national aircraft industry.

European aerospace collaboration, in a more general sense, is a fundamentally political arena. The history of collaborative projects has often revealed powerful clashes of national interests. The mixed fortunes of Anglo-French relations during the 1960's led to mutual suspicion which, in some quarters, still haunts cooperation between the two industries. The most obvious consequences of this period can be seen in the limited Anglo-French cooperation in aero-engines and combat aircraft and Westland's preference for working with US or Italian helicopter firms. Despite the years of collaborative experience, there are still differences in attitude and policy amongst the major European aerospace nations and amongst different companies in the same state. The French have, with some success, reconciled the objective of building a strong European industry as a political-strategic goal with their own national requirements and interests. The British, on the other hand, have tended to view collaboration more pragmatically, with a greater and sometimes narrow concern for cost.

A clash of attitudes was clearly evident over European space policy. The French have successfully laid claim to leadership of the European space effort and were the architects of a fully comprehensive European Space Agency (ESA) programme complete with an independently manned capability. The British Government, with far less commitment to space generally, derided the ESA targets as a grandiose waste of money. Although other European states have resented French domination, the British found themselves clearly isolated over the ESA programme.¹⁶ On the other hand, the arrogance of Dassault combined with the close working relationship between British, German and Italian firms, left the French equally isolated in the search for a new European fighter.

Aerospace has also played a key role as a substantive element in Franco-German reconciliation. Indeed, the French have often worked on German sentiments to influence collaborative decisions. This tactic failed in the case of EFA and the Rafale fighter, but it certainly played a significant part in the launch of the PAH-2 helicopter. The Franco-German link in fact is at the core of European aerospace and with the exception of the most advanced combat aircraft, most of the major European programmes are centred on French and German partnerships. From a West German perspective, collaboration has been vital in the development of its aerospace industry. However, the feeling that German firms should have more influence over cooperative projects and to lay claim to the more demanding technologies and production work has begun to grow within the Federal Republic. This has led to a more assertive approach to collaborative negotiations and the search for alternative, perhaps German-led, collaborative projects.¹⁷

Global Consideration

Although collaboration within Europe has become the dominant industrial paradigm, there have been alternatives. There are several important national programmes (or predominantly national programmes), such as the Rolls-Royce RB-211 family of civil aero-engines. European firms also cooperate with companies outside Europe. In particular, all of the major European aerospace firms have worked with the US when it has suited national or corporate interests. While cooperation with the US is not inconsistent with building a stronger regional capability, it has sometimes been seen as the more attractive alternative to dependence on a European partner. The Franco-American CFM International aero-engine programme has been very successful, as has BAe's

relationship with McDonnell Douglas (MDD) in the Harrier. The West Germans have long supported links with the US in the area of manned space activity. There is also an extensive trans-Atlantic subcontract network, particularly important to the smaller European firms such as Shorts (now owned by the Canadian Bombardier company). The Italian industry, for example, has shown a distinct preference towards working, on a risk-sharing basis, with US firms and Agusta is showing an interest in a closer relationship with Sikorsky. However, the Italians are still strongly European in other respects through participation in the Franco-Italian ATR42 and ATR72, the EH101 helicopter with Westland and as the third most important contributor to ESA. There are many additional links between European and other manufacturers in Japan, Canada, Brazil, Indonesia, China and South Korea. In the future, collaboration with the Soviet Union—certainly in space and civil aircraft technology—cannot be ruled out. The European aerospace industry must be seen increasingly as part of a wider global industry and as such, working with the US is an important element in the overall structure of European aerospace.

Working with the US can be difficult. US firms have tended to demand leadership of joint ventures and have sometimes shown less sensitivity to the needs and interests of junior partners. Programmes are vulnerable to congressional intervention and, as we have already noted, the US industry-government relationship is more adversarial than is the norm in Europe. Consequently, commitments to joint projects may be even more uncertain than they would be amongst European governments. More recently, there have been signs of a renewed US interest in cooperating with Europe, which is clearly driven in part by reductions in US defence spending and a fear that "1992" will lead to American exclusions from European civil and military markets.¹⁸ But there are also signs that US firms are more prepared to accept a "European" approach to collaboration with a greater recognition that European firms are their technical equals with comparable claims to programme leadership. However, the prospects of increased trans-Atlantic cooperation has to be reconciled with the incontrovertible fact that the US represents the main competitive threat to the European aircraft industry. Indeed, the Airbus has been the focus of long-standing US complaints about "unfair" trade practices and the prospect for cooperation between the US and Europe in large civil aircraft seems remote. Cooperation with the US therefore must be treated with due circumspection and accepted on mutually favourable terms. It should certainly be based upon equality and negotiated from a position of strength.

