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Trade and Industry Committee

The UK Aerospace Industry

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Oral and written evidence

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The Trade and Industry Committee

The Trade and Industry Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department of Trade and Industry.

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Richard Burden MP (*Labour, Birmingham Northfield*)
Mr Michael Clapham MP (*Labour, Barnsley West and Penistone*)
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Sir Robert Smith MP (*Liberal Democrat, West Aberdeenshire and Kincardine*)

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Footnotes

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Oral evidence

Taken before the Trade and Industry Committee

on Tuesday 14 December 2004

Members present:

Mr Martin O'Neill, in the Chair

Mr Roger Berry
Richard Burden
Mr Michael Clapham
Mr Nigel Evans

Mr Lindsay Hoyle
Linda Perham
Sir Robert Smith

Witnesses: **Dr Sally Howes**, Director General, Society of British Aerospace Companies (SBAC), **Mr Kevin Smith**, President of SBAC and CEO of GKN and **Mr Colin Green**, Vice-President, SBAC and Director of Research and Technology, Rolls-Royce, examined.

Q1 Chairman: Good morning. Once again, can I welcome you; this is one of our regular looks at the aerospace industry. We do this in part because we are conscious of the significance of the industry in parts of the country and generally in relation to the UK economy, also because it is one of these industries with which the Government is very closely involved and, while people do not want interference, they certainly want the money that interference sometimes brings along. We recognise as well that it is one of the yardsticks by which we judge the effectiveness of our manufacturing industry and we do feel that it is an important industry because it attracts investment into the country as well as providing us with exports. That is really where we want to start, if we can get from you an impression of what you think are the main competitive advantages that the UK aerospace industry has in the international marketplace as it were. If these competitive advantages do exist, are they being sustained, are they being improved? That is really where we want to start off this morning; Dr Howes, maybe you could introduce your colleagues and then we can get started.

Dr Howes: This is Kevin Smith, the President of SBAC, he began his presidency last September, and Colin Green is the Vice-President of SBAC.

Mr Smith: Maybe I can start to talk a little bit about that, and then if my colleagues want to, they can add any points to that. The first thing to say is that we come here as a successful industry; we are the second biggest global player, £17 billion worth of turnover in the year 2003, £6 billion of value added to the UK economy, over three per cent of the UK manufacturing jobs and a large positive trade balance for the UK. So as we come here we do have that very strong position, and you do not do that without having some significant advantages. The first thing to say is that we have a very comprehensive industry in terms of its capability and throughout the supply chain we have strong capabilities in the UK. We have major and I think leading capabilities in wing design for large aeroplanes, and I know Iain Gray from Airbus is here and you can talk to him later on—

and the engine capability in Rolls-Royce is absolutely superb. We are also very strong in international markets and I think that is important. Of our £17 billion around £12 billion plus of that actually goes out into the international marketplace, and being able to work in Europe and the United States—and we know there are some issues there around market access on the defence side—we think has some unique strengths for the UK aerospace industry, which we are very proud of actually. Also, being able to export into international markets is again another strength for the industry that we have. In terms of the future, as you know, in 2002 we carried out a review of the UK aerospace industry with the Aerospace Innovation and Growth Team, which was the first such review for 40 years. It was a comprehensive review, it included all stakeholders in the UK and identified a number of areas of work to be able to maintain that position in future. It is an industry that is changing, globalisation is affecting the aerospace industry very quickly, with nations out there with strategies to build aerospace industries. China is going to be building aeroplanes in the not too distant future, that is out there, that is real, that is a threat to us and an opportunity to us if we can maintain and enhance the capability of the UK. There are three areas that have come out of that work for us as the Society for British Aerospace Companies that are extremely important to us in being able to develop the industry that we have. One is skills, one is the technology base and the third one is what we call process excellence, which is all about productivity, and we recognise that there is a lot that we can do in terms of improving our own productivity. All of those areas are about capability, enhancing the capability within this country to be able to continue to compete effectively in that global market. Having done that, there are a number of areas where we would like the playing field to be level, we would like market access, particularly on the defence side, in the United States and Europe to be more open for us, but all in all my summary would be as we sit here today that we are in a strong position. Our

challenges are about how we actually maintain and develop that position for the future. We have a good plan, the work of our Innovation and Growth Team was good work, came out with good conclusions and our challenges are all about execution; the link-up with Government in that execution is extremely important for us. Is there anything you want to add, Colin?

Mr Green: No, that is a fairly comprehensive opening statement.

Q2 Sir Robert Smith: If I can just pin down the picture here of where we fit into the world, you mentioned the amount of money generated by the industry and in your own submission you talk about 0.6% of gross value added without the supply chain and something like 1.2% with the supply chain. How does this compare, the direct and indirect contribution of aerospace industry, in our main competitor economies?

Dr Howes: Some of these international comparisons are actually quite difficult to make. With both our colleagues in DTI and across industry we do recognise that there are some weaknesses in trying to get comparable information, but in terms of productivity we do feel that the productivity gap compared with the US is certainly very much closer than it was and we are working very hard to support that. In fact, one of the recommendations that came out of the AeIGT was specifically to work together with Government to try and improve the evidence base for the industry, but the international comparisons are extremely difficult to make.

Q3 Sir Robert Smith: What makes them difficult, the definitions or the measures?

Dr Howes: Definitions and access to data I believe, the amount of information that is disclosed both at Government level and within companies.

Q4 Sir Robert Smith: Is it any easier when it comes to trying to gauge employment and trade balances from aviation or do the same problems arise?

Dr Howes: Employment is much easier to look at. You quoted the figures, 122,000 people employed directly in the UK; we are the largest aerospace sector in Europe and we have 30% of total employment across Europe in the UK. The figures for the US I do not actually have to hand at the moment.

Q5 Sir Robert Smith: But you could send them to us.

Dr Howes: Yes, we could provide those, certainly, which would make it clearer.

Sir Robert Smith: Thank you very much.

Q6 Linda Perham: You say in your submission that the terrorist attacks of 9/11 led to a dramatic reduction in orders for civil aircraft and I think a 20% drop in UKAI turnover, an immediate drop. Was that reflected in our competitors or was there anything particular about the UK industry where there were problems?

Mr Smith: No, it was reflected in competitors too and I think probably in some respects the companies working in the US who were not aligned with Airbus had more significant problems than companies that were aligned with Airbus. In Airbus it actually stopped growth but in Boeing there was a very significant reduction in output which did impact on UK companies too, but it was a global phenomenon at that time, a very sharp decline in the demand for commercial aircraft in that period.

Q7 Linda Perham: So as much as 20% elsewhere?

Mr Smith: I would think probably in the US that would be the case.

Q8 Linda Perham: You also mention that concurrently there were development issues in a number of defence programmes leading to major delays; so that was a factor as well.

Mr Smith: Do you mean during that period?

Q9 Linda Perham: Or just post 9/11 or in the lead-up to it.

Mr Green: I would say that on balance the impact of the increased awareness of the importance of defence probably led to a slight growth if anything in terms of the demand and activity rather than reduction.

Q10 Linda Perham: If I could just ask about something else which is in your submission, at 3.1.2 you say that "Post 9/11 the security environment continues to pose substantial challenges . . . Growing levels of both public and private investment in security technologies in the US and most EU countries have not as yet been matched in the UK." Are there going to be changes so that it is matched, or does that depend on the assistance you can get from Government and other sources?

Dr Howes: One of the critical aspects of that is that the industry is quite keen to understand what more of the coordinated demand from Government is for security products and services into the future. There are quite a variety of Government departments and agencies involved in this whole piece and sometimes it is quite difficult for industry to understand what the coordinated demand will be. Certainly with the way that Europe is moving towards to looking at security at the European level, it is quite important for the UK picture to become more coordinated.

Q11 Linda Perham: We are actually behind, it is said, most EU countries and the US in security technologies, so does that concern you?

Dr Howes: Yes, it does at the industrial level. Certainly, there is an issue to do with R&D into those products and services for the future and of course companies are looking very keenly at that, but again it is understanding what the demand piece is going to be as well. We are quite interested and keen to work with and support Government in having a look at that.

Linda Perham: Thank you, Chairman.

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Q12 Mr Berry: Obviously, one of the key issues here is productivity and competitiveness. Could I start by asking a factual question about what you said about productivity; in 2.2.1 you say that “The UK aerospace industry has shown rates of productivity improvement of 4.2% compared to 2.3% in France . . .” Can I be clear, over what period do these figures relate?

Mr Green: It is between 1992 and 2001.

Q13 Mr Berry: So that is a good period of time. You also go on to say—and you referred to this earlier—that UK productivity remains behind both the US and France but I do not find any figures on that. Do you have those figures to hand?

Mr Green: We have some figures here that I can quote from. The difficulty, as Sally said earlier on, is actually getting a sensible comparator because one of the things that certainly influences the way in which those comparisons are drawn is the exchange rate, which itself is pretty volatile—and I am talking about the UK versus both the euro and the dollar. What we have tried to use is the so-called purchasing power parity exchange rates and on that basis the value add per employee in the US aerospace industry according to the figures we have is on average 26% higher than we have in the UK; the one that we always find difficult to really get our minds around is again based on the IMF estimates and in France it appears to be 42% higher in the same period, which would imply that France is more productive than the United States.

Q14 Mr Berry: By a significant amount.

Mr Green: By a significant amount.

Q15 Mr Berry: And you believe this.

Mr Green: That is what the figures say, but I think the industrial anecdotal evidence does not really support that overall comparison, but what I think it shows, more importantly, is that over that period the gap itself, even if we may dispute the absolute levels, the gap itself has closed against both economies, so the UK aerospace industry is definitely becoming globally more competitive.

Q16 Mr Berry: So you think that the figures are robust enough to arrive at that conclusion.

Mr Green: In terms of trends.

Q17 Mr Berry: That is fair enough. We tend to compare UK productivity growth with countries which are doing quite a bit better in terms of absolute levels of productivity. We are chasing the US and apparently France, but who is chasing us? What about those who are coming up behind the UK, what is happening there?

Mr Smith: I would characterise the world as being a fairly mature set of nations, which would include the European nations, falling into that basket, and the United States. Emerging economies are trying to build and develop an industry, and I think the difference between those two is actually all about capability; there is absolutely no doubt that in those developed economies that we have spoken about

there is a hugely greater capability than in emerging markets, but those emerging markets are learning very quickly and, as I have mentioned already, China will be building aeroplanes and they are the people who are going to chase this industry over the next 20 years. They also provide a great opportunity for us because if we can continue to enhance our capability, continue to be competitive, then those growth markets give a real opportunity for the UK aerospace industry. In China today there are around 700 aeroplanes in its inventory, by 2020 it will have well over 2000, which is huge and makes it probably the second biggest aerospace economy in the world, and in that it is actually going to develop its own industry. The challenge for us therefore is actually keeping ahead from a capability point of view. What I would also say about these statistics is that they are difficult to compare and there is a history in many respects; as we sit in the industry today it does not feel like we are disadvantaged by the 18% of the US, it does not feel like we are disadvantaged to France.

Q18 Mr Berry: Let me ask a qualitative question then. You are absolutely convinced—and I think this is generally accepted—that the productivity gap with the United States and France is narrowing, there is no doubt about that.

Mr Smith: Yes.

Q19 Mr Berry: My final question would be why, and what should be done in the future to narrow the gap even further?

Mr Smith: My own feeling about it is that in the UK I do believe we are much more cohesive. If you look at the way the managers are working with the trade union movement, particularly in manufacturing, we have made huge progress in not only removing restrictive practices but also working in a much more collegiate fashion around common goals in the UK. That has not happened in the United States; if you look at the US there are still huge barriers in terms of restrictive practices in their aerospace industry and I think that is one of the major reasons why we are improving our competitiveness. For the future it is about those fundamental things again: it is about skills, it is about capability, attracting the best people into the aerospace industry—we have enjoyed some really super people in this industry over quite a long period of time—and developing the technological capability of our industry in the UK. For me it is all about capability enhancement in its broadest sense in the UK aerospace marketing economy to be able to continue to compete effectively in the future.

Mr Green: I would like to just amplify one point that Kevin made and that is that we have developed a very good and lasting partnership with academic institutions, so that you have got—to use a hackneyed phrase perhaps—a joined-up system between identification of research topics in universities and the route to market for those technologies in value adding products for customers.

Q20 Mr Clapham: On the capability issue, of course, research and development is crucial. Can I just take you in your executive summary to paragraph 4 where you say “Levels of Government investment in aerospace R&D compare unfavourably with those in the US and Europe. The UK aerospace industry continues to invest heavily in R&D and is second only to pharmaceuticals in its R&D intensity. Government targets for increasing R&D cannot be met by industry alone.” Given that statement, is there evidence to show, for example, that levels of R&D investment by governments in other countries are high?

Dr Howes: Yes. Again, one has to revert to the data that one has and the last comparative data we had was in 1998 where the US Government was investing £620 million in civil aerospace compared to £120 million in Germany, £50 million in France and just £20 million in the UK. That was the figure in 1998 and, obviously, since that point in time from a UK perspective we have seen quite a further reduction of Government DTI funding into civil aerospace, and in fact on the MoD side, air-applied research has fallen from £250 million to £185 million over the last six years; so one would suspect that that gap has probably worsened over the last few years.

Q21 Mr Clapham: Has this issue been raised with Government and, if it has been raised with Government, what has been the response, for example, at DTI?

Dr Howes: It was certainly raised as a result of the Aerospace Innovation and Growth Team recommendations where, of course, the importance of getting the right balance of investment in the R&D process from science right through the technology demonstrators and into exportable products is critical. At the time when the AeIGT reported, DTI investment was in the area of £20 million a year through a particular programme of research that was focused for civil aerospace, and it was suggested that to actually meet the right targets for sustainable aviation for the industry, looking forward to keep the industry competitive in its number two position, this should really be rising to a total of £70 million a year. There is a technology strategy that has been articulated that supports that figure and demonstrates what markets and why that funding profile is the right one, and of course that would be matched with industry. As a result of developing that technology strategy we have been working very closely with our colleagues in DTI and increasingly in the regions, the devolved administrations, to actually set out an appropriate funding capture plan for that, because of course Government policy has changed. Lord Sainsbury has been tasked with the job of trying to look across Government, MoD, the DTI and into the regions to actually try and find the right funding profile to fund the right R&D that will secure that future.

Q22 Mr Clapham: Given the profile, is it possible to say what proportion of investment in the UK aerospace industry is from the Government and the private sector, and how does that proportion again compare with our competitors?

Mr Green: It is important first of all to focus on the fact that we are talking about R&T, so it is research and technology as opposed to product development, where of course the numbers are much, much bigger and the proportion spent by industry relative to Government is much bigger. If we take the R&T spend, the total spend by the time we completed the report was £355 million, of which industry itself funded £150 million with the balance coming from Government, both the UK Government and the EU. The proposal that was identified in the AeIGT report was to increase that total spend, as Sally said, to a total of £405 million but, more importantly, focus the spend much more on industry-based research and technology and less on Government-based research and technology. In particular that recommendation was made within the Ministry of Defence where they spend a total of £165 million a year on research and technology and today only £40 million of that is spent with industry, so the recommendation is not that the amount should increase but that the proportion spent with industry should increase to whatever we may feel it should increase to, £92 million of the £165 million.

Q23 Mr Clapham: Is headway being made to encourage the industry to invest more in technology?

Dr Howes: I think industry is anyway. An SBAC survey that we did in 2003 showed that industry investment had increased by 18% on the previous year to a level of £2.1 billion, and if you look across the top 10 R&D investors we have three of our major companies in there—BAe Systems on three, Airbus ranked seventh and Rolls-Royce at 10. So I feel that the industry investment is actually rising significantly anyway.

Q24 Mr Clapham: We see a different scene in America of course with the subsidy to Boeing; is there a suggestion that you would like to have the same kind of subsidies that Boeing gets?

Mr Smith: If you look at where we are in the UK, there are a couple of issues that are really important to us. We have done our survey on R&T, we know what we want to do and what anybody else wants to do really is down to them and in some respects having what we have got we feel is much better because it is cohesive. For the first time everybody has coalesced around a set of research areas and a set of areas where we are actually going to demonstrate the technology acquisition. That is a huge step forward for us which means that resources can be far better used around that plan, so what we would rather focus on is having that plan properly supported and delivered and executed rather than looking at what other people get, quite frankly. The other point is on the defence side. A substantial part of R&D is on the defence side and we do feel that turning defence industrial policy into defence industrial strategy for the UK is another important part of trying to ensure that the UK industry gets a real part of the D side, the development side, on these programmes. What I would say to you therefore is that we feel that in some respects our destinies are in our own hands. Industry has

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undertaken to increase R&T funding and we have a good technology strategy in terms of how we want to deliver it. The challenge is around execution, you know, getting on and actually doing it for the benefit of the UK in the future.

Q25 Chairman: Before we leave this issue, the sources of public funding that you get, some of it would obviously come from the DTI and the figures you quoted for 1998 do not really take account of the emergence of regional development agencies. There is often a worry that with a rough and ready per capita allocation of funding across the RDAs there are some areas that might not be treated as fairly as they ought to be—I use the word fairly in a non-pejorative sense—and as far as the demand in the region is concerned, whether it is the South West and the Bristol area or the North West, are you happy that the money which hitherto came from the DTI and now comes through the RDAs is coming through in sufficient amounts to support the industry in the way that it was before? There is a sense in which some people say that the people at the centre have forgotten that different regions have different requirements and that some industries have got a lot more of the money than other regions which do not have such industries. So one might be under-resourced and the other might be—I would not say over-resourced, but they might get a bigger share than they require.

Mr Smith: It is an issue. You find us in a time of transition really; I mean, as we mentioned earlier the CARAD funding has disappeared and the devolvement of funding to the regions is taking time to actually fill that gap. Some of the RDAs currently do not have a remit to invest in aerospace technology so the challenge of turning national strategy into regional implementation is something at the moment that we are still working our way through. I have to say the RDAs are supportive of that and we have people there who are involved in what it is that we are actually doing, but we are not there yet, we do not have those processes in place. It is lagging behind and one of the concerns that we do have is having the impetus behind making sure that that resource does find its way into the aerospace industry through the regions.

Q26 Chairman: To put it very simply, let us take the North West and the South West as two of the biggest potential consumers of resource; are you confident that the regional development agencies have the resource to meet what has been a recognised demand for Government support, or if the money is coming, is it coming at the expense of other activities that the RDAs in these areas could legitimately expect to have to fulfil as well?

Dr Howes: I think it is true to say that the RDAs dealing with innovation and investment in technology is a new piece for all of them and it is at the moment quite difficult to see how the budgets will all be connected together at the right level, at the right time. The way we are tackling that together with DTI and colleagues in the region is to drive it from the National Aerospace Technology Strategy,

which is the right way to do it. As Kevin said, there is a plan, there is a justifiable and defensible investment that needs to be made, but we have to go through quite a sophisticated process with DTI and into the regions to match the funding availability there. It is true to say that because innovation is a new remit for the RDAs it is not clear what funds might be available to support that or how they are going to connect together with other regions to make sure that the outcome is right for the industry as well as being right for economic development in that region. As I say, there is a process and there are teams actually working this through from the right end of the microscope which, if you like, is from the perspective of the National Aerospace Technology Panel, but it is unproven at the moment.

Mr Green: One other thing that I might add to that, if I could, and that is that the dilemma that we all face when we are talking about research and technology funding is two-fold. The first is the sheer length of time between the investment in the technology and the economic return on that investment; that makes it difficult for individual companies and it makes it difficult for regional development agencies that tend to be more focused on the short term rather than the long term. The second is that there needs to be—because it is a matter of choosing which are the technologies that are going to make a difference in the long term—a coherent plan that all parties are signed up to. To some extent that funding therefore needs to be in some way ring-fenced, and we are concerned that the focus that we previously had with the CARAD funding has now devolved into more general technology themes, and there needs therefore to be a framework against which those technology themes can be brought back together and focused on the aerospace industry.

Q27 Chairman: Would you say that as a consequence of that you have lost money and you have lost opportunity, or have you been able in the traditional British fashion to muddle through?

Mr Green: I would say that at the moment we are still struggling through, but we are already seeing some concern about the length of time it is taking and the number of individual decision-making bodies that are engaged in arriving at an agreed way forward. Some of that is good because the challenge of any technical plan is a good thing to do, but some of it is not so good if it is delaying the process and meanwhile, as Kevin indicated earlier on, our competitors are certainly making investments.

Q28 Mr Hoyle: Obviously you are beginning to get some experience of the RDAs and presumably Rolls-Royce look at the East Midlands and the whole map, but how does it compare to, say, the Welsh Assembly? They have had a bit of a struggle trying to get Cardiff to understand about North Wales, but I think once they overcame that they actually saw the money coming in. I just wondered, you have a Welsh Assembly that seems to have a little more money than what the RDAs have, do you

think that is an easier route and do you think the RDAs are failing because it is diluted and you cannot join it up?

Mr Green: Why not let Sally tell you what we are doing in Scotland, which is probably another way of explaining an answer to that.

Dr Howes: Yes, in Scotland there is quite a significant aerospace industry and the Scottish Parliament has actually defined aerospace and in fact defence as the priority market for them. We are actually opening an SBAC Scottish office specifically to help member companies with aerospace development etc but also to help them align communications themes into the Scottish Government and into the Parliament, and to try and help align those with the communications messages coming in here, so that again we can take a view on a regional policy and regional business imperatives there and connect it into the national view. We are dealing very much with an international industry here and another example would perhaps be to look at some of the manufacturing improvements that go on. There is a huge amount of Government money going into the Manufacturing Advisory Service and that goes out—it is supported an awful lot by the regions—into companies to help them within their firm on business improvement. One of the paradigm shifts that has come out of the AelGT is to look across the supply chain, not just within the firm; that goes across regions and that is another driver for looking for those regional connections and making sure that what is happening regionally is following the national strategy in line with the business objectives. So from a number of perspectives getting this co-ordination is actually quite important and we are trying to take that on through the trade organisation and get it a bit closer behind.

Q29 Mr Hoyle: So you are getting the cheques?

Dr Howes: Our member companies are certainly supportive of us creating this initiative.

Q30 Mr Hoyle: The bottom line is if you are not getting the money through it is failing, but you are saying to us that the money is coming through but maybe not as quick as it did in the past.

Dr Howes: Yes.

Mr Smith: There is a difference between the things that the RDAs have traditionally been mandated to do, which we would say are going pretty well—things like skills initiatives and those sorts of things—and we have good relationships there, and the things that they are in the process of being mandated to do which is in the innovation and technology area. In that area, Lindsay, we are concerned about our ability to make progress and if there is one message to take away from us it is that you are right, Martin, this is an issue for us, the pace at which we can actually deploy national strategy through the devolved process around this R&T activity is of concern for us. We have not got a flag up the mast, the white flag is not flying, but it is something that we are concerned about and that we will be working extremely hard on, and any support in that would be much appreciated.

Q31 Chairman: You have given us a couple of paragraphs on it but maybe you could help us a wee bit more and be a bit less coy and tell us which development agencies are not worth a light at doing the business. We know that there are such things as regional variations and silent pain evokes no response; if you want to be more frank in stating what is going wrong then we are not here to defend development agencies, we are not here to defend the status quo. Many of us have supported development agencies but we find it rather embarrassing that they have such a cack-handed way of actually setting about doing the job that for so long so many of them have wanted to do, and it is often at the expense of people like yourselves who have had established patterns of support, which are cast to the four winds, and have a rather difficult task to keep up with things because you are not getting the resource stream that you had assumed you would be getting because these people just do not know what they are up to in a number of instances. Some of them seem to have come in out of the rain, there is no other reason for them being there, so it would be useful if you felt it appropriate to send us a note about any of the sticky areas.

Mr Smith: Okay, thank you.

Q32 Richard Burden: In 2.3.3 of your submission you state that “the private return on investment and R&D in the aerospace sector is also low—in spite of strong growth, an increasing share of world markets, and high levels and growth rates of productivity.” Can I just for the record establish there whether you are talking about it is just in the nature of the industry that the returns are low, or are we talking about a rate of return over particular time frames?

Mr Green: Perhaps I can start while my colleagues are preparing their own response. Part of it is what we said before, the length of time it takes for an aerospace project to move from research through to market is quite long and, in consequence, when you do the discounted return on that investment it is not as attractive as putting the investment into near return technology. Also, it is implicit in the other part of the paragraph that we as the industry fully understand that it is the lifeblood of the industry to be pushing that technology barrier forward at all times, and the growth that we are presently enjoying in the commercial aero engine sector is very definitely driven off the investments that we made in technology 10, 15, 20 years ago. So getting that economic fact of comparison relative to shorter timescale industries into a balance is important. That is connected, not surprisingly, to the point the Chairman was making a second ago, which is that we have to find a way in the new structure for promoting research and technology and innovation in this country for enabling all stakeholders to have a view of the strategic importance of long term investment in R&T. There is a bit of a challenge there because, by its very nature, not all investment in R&T will be successful, some will wither and die because it turns out not to be something that actually is exploitable in the market. The message we are trying to convey here is that if it is left solely to the

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capital markets to raise the funds for research and technology, it is unlikely that we will have the level of intensity that we need in this country to remain world class competitive because with R&T funding in other countries, one way or another, the cost to the private investor is reduced—and we talked about the subsidies that Boeing may enjoy and we see the launch investment type opportunities in this country and others. So that engagement with the long term availability of R&T funding is critical, and that I think is the message that we are trying to convey.

Dr Howes: I have nothing to add to that.

Q33 Richard Burden: It is important to establish that because, playing devil's advocate here, there may be some who would say—it is not a view I hold myself—that if returns from investment are so low from the private sector, why should the Government step in with more public money? You have been talking about the long term there and I would just like to get your sense of what the future is for that. The work of the Innovation and Growth Team is looking at the immediate challenges facing the industry and how we build for the future, how we consolidate for the future and how we exploit opportunities for the future. Looking towards that future, what do you think the future shape of financial support for the Government should be, looking ahead? Are you looking to a time where you think the aerospace industry may not need Government support, or are you looking at a time where that will actually be a permanent feature of it but the nature and shape of it may not be as it is now?

Mr Smith: My feeling about it is that if you look at the industry in the UK, around half of our revenue comes from the defence market, half of that from exports and half of it from the UK market. I do feel, if we go back to the capability point, being able to translate defence industrial policy to defence industrial strategy is a really important point for the industry in the UK, and for industries to know that they have a strategic long term future, which allows investment decisions to be taken much more effectively than would otherwise be in my view. Having clarity for the industry, therefore, is an important point. Secondly, what I would say is that if you look at the industry in the UK and you look at the AeIGT report it does not talk at all about how traditional UK companies are the biggest and the best in the world, what it talks about is having an economy in the UK in the aerospace sector that is the most attractive in the world for investment in aerospace. That requires the development of capability, and my feeling is that on top of company choice and competitive markets in terms of development of that capability, some view from Government and something across the top from Government so you actually understand the capability of this industry, how it has been developed and the skills and technology is extremely important. Capital is globally mobile in the aerospace industry now and companies that invest globally look to invest in the best markets for the use of that capital. I feel that the long term needs of the aerospace industry in the UK outwith UK

companies would be for some Government overview and support to make sure that the capabilities in these areas continue to be developed so that the UK economy can compete outwith the companies that actually operate in that economy.

Q34 Richard Burden: To an extent I understand your view about the need for Government to stay engaged strategically on this and to work with the industry to look at where it is going and how Britain can stay internationally competitive, but what I was really looking at was in terms of the financial aspects of that, the Government support aspects of it, and the kind of things that you have been saying in terms of what is needed now and the kind of shape of things that you think are going to be pretty much permanently in place, or do you think the nature of that support will change in the future? If it is the latter, without wanting to stargaze too much, maybe you need to be preparing for some of those changes.

Mr Smith: In terms of what we actually produced in the AeIGT report it was a reasonably clear route forward in terms of what was required to allow us to support the capabilities where we believe them to compete globally, and the capabilities where we believe we can actually secure a competitive advantage globally. What I would say is that from where I sit today I think we have a plan that defines within it the parameters for financial support within the UK aerospace industry, and if we could execute on that plan then I think that would be a huge start in being able to answer the longer term questions for the industry.

Mr Green: Could I just add to that to make the point that as the AeIGT report itself pointed out, we are not talking about any one stream, we are talking about complete capability, and companies making long term investment decisions, of course they look at the funding support, but that is not the only thing they are looking at, they are looking at the availability of skills, the quality of people, the degrees to which there are clusters of capabilities locally in the areas in which they want to operate and so on and so forth. The reality of our business is that because it is intrinsically a very high value adding business and therefore generates social value over and above the immediate economic return, overseas governments are increasingly turning their attention to this sector as a means by which they can drive the economic efficiency of their industrial base forward. So whether the UK Government likes it or does not like does not matter, they are part of this competitive global equation that we are talking about. Therefore, the engagement with Government, I repeat, across the totality of the spectrum is really important; if it was just putting funding in and unlocking royalties that would not solve the problem. It is really important to take this balanced picture and that, I think, is the strength of the AeIGT report. Last time I gave evidence here we were able to talk about the fact that, uniquely in putting together the team of people to respond to the challenge of putting the AeIGT report together, we had leaders of companies that were based in the UK but had their ownership overseas, we had a broad

number of academic institutions, some of which had global activity as well and we had, as Kevin said, strong support from the trade unions and we had engagement with the wider support base including the financial institutions. The picture that emerged, as Kevin said when we started this, was that today, largely as a result of previous investment decisions across the whole spectrum we have been talking about, the UK aerospace industry is one of the world's leading capabilities. If we make the right decisions over the next 10 or 20 years there is no reason at all why that should not prevail into the future, but it will involve Government, industry, academia, the institutions, the trade unions, all those stakeholders working together to create this vision going forward so that it does indeed remain a place where people want to invest to conduct this kind of activity.

Q35 Sir Robert Smith: In that climate how do you find the R&T tax credits, do they play a part of that incentive and how or have they altered investment behaviour?

Mr Green: They are certainly welcome, as you would expect me to say, but it is probably too early to say they have demonstrably changed investment behaviour, but what I can tell you for certain is that the way in which we do our own internal analyses about R&T investment, certainly the R&T credits have changed the economic evaluation and makes it more attractive. So it is a good thing and of course we would like more—we always would—and it is certainly helping, I think, to encourage investment in this long term activity. Inevitably, in the second year of the scheme it is too early to say exactly how well it is working but we are encouraged by the approach so far.

Q36 Chairman: The litmus test is surely whether the Treasury had to be dragged screaming into the room to accept this, and their view always was that the good companies would have spent the money anyway so the taxpayer does not really need to shell out. Have you seen a step change within your membership which would tend to contradict the rather cynical Treasury view?

Dr Howes: I really do not think we have managed to gather enough data. We were actually looking at this yesterday to see what information we had but it still is early days, that is the issue. We are keeping an eye on it and we would be happy to report in on this.

Chairman: I think it would be safe to say that the short termism which was a characteristic of some aspects of Treasury thinking might well come to bear on this, so get your information quickly to prove the case if you can. A lot of us who supported it would be very grateful if you could because we are not sure how long it would last. Maybe I am being unduly cynical.

Q37 Mr Clapham: From your submission at 2.2 it looks very impressive, you are saying that the UK aerospace industry has shown rates of productivity improvements of 4.2%, 2.3%. Does the availability of Government aid help, for example, in increasing

that productivity? Earlier you were talking about our capability and presumably Government aid actually helps greater cohesion with regards to that capability across the industry.

Mr Smith: I do not think government aid is significant in terms of what we are looking at here in terms of productivity. What is really important is skilled people who are attracted to working in manufacturing industries in the UK, and within companies the continued development of those people. The encouragement in training is hugely important. Our ability to work more productively with our workforce, to attract high skilled people into industry which requires high skilled people, people who are able to operate with high technology, new capital investment, new techniques, are the things that are really impacting on productivity. My focus on that from government would be very much in skills, training and supporting generally the workforce to be able to operate in that sort of environment.

Mr Green: When we are talking about training, it is really important to recognise we are talking about lifetime training, continuous, professional development, upskilling and in some cases reskilling. As the technologies move, the demands on people working in those technologies change. We have had a great deal of success in this country in recognising that competition is not between management and organised labour but between UK industry and other industries. In comparison to some of our competitors, we are light years ahead. I share the view that that is one of the reasons why the UK is closing the gap.

Q38 Mr Clapham: A little earlier you mentioned the trade unions. How important are the trade unions in the productivity issue? Are the trade unions supportive of inputs and investment into technology and do you find that they are an important aspect of this?

Mr Smith: Very much so. I know some of our friends from trade unions are here. We have rock and roll times in our relationship but putting that to one side there is absolute cohesion in terms of the need to improve the performance of our industry. That will allow us to secure more business and jobs. That is a really healthy approach. There is also a strong recognition of the need to skill and develop people. The aerospace industry is fortunate because our products are always moving ahead technologically and technology is important. Those fundamental things are there and are really important to us and extremely valuable. We will continue to rock and roll from time to time but it is a very healthy relationship that is focused on the right things. The trade unions have been involved in the work on the AeIGT and the SBAC in helping us to look at how we develop skills for people who operate in our companies.

Dr Howes: In a lot of the SME companies that I visit, you should not underestimate the role that the trade unions can play in giving the management the confidence to take on quite a lot of change in their

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business which leads to productivity improvements. Because they are going across different companies, that confidence build is important at the SME level.

Q39 Mr Clapham: In terms of the capability, is it possible to say what aid the UK Government makes available to subsidiaries of foreign companies that are here that you have a connection with? Does that aid that the UK Government gives to those companies help to increase productivity and competitiveness?

Dr Howes: I believe it does. The last time we measured all of this, overseas aid to companies was about 40 per cent of the UK aerospace revenue and that is about 45,000 employees. A lot of those companies are obviously helping to give the broader UK-based industry access to markets. Developing them as an integrated part of the economy is quite essential to going forward.

Mr Green: We spent some time looking at what we mean by the UK aerospace industry in that context. We came to the conclusion that the UK aerospace industry had much more to do with the level of commitment to the future capability and the development of intellectual property in this country than about who owns the shares. Some of the companies that we call British, when you look at their share register, are not very British in terms of their level of investment and country of origin, where their investments come from. We do not even collect the data in the way you ask the question because we focus on that concept: are these companies increasing the total capability in this country? Are they participating in the kind of things that we are talking about in terms of the lean manufacturing initiatives? Broadly speaking, we have some very good examples where the foreign owned entity is doing better in the UK now under foreign ownership than it was when it was under British ownership. The important thing is are they engaged in the development of the overall capability in this country; have we route to market; have we intellectual property being generated and shared in this country.