The European Community industry ranks second only to the US in terms of total sales (ECU 36 billion compared to ECU 90 billion) and employment (477,000 compared to over 1.2 million).¹⁹ In 1987, the EC aerospace industry exported over half of its sales, and was in surplus to all countries except the US. Although Europe remains the US aerospace industry's main market, this represents a significant improvement over the last 20 years. The three largest national industries, those of France, Britain and West Germany, account for over 87 per cent of the EC total, with Britain and France vying for first place overall (each has about a third of EC sales). Both the British and the French industries have full design and development capability in a wide range of aerospace products. The French have a superior missile/space sector while the British have the more capable aero-engine sector. These two countries also dominate the European avionics and aerospace equipment industries. The West German industry, responsible for just under a quarter of EC output, has grown rapidly over the last two decades in terms of both scale and competence. Italy, with just over 8 per cent and the Netherlands with 2 per cent of EC output also have some independent design capability, with the Dutch especially prominent in civil aircraft. Belgium and Spain are junior partners in EC aerospace, each with less than 1 per cent of EC sales.

State-of-the-art

Airframes (aircraft, helicopters and missiles) made up just under half of the 1986 EC aerospace production; engines accounted for 17.6 per cent, equipment 27.8 per cent and space vehicles 5.4 per cent. Sixty-four per cent of this was military, a fall of 6 per cent since 1980—the difference due mainly to a sharply increased civil output. In the mid-1970's, Europe had less than 5 per cent of the world market for civil airliners; by the mid-1980's this had touched 30 per cent and had stabilised at just under a quarter. The bulk of this production comprised aircraft from the Airbus "family", with the A320 becoming the first European large civil aircraft to exceed 500 sales. European manufacturers were also well represented in the market for feederliners, commuter and executive aircraft. The European civil aerospace industry is well placed to achieve a substantial share of a market over the next fifteen years estimated to be in the region of \$500 billion. The main European civil aero-engine companies, primarily Rolls-Royce and the Snecma-GE CFM International consortium, are also set to share in this huge market. Technically, European civil aerospace is "state-of-the-art" and in some respects a world leader with the Airbus A320 setting the pace in terms of "fly-by-wire" control systems and other advanced

design characteristics. However, the profitability of key programmes such as the Airbus depends upon improving productivity and efficiency and despite its evident commercial progress cannot yet be declared an economic success. Other European civil airliners, such as the Fokker 50 and 100, the BAe 146 and the ATR 42 and 72, are also set to benefit from an expanding market.

By the mid-1980's, the European military sector had reached a plateau, with mature programmes such as the Tornado and the Mirage F1 and Mirage 2000 reaching a peak of production. A similar point has been reached in the life-cycle of European military helicopters and guided weapons. New programmes are in early stages of development, but their future remains somewhat problematic; European industry is less united than might be desirable at a time when the defence market is growing slowly, facing possible constraints from conventional arms control agreements, with European firms subject to even greater international competition and with defence budgets, particularly in West Germany and the Benelux countries, under severe pressure.

The establishment of two competing fighter aircraft programmes—the French Rafale and the EFA consortium (UK, West Germany, Italy and Spain)—reflected a failure in cooperation, due in large measure to French intransigence and in particular the failure of Dassault to have learnt from the limited export success of the Mirage 2000 and the failure of the Mirage 4000, both national projects. The European helicopter industry has too many projects with a confusion of uncertain, evolving national requirements. Changes in the nature of the European defence market, with increased stress on competitive procurement and cost-saving, have added to the climate of uncertainty. The defence electronics sector has become especially volatile, with national and international mergers and acquisitions altering the face of European production.