Q40 Mr Berry: Could we come back to financial support from the Government, in particular Launch Investment? This has been controversial on occasions and I remember four years ago being in a TV studio supporting the half billion of taxpayers' investment in the A380 programme. There was a colleague of a different persuasion saying that it was outrageous that taxpayers' money of that magnitude was being pumped into a private company. As it happens, the taxpayers did rather well out of that investment so he was wrong and I was right. More generally, how critical is Launch Investment to the industry? Let us talk money here. Skills and all that are fine but substantial sums of money from time to time go from taxpayers to the industry. In terms of the Launch Investment part of that package, how critical is that to what you do? You touched on the rationale for it but if you could expand a little on that briefly I would find it helpful.

Mr Green: I hesitate to teach granny how to suck eggs on this. The important point is the nature of the Launch Investment. What it provides is a substantial derisking of the programme for the industrial investor by sharing that risk on a broader basis. You are right to make the point that if you look at it in the aggregate it has turned out to have been a pretty good deal for the UK taxpayer. As you would imagine from your Treasury friends, they drive a very hard bargain. The rate of return that the Government benefits from is every bit as good—in some cases better than—industry itself gets from that investment. It is not cheap money so why do we do it? We do it because the Government, through Launch Investment schemes, shares the market risk and that allows us to match the moneys that flow from the taxpayer to the expenditure on the research and development of the product. That has a profound impact on the overall business case for that investment. Increasingly, you have seen arising in the market in these large capital programmes some form of risk and revenue sharing partnership. Some of them are industrial collaborations between companies of like skills or complementary skills, where they do work in kind. They do part of the research and development and become part of the industry supply chain. Some of them are purely financial investors, people putting money down now to share in the future revenues. Government investment sits pretty well between those two things.

Q41 Mr Berry: Do you have any criticisms of the Launch Investment scheme, apart from the fact that the Treasury drives a really good bargain for the taxpayer? Could it be improved in any way?

Mr Green: I think it certainly could. The overriding criticism we have had in the past has been that it is by its nature a one-off decision. The rules surrounding the ability or otherwise of the Government to make the funds available hinge around considerations like additionality and those sorts of things. That forces a rather artificial approach to the programme because if you take the A380 what it says is you would not do it if it was not for UK Launch Investment funding. That is a kind of convoluted argument because it is a good programme. What you are trying to do as a business is to put together a blend of funding sources. Sometimes, the economic arguments become a little obscure, whereas I do not think it should be taken on the grounds of some kind of apology. This is a good investment which helps to balance a market failure but we are talking about a large amount of money that you cannot simply raise overnight from any one source. We would like to see it being more recognised as a normal way of doing business rather than being treated as a one-off in every case. The other thing that we would prefer to see is some way whereby the successful returns that the Government—in this case, the Treasury—has achieved from their investments are in some way preferentially recycled back into the industry.

Q42 Mr Berry: I knew you were going to say that.
Mr Green: I am glad I did not disappoint you.

Q43 Richard Burden: You have said that without Launch Investment the industry would contract and the UK would lose a world class industry. At the same time, obviously, there are parts of the industry where if you work in it you might say that is happening anyway with work being outsourced to low cost economies. If you are looking at that aspect, what parts of the supply chain would you say are most at risk?

Mr Smith: If you look at what is happening in other industries—and we at GKN as you know work in the automotive industry—it tends to be those things that are commoditised that are of low intellectual added value. The ones in the globally competitive world tend to get outsourced first. In the aerospace industry, I sense it will be the same. The ability to compete internationally on our programmes requires low cost sources of supply on those programmes if we are going to be successful in winning them against international competition and we are doing the same things. My feeling is that the commoditised end of manufacturing in aerospace is the sort of area that is most at risk in terms of being outsourced internationally.

Q44 Richard Burden: If you are looking at China and south east Asian economies, the boundary between commoditised areas and other areas is getting a bit thinner, is it not?

Mr Smith: As time goes on it gets thinner. It is another reason why we need to continue to raise the intellectual capability and skills capability of what we are able to do in the UK and what we need to do with the UK workforce because there is absolutely no doubt that through time, in these economies with the sort of investment that goes into developing manufacturing industries, you and I know that China has a strategic intent to develop manufacturing industries and will invest, which is a competitive threat. It is an opportunity. If you look at it the other way round, the ability for us to export our product into those markets is very significant. If you look at Embraer in Brazil, it took them 30 years to build an industry in that sector and 75% of the value of those aeroplanes is imported into Brazil. British companies play a significant part in that. It is not all downside. If you are an industry whose strategy is based on high value added, high intellectual content and you concentrate that in this world—and it is a growing world—the aerospace market is a growing market. We have good opportunities to be able to develop our business. In the global economy we have to look at every way of being cost competitive. I will try and characterise it in that way. In terms of Launch Investment, if you look at the A380 programme, it is a huge success for the UK industry, £7.5 billion, 400 companies involved in it plus—and I say that from personal experience; I am sure others will say the same—new technology on that aeroplane for the first time, which was a supply base, gives us opportunities to compete elsewhere with that technology. Those

things would not happen if it did not have the sort of approach that we get and are fortunate to have in the UK.

Q45 Richard Burden: There are things specifically in relation to that end of the industry that perhaps you think the Government could be doing that it is not currently doing to help. Do you think that is mainly contained within things like the AeIGT recommendations?

Mr Smith: The skills agenda is an extremely important one. There is a lot of work going on at the moment to look at the skills requirement for the future for the UK aerospace industry. There is work going on also to look at the sector skills agenda. It is extremely important that we focus our attention on developing our people so that we can support our aspirations as industrial leaders, for want of a better phrase, in terms of where we want to take our business, all the way down that chain of events that leads to the value add. I think we understand what we have to do. There is work there, setting about doing it. The real issue is about executing the plans. There is a pretty good sense that these are the things that are going to be really important for us to develop this industry in the future. We can do that speedily and effectively. It will be the most efficient way of retraining people, upskilling people and doing all the other things that will allow them to continue to participate and grow in the aerospace economy in the UK.

Q46 Richard Burden: In paragraph 1.4 you talk about spin-offs within aerospace in terms of the links between aerospace and a range of medical technologies, performance engineering, motor support and mainstream automotive composites. How important do you think it is, trying to develop links within the supply chain and getting companies to be looking beyond the sector of aerospace or indeed some of those other sectors that will build their competitive edge in some of those spin-off areas? Is there more you could be doing there? There are a number of innovation and growth teams across different sectors. Do you think something needs to pull together the work of those because they are coming up with similar conclusions separately?

Mr Smith: Recently the Manufacturing Forum has been formed which I co-chair with Jackie Smith. Part of that is very much to encourage a coming together on those common issues and some work across manufacturing industries in the UK. The Manufacturing Forum has a good role to play in looking across manufacturing and what is coming out of the innovation and growth teams and what additional impetus and support can be given to that. This is not all about Government. We are big boys and girls. We have to help ourselves. There is a lot of work going on particularly with the aerospace and automotive industries, where we are starting to work together on skills. We are looking at the Automotive Academy that the government has funded through the DTI and how we could utilise some of that activity across the aerospace group. In the UK at the moment I feel a bit of a head-wind. People are

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starting to believe that manufacturing is important and that it does have a future. Those feelings are giving people a bit of confidence about stepping out a bit and working more effectively and constructively together. My answer to that is I would not flog yourselves. There are things going on and there are mechanisms in place. If we can ensure they focus and deliver on the key issues, we will be fine. That is my message. We know what we have to do. We have put fora in place. There are resources available. They might not be in the right places and there is a lot of fragmentation but if we work really hard we can pull it together and make a lot of progress.

Q47 Mr Evans: Looking at the aerospace innovation and growth team, it has been going a couple of years now and its remit was to look long term, 20 years ahead. It brought out a report last year with five main objectives. How do you think it is generally going? Is the prospect for the future looking very good and, within the five objectives that have been set in the report, are there any that you think they are flagging badly on?

Dr Howes: We have made very good progress in getting sensible plans in place and getting them well articulated. The last discussion was a very good example of that, the whole issue about the focus on competitiveness and profitability. What does that mean in terms of the scenarios for not just what skills you want but how many people you are going to employ. Those are in place quite well now at the industrial level but there is this flow-down issue which is getting more of the industry and more broadly the Government to understand what those plans are and what the pictures are for the future and moving that forward. The discussion that we have just had, for example, cuts back on some of Martin's issues to do with RDAs. There is a modernising industry that is trying to face up to some quite difficult and sophisticated decisions in some places. Some of them are not easy at all. We have to keep the focus on what the 'to be' state is, not what the past was. It is important that where RDAs, for example, come in and are trying to support small business, it is support that is gearing for the medium and the long term and the general direction of the industry rather than perhaps just interim measures. There is an issue now to do with the flow-down in the communications. We have done enough work trying to develop that. The one area which is quite active right now is the piece we have not referred to yet today which is sustainable aviation. We as an industry are very much taking the lead from transport policy that the government has defined. With quite large growth in air transport, we have some very stringent targets which Europe has signed up to on noise and emissions and these kinds of things. It is probably true that a lot of the technologies for that sustainable future are around, feasible and in the industry's sights but they are certainly not going to meet price issues on the free market. This is a whole area where regulation has to be introduced to make the right market conditions. The industry would acknowledge that this is

probably lagging a little behind where we should be at the moment. There is a draft sustainable aviation strategy for the industry where we have linked the manufacturing, the operators and the airlines together and we are trying to come out with an integrated piece for discussion with the Government early next year. That is probably an area for focus as well.

Q48 Mr Evans: Do you want to give an end of term report? It is only two years in but is the future looking good with all the competition you say is coming from China, the support that is going into the American industry as well and all the other pressures that were there? We have talked about 9/11 and things that we do not even know about may be round the corner. It is looking good at the moment. Do you think it will still look as good in another 18 years' time?

Mr Green: There is a much greater understanding of what needs to be done. There seems to be a more coherent agenda for action across the whole of the stakeholder community. We have to move from talking about it to doing it. We are not satisfied yet with the progress being made on particularly the R&T strategy. Every month we do not launch one of those R&T programmes, the more it places the rosy future that we predict at risk.

Mr Smith: One thing we have not talked about is the market access point. We can work really hard in improving the performance of the business, skilling our people, doing all those good things but if we cannot supply, particularly on the defence side where you know we have issues around technology transfer etc., that is quite a significant issue for us on which we have to make progress. Also, we need to keep the playing field level. We have talked about Launch Investment this morning. We can do our stuff, get on and develop the skills. We can impose all the processes we like but those high level issues are extremely important for us to be able to work in an environment where we have a strategy for our defence industrial base that people understand, that is long term, that allows you to invest so that markets open in that sector and give us the opportunity to show that we can compete. We are 18% worse than the Americans. Give us a shot. In the commercial aircraft sector where there are few competitors, every product is a big gain, hugely important to us all. We have confidence in our skills and competences and my feeling is that the rubber has to hit the road on the stuff we have to do. We can do those things if we get the technology support and work hard on skills. It needs these other things to come into place for us.

Q49 Mr Evans: On technology transfer, we are fighting with one hand tied behind our backs, are we not? What more can we do to ensure that we get a fair share of that?

Mr Smith: We have to continue to push at the highest level of government around the relationship that we have to get ourselves into a position where we can transfer technology in a more effective way and we can participate more fully in programmes in

the United States. I do not think you can do much more than that. If we keep that pressure on and keep working hard on it and stressing how important it is—

Q50 Mr Evans: It is a bit of a let down though, is it not? With all the support we have given the United States particularly recently, why are we failing to get this transfer of technology?

Mr Smith: We know there is a whole system in the US that goes right around the US industry.

Q51 Mr Evans: It is hugely protectionist, is it not?

Mr Smith: We all know that the US market is a difficult market on the defence side to make inroads into unless you become an indigenous player in that market, which is what companies do in a world where capital is mobile. If we had more flexibility and freedom, it would be more helpful.

Mr Green: It is not the UK aerospace industry with its hand out saying, "Give us technology from the United States." What we are talking about is the ability to jointly develop and transfer technology across the Atlantic. In many ways, the US market is more open than the majority of Europe. Let us keep a sense of balance here. There is a significant amount of investment being made in the United States. It is clearly impossible for the UK to try to keep pace with all the technological investment that is being made in the defence arena. What the defence industrial strategy must come out with is an ability for the Government and industry to work together to decide these are the things in defence technology we are going to invest in in order to keep us at world class levels of capability so that when we collaborate with the United States or any other country round the world we are doing so from the position of an equal partner and not as a junior partner.

Q52 Mr Hoyle: We are all talking about Joint Strike Fighter where most people say we have the raw end of the deal. It was meant to be a joint project. We have come out of it very poorly. We have been unable to do the final assembly because technology transfer is very protective. You are saying we ought to welcome overseas companies. They are much better than British companies. Here we have a joint programme that is not as good as we thought. Yes, there will be jobs in the UK but not as many as we expected and we certainly are not getting a fair share of that technology transfer. Do you think we ought to go a little further and play the Americans at their own game by saying, "If you are going to supply us in the UK, we expect a minimum of 50% build in the UK"? This is defence money being spent on defence procurement. I wonder if that would be a way forward. The Americans use it very successfully.

Mr Green: I do not agree with your characterisation of the programme.

Q53 Mr Hoyle: We will take you to Wharton. We will show you the assembly line and say, "Just think how much more we could build if the Americans

would let us." Rolls-Royce might be very comfortable but we have to think a bit further than Rolls-Royce.

Mr Green: I am not making a Rolls-Royce point at all or a BAE Systems point. In terms of the return on the investment that the UK is making in the JSF programme, I am not so sure that the balance is as strongly pulled in the direction that you identify. It is worthy of doing a more detailed study if that was something that people wanted us to do. There are lessons to be learned. There are things that we did not do as well in negotiating the position that the UK would take in JSF, in particular the one we have just talked about: the ability to make sure that the rhetoric that was being talked about at the time when we joined the programme of best athlete rather than national work share—we seem not to have followed that through to the full extent that we could have done. I accept that position but it is important that we learn the lessons of that and go forward but also recognise that Joint Strike Fighter is bringing significant workload up and down the supply chain, not just in the two primes. That is immensely valuable. From all the work that we have done, in order to be successful in the aerospace industry, you have to be successful in both commercial and defence. The transfer of technology and capability is so intense between those two sectors that if you do not have a strong defence capability you will inevitably lose your position in the commercial aerospace industry. Participating in new, modern programmes for defence remains a key part of this strategy of going forward and Joint Strike Fighter is a part of that.

Q54 Mr Hoyle: What about the 50% rule?

Mr Green: If you put 50% of the money in, you will get 50% of the work. That would be the European approach.

Q55 Mr Hoyle: I think you misunderstand the question. In America, we won the field contract. The Americans said, "You won this contract to supply. We expect a minimum 50% to be built in the US because you are supplying us." In the same way, we may be taking 150 aircraft in Joint Strike Fighter so should we not at least expect 50% of that build in the UK?

Mr Green: Fifty percent is 75. It may be an economically viable thing to do but it may not be.

Q56 Mr Hoyle: Sorry; I am not with you.

Mr Green: You said you want 50% of the buy and the buy in the UK is 150 aeroplanes. That is 75 in the UK. That may be economically viable but it may not be. I do not know. I would much prefer to have a situation where we have an ability to supply the totality of the production, regardless of where the uptake is.

Q57 Mr Hoyle: In the same way quite rightly you could argue that when we supplied Australia with Hawks they wanted some assembly out there. India wanted assembly. Would it not be right that we start getting that? Let us just take a reclaiming of trucks

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vehicle order for the Army. We ended up with not a truck being built in the UK. If we had a 50% minimum, at least taxpayers' money in procurement would be creating and protecting jobs in the UK. I do not think it is too much to ask. I am sorry we do not seem to be getting some support from SBAC. Maybe it is a policy they ought to look at.

Mr Smith: The point you make about whether we get value from the amount of money that we spend overseas is a really valid one. Our offset arrangements are not as stringent and we are not as good at overtly making clear what the UK wants. I have a bit of difficulty with the percentage argument. Again, it goes back to the defence industrial strategy. What are the competences and areas that are really important for the UK? When we do a procurement, when we do not have the product, where it is somewhere else, we are as one in terms of making sure that we get out of that programme activity which is going to sustain and enhance that capability. I would be very strongly supportive of an argument that says: let's get this defence industrial strategy sorted and then look at what comes out of that. What is the best means of securing value for the future of the aerospace industry in the UK? You have a really valid point around that argument of value into our economy from the amount of money that we spend overseas on defence products. I am not sure what the answer to it is but I would like it to be based more on the capabilities that are strategically important for the UK, to make sure that we are developing and sustaining those, rather than sending maybe 15% to China because it is near the low end of the supply chain.

Q58 Mr Hoyle: On market access, are there any real trade barriers there between civil and defence where you feel you cannot get round them? Have you any evidence of this? You have the world out there. You are not allowed into that market whether it is civil or defence. Let us look around the world.

Mr Smith: It is a much stronger issue on the defence side than on civil. I do not think it is a significant issue on the civil side. If you look at emerging economies, if you are prepared to work with companies, they will be prepared to work with you in those sectors. 50% of our revenues today in the UK aerospace industry comes from defence and being able to work more effectively in Europe and in the United States. Probably the key issues are opening up the European market more and having the ability to operate more effectively across the Atlantic.

Q59 Mr Hoyle: Is there anything the Government can do to help remove barriers?

Mr Smith: We have talked about the technology side and the US. In Europe, with the formation of OCCAR and the move to look at the basis on which we can open up the European market, support for those things and helping make sure that those things are done in a way that has fairness around it. You know what we are like. We are always the first in. There are some really good signs and some opportunities to work on some issues that are quite difficult, and supporting those things rather than starting new things, in my view, would probably be the right thing to do.

Q60 Mr Hoyle: Do you think companies put barriers up? I will give you an example: Singapore is looking to buy the new fighter replacement. The French were at the Military Air Show with Raphael and the Americans were there with the F16s. We were not there. We missed the military show. We knew we had to fly off against the other two countries; yet we were very late getting there. The Military Air Show had gone. We had missed the market in Asia. We may win the contract but is that lack of support from the Government to help get the aircraft out there or is it just the industry that feels certain markets are not worth pursuing?

Mr Smith: It is hard to comment without knowing the specifics. I have spent a lot of my life getting aeroplanes around. It is not easy. The priority has always been to make sure that the development programmes are delivered. If you have space, being able to support the market activity has been the secondary consideration. In this case I just do not know the facts of the situation. Generally, we get a lot of support from the MoD and the armed forces in our export activity. I have been intimately involved in EH101 in the United States. We have had a huge amount of support from the UK defence forces. As a company we have paid costs associated with taking that product away. I do not sense any reticence to push the case in some of these extremely important markets. In the past I have had some very hefty marketing budgets in some of these companies to work with because exports are extremely important to us and these campaigns are long and expensive to operate.

Chairman: Thank you. You have had rather longer than we had anticipated but that is because your answers were very full and helpful. If there is anything else you would like to provide us with information on, we would be very happy to receive it. Thank you once again.

Witness: **Mr Iain Gray**, Managing Director, Airbus UK, examined.

Q61 Chairman: Good morning. We will start off with the international dimension of Airbus UK. In your submission you have said that Airbus has design and manufacturing facilities in France, Germany, the UK and Spain and subsidiaries in the US, China and Japan. Perhaps we could start with the non-EU subsidiaries. What do they offer to you that you could not do in the UK?

Mr Gray: Thank you very much for the opportunity to respond. From my perspective, Airbus is a huge success story. Airbus UK is a story that is only just now starting to emerge in the UK as the real success that it is. The organisation of Airbus probably needs to be understood in the context of your question. Airbus is an organisation that has been in place for about three years,

although Airbus itself as a product family has been in place for about 30 years. In terms of the way Airbus is organised, it does have manufacturing facilities in France, Germany, Spain and the UK. In terms of business, we have sold 5,000 aircraft and we have sold aircraft around the globe. The subsidiaries in China, the US and Japan are primarily sales and customer support offices. They are not manufacturing and development offices.

Q62 Chairman: On the other hand, in relation to R&D work, how does the UK benefit from work carried out outside the UK? I am not here talking about the sales facilities you have in other countries. Are there any means whereby we say the UK puts in so much for R&D and the fruits are spread all over the world? What proportion of the turnover of Airbus is identified for R&D and how much do we get as our share? Are we getting enough bangs for our buck?

Mr Gray: The really good news story for us in the UK is it is a global business. Airbus has sold over 5,000 aircraft. In the UK, we are responsible for the wings, the landing gear and the fuel systems. Every wing of every Airbus that has been sold and is flying today has been designed and developed here in the UK. In terms of the R&D turnover, the wings are a high technology component part of the aeroplane. There is a disproportionately high level of R&D investment that goes on here in the UK. Factually, Airbus as an overall business probably has about 9 per cent of its turnover related to R&D but in the UK, where we are very much focused on the high technology side of it and the wings, the landing gear and the fuel systems, that proportion is up to about 21%. A very high level of turnover here in the UK is dedicated back to R&D.

Q63 Linda Perham: In your submission you say that Airbus UK is delivering positive results in terms of productivity gains and that sales per employee have sustained a real growth rate of 7% per annum in the last two decades. How does productivity in your overseas subsidiaries compare to productivity in the UK?

Mr Gray: To clarify where the operating subsidiaries are, the primary manufacturing facilities inside the Airbus system are in France, Germany, Spain and the UK. In the UK, we have had this sustained 7% growth and productivity improvement year-on-year. I do not have the facts in France and Germany. We can try and get them. The way Airbus sets productivity improvement targets across the whole business is in terms of the control of budget. It controls the productivity improvement in the other national entities by having year-on-year, very challenging productivity improvement targets set through reduction of budgets. We in the UK have to play our part in that so we will be set very challenging targets by the overall Airbus system. It is incumbent upon us to achieve them and that is one of the key drivers in terms of sustained work here in the UK.

Q64 Linda Perham: Have you learned any lessons from the operation of European subsidiaries in other countries that have been incorporated into UK operations or can you not define it in those terms?

Mr Gray: Airbus is an interesting organisation in that it is probably one of the first truly integrated businesses in Europe. There are some very different cultural experiences in terms of how we go about achieving our targets. One of the great opportunities that we have had in the UK is to pick up and learn some of the ways that industry in France and Germany has approached the same problems. Sharing best practice, seeing how different companies contribute to the productivity improvements, is one of the enriching parts of being part of the Airbus company. In terms of comparisons with other UK companies, we have as Airbus UK played a very key role in the AeIGT campaign. One of the key objectives there was lean manufacturing. Airbus UK does pride itself in being one of the benchmark companies in terms of productivity and productivity improvements. We have been able to bring a variety of best practices to bear and Airbus UK is then able to set itself up as a benchmark company in front of other supply chain companies in the UK.

Q65 Mr Clapham: In your submission you refer to the fact that civil aircraft continue to be priced in US dollars and the continuing weakness of the US currency is putting considerable pressure on margins of suppliers in the UK and the rest of Europe. How significant is it that civil aircraft are purchased in dollars, whereas the cost of production is largely in other currencies?

Mr Gray: It is a hugely significant issue for us. It is an issue which our major competitor does not face to the same extent. If we go back three years, the euro to the dollar was about one euro to about 0.89 dollars. Today it is 1.3/1.33. It is a very important issue for us. It is recognised within the business and we are putting some major internal challenges in the business. We have a big initiative called "Route 06" which is effectively to take 1.5 billion out of our cost base by the end of 2006 to help keep us competitive against that deteriorating dollar situation, but it is a very significant issue for us.

Q66 Mr Clapham: Is it an issue that you have taken up with government and, if so, what has been their response?

Mr Gray: It is largely an issue that we have tackled internally, both through our currency hedging policies in the short term and largely through trying to take cost out of our cost base in the longer term. There is a further challenge for us in the UK in that we are operating in a sterling based economy. Our labour rates are in sterling so we have the double impact of sterling to euro fluctuations as well as the broad euro to dollar fluctuation. It is a very significant issue for us. We do talk to government about it. It is not an issue that we have come to government to seek specific help on. It is an issue that we are tackling inside our own business.

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Q67 Mr Clapham: In tackling it inside your own business to try to get a reduction in that cost base, has there been any work done with, say, the DTI on how you might be able to be effective with the internal changes?

Mr Gray: It comes back to the broader policy framework in which we as a business operate. I am sure we will talk a bit about Repayable Launch Investment and some of the other economic policy initiatives in which we do work. Those are the important contexts in which the Airbus competitiveness exists. Airbus UK needs that framework for it to remain competitive. The euro to dollar issue is very significant for us but it is one that we are addressing internally.

Q68 Mr Clapham: Are you confident that you will reduce costs sufficiently to be able to retain the competitiveness?

Mr Gray: I am very confident that the challenge is fully understood by everybody in the business. Inevitably that challenge flows down not just into Airbus but into the broader supply chain as well. Frankly, if we do not respond to those challenges, we will lose that competitive edge that we have. It is hugely important that we rise to that challenge and achieve the kind of cost saving that we are looking for in the business.

Q69 Mr Berry: You raised the question of Repayable Launch Investment and in your submission you say it is a critical element in Airbus's ability to compete with the heavily subsidised US sector. Can you say a bit more about how important launch aid is to Airbus and your supply chain?

Mr Gray: Launch Investment is hugely important to us. It has been hugely important to us through all the development programmes from the A320 onwards. It is an investment. We are a net repayer to government rather than a net borrower. It is an investment partnership relationship. My colleagues from the SBAC talked about the hugely important role in terms of the market risk. It is important to recognise that the company private investment is still the dominant part. For me, for the UK to have a role in the new products would not have happened without Repayable Launch Investment. From a supply chain point of view, my very strong conviction is that it is new products that generate the work that goes into the supply chain. I would argue very strongly that without the presence of Repayable Launch Investment we would not have the new products and the jobs that we have generated in the UK today on Airbus commercial programmes. For me it is a fundamental.

Q70 Mr Berry: You refer to the EU/US 1992 bilateral agreement and, as you describe it, its unilateral violation. How has that impacted on support for civilian aircraft, particularly Airbus? How much does it impact on the wider UK aerospace industry?

Mr Gray: The 1992 agreement meant that the Launch Investment process was very transparent. We have conformed to the 1992 agreement in our

Launch Investment applications. It is my understanding that that agreement is still in place. For me, Launch Investment is a hugely important part of Airbus. If we did not have the Launch Investment mechanism here in the UK, I do not believe we would have had the level of work that we have enjoyed both within our own company and the supply chain in the UK over the last decade.

Q71 Chairman: On the A350, has any decision been taken about applying for Repayable Launch Investment for that aircraft?

Mr Gray: The A350 is another example of a great news story for Airbus. Last February, Airbus announced an authorisation to offer an agreement by Airbus and its shareholders which will allow it to go out to the marketplace with a sister product to the A330. We are in continual dialogue with the Government. I cannot comment on the specifics of a Launch Investment application but the A350 product is a step change in wing technology. It is the very first time that an Airbus programme will move from what was a conventional, aluminium, metallic construction to a new carbon composite material. It represents a watershed in the technologies that are applied for wing developments. It is hugely important that we get the support in the UK that will position the UK to maintain its wing competitiveness but, more fundamentally, the wing manufacturing capabilities for that programme. For the A350, I see that as a very big step change in the way we will produce wings in this country. We need to get the right level of support right through the supply chain, right through the industry and in partnership with the Government to make sure that the success we have had on the Airbus family to date is maintained into the future.

Q72 Chairman: What you are saying is that it is going to be exciting new technology, damned expensive and we need money but we are not sure out of which purse it will come?

Mr Gray: We are still studying the business case. We need to understand exactly what the mechanisms will be. We had some very good support from the Government announcing in technology terms a composites innovation network. This is an application of technology. It will be the first wing that has been done inside the Airbus family which will be fully composite. It represents a step change in the way that we will apply technology and the UK needs to step up to the mark in terms of embracing that new technology because there are other nations around the world who, in my view, probably have a lead on us in terms of previous investment in R&T technologies in that area.

Q73 Chairman: Are these companies which are currently supplying Airbus in other areas so that they know what is expected of them?

Mr Gray: Yes. We have been talking to government for a number of years about the importance of composites and investing in composites from a capability and a technology point of view. We are now at that hugely important watershed where we

are making the step change in the industrialisation of composites. That is a different ball game and it is something that from a UK point of view we need to fully understand. From an Airbus point of view, the A350 wing is something we want to see done here in the UK. More importantly, we want to see the same level of the component manufacture and supply done here in the UK.

Chairman: We have the message, although it may be a bit in code.

Q74 Richard Burden: Looking at issues of government aid, in 2000 you received £500 million for the A380 programme. Could you take us through any other forms of financial assistance that Airbus receives—for example, support in export markets?

Mr Gray: We have talked about Repayable Launch Investment. That is a hugely important mechanism for us here in the UK. ECGD is again hugely important for Airbus. One of my colleagues was here in the summer and presented to this Committee I believe our position on ECGD and outlined the importance of it. Airbus is a very significant user of ECGD and continues to see that as a very important mechanism that the UK needs to remain competitive in the way that it supports ECGD. The other financial aspects are in support of partnership arrangements related to R&T investment. Colin Green drew out the distinction between R&T and R&D and the longer term technology investment is very important to us in the UK as well.

Q75 Richard Burden: What kind of assistance do you get in the other countries where you operate and where you have facilities?

Mr Gray: All the mechanisms exist to differing extents. It is very important that in the UK we are seen to be competitive against those other supports. In France and Germany in particular, people keep a very close eye on what support we are getting from the UK Government and treat it as a litmus test in terms of how serious the UK Government is towards supporting its national aerospace business, its civil aerospace business. It is very important that Airbus sees the support coming from the UK as being competitive against France and Germany.

Q76 Richard Burden: What are we being competitive with? What are the kinds of support you get in France and Germany?

Mr Gray: The support is similar in terms of both Repayable Launch Investment, ECGD support and R&T investment. All of the mechanisms that we use within the UK are mechanisms which exist throughout the Airbus companies in slightly different forms. Fundamentally they are the same mechanisms.

Q77 Richard Burden: Are they comparable?

Mr Gray: They are the same mechanisms.

Q78 Richard Burden: Are they comparable in terms of assistance to you?

Mr Gray: I am not an expert on ECGD. My colleague in the summer made some important points about the need for competitiveness in the ECGD market. In terms of Repayable Launch Investment, I believe the UK Government partnership approach on the A380 was hugely important as seen by France and Germany and the rest of Airbus in securing the launch of that programme. Our colleagues in Airbus look very closely at the relationship we have with the UK Government and they do see that as a key litmus test on the UK value of commercial aerospace.

Q79 Richard Burden: What about Spain?

Mr Gray: Spain is a very important part of the Airbus system. It is an omission on my part not to have referred to them. Spain has had some very significant support in terms of technology and investment. They also receive the same support in terms of Repayable Launch Investment and ECGD support.

Q80 Richard Burden: There is nothing in terms of the other countries you operate in where you say this is what happens in some of the other countries you operate in and this is something that the UK could learn from? You think the UK approach is competitive?

Mr Gray: The Airbus system does look in on all of the nations in terms of its support and the level of support that we get does play a part in terms of the respective manufacturing content that is placed in those countries. Whilst there are some fundamentals as regards centres of excellence, the wing centre of excellence is very much here in the UK. For the A350 programme, I have talked about the composites and composites technology. Composites are an area where Spain, for example, has placed some very large sums of technology funding to enhance their capability. It is something in the UK that we need to acknowledge and recognise we may have some catching up to do.

Q81 Richard Burden: How have they done that? What mechanisms have they used?

Mr Gray: In terms of technology funding, through partnerships in technology programmes. They had a focus on composites technology.

Q82 Sir Robert Smith: Obviously the history of Airbus is one of international cooperation. How important is that to the future of Airbus?

Mr Gray: Airbus is a global company. We sold 5,000 products to 200 airlines around the world. The context is it is operating in a global environment. It has a global customer base. It has a global supply chain. The centre of Airbus is based very much around France, Germany, Spain and the UK but it is hugely important that it is seen to operate in that global environment and work with the global supply chain.

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Q83 Sir Robert Smith: You mention the global supply chain. What sort of proportion of your supplies would you say are sourced from UK companies?

Mr Gray: In the submission we give an example of the A380 programme. We talk about 400 suppliers in the UK on A380. Airbus UK itself sources 68% of its purchase build from the UK. Airbus UK is a very significant contributor to the UK supply chain. What is also important is that the competitiveness of the UK supply chain puts it in a good position to win work from other parts of the Airbus system. It is not just a case of the work that Airbus UK does flowing into the UK supply chain. We need a competitive supply chain so that UK PLC wins a share of the work from the broader Airbus business and the engine side of things as well with Rolls-Royce, again a very significant UK supply chain.

Q84 Sir Robert Smith: Do you have figures for the UK supply chain into the rest of Airbus?

Mr Gray: That is something we could provide a background note on.

Q85 Mr Hoyle: Can I take you on to the development of the National Aerospace Technology Strategy? How does that help with the health of Airbus UK and other aerospace industry within the UK?

Mr Gray: Airbus UK has played a very important part in the AeIGT initiative and we have seconded a number of people into the team to do that. We have played a key role in developing that National Aerospace Technology Strategy. From the outset of that work, there was a recognition within the business in the UK that we cannot do everything; therefore, we need to pick the winners and develop a strategy that is focusing in and picking on the winners. The National Aerospace Technology Strategy is very important for us. In an Airbus sense, it focuses in on wing technologies, landing gear technologies, field system technologies, which are the crown jewels for the UK in the Airbus system. I think it provides a good framework upon which we could potentially bring together academia, the supply chain, the primes in terms of focusing our efforts on the right things rather than dispersing things across a wide range of subjects. It is very important in that respect.

Q86 Mr Hoyle: There were five objectives in 2003. How far on are we with the five objectives? On line?

Mr Gray: My colleagues from the SBAC gave a broad overview from an SBAC point of view and Airbus was a contributor to the SBAC submission. Focusing a little more on an Airbus UK perspective, an area I have some concern about would be related to the research and technology aspects. We talked earlier about the demise of the CARAD budget. The National Aerospace Technology Strategy provides the right framework. There is some very good work being done but we are reaching that point where we need to move away from the talking side to the delivery side. I am nervous and concerned that I do not see the mechanisms being put in place necessarily

to delivery what the technology part of AeIGT said it is going to deliver. We have a National Aerospace Strategy. We have money flowing through the RDAs. A fundamental role of government in my view is to provide a coordination mechanism that links up the different aspects of funding. It is not necessarily asking for money; it is asking for a more coordinated way in which we spend the money. We have a very good example in the composites innovation network that was launched at Farnborough this year. I would hold that up as a very good example of progress. I think there are other areas where I do not see the same progress being made and I am nervous that we are now reaching a point where we need to move away from the talking about it to the delivery. We are reaching that moment of truth now in terms of whether it will be effective or not.