According to the IEPG, the European military aerospace technology base is generally “very sound”. There were potential gaps in “stealth” technology and some materials applications. But there was a longer term danger that US commitment to basic R&D could leave Europe at a disadvantage. More seriously, in electronics—the heart of the modern combat aircraft—although Europe was holding its own in most areas such as radars and flight control systems, there were already some deficiencies. The strength of European aerospace industry was clearly dependent on the continued health of the European electronics industry, especially in the field of advanced integrated circuits and data processing.²⁰

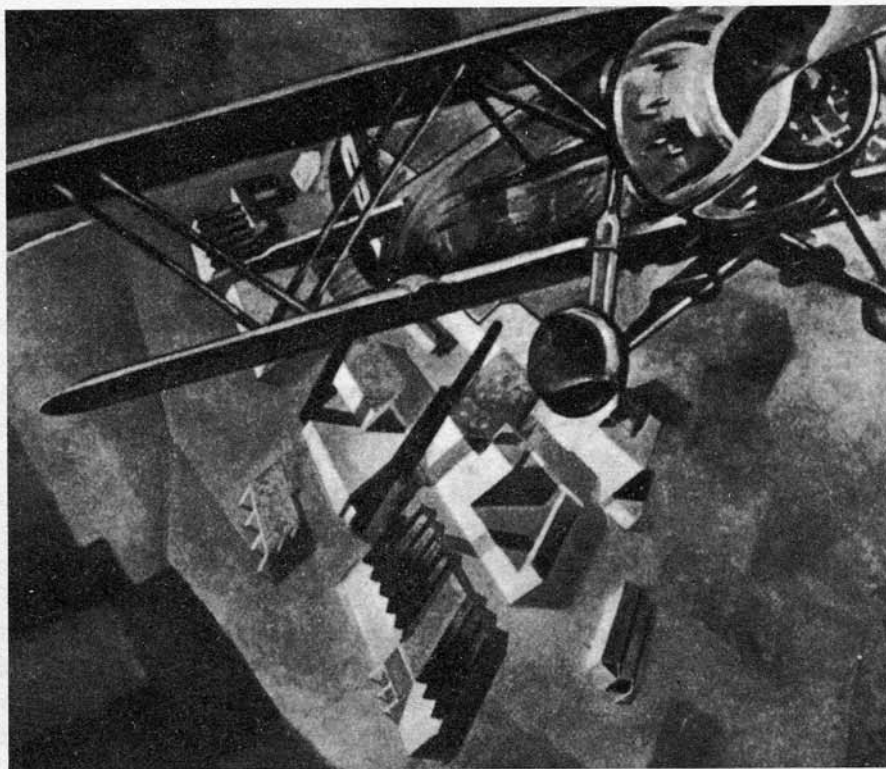
Europe's space industry can show a similar mix of current achievement and future uncertainty. The undoubted success of the Ariane series, which has won over half of the world's satellite launch orders, is a vindication of ESA's (and France's) determination to provide Europe with an independent access to space. Overall, however, the space sector represents only 5.4 per cent of EC aerospace output, despite its very high political profile. The commitment in 1987 to the further development of the Ariane rocket, to build a European manned space vehicle—the Hermes—and to participate in the US-led international space station represented a major increase in the European space effort. However, the decision, with a commitment to development spending of about \$12 billion, was not without controversy. Some of Britain's doubts about the viability of the programme were legitimate, despite its inept diplomacy, and both the Hermes and the Space Station will have to overcome serious financial and technical challenges.

Beyond collaboration

Even after three decades of national rationalisation amongst European aerospace companies, the difference in scale between the US and European companies is still substantial. The most salient feature of European aerospace is the tendency towards “national champions” which still only just match the smaller of the US giants. Collaboration has provided a basic framework within which European companies have been able to compete with the US. Equally, the organisation of collaboration has also steadily improved through successive generations of European firms and personnel working together; Airbus Industrie, Panavia/Eurofighter and Arianespace are “state of the art” project-based joint ventures. The question remains: is there yet a better way of ordering things based on transnational ownership? Equally important, is it realistic to consider a more integrated European industrial system?

Airbus Industrie is a particularly significant case of a long-standing European programme facing a potentially difficult transition. There has been growing concern, especially on the part of its government sponsors, that despite its commercial success, the programme is still a long way from sustained profitability. The position has been exacerbated by the weakness of the dollar—the international currency for civil aerospace trade—but there are also deeper problems stemming from its collaborative format. In 1988, an investigation initiated by the four governments, led to a “Wise Men” report on the Airbus system. Its conclusions were, *inter alia*, that the

consortium's decision-making structure had to be streamlined and that its management in general should "as far as possible mirror that of a public company". The existing system, based on the French legal formula of a *Groupement d'Intérêts Economiques*, has proved an effective basis for initial production and for establishing a market presence, but it lacks sufficient accountability and commercial sensitivity for what has become such a large and expensive undertaking. In particular, the prime contractors (and owners of Airbus Industrie) will have to adopt a more commercial approach to subcontracting, including more competitive tendering, in order to increase efficiently.²¹ Implementation of the reforms was finally agreed in March 1989 after some tough negotiations between the partners and their governments.