Q87 Mr Hoyle: There is a lot of speculation in the press that BAE may be pulling out of the Airbus family. Is there anything you could share with us?

Mr Gray: BAE Systems is a 20% shareholder in Airbus. My employer is Airbus. I am on the Airbus payroll. Airbus has two shareholders, BAE Systems and EADS. Airbus makes a very positive contribution to BAE Systems. I cannot comment further than that.

Q88 Mr Hoyle: There is no for sale sign on the shares?

Mr Gray: There is nothing that I am aware of. BAE Systems is a very important shareholder.

Mr Hoyle: Let us hope they remain so.

Chairman: We can write to BAE Systems and ask them.

Q89 Mr Evans: Looking at your submission, you talk about the 400 UK companies working on the A380 programme but what links do you have with academia? Do you think it is important? If so, can you tell us what links you have?

Mr Gray: It is hugely important in the long term. The supply chain is about the industrialisation of the programme but that only happens if we have the right skills and capability and we have invested in the right themes very early on in terms of technology. Technology partnerships with academia in universities are hugely important. Airbus UK spends around £2.5 million per year in university research. We have strong links with many of the aerospace universities in the UK. AeIGT and the National Aerospace Technology Programme provide a framework around where we would want to invest in terms of which technology subjects we would want to work in. I see it as our long term future. I strongly believe that if we are not developing the right relationships now we will not continue and sustain the kind of longer term support into the supply chain that we achieve now so it is hugely important to do that. Airbus UK is committed to doing that in a skills and capability sense, but again it requires this policy framework as well to help make sure that that is a long term, sustainable position.

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Q90 Mr Evans: Are there any shortages of skills that Britain should be doing a little more on?

Mr Gray: The general issue of promotion of engineering and the manufacturing business is something that government can play a huge part in, making engineering an industry attractive to everybody from a very early age, into the schools, particularly making it attractive to females. We still do not see enough of our talented female population coming through into the manufacturing business, into the aerospace business. Long term skills and capability and the promotion of engineering as an attractive career option are hugely important. In terms of skills, my view would be that we have experienced the same sorts of issues that are generally talked about now. There is no shortage of talented people coming into the top aerospace engineering courses. We see some shortcomings in terms of some of the basic numeracy and literacy skills. I would support the general view that there is something not happening there. More importantly for me though are the vocational skills. We need more emphasis in this country, more importance placed on vocational skills, attracting people into the industry through apprentices. Our company is very proactive in supporting apprentice training schemes. We currently have about 500 apprentices on our books. Vocational training and basic skills are something we need to place more emphasis on.

Q91 Mr Evans: You say that this is where there is a deficiency currently that you can see and it will obviously have repercussions in the future if we do not do something about it. Is there any more that industry could do and Airbus in particular? I know you have links with a number of schools. Is there anything more that you could do to ensure that these skills are fostered?

Mr Gray: I believe Airbus UK is a huge success story. The A380, the biggest engineering challenge that we are facing in the country today, is a hugely exciting project. From a UK PLC point of view, we could perhaps do more to use that example as an example of attracting young people into the aerospace business. In Airbus UK we do that but in a broader enterprise sense I think UK PLC could take greater benefit from the success of the Airbus programme to promote engineering into schools and universities. There is a very big opportunity on January 18 at the A380 reveal ceremony in Toulouse to do that. In terms of other things that we can do in partnership with government, I very strongly support the initiatives of the Engineering Training Board, the Royal Aeronautical Society, mechanical engineers, institutes that are promoting engineering as a profession. The promotion of vocational training, apprenticeship training, I believe Airbus plays a very active part in. Certainly our Broughton facility is the biggest apprenticeship training provider in Wales. The model of working with local colleges—in that particular instance working with Deeside College—is a benchmark example of how we can work together with local colleges and schools. I would like to see that extended in a broader sense.

Q92 Chairman: I think we have covered pretty well all our topics. Thank you very much for your evidence this morning. Is there anything else you want to say?

Mr Gray: I believe we have a great success story to show and from a select committee viewpoint I would extend an invitation to visit either of our facilities in Filton or in Broughton to see what I think is best practice at work.

Mr Hoyle: That is an excellent idea.

Chairman: I imagine Broughton is not a million miles from Chorley!

Witness: **Mr John Wall,** National Officer for Aerospace, Amicus, examined.

Mr Hoyle: I am a member of Amicus.

Mr Berry: I am also an Amicus member.

Q93 Chairman: I think I am also a member of Amicus. We have had fairly good news this morning. How do you see the future of the UK aerospace industry at the moment? What do you think needs doing? If it is as successful as we are led to believe, how do you see things developing from where we are?

Mr Wall: Before I start, *mea culpa*. I have just passed to staff the final version of what was the draft of our written submission. I am the National Officer for Amicus with responsibility for aerospace and shipbuilding. I am also the chair of the Confederation of Shipbuilding and Engineering Unions Aerospace Committee which embraces all of the unions in UK aerospace. Finally, in my spare time, I am also chair of the European Metal Workers' Federation Aerospace Committee and

that is certainly relevant to the way in which I will attempt to respond to your questions today. How do I see the future? I see it with a real sense of challenge. I think we are in quite good shape but we have to get in better shape. One of the big things we have going for us is the passion of the people involved in the industry. You have seen some examples of that today, particularly from my rock and roll partner, Kevin Smith. Being a child of the sixties, I do not know why he missed out the other two things we used to enjoy back then but certainly the rock and roll aspect of it he is probably still capable of performing. What we also have going for us is that we have at least been given the opportunity by government to sit down and take a long, hard look at where we are and where we need to get to through the auspices of the Aerospace IGT. That was a crucially important exercise. What was most important was that we had all of the stakeholders involved in that. If I look across at the competitive nations, they have not done that. They have either

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never even attempted to do it or their peers in the United States could not come across with the same breadth of stakeholder involvement. That was the Blue Ribbon Commission and there was a single member from the trade unions involved in that but they could not even reach fundamental agreement and he had to end up writing a note of dissent. What we do have going for us is a shared responsibility and a shared passion to try and make the industry grow. What we need you have touched on here. We most certainly need an environment in which fiscally we need to be able to compete. The Repayable Launch Investment is crucial as are export credit guarantees. In R&D, we have been living off the back of legacy investment for far too long. We really need to shape up on that. We have to encourage the innovation that has been highly instrumental in getting us to where we are and, from the trade union side, we have had our wake-up call. If we needed a final one, it is the aftermath of 9/11. We are responding. I think we are proactive. All of the successful companies in the business recognise us as a major contributor and sit down and work with us to try and meet these challenges. What is happening in the outside world? The emerging low cost economies will take some watching. We will have to very carefully observe what is taking place there and carefully judge our involvement with them. I touch on the United States and that is a biggy. We have to examine very closely what we have done and how much we can improve on that. At the very top level we have to sharpen things up but we can also do something a bit further down at the congressional level. We can certainly engage much more there. We have enough people in the United States to engage more with congressmen.

Q94 Chairman: You make a reference in your evidence to US subsidiaries locking the technology in, sometimes to the detriment of the UK, but there are other concerns about outsourcing. You mention the low cost economies but what about the amount of R&D that overseas subsidiaries are undertaking? This is in some ways denying us access sometimes to the fruits of that R&D. How can the Government help aerospace companies overcome these kinds of technology barriers?

Mr Wall: That gives you a feel for the highly globalised nature of the sector. It is possibly the most globalised of all the industrial sectors. We have to ensure that the financial environment that we have is competitive at all times. What we are up against—and I think we are just starting to understand it with the concept of the RDAs—in many cases is not just a federal financial support mechanism; it is also very much a regional financial support mechanism. An example of that is the Quebec region of Canada which has a very high concentration of aerospace companies, where that regional government does enormously well in helping to support its immediate, indigenous aerospace industry. They get two bites at that cherry. You talked earlier on to the SBAC representatives about how the RDAs are performing. I still very much think they are finding their way. There is money out there. How much I do not think people know. How do you access it? I think

they are still learning. Sally Howes brought out very well that we are maybe four or five years further down the line in Scotland with evolution. There is much more a recognition of how important and how good an investment aerospace can be to that global economy. We are still a number of years away from that in the RDAs and even in regions like the north west and the south west where it forms a huge part of that economy. We are still very much finding our way. An example of that is that GKN had been trying for quite some time to get some part investment on a composite centre on the Isle of Wight. They went through so many hoops and over so many fences it was unbelievable. We became involved in that and we whispered in a few ears. Eventually, it shook loose. We are not talking about a huge amount of money but what we are talking about is a scenario where the state of Alabama was prepared to put much more funding for that composite centre up front to that company, conditional upon them moving that centre of excellence to Alabama. We cannot afford to take that long to start shaping up with our regional assistance and regional encouragement.

Q95 Mr Berry: You have referred to the emerging low cost economies and you talked about China and so on, as have others this morning. On the one hand, a growing market means that there will be competition which potentially could put certain UK jobs at risk but also the other side of the coin is that a growing market means that there are more export opportunities which is good for the UK workforce. Therefore, what is your overall impression about this globalisation? Is it going to be a net benefit to the UK workforce or is it going to be a net loss?

Mr Wall: It depends on whether your view is that your cup is half empty or half full. Mine is always half full. Let us recognise that it is global. If we do nothing, we vanish. We are not going to do that. That is just not in our nature. We will not allow it to happen within the industry and neither should HMG allow it to happen. We really have to get in there and compete. What we have to recognise is that in order to get in there, there has to be some exchange of technology. Hopefully we can do it at the lower end and we can control it. At the same time, we have to decide what we want to be really good at and become the best at it. That is the only way in which we can approach that. Also, we have to do it in such a fashion where we are taking our workforce with us. The better companies are doing that. They are into works councils, employee fora and situations where it is not just a question of saying, “We will sit down with you when the wage deal comes round or the annual redundancy comes round.” “This is our strategy. What do you think about it?” The better ones are saying, “Do you have a view on it?” We have to do that together.

Q96 Mr Berry: Some levels of the supply chain are obviously more robust than other parts of the industry. How should the Government respond to that?

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Mr Wall: We have recognised for quite some time I think what we call tier four and five, the lower value, lower technology, machine type stuff. We have to continually do a skills audit, evaluate exactly what skills we need to be good at, try and encourage our workforce to respond to it. It is life long learning. There is no alternative to that. What you find is that if we approach it in a proper fashion people will respond positively to that. The days are gone when there was a queue of people waiting to grab the early retirement or the redundancy and run out the door. We have people now who by and large are willing to respond to training, to upskilling, to learning new things. We have to go down this road really heavily.

Q97 Mr Clapham: We heard this morning from the SBAC that they see the trade unions as being a very important element in the overall capacity of the industry. We also hear that, for example, Airbus industries are looking at getting their costs down. We know from the way in which some of the outsourcing has gone that it has not just gone to some of the cheaper countries of Asia. Some outsourcing has gone to Austria and Italy. What do you think is causing the UK to be a more expensive option than other parts of Europe?

Mr Wall: I do not believe there is any evidence that indicates it is a more expensive option than other parts of Europe. If work has gone there it is possibly on the back of joint ventures. Possibly it is offset. I do not think it is on the basis that we are more expensive than Austria and Italy.

Q98 Mr Clapham: Given that from the information we have that has happened and outsourcing is going to those two countries, it does present us with a challenge. Would it be possible to increase productivity and get costs down perhaps by the introduction of more technology? Would you be in favour of that?

Mr Wall: Nothing stands still. It is always possible to try and squeeze a little more out. There comes a point in time when you say that it is becoming counter-productive to squeeze too much. Our response to high performance workplace organisations, our response when companies have sat down and consulted with us on the benefits of new technology, has been a positive one by and large, if it is linked to new investment, to new facilities, to the fact that there is going to be a future there. It is not just about driving cost out. That is the key. If we are allowed to take part ownership of that process, then we respond positively but cheapest is not always the best.

Q99 Mr Hoyle: On skills and training, are there enough skilled people for the industry?

Mr Wall: In certain areas, yes. If we are looking at the more traditional, metalworking trades, there are plenty of people in them. If we are looking at the top end, computer software engineers, there are never enough of them. A concern that I have in terms of skills is that we may at times lose sight of a very useful traditional route of acquiring skills. It is bright, young people starting on the

apprenticeship route and moving from the tools into the drawing office and the design areas; and then being encouraged yet further to possibly go out and turn that into engineering degrees. There is still some of that going on. We have some real leaders in the UK industry who went via that route, guys like John Ferry from Smiths. I am a bit wary that it may be taking a bad second place to get hold of graduates and bring them in without letting them experience a bit of the traditional part of the skills acquiring route also. The basic answer is in some areas, yes, but not in the traditional areas.

Q100 Mr Hoyle: What can aerospace and the Government do to attract those specialist skills that are needed and that knowledge for the future of the industry?

Mr Wall: We have had a hell of a lot of debates on this. We can all do something. It is vitally important that we attract the best people, the brightest people. We have been very bad as an industry at doing that. I say that collectively. There is a traditional perception that it is manufacturing. It is smelly. There are always redundancies. There are always factory closures. There is an uncertain future. There has been a look at the whole education system and there has been incentivising to the deliverers of education which tends to end up in how many kids are you signing on to further and higher education. Therefore, at the traditional end, anybody leaving school at 16 seems to have the stigma of failure across their forehead and I think that is entirely wrong. We have a problem, I think, in attracting good, bright, young people at 16 to come in at that end. There is an opportunity at the 18 mark if we are looking at people leaving with GCSE A levels to maybe look at bringing more in there rather than going straight on to university. At the university end, we have the national problem. Is engineering perceived to be rewarding and important enough? The answer is in the UK no, certainly not in comparison to France, Germany, Italy and Spain, where an engineer is someone important, who is perceived as making a real contribution to their country. It is not here. There is image, perception and very much reward. We have to convince more bright young people and more teachers that it is worth going into an exciting industry with a future like aerospace. I was fortunate enough to be in Toulouse on Monday, seeing the new A380 with the bloody great wings stuck on it. It is fantastic and exciting. The facility at north Wales that you have invested a fortune in and are making a nice fortune out of now is a fantastic workplace, a really exciting place to work. That is what we have to get through to all the people involved in producing young people for industry.

Q101 Mr Hoyle: Maybe we ought to be looking at more workplace degrees so that people can get into the industry, get the qualifications on site, do the training and degrees ought to be fitted around that. That would be one way and also do you think the Government has made a mistake by saying we

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should have 50% going to universities because people begin to feel they are a failure unless they have achieved their 50%?

Mr Wall: I touched on that. I really think that needs to be looked at again.

Q102 Chairman: Some of us have personal experience of children who have graduated with debts and financial difficulties.

Mr Wall: I am still paying them!

Q103 Chairman: We both carry the same crosses in this respect but I was wondering if big companies in particular could look more at golden hellos. They are used in the City for graduates. Very often, the numerate, scientifically trained graduates find that a career in the City involves the clearing of their debts and things like that very early on. Do you as a negotiating body try and bring this to the table with management and say, "If you have skill and graduate shortages, why are you not a bit more imaginative?"?

Mr Wall: Manufacturing industry is more in tune with golden goodbyes than golden hellos but it is certainly a concept worth thinking about. You are right. Increasingly young people or their parents and their parents are now having to face up to huge sums of money, £25,000 or £30,000 in debt, before they start earning a wage. If an employer is saying, "I will wipe that" that becomes very attractive. Maybe there is a moral argument that that is not the sort of people we need to attract but when we live in the real world that is very attractive. The difficulty I would have as a negotiator is how to inject fairness into that at that end when I am not doing that sort of thing with a 16 year old at the other end. It is very difficult indeed but it is all part of reconsidering the reward package for people who work in the industry.

Q104 Chairman: There are things like part-time degrees and the employment of students during the holidays which, if they are properly remunerated, can help them with their financial difficulties. One gets the feeling that British management has not yet been sufficiently imaginative in addressing what are now real social problems. They may not be of their creation but they cannot complain if other parts of British industry or the British economy say that we are cherry picking.

Mr Wall: Your comments are fair. The challenge is putting that into a balanced approach to the whole reward package.

Q105 Sir Robert Smith: How much is the outsourcing internationally affecting the skills base, the development of skills and the maintenance of a skills base in this country?

Mr Wall: To a degree it is but the majority of outsourcing has been at that lower tier end. We were more affected in terms of the employment levels by the aftermath of 9/11 than we were by that, very much so.

Q106 Sir Robert Smith: As costs are altered by the outsourcing at the lower end, has that been generating any greater employment at the higher skills end?

Mr Wall: It is an absolute fact that we have many more white collar than we have blue collar now, particularly at the higher technological end. That is just the way in which the UK sector of aerospace has had to go. We have done it quite well and it is one of the reasons why we are still number two in the world, but I do not think it has created more jobs. I think it has just shuffled the pack around a bit and put them up at the top end.

Q107 Mr Hoyle: In the case of the aerospace innovation and growth team and the 2003 report, it was about continuous professional development of the workforce within industry. What progress has been made towards fulfilling that objective?

Mr Wall: It is a bit lumpy. We have a situation where we have 300 or 400 companies involved within it. Yes, there is an employers' association and it is doing a good job in trying to create a policy, form a strategy and deliver. That is extremely difficult because not all the companies are in it for starters. Secondly, how do you do that standard skills audit? How do you evaluate it? How do you prioritise that which we need? How do you target it and, most importantly, how do you deliver it? That is why I think the results so far—and it is an ongoing process and it will be for ever—are a bit lumpy. The other thing is who is at the other end of that? My members, other union members and members of no unions. Not everybody responds positively. Much of it depends on the way in which it is sold to them. We really need to look at tasking a group of people with trying to ensure that that comes across in a uniform fashion; that it is going to the regions in a uniform fashion; that it is being monitored and, where we see problems, we get in there and put some push behind trying to achieve, because we do have to achieve. There really is a very limited shelf life for anyone who says, "I have been doing that for 30 years and I am going to continue doing it." They are not. It is as blunt as that. That is a message that we try to put across. By the same token, what we are saying to companies is, "For God's sake, do a skills audit of your people and try to encourage your people to respond positively. We will help you in doing that."

Q108 Mr Hoyle: In fairness, it will be the same with the other four recommendations? They are all lumpy in the same manner?

Mr Wall: Yes.

Q109 Sir Robert Smith: On a specific example, Rolls-Royce are half-way through a five year programme to modernise the whole manufacturing process. How are such competitiveness measures affecting the working lives of your members?

Mr Wall: When you see that challenge, it has been put fairly and squarely and starkly: you need new investment. We are prepared to commit significant sums of money. However, you need to change the way in which you work. Immediately the hackles rise

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and suspicions emerge. We are looking at a company that has shed several thousand employees in the last four or five years. It is a testimony to the way in which people have worked together that we have negotiated that through such sleepy hollows as Barnolswick. You do not get much more remote than that, I can assure you. We have the new facility up and running there and we have people working to the new processes up there. We have it in Shennon which is a fantastic, shiny, new example of an initiative which was taken by the Scottish Executive up there. We have it in some of the areas of Derby and we are nearly there—this is why I was smiling—at Bristol, not without some pain. That was only on my behalf. What you are asking people to do is to look at an all-in situation of working and move away from the traditional overtime scenario. It is dead easy to point the finger at management. They had not been managing overtime properly. It had become institutionalised, one of the worst British industrial diseases. It was a cop out. That is right at the heart of trying to change. So also is giving management of their own destiny to groups of people, teams of people, to start thinking in a team concept. We have some badly scarred old warriors there in the shop stewards committees on those sites but we have been able to negotiate it through. If God gives me a long enough term, we will finish it off at Bristol as well. I only have seven years to go, by the way.

Q110 Sir Robert Smith: Do the aerospace companies tend to come to you early on in the process?

Mr Wall: Sometimes they do not come to me at all. Where we are good, they do not come near me. They are doing it with the local shop stewards committees. Rolls-Royce is an example. About four years ago we exchanged some pretty strong words about their employee consultation methods. They have responded very well to that and we are just putting the finishing touches on a global employee forum, involving shop stewards from Canada, Ohio, Indianapolis, Germany, Spain and all over the UK. That is about consulting over the way forward and flagging up things that we have said. We have to put that into practice, go onto the sites and start negotiating and putting it in front of people who have worked in a certain way for decades, saying it has to change. “This is why it has to change and these are the consequences if we do not.” We are getting there but it is not easy.

Q111 Mr Hoyle: Could you give us what the position is with Bombardier because they were looking for financial support as well? What is the future for Northern Ireland and its aerospace industry?

Mr Wall: I have been fortunate in that I have been to the Montreal sites of Bombardier. I have been to the Toronto site and I have sat down and discussed with the shop stewards at the Wichita site as well as having numerous visits to Northern Ireland. The facility, the workforce and the management at Northern Ireland have a hell of a lot to offer for UK aerospace. This project of the new C series I think will be a watershed for the company. I think it offers enormous opportunity. It is absolutely crucial in terms of capability that we get in there and get a lion’s share of those work packages. That means looking again at Repayable Launch Investment and looking at the whole financial package that HMG can offer to the best of its industry. Certainly we will be in competition. Just as Boeing with the 7E7 rolled out the principle of risk sharing and the third, third and third, I have been in there talking to people from the Treasury about how would they like to make some money. It is not easy but I honestly do think it is an investment which, number one, that workforce over there is more than capable of responding positively to and delivering. Number two, it retains capability in this country. Number three, there is a wide supply chain that would benefit from it. What is the alternative? We just step to one side and let either Montreal take all it wants to take and the capability in Northern Ireland vanishes, especially at the clever, higher value end of it; or there are at least three states in north America that have put in serious bids for work. We all know how that happened in the Boeing 7E7 situation where a number of states were putting serious investment support in there. I think it is a crucially important challenge for the UK aerospace sector now.

Q112 Chairman: Thank you. I think we have covered all the ground. We were able to avoid the need for simultaneous translation although I think you did offer a new word to the Committee’s lexicon, namely “lumpy”. It was well chosen and I think we got the message.

Mr Wall: Despite my 23 years of education in Chorley, you can still understand me.

Chairman: I would have thought that would be a distinct disadvantage! Thank you very much.

Tuesday 11 January 2005

Members present:

Mr Martin O'Neill, in the Chair

Richard Burden
Mr Michael Clapham
Mr Lindsay Hoyle

Judy Mallaber
Sir Robert Smith

Witness: Sir John Chisholm, Chief Executive, QinetiQ Group plc, examined.

Q113 Chairman: Good afternoon, Sir John, welcome to the Committee. As I think you are aware, we have been looking at various aspects of aerospace and we are very pleased that you are here. I do not think that QinetiQ in its present incarnation has ever given evidence before this Committee.

Sir John Chisholm: I think we have.

Q114 Chairman: The knowledge driven economy, I am just reminded. The thing is, the name always tends to confuse us, but we will not go into how you got it because we are not very sure.

Sir John Chisholm: Thank you.

Q115 Chairman: Could you identify for us what you would consider to be the current growth sectors within the aerospace industry. Given your role as a company which has a foot in both the public and private sectors, to what extent do you think these areas of potential growth are being supported adequately by Government?

Sir John Chisholm: Thank you very much. What I would like to do is to put my answer to that in the context of three points, and I will come to answer your question specifically with the third of those. The first is that aerospace for the UK, in our view and we cover a lot of sectors is a very important sector indeed. Not only the size of it, which is around £18 billion, but the UK is good at it and there are not many manufacturing industries where the UK has got a world position, so let us just remember the importance of that. I think it is also quite obviously a much better investment than inward manufacture of semiconductors where perhaps you end up with skills in fastidious cleanliness or nimble fingered operatives, whereas with aerospace you end up with a technology which pulls through into all sorts of other industries. For instance, we would not have the motor racing industry—£5 billions' worth—in this country if it had not been for the basic technology generated out of aerospace. The problem we have is that it is a long-term industry and we are surviving upon the investment that has been made in the past. I think that is a fairly well understood phenomenon. Let me just make a point about that long-term aspect. Basically, it is a physics-based industry and when you are investing in physics-based industries it is a very long cycle time from the invention, which basically comes out of blue sky research, into something which can be manufactured and made and you can develop economic benefit from.

Maybe 15 years has to go by and the real value is in that innovation process, not the original invention. The invention of creep, say, in metallic materials is something that can be invented in universities but to actually make that invention into something that you can economically exploit takes a very long time. Because of that long period of time, virtually all such industries around the world need a degree of government support to make that an economically viable decision for companies to make. Then you get to the issue of if it is going to need government support, why is that a rational decision for this country to make given the size of this country vis-a-vis the United States, for instance. Can we afford to invest enough to make a difference? This is what comes to the answer to your question. Our answer is that yes, you can, if you do two things. One, you concentrate on the things you are good at and, two, you co-ordinate nationally, so you do what you do efficiently. In this country the areas where concentration is going to be beneficial to us is in wings, where we have our position with Airbus and since wing technology is changing this is the big challenge for us, and arguably the basis upon which we have been strong in the past may not be the case in the future, so that is a challenge to us, to our position in engines where in Rolls-Royce we have one of the two leading companies in the world arguably, possibly three, possibly four and electric systems. Those are the three areas where there are strong opportunities for us in the United Kingdom to sustain and grow our position and that is where we recommend that concentration and the co-ordination across our industry in the UK should be based.

Q116 Chairman: Do you think that the level of support and co-ordination being offered by Government is sufficient at the moment? That may be a leading question in the sense that no-one will ever say it is sufficient, but do you think that we are getting as much resource behind our industries as our foreign competitors are, for example?

Sir John Chisholm: We are not. Obviously if you compare us with the world's leading nation, the United States, it is a fraction of the investment that the US Government puts into the industry. The challenge that we face is how, within what is a reasonably practical level of resource, we can apply that in a way that is going to make a difference. In our view, the co-ordinated view through the AeIGT suggested that more investment, not by an order of magnitude but more investment by £50 million,

which is comparatively modest in the total scale of things, would be enormously beneficial, so more investment would be helpful. Also, in the way we do it, let us try even harder to be better co-ordinated about the way we do that investment.

Q117 Chairman: You think it is down to the Government to co-ordinate it rather than the players themselves?

Sir John Chisholm: To be frank, I think industry has done a really rather good job of co-ordinating itself. When I first became strongly active in this field 15 years ago industry was all over the place in terms of its co-ordination. When I first became Chief Executive of the then Defence Research Agency and I called together industry meetings to try and discuss where best investment should be placed in aerospace technology, I found it very difficult to draw from industry any kind of co-ordinated view because every company was pursuing its own best interest. What has come out through particularly the AeIGT process, I believe, is the best co-ordinated, most authoritative position the industry has ever had.

Q118 Mr Clapham: Can I just look at the technology gap because you say in the submission that you have made that the problem for the UK is that there is this perceived technology gap, the difference between what is developed at the laboratory and the final product, yet when one looks at the USA it is the technology that is a real driver and is very important to their competitiveness. Is the innovation gap the reason that we are second to the US rather than equalling the US in the aerospace industry?

Sir John Chisholm: As I was saying earlier on, our view is that while we are extraordinarily good at the science at the front end of the process and we can stand shoulder to shoulder in laboratory terms with the US, the gap is the taking that from the laboratory through that 15 year process to a point where you have an economically manufacturable product which gives you competitive advantage in world markets. That is where the gap is. That is where the US invests more as a proportion of its total investment than we do.

Q119 Mr Clapham: Have you suggested to Government ways in which we could improve that at all?

Sir John Chisholm: Obviously, as a company we have been consistent in what we have been saying for many years, that that is where more attention needs to be paid. Clearly, it is what we as a company are deeply involved in so it is part of our normal speech.

Q120 Mr Clapham: Do you feel that Government is really aware of the challenge that there is there? Is there more that they could be doing?

Sir John Chisholm: I believe there is more that they could be doing. Clearly by investing a greater proportion of its resources in that transfer from

basic science into manufacturable product by changing the balance in that direction would be a good thing.

Q121 Richard Burden: You say in your evidence that in the past the role of bridging the innovation gap was something that the government research establishments were pretty effective in co-ordinating and carrying out, and then you say that much of that applied research has disappeared. That confused me a bit because you were one of those research establishments. Can QinetiQ not take that kind of role now?

Sir John Chisholm: I think the point we are making is in times past the balance of funds was rather different. If you just look at how much money was spent in the 1980s, say, or the 1970s, because most of the technology which is now going through in today's manufacturing had its origin in that period of time, if you look at the 1980s and the balance of what was going through government research laboratories compared to what was going through universities at that time, for instance, it would be very different from what it is today.

Q122 Richard Burden: In order to bridge the gap now you have indicated a modest amount of extra funding would be needed in certain areas, but are you suggesting recreating those research establishments?

Sir John Chisholm: No, I am not. I think there is no advantage at all in going backwards because there was a lot wrong with that era as well. I was just making a point there about the balance of investment. I believe that a better understanding of where we position ourselves in the world, that is the concentration, enables us to be more efficient now. Also, better co-ordination within industry enables us to be more efficient now. If we could get together on how best to balance the programme as between many, many small projects focused upon individual pieces of innovation compared to selecting some of that innovation to be taking it through to a point where it is closer to being something that you can manufacture and sell competitively, that is the sort of change that we would advocate.

Q123 Mr Hoyle: Obviously we have had witnesses before us who have been telling us that they have to outsource their R&D and it is interesting that you also said about the innovation gap. Do you think international competitors are taking advantage of that gap that has been created or do you feel that it is being done for financial savings? Is there a genuine gap there or do you think it is done for financial purposes? What do you think the reason is?

Sir John Chisholm: Just to position my answer in relation to your question: it is undoubtedly true that in the United States, for instance, there is a great availability of funding to take technology further downstream and, therefore, companies like mine certainly offer technology into the United States for that process. We have to meet the requirements of our shareholders and we will go

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wherever we need to go in order to exploit the technology that we have got. To a degree, that plays to the concern that you express there, that where there is an international competition for the ability to develop technology the most supportive environment tends to win out, that is true.

Q124 Mr Hoyle: Do you think there is more going out than coming in?

Sir John Chisholm: I am talking specifically about the aerospace industry here.

Q125 Mr Hoyle: So am I. I am talking purely about aerospace. Do you think there is more coming into the UK than there is going out?

Sir John Chisholm: I am not aware of a lot of technology coming into the UK.

Q126 Mr Hoyle: So you think there is a lot more going out?

Sir John Chisholm: There is a lot more going out than coming in, yes.

Q127 Mr Hoyle: Do you think it is purely for financial reasons?

Sir John Chisholm: It is very much driven by the market structure. We have got much more opportunity in the United States: it is a bigger economy and there is more funding available.

Q128 Mr Hoyle: Who are the main players for going abroad in R&D for aerospace?

Sir John Chisholm: I do not think I am well focused on giving you a very long list but virtually everybody who is involved in the aerospace industry in the United Kingdom has units in the United States, we amongst others.

Q129 Chairman: We have heard a lot about partnership between academia and the aerospace industry. People have been saying to us that partnerships between these two groups should be made to stimulate innovation and obtain access to best technology and research. I suppose in some ways to be against that would be to be against apple pie and what have you, but to what extent do you actually do anything about this? Do you have much in the way of partnerships with academia and, if so, in what areas?

Sir John Chisholm: We have some partnerships with academia, arguably too many because we are trying to do exactly what I have been talking about this afternoon, which is to concentrate a focus. At the moment we have relationships with some 90 research institutions in the United Kingdom and we are trying to focus that better through a programme which we are about to announce.

Q130 Chairman: What about the small companies that are engaged in research work, sometimes spin-offs from academia themselves, sometimes spin-offs from bigger companies doing rather more specialised work? Are they too small to be of consideration to a big player like yourself?

Sir John Chisholm: They play a useful role in the transfer of technology. It is one of the mechanisms by which basic technology gets transferred, typically through funding through venture capitalists which creates a viable entity, that entity grows and eventually gets absorbed into something bigger. That is just one of the conventional mechanisms for that and we, like other players in the field, have relationships of various sorts. We have some spin-offs of our own and we do business and have partnerships with spin-offs from other people.

Q131 Chairman: Do you think the Government does enough to act as a catalyst or a facilitator in this area or do you think they stand in the wings and leave it to players like yourself?

Sir John Chisholm: I think the Government is trying to be active in this field. The Government has done some rather useful things. The more it can do in terms of encouraging venture capital, which is one of the lubrications of this, the better and the more it can do in encouraging angel capital, which is another route, is a good thing. The most important thing it could do, however, is to encourage early adopters of technology because that is what you really need in early stage technology; you need customers who are early adopters. For the Government itself, as a potential early adopter, one of the most important roles it can play is through its own purchasing being an active early adopter of early stage technology.

Q132 Sir Robert Smith: In trying to encourage the Government to be an early adopter, how do you then get round the current philosophy that it should also get good value for money as the customer for the taxpayer in what it is adopting? Do early adopters not take a risk?

Sir John Chisholm: A very good point, Sir Robert, a very good point, and I would say that this Committee has got a very important role to play in that in providing a counterweight to the Public Accounts Committee in its scrutiny of what departments are doing. The Government has a responsibility in relation to the broad picture of benefit to the economy, not simply the narrow picture of not wasting money. If you are taking a degree of risk in your purchasing, some of those purchases are not going to work but overall you are going to do a good job for the economy. If you only concentrate on the few that fail and you do not concentrate on encouraging the purchasers to take risk then you will end up with a very pedestrian purchasing programme.

Chairman: People on the PAC are only there because they found the DTI Select Committee too exciting!

Q133 Sir Robert Smith: On the issue that you have been raising about this being an industry with a long timespan before something becomes commercially attractive and the need, therefore, of possibly an extra £50 million and so on, is there anything in the private markets or the capital

markets that is a barrier to the private sector investor getting more interested in some of these long-term potential returns?

Sir John Chisholm: The chief problem is the length of time for return and the uncertainty as to who will actually benefit from it when you set off. That is the basic economic failure because that is unpredictable at the start. It is hard to get private sector capital in because they do not know what to invest in, and that is why the Government, who will benefit when the nation benefits, has an inevitable role in stimulating this process and funding. Obviously as you get towards the end private capital can pick up but in this transfer process, because of the length of it, the Government has a crucial role to play.

Q134 Sir Robert Smith: Finally on that issue, as the markets become so much more global can the Government actually lock that benefit into the UK economy? In biotechnology we looked at a lot of German investment to really build up the biotech skills base in all sorts of innovations and all sorts of start-ups but then they had not got the capital market to take it further, so the Americans got skilled labour and innovative ideas paid for by the Germans. Is there a way of seeing a lock-in at the end of that 15 years if the Government has taken the risk?