The craft and the factory

However, the most radical solution—the creation of a separate and privately owned Airbus company—was shelved because of the different forms of ownership of the parent companies and the degree of support they received from their respective governments. Although the new system should lead to significant improvements in industrial efficiency, Airbus Industrie will still have to work within the constraints of a four nation/four company programme. For example, proposals to alter production responsibilities which may be economically desirable will still have to overcome corporate and governmental reluctance to give up perceived national benefits. There is still only a limited provision for fully open tendering for sub-contracts and equipment supply.²² On the other hand, the creation of some form of pan-European Airbus “company” could dilute the technical and financial links between civil development and production and the broader aerospace/engineering base provided by the prime contractors.

The transnational way

In general, European firms are still reluctant to move away from the consortium approach to project development. Equally, although there is much talk and some movement towards the creation of a more trans-national aerospace industry in Europe, the main preoccupation is with further national consolidation. This has been especially marked in West Germany, where the rationalisation of aerospace and much of the national avionics industry is occurring through the takeover of Messerschmitt-Bölkow-Blöhm (MBB) by Daimler-Benz, and the subsequent creation of Deutsche Aerospace. Its primary rationale, although the Daimler management has advocated cross-national shareholdings, has been to strengthen West Germany's position in collaborative ventures. Similar motives can be seen in BAe's expansion and diversification into automobiles (Rover), construction (Ballast Nedam) and armaments (Royal Ordnance). Both Daimler and BAe are also motivated by the synergies that may be obtained from linking automobile technology with that of aerospace. There are certainly powerful technical reasons why electronics and aerospace should be more closely integrated. However, the main purpose of this rationalisation is to create more powerful industrial units with the resources to match US and Japanese high-technology firms and to be better positioned in the European market. Although the French aerospace industry has been slower to move in this direction, there is certainly concern that French firms will be squeezed between BAe and Daimler and a similar degree of national consolidation may be forced on the French.²⁴

The only example to date of a European aerospace transnational merger, VFW-Fokker, broke up in the late 1970's due primarily to an inability to transfer military work from Holland to West Germany. Although there are some cross-national shareholdings (Aérospatiale in MBB and Daimler-Benz and GEC in MATRA), the European aerospace industry is still mainly based on national units. Similarly, the degree of real integration amongst European aerospace firms hardly matches that of the motor industry. This is largely a reflection of the importance attached to the national security aspects of aerospace as well as the perceived technological benefits of having an independent national industry. However, the prospect of more substantial international as well as intra-European companies can no longer be ruled out, especially as 1992 looms larger in corporate minds. The defence/aerospace electronics sector may well be leading the way in this respect. Although in the past the US has been the primary target for overseas acquisition, the joint bid by GEC and Siemens for Plessey, as well as Thomson-CSF's aggressive international acquisition strategy, indicates that large European transnational defence enterprises are emerging.

The aerospace sector may yet follow this trend, but as some analysts have noted with respect to the electronics industry, would the creation of European as opposed to national "champions" be really desirable? The danger is that such firms would be insulated from the positive effects of competition and lose their edge in world markets just as some national champions have in the past.²⁵ In the case of aerospace, this fear is probably less justified because of the sheer cost of development and production. The establishment of pan-European firms would only match those in the US for scale and there would be benefits in terms of more efficient and flexible manufacturing. However, proposals for integrating the European aerospace industry are hardly novel.²⁵ The key question is how to bring it about? As we have suggested, the trend appears to be towards the creation of nationally based conglomerates with increasingly important transnational links. If, however, the new industrial structures demand a more commercial approach to aerospace, there might be fewer obstacles to the creation of international, functionally defined subsidiaries capable of achieving more efficient management and more commercial approaches to subcontracting and equipment purchase. The path would undoubtedly be eased by the evolution of cross-national shareholdings along the lines proposed by Edzard Reuter of Daimler. Certainly, the process will become easier as other related industries also move towards multinational ownership and as the European market for military and civil aerospace products is liberalised.