Sir John Chisholm: I would argue that is one of the reasons why Government should look kindly upon aerospace because you need industrial architecture to be successful in aerospace and, because of that long timeframe, for other nations to get into it they have got to invest over a long period of time to build up an equivalent architecture to that which we have already got. We could ruin ours, but if we invest sensibly we can keep it going and, therefore, give ourselves a very high chance of the benefit coming to the UK.

Q135 Sir Robert Smith: One other issue is access to other overseas markets and other people have raised the issue of access to markets. As a company, have you experienced any barriers to trade that you have come up against in reaching other markets?

Sir John Chisholm: In relation to QinetiQ's own business, it is not a significant problem because we are in the development of early stage technology and then the handover of that to other companies who will go into the manufacture and development of it.

Q136 Sir Robert Smith: So people want you, they do not really want to keep you out?

Sir John Chisholm: They want us. There is a legitimate question for you to ask, if I may put it that way, which is since the US has such a vibrant market, does the technology then get locked in the US, and the answer is, of course, yes, but that is a concern for the nation.

Q137 Chairman: You made the point that there is a role for venture capital. One of the things that we discovered, which was not in the field of research

but we encountered, was that in the biotech industry, for example, which has equally long lead times, 15 years to get through the last of the clinical tests, in the US in particular the capital markets, the venture capitalists, will come in and go out at various stages, so when a project, as it were, has developed a certain distance and a value has been added to it, people will sell off their share and someone else will buy it and come in. Do you envisage our financial markets becoming sufficiently sophisticated, as it were, to have players who will come in and go out of the investment cycle in this way?

Sir John Chisholm: We do, although on a much smaller scale than the United States. We do indeed have such a structure of the private equity market in the UK. Can I just describe the difference between the biotech market and the physics-based market? The key thing with the biotech market is you get so much of the value added in the invention. If you have got an efficacious compound then you know that if you can get it through the FDA process you have got something that is really going to make money. In the physics-based business you have got a long way to go before you get to that stage and, therefore, getting the early stage capital in is much more difficult. We did half a dozen spin-offs when we first started this process of technology exploitation—this was in my DERA days—and the only one thus far for QinetiQ to have cashed out of was the one pharmaceutical product we had and was the one that was furthest from revenue. The reason for that is exactly as you have articulated, that because it is a proven efficacious product the private capital is prepared to come in years before revenues because they know that when it does get to revenues there will be profits.

Q138 Mr Clapham: You make the point in your submission that, together with another aerospace company, you put forward a programme that was acknowledged to be of some strategic importance only to find that it was turned down because fault was found in the detail of your submission. Could you tell us a little bit more about that and perhaps say a little bit about the fault in the detail of the submission?

Sir John Chisholm: The project we were relating to there was something called Active and it was a joint proposal with Airbus and Short's and Rolls-Royce and others for the validation of new routes to manufacture composite structures. Doubtless we could be told that there were all sorts of failures in the way that the proposal was articulated that is always true when someone turns you down but it is also noticeable that out of the many awards in this call there was only one major programme, and this was a major programme. That has led us to surmise, just looking at the statistics, that major programmes which have the characteristic that I am talking about of investing in the taking through of technology into a manufacturable product are less favoured than those programmes which are essentially focused on the very early stage of

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creating new innovative science. As a company, we have been pretty successful in calls so we have no cause for complaint about the process of selection of bids to fund because we feel quite happy that we have done quite well. The reason for that is that as a science-based company a lot of our proposals are inevitably at the earlier stage, so we have done quite well out of it. The question mark in our submission is whether that would have been best for the nation as a whole.

Q139 Chairman: Can you tell us what this project was?

Sir John Chisholm: It was a project called Active for the validation of new routes to manufacture composite structures. Previously we invested in technologies for composite structures and this was about taking that technology in composite structures and testing it out in a manufacturing environment.

Q140 Mr Clapham: Would the intention have been to link it to wing technology?

Sir John Chisholm: Yes.

Q141 Mr Clapham: In terms of the UK's competitors, I notice that we have got France, we have got Germany, but you did refer to areas that we ought to concentrate on and there does not seem to be any mention of competitors in Asia. Do we have Asian competitors, for example Taiwan, in aviation electronics?

Sir John Chisholm: Of course there are Asian competitors. The advantage we have for the moment is what I was referring to earlier on, which is an architecture. We have not only the big companies but also we have middle sized companies and small companies and we have universities. We have a complete industrial architecture which supports the eventual production of the aerospace product. Furthermore, people like Rolls-Royce, who have been in the market for a long time, have deployed equipment which generates wealth from all the back-up services which go beyond that. Getting into that very long cycle market for a new competitor like Taiwan would take them a very long time. This is why this is a good industry for us to invest in. I believe the man from Mars looking at Britain would say, "this is the sort of area you should be investing in".

Q142 Mr Clapham: I jumped ahead of myself there. Could I ask in terms of the programme that you referred to a little earlier, has that been taken up by anybody else? The fact that your submission was rejected, does that leave us with a disadvantage as far as composite materials are concerned and their relation to wing technology?

Sir John Chisholm: We are not going to give up, we are going to try again to find a different way. Let us face it, what I am saying today is helpful from that point of view. We are trying to make the point that this is something which the nation should be

investing in. We should be investing in taking our science through to support our manufacturing industry in this area.

Q143 Mr Hoyle: In your submission you talk about lack of co-ordination between the different Government bodies that are meant to look after aerospace and the system. What style of co-ordination would you like to see and what do you suggest would be an improvement to this situation?

Sir John Chisholm: This is now complicated because we have the DTI with its innovation schemes, who have distinctly limited funds but perhaps have the most broadly based national view; we have the OST with its funds, which are much larger but are not focused; we have the MoD with a rather narrow remit; and we have the Regional Development Agencies, each of whom has their own remit. Corraling that into a coherent form of funds so they are used to the maximum effect for the UK as a whole has become a complicated thing. As I said earlier on, the industry is relatively well co-ordinated here and it is now becoming a skill in industry how you go round and pick up bits and pieces of funds from various bodies to pull it together into a proposal which then goes in the DTI and has maximum chance of getting funded. It would be very attractive if on the Government side there was a similar co-ordination and vision so that all of those various agencies participated in a co-ordinated vision of what they are trying to achieve, and what we are trying to achieve out of the innovation funding process in Government.

Q144 Mr Hoyle: Obviously each Government body has a different priority. Which do you think are the good guys and which are the villains?

Sir John Chisholm: They are all good guys, of course, because they all give us money.

Q145 Mr Hoyle: Who are better than others?

Sir John Chisholm: As I said, the DTI has a natural co-ordination role in relation to the wealth of the UK, so you would expect the DTI to have the clearest overall vision. We would hope that the MoD would see the value in there being a strong UK industry and would be sympathetic to funding programmes, being very much an early adopter of technologies, which would help draw the technology into the economy which can subsequently migrate into the civilian aerospace sphere.

Q146 Mr Hoyle: Do you think there ought to be a payback to the MoD when they invest in technology where it is defence related and we see a technology transfer to civil application? Do you feel that it might encourage the MoD if they were going to get some payback on it?

Sir John Chisholm: In principle there are export levies and things like that which the MoD does benefit from. It is kind of hard to collect on, I imagine, but I have never paid one so I would not know.

Q147 Mr Hoyle: If we take Typhoon, the super aircraft, who knows, there may be something that transferred that the MoD helped to fund. Do you think there ought to be a payback if BA used that within the civil area?

Sir John Chisholm: On the other hand, the MoD gets the benefit anyway because if the technology transfers into the civilian sphere they get the chance to buy it back more cheaply because the production runs are very much greater in the civilian sphere.

Q148 Mr Hoyle: That is usually after you have already built the aircraft. How do you judge the RDAs? If we talk about the good guys in Government bodies, if we take the East Midlands and North West Development Agencies that have both got huge aerospace related jobs, do you think they both come out good?

Sir John Chisholm: Personally, I am not very familiar with either of those so I can only talk in general terms. In general terms, my experience is necessarily the RDAs are focused upon their local priorities and aerospace is inherently national and making that work is a difficult thing to do.

Q149 Chairman: There are concentrations of aerospace activity. You have centres in different parts of the country. To what extent did you seek to engage with the RDAs when they were establishing their priorities? These priorities did not come out of the air, they were supposed to have been based upon a process of consultations with local players, of which you would be one.

Sir John Chisholm: We do interact with the RDAs and in our interaction I hope that we help them form their priorities. Clearly in those regions where we have a significant presence I believe we are quite important to the RDAs because having a technology basis is generally seen in each region as key to future prosperity. In the West Midlands, for instance, we have a very active interaction with the RDA there. The point I am making is that each of them is different and when you are trying to get together a national programme it is actually a complicated thing to weave together why that particular programme meets the objectives of different RDAs.

Q150 Richard Burden: Just continuing along the theme of RDAs, there are a number of areas now where the RDAs say they are trying to co-ordinate their activities where particular sectors or clusters do not fit neatly according to regional boundaries. In relation to aerospace, do you know (a) if they are doing that and (b), if you have heard they are doing that, is it working at all or as far as you are aware are they just not doing it in aerospace?

Sir John Chisholm: I do not want to say that the RDAs are not trying because I am sure they are, but my impression of interaction with the RDAs is each of them has got their own priorities. What we are currently talking about, which is funding

innovation through to manufacture, generally speaking is not explicitly one of them, they have to twist something around their priorities to make it fit.

Q151 Mr Hoyle: I am a little bit concerned. You mentioned the West Midlands, which is very important but it is hardly the hotbed of aerospace, whereas if we take the North West many tens of thousands of jobs are dependent on aerospace. Have you met the Chief Executive of the North West RDA?

Sir John Chisholm: Personally, I have not.

Mr Hoyle: That worries me because that proves there is not really an interaction. Should it be the RDA that comes to you or should it be you that goes to the RDA, I am not quite sure, but both of you should have been leading the role, and I am very, very concerned. If somewhere is important in aerospace and you are not meeting with the RDA, we have really got a problem.

Q152 Chairman: Just before you answer that question, how many people do you have working in the North West in QinetiQ? How many of your employees are located in the North West region? Do you have a big presence there?

Sir John Chisholm: It is not a huge presence. It will be a presence in the hundreds rather than in the thousands.

Q153 Mr Hoyle: As a percentage of the company, how many is that? That could be 10% or it could be 20%, it is a bit misleading.

Sir John Chisholm: In the RDA defined by the North West it will be less than 5% of our employees.

Q154 Mr Hoyle: You are talking from Scotland to Stafford.

Sir John Chisholm: I know the region.

Mr Hoyle: Please come and meet the Chairman and the Chief Executive, I think that is the answer.

Q155 Chairman: I think the point we are trying to get across is we get from businesses this constant line that there is a danger that "The RDAs do not understand our predicament sufficiently well, we do not register on their radar screens" and that begs the question is that because you are too small or you do not try hard enough to get yourself on to it? We realise that it varies from one region to another. How many people do you have in the West Midlands, for example?

Sir John Chisholm: There we have 3,000 or so. We are much more active in the West Midlands, and obviously in SEEDA as well.

Chairman: Yes, the South East. I think that covers all of the areas that we wanted to raise. If there is anything else that we need to come back to you on we will be in touch. Thank you very much for the information that you have given us today.

Witnesses: **Mr Ken Maciver**, Chairman of Aerospace Technology Steering Group, **Mr Colin Smith**, Director of Research and Technology, Rolls-Royce and **Mr Lambert Dopping-Hepenstal**, Technology Director, BAE Systems, examined.

Q156 Chairman: Mr Maciver, as you said earlier to me, you have been here before wearing a different hat. Perhaps you could explain to us exactly what the Aerospace Technology Steering Group involves, introduce your colleagues and then we will get started.

Mr Maciver: Chairman, on my left is Lambert Dopping-Hepenstal, who is the Technology Director of BAE systems and on my right is Colin Smith, who is the Director of Research and Technology for Rolls-Royce. They are both here, as I am, as members of the group. When the AeIGT was set up there were originally four groups set up to progress the work, one of which was based on technology and at that time we were known as group one, which we felt was a rather impersonal title, so we are now known as the Aerospace Technology Steering Group. We are responsible for co-ordinating the technology element of the Aerospace Innovation and Growth Team. It was based on the recommendations of this group that we recommended the National Aerospace Technology Strategy as the focus of investment and technology for the future. My capacity is as a semi-retired former industrialist and I chair the group.

Q157 Chairman: How far have you got along the road to the National Aerospace Technology Strategy? How well developed is NATS?

Mr Maciver: As Sir John was kind enough to say a moment ago, industry has its act quite well together on that. To be frank, I think if we had been asked two or three years ago if there was a lot of money available what we should spend it on, we would have had to take a step back and think about it. During that period we have identified and developed based on looking at the market forces and looking at the opportunities for the future the technologies which we believe are important to the continued success of aerospace in the United Kingdom. We have developed very specific programmes which would support that programme in the long-term which the intention is should be funded by industry in partnership with Government. Developing the programme is well advanced and, if you recall, the original AeIGT Report was published in July 2003, and the implementation process started in the autumn of that year, September/October. The rate at which we could progress was limited to some degree to take account of the Innovation Review, which was published during this process, I cannot remember the exact date. The work with the MoD ultimately takes the form of the MoD Technology Strategy but, be that as it may, we have published a full implementation report. The issue which confronted us, the original vision, was and I think, again, Sir John explained the reasons so I will not repeat it unless you wish to go into it further why this investment is important, the vision at that time was we would see an increase in the funding which went to a programme called CARAD where we believed we had fallen behind enormously and that was

where the increase in funding would come originally from central government. With the publication of the Innovation Review, it became very clear the programme could only be funded by drawing on both the technology funding from the DTI, which would make a contribution but is not enough to fund the Government side of the programme and we would have to access the regional authorities, both through the devolved administrations and the RDAs. We have been working very, very actively on that and we had a mixed result. The first test of this was the April call for technology funding from the DTI where we have some concerns. The programmes which were favoured tended to be the smaller programmes and with the very nature of aerospace you are dealing with big technology programmes. We will be making a formal input to the DTI that what we have seen from the first attempt, while on the face of it it looks encouraging, the type of programmes funded we have some concerns about and, hopefully we will have a dialogue on that. The DTI was given the task, specifically the Prime Minister asked the Minister for Science and Innovation, to co-ordinate funding from all sources to support the National Technology Strategy and work has been progressing on that. In terms of the detail, since the DTI has taken the lead they are better able to describe the detail of that than I am. We are now at the point where we have to demonstrate that the process, bringing together funding from central government and the innovation source—the regions, will fund the kind of programmes which are essential to the National Aerospace Technology Strategy. I think I can say the industry position is and I am trying to speak as a bridge between industry and the DTI in this regard—they are not yet confident that this can be done. They need to see some practical demonstration that we can fund jointly one of the major programmes in the first half of this year. If that cannot be done, it would either undermine the strategy, which I think we would be very reluctant to accept, or the mechanisms will have to be readdressed. Everybody is working very hard to this end and a lot of progress has been made. Initially, we did not believe that the tasking frameworks for the RDAs, in particular, would support this kind of funding. We are now assured it is possible, but we have yet to demonstrate that we can fund the major elements of this programme. In a nutshell, there has been enormous progress on developing the strategy in detail and, from an industrial point of view, industry is ready to go ahead. From the funding point of view, we are not yet there. I think it is worth emphasising, industry will go ahead anyway, but they will spend their money where they have the most effective partnership with government, whether it is in the United States, France or Germany. Their propensity to spend their own research money in the United Kingdom does depend on the success of the strategy. Chairman, I am afraid that was a rather long-winded answer.

Chairman: I think Richard would like to follow up on that.

Q158 Mr Burden: I have to confess I am getting a little confused about this issue of funding and exactly how you want to see it taken forward. Are you simply saying that government funding for this whole strategy to work is pretty crucial?

Mr Maciver: Yes, it is crucial for this to happen in the United Kingdom.

Q159 Mr Burden: In terms of that strategy implementation, you have put the figure of £50 million on that. I am still not clear exactly where that figure of £50 million comes from. Is that what you think is going to be roughly right if all the bits of the strategy come together or is it based on something more substantial?

Mr Maciver: It is based on a great deal of work. What we did, as I say, we went through a very rigorous process to identify where the inherent strengths were in the United Kingdom and where the market opportunities were. Our recommendation was that investment on acquiring technology, proving that the outcome base can be used in aerospace, should be concentrated on certain broad themes. Then we developed what we regarded as the minimum programme which would make that viable. In other words, there is no point in spending money that is insufficient to achieve anything. We scoped the programme on the basis that it would be broadly funded approximately by 50% by industry and the remainder by civil sources of funding and the MoD. That required two things: firstly, the amount of civil expenditure, which at that time was purely DTI, was increased by the order of £50 million and, secondly, more of the MoD expenditure was spent in partnership with industry. In memory, that total programme added up to something over £300 million a year, as I say, half funded by industry. The missing part was the funding, which we are now trying to piece together, both from accessing innovation funding from the DTI and regional support. I hope that has clarified that.

Q160 Mr Burden: I understand the criticisms or reservations you have had about the way certain bits of government funding may have been used in the past. You mentioned the issue of money going to smaller projects where that was not necessarily the best use of resources. With the process now going on, which promises to bring the issue together with the ministerial involvement to get the co-ordination you have been talking about, are we now at a stage where you say, we are reasonably confident that if there is a mechanism to bring the process together, that mechanism is as good as it could be at the moment, we wait to see if it works and if it does not then something, presumably, needs to be done, or is there something which you are looking for in the mechanism now that could improve it?