In the short term, however, the future may be much like the past. European aerospace collaboration is undoubtedly still some way short of an optimum form of organisation and operation. Equally, there are still significant policy and attitudinal differences between the European aerospace nations. There will be a greater degree of internationalisation in terms of ownership and operation, but it will still be firmly based on a core of national manufacturers. This may be sufficient to maintain Europe's competitive challenge in aerospace into the next century. On the other hand, more radical changes may be forced on the industry in the face of not only US pressure, but the continued expansion of the world aerospace industry as well. So far, the European aircraft industry has achieved a strong position in the global marketplace; it would be a tragic irony if residual nationalism undermined hopes for its future success.

References

- ¹ - There are, of course, several industries which are already operating on a European scale with even more cross-national integration than the aerospace industry—for example, automobiles and chemicals. Others, including much of the electronics sector, have really come to collaboration only in the last half decade.
- ² - *Toward a Programme of Strategic Measures in Aeronautical Research and Technology for Europe*, COM (88) 294, (Brussels, July 6, 1988) p.i.
- ³ - For a more critical view of European collaboration see K. Hartley, *NATO Arms Co-operation*, (London, 1983).
- ⁴ - See M. Schwarz, "European Policies on Space Science and Technology", *Research Policy*, 8(1979) pp. 210-225.
- ⁵ - *Action Programme for the Aeronautical Sector*, R/2461/75, (Brussels, 1975).
- ⁶ - *Aerospace*, October 1985.
- ⁷ - It should be noted that even in the US, defence aerospace production has been criticised for waste and inefficiency. See J. Gansler, *Affording Defense*, (London, 1989).
- ⁸ - For background to the major national aerospace industries of Europe, see K. Hayward, *The British Aircraft Industry*, (Manchester, 1989); K. Hayward, *The West German Aerospace Industry and its Contribution to Western Security*, (Royal United Services Institute for Defence Studies, Whitehall Papers series, Autumn 1989), and G. Jalabert, *Les Industries Aéronautique et Spatiale en France*, (Paris, 1974).
- ⁹ - Strictly speaking, European space activity originated in the early 1960's with the creation of the European Space Organisation (ESRO) and the European Launcher Development Organisation (ELDO). These were merged to form the basis of the European Space Agency, created in 1975.
- ¹⁰ - For a general background on the development of European technological cooperation, including aerospace, see M. Sharp and C. Shearman, *European Technological Collaboration*, (London, 1988).
- ¹¹ - For a more detailed examination of the Airbus and Concorde programmes, see K. Hayward, *International Collaboration in Civil Aerospace*, (London, 1986).

- 12 - *Towards a Stronger Europe*, IEPG, (Brussels, 1988), Vol. 2, p. 119. The shortcomings of the Tornado programme are discussed in P. Creasey and S. May, *European Armaments and Procurement Cooperation*, (London, 1988), pp. 150-2.
- 13 - *Interavia*, January 1988, pp. 45-50.
- 14 - See Hayward, *The West German Aerospace Industry*, op. cit.
- 15 - Ibid., and B. Huebner, "The Importance of Arms Exports and Armament Cooperation for the West German Defence Industrial Base", in D. G. Haglund, *The Defence Industrial Base and the West*, (London, 1989).
- 16 - See H. Wallace, *British Space Policy and International Collaboration*, (London, 1987).
- 17 - See K. Hayward, *The West German Aerospace Industry*, op. cit.
- 18 - See *The US Aerospace Industry and the Trend Towards Internationalisation*, Aerospace Industries Association of America, Washington, 1988.
- 19 - Data is based on the *European Industrial Outlook, Aerospace Industry*, published by AECMA (Paris, August 1988).
- 20 - *Towards a Stronger Europe*, Vol. 2, pp. 73-7.
- 21 - For details of the proposed reforms in the Airbus Industrie system, see *Financial Times*, March 21-22, 1989.
- 22 - Ibid.
- 23 - The French view the reorganisation of the German Aircraft industry with some concern, although Thomson-CSF is one of the most aggressive seekers of European links. See "Français gare a Daimler", *Le Nouvelle Economiste*, No. 684, March 3, 1989.
- 24 - See M. Sharp, *European Technology: Does 1992 Matter?*, text of lecture, SPRU, University of Sussex, March 1989; W. Walker and P. Gummatt, "Britain and the European Armament Market", *International Affairs*, Vol. 65, No. 3, Summer 1989.
- 25 - Several European industrialists and politicians suggested in the early 1970's that the major European aircraft and engine industries companies should be merged into three units. One of the advocates was the then British aviation minister, Michael Heseltine. The idea was never taken that seriously by industry or by governments, most preferring to improve *ad hoc* collaboration.