Mr Maciver: Whatever the source of funding, we would like to see recognition given to the importance of the overall strategy. We are not at the point where I can say it will succeed or fail. We are very

determined to bring the programme together and to establish the funding necessary to the best of our ability. I think it remains to be seen; we are not yet confident that can be done. Until we have commitments from the relevant RDAs or whoever and until we see the ability to support the programmes through the DTI's innovation funding, we cannot be sure, that is the bit that remains to be proven. We are not yet at that point, but a great deal of effort has gone into it. The mechanisms are not ideal because we have to deal with fragmented sources of funding which makes it more difficult but, nevertheless, that is what we have set out to do. That process, as I say, is being led by the DTI with the full support of myself and my colleagues here.

Q161 Mr Clapham: Mr Maciver, could I probe you on how the National Aerospace Technology Strategy will work in practice? Is it possible for you to say how important is it to the UK aerospace industry?

Mr Maciver: I will say very briefly and then, perhaps, if you agree, Chairman, my colleagues will broaden it and add to that. This industry is based on technology and, as Sir John mentioned in the earlier session, we cannot take something straight out of the science base and put it on an aircraft. Putting it at a personal level, I am sure none of us would like to go on vacation on an aircraft using unproven material. Aerospace is safety critical, regulated and this takes time. Typically you have to have a good understanding of the technology 10 years before you apply it to a new aircraft, a new engine or whatever. The biggest single determinant of success in aerospace is being at the leading edge of technology. I just wonder, Lambert, if you would like to put that more clearly than, perhaps, I have.

Mr Dopping-Hepenstal: I do not know if I can put it more clearly. Technology is a clear differentiator in our business and, as Ken has said, it takes a long time to mature that technology. I think I would argue that aerospace is the integrator of a very broad call for science and probably in industrial terms it is the biggest invigorator of breadth of science that there is. It is an extremely good way of pulling the science base through to wealth creation and product application. It is absolutely fundamental to us. It is a technology based industry and we are only going to compete in the world through having differentiating and leading edge technologies.

Mr Smith: I think I would like to add that the competitive nature of aerospace is such that if you get behind the curve on technology, you could be offered a platform for 10 or 20 years. So, two or three per cent in terms of loss of technology, in terms of performance and you are out of that business for good and, that is a long time. We have to stay right at the leading edge even if it takes a long time to get there.

Q162 Mr Clapham: It provides that co-ordinated vision that we heard about earlier. Given that, how does it connect into some of the other initiatives, for

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example, Aerospace Innovation Network and the Aerospace Technology Validation Programme, how do they connect with the strategy?

Mr Maciver: Basically, when we looked at investment in these broad themes—one very much of interest to Colin's company—the environmentally friendly engine, that is a very big subject, so you have to break it into manageable chunks. At pure, let us call it, applied research level we propose a series of aerospace innovations networks to focus research on taking ideas or concepts from the science base and investing it even further for application in aerospace. However, aerospace is not sufficient, you have to validate the technology or demonstrate it. You simply have to show that it will work in an aerospace environment and these are the validation programmes. By their very nature, these are quite large, you cannot validate part of an engine concept, you have to validate the whole thing or whatever it is. There are two elements: the very focused research on specific areas of interest to aerospace and the validation programmes, which are designed at a very practical level to demonstrate that these technologies will work safely in aerospace. Also, that applies in defence because it is very important in the interest of programmes being on time on cost that technology is validated before we are committed too far. These are the two mechanisms and these together will support the major themes of interest to us. That is the concept.

Q163 Mr Clapham: In effect, the strategy provides the framework but within that framework we segment it to the various aspects that you want to concentrate on?

Mr Maciver: To practical, manageable elements.

Q164 Mr Hoyle: We keep touching on funding and the worries about the future of funding. Obviously, in the National Aerospace Technology Strategy Implementation Report, the suggestion is that companies continue to spend the amount that their global competitors are spending; yet the hint is that the Government is spending significantly less than the competitors' own economies. I know in the report you state quite clearly that the DTI is inadequate in the support it is given. What evidence have you for this?

Mr Maciver: Both statistical and anecdotal. The statistics are not fully up-to-date and I believe the Committee will be receiving a further submission from the SBAC. The latest statistics available show very clearly that while, so far, industry spend was being held or even increasing, Government spend had fallen. Anecdotal, before I retired from my company role, I had operation of management here, in north America, France and Germany. The experience of one company would very much support this, where I had offers from government agencies in other countries to work alongside them, which would have meant moving the focus of research in certain areas from this country to, for example, the United States.

Mr Smith: Other countries have national strategies which they then fund and the funding mechanism, once you manage to get on to that, can be quite attractive in simplicity. The US is obviously the big one in terms of the amount of funding that goes into the civil sector. The last data we had showed about £620 million in 1998, which is significant and an order of magnitude or two greater than the UK. France and Germany have very clear national aerospace strategies which are funded and once you start that it has to be competitive but nevertheless it is easy to put it together.

Q165 Mr Hoyle: What percentage is there between private and public sectors respectively, on programmes?

Mr Maciver: It has changed over the years. Currently,—correct me if you have any differences from your company perspectives—companies are maintaining the level of spend on acquiring technology. I cannot be precise on that but the published figures would suggest it is significantly greater.

Q166 Mr Hoyle: What percentage, would you say?

Mr Maciver: Percentage of?

Q167 Mr Hoyle: Of the amount, the total. What percentage is government putting in and what percentage is private putting in?

Mr Maciver: I am not sure I can give a direct answer now.

Q168 Mr Hoyle: Roughly?

Mr Dopping-Hepenstal: I am not sure I can give a direct answer.

Q169 Mr Hoyle: Ballpark figures?

Mr Dopping-Hepenstal: From our experience, in terms of R&T investment, for every pound that we would put in, we would probably get about 50 pence worth of government funding in support of that.

Q170 Mr Hoyle: Of the pound or in addition?

Mr Dopping-Hepenstal: In addition to the pound, whereas in the States for every dollar we put in we expect to get about two dollars of additional government funding. That is the sort of experience we are beginning to see these days.

Mr Maciver: There is a very important point here. At present, company expenditure has been maintained. If they are unable to work in partnership with government here or on less satisfactory terms than they could elsewhere, they will tend to migrate to where they can invest in partnership with the particular government. That implies that the level of spend today that you see from companies will decline. It cannot be taken that it will be sustained unless there is a competitive participation by government.

Q171 Mr Hoyle: What help have the tax breaks been that the Chancellor brought in, in R&D? They must have helped but is it now beginning to trickle through more? Are we seeing it begin to flow?

Mr Maciver: I am not sure we are the best people to answer that but very broadly the tax breaks address the broad subject of product development as well. We are talking of the very specific area of acquiring the technology. Tax breaks alone are not enough to make a difference there. What is important here is the ability to work in partnership with government, with academia and of course industry on effective terms. The basic equation here is: where the technology is acquired, that is where you tend to develop the new product because you are not going to move all your scientists and engineers having acquired this technology. Where the product is developed, that is where you tend to make it and that is where the jobs and value creation lie. It is absolutely fundamental. Tax breaks are very important in the overall context of product development but they are not sufficient to make a significant difference.

Q172 Mr Hoyle: It is a step in the right direction but you need more direct funding?

Mr Maciver: It needs a much closer partnership and that is what the National Aerospace Technology Strategy is supposed to deliver.

Q173 Sir Robert Smith: I wondered how much longer the market thought the Americans were going to still be able to come up with the two dollars to match every dollar. Is there confidence that that is a long term structure to the American economy?

Mr Dopping-Hepenstal: I am not sure I am enough of an economist to be able to answer that question but I think it has been an enduring trend for some while. I do not think we are going to see a very short term decline.

Q174 Sir Robert Smith: One of the things you mention in your submission on the funding and trying to bring together all the different pots and RDAs is the requirement to amend the existing tasking framework which does not provide for investment in research by RDAs. How are you finding progress with that?

Mr Maciver: Our present understanding is there is enough flexibility in the tasking framework to accommodate this but that is what we have to demonstrate by the readiness of RDAs or equivalent devolved bodies to commit their budgets to this sort of expenditure in the future.

Q175 Sir Robert Smith: In the written submission there is talk of it requiring amendment but you think—?

Mr Maciver: I think progress has been made in this area.

Q176 Sir Robert Smith: In terms of the strategy, how important is international collaboration in achieving the strategy?

Mr Maciver: It is a global industry. The Innovation and Growth Team were addressing the success or otherwise of the industry in the United Kingdom. It is extremely important in a number of respects. The United Kingdom participates in international

programmes, both in the form of EU funding and in the form of collaborative programmes such as the Joint Strike Fighter. What is very important to recognise here is that if we do not fund our own base technology programmes we simply are not in a position to participate in these programmes. They are not alternatives. In a sense, our entry ticket to global, collaborative programmes is that we sustain the necessary level of investment in technology acquisition in this country.

Mr Dopping-Hepenstal: There is some gearing here because by being competitive one can access some of these programmes so therefore you can access investment, say in Europe or in the States. There is an element of gearing about getting ourselves into a competitive position, being able to work in partnership with others and take advantage both through technology and investment from other sources.

Q177 Sir Robert Smith: What assessment did you make of competition from low cost economies when looking at the strategy?

Mr Maciver: In the short term, low cost economies are an opportunity in the sense that, while it may sound paradoxical, it strengthens the UK economy to take advantage of their low costs in the lower tech areas of technology. In the short term they are not a threat because the barriers to entry in the aerospace industry are very high, but we have to be very careful in making that assumption. The regional aircraft market today is dominated by Canada and Brazil, countries that a number of years ago would not have been seen as being in the forefront. I think all of us to some degree were active in China and in China there is a very serious intent to develop the aerospace industry. It is not the immediate threat today which comes from the more developed economies but, in the long term, if we do not sustain the level of technology we will eventually be supplanted.

Mr Smith: A number of governments have shown interest in those countries to create an aerospace business and are quite favourable in their terms to try and attract the higher technology end there.

Q178 Chairman: We have also had it suggested to us that UK companies are being bought up or have become the subsidiaries of US companies and they are locking in the technology to the detriment of Britain. Do you think that is true and, if it is, how can we try to protect the British companies, if that is indeed necessary, from this kind of economic imperialism, for want of a better expression?

Mr Maciver: Your term, Chairman. My company was progressively bought by TRW, a US corporation, and then by Goodrich so I am perhaps most closely involved with this. That, I am afraid, is a global trend. My colleagues' companies have major operations in the United States. I do not believe there is any mechanistic or legalistic safeguard. I think the safeguard is, for the long term, is this an attractive environment in which to develop technology and develop the business. To date, that has been the case and that is the very reason US corporations have bought British companies but for

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that to be sustained these companies and indeed British owned companies have the option of doing this in north America or in continental Europe. The only safeguard, I believe, is that we maintain a strong technological base in the United Kingdom. There are other factors of course. We have to be competitive in manufacture and all these things, but the starting point is: do we have the technology? I do not see any simpler answer than that.

Q179 Chairman: That is ownership of business and ultimately things like intellectual property rights. What about concerns about the outsourcing of R&D? Are you equally relaxed about that? This is a factor of modern life that, if R&D research is outsourced, we would do the same if we had the chance? In some ways it maybe begs the question: do we have the chance to do these kinds of things? Is Britain sufficiently aggressive?

Mr Maciver: When we contributed to the original IGT report, we resolved between us that we had to be very objective and realistic about what we were saying. I was delighted, surprised, to find such a high level of consensus among us. People did put aside whatever competitive issues there were and look very clearly at where we could be successful. I think we can be successful. I personally do not see development work, other than low level development work, going offshore. The core of our technology must be here if we are to create value from the aerospace industry. I am much less worried about low technology work going offshore but if we do not retain the intellectual property, the technological skills, we will not have the industry we have today.

Mr Smith: That is the whole essence of the National Aerospace Technology Strategy. If the research and technology were to leave these shores, in the next programme where they were going to be applied the research and development would follow them. From my company's point of view, we put a lot of emphasis on research and technology in the UK. We also have an American division. The reason why we feel so strongly about the funding of the demonstrators and the aerospace innovation networks we have talked about is that, from the economic point of view, we would like to retain it here. The product development will follow the research and technology, the infrastructure and the academic base that that sets up. The next six months are going to be quite critical from the point of view of making sure we can implement this national strategy.

Mr Dopping-Hepenstal: We have tried to focus on those technologies that are really going to matter. It is not trying to whitewash the world and do everything. The strategy is concentrating on the things that are going to make a difference.

Q180 Mr Hoyle: What you have mentioned is very important. What are your views on, say, the Joint Strike Fighter where there is an argument on this joint project that the transfer of technology is not coming to the UK?

Mr Smith: Technology goes both ways on the Joint Strike Fighter. We are responsible for the propulsion, the lift fan system and many other parts. We have programme share on an international project on the back of that technology. I doubt very much whether as an industry we would have got programme share without the technology, or maybe as a supplier only.

Q181 Mr Hoyle: I beg to differ with that. We do share the propulsion technology but in the frame technology and other parts we know that that technology is not being shared and that is why the assembly is not taking place in the UK. There is a worry that what we envisage being transferred to the UK has not happened and I am just wondering what your concerns are. Obviously, Rolls seem to be happy but what about the rest of the sector?

Mr Smith: We do not give them the IPR and the intellect to know how to make the bits that we manufacture.

Q182 Mr Hoyle: So you are not transferring technology either. It is both ways.

Mr Maciver: I no longer have a company to speak for. I was positioned firmly in mid-Atlantic when I had so it would have been an interesting reply.

Mr Dopping-Hepenstal: The US has restrictions on technology transfer for the UK and it is a challenge for us. We will only address that by tackling it head on in discussions with the US about getting equality, but we will only get towards equality if we have a capability that is high enough to warrant that. We have to reach this competitive position ourselves.

Mr Maciver: There is a major problem. It is not helpful that there are major barriers to working jointly with the United States certainly on military projects. As far as what we are charged with, the National Aerospace Technology Strategy, it just underlines its importance. There is no easy way of working with the United States in certain areas. Where we have strong technology, we can take advantage of the situation but it makes it even more important that we have a strong technology base ourselves.

Q183 Mr Clapham: You would see the National Strategy as reinforcing our position as the smart competitor, keeping the technological lead here but obviously, in terms of subsidiaries and outsourcing, the lower end of the technology is passed on?

Mr Maciver: There is very little technology passed on when you subcontract low level manufacturing. The bulk of the technology remains here and that is the bit we should not surrender, because it is the value creation which ultimately is what creates employment. That is based on the technology.

Q184 Mr Clapham: There is another aspect to the technology transfer argument and that is whether it has an impact on the retention, for example, of experienced, skilled workers in the UK aerospace industry. Are these threatened at all by outsourcing?

Mr Maciver: I am not sure I can quantify it. In the highly skilled work, the complex manufacturing processes, the assembly and test processes, I personally think it is unlikely. If the technology is here, these skills tend to be here as well. Some of the low technology work will undoubtedly go but that is not critical to the long term success of the industry.

Mr Smith: The academic base is linked to the real needs of the programme that drives the technology into a product.

Mr Maciver: You are quite right in that we are equally reliant. There is no point in having the technology if you cannot deliver the product and we are dependent on a highly skilled workforce to deliver the product.

Q185 Mr Clapham: Is there any evidence that outsourcing the low cost jobs to low cost economies is balanced by creating higher skilled jobs or more technologically orientated jobs in the UK?

Mr Maciver: The balance of the total workforce will change. It is becoming more educated and more skilled. Is it increasing in absolute terms? I would have thought not. If the value created increases, that tends to result in greater employment in the wider sense. I know jobs are important and if we do not make things there is no point in doing all the other things, but it is the skill level that is important rather than the sheer number. We have to be more efficient as well in how we deliver because there is competition in price. The biggest determinant is technology but having got through that barrier you then have to deliver the product on a competitive basis. Will there be an absolute increase? I would doubt it, but I see no reason why the value created should not increase; nor any reason why the employment level should not be at least sustained. It would be wrong to suggest that there is the opportunity for a significant increase.

Q186 Chairman: Do you not see an opportunity, for want of a better expression, for upskilling of those people whose jobs are being outsourced, because some of them are accidents of history in the sense that they missed the boat on apprenticeships and things like that or training schemes before? Do you try and retain people and actively make up the skill gap?

Mr Smith: Very much so, where at all possible, but I think we are talking about outsourcing R&D and outsourcing R&T. We need to be quite careful between that and outsourcing manufacturing jobs. Our premise is if we let the R&T go then the R&D, the development programmes, will follow and even more of the manufacturing jobs will follow then. Most of the companies have already taken decisions on what they outsource and the crown jewels are usually retained where the research and technology has been done and you have a cohesive skill base

there. Clearly, we do try and upskill people all the time. We work very heavily with the training boards and the RDAs to make that happen.

Mr Maciver: The industry is very committed to skills at all levels from the graduate engineer to the skilled people in plants. We depend on them.

Mr Smith: If we do not have exciting programmes for engineers to work on, they will vote with their feet. A few years ago, we had a major exodus of engineers from my company to the States where their programmes were more exciting. The same will happen. If we do not maintain the through flow of demonstrator vehicles, the engineers will not stay here.

Q187 Mr Hoyle: We noticed that within the report there is no area that covers the future workforce, in the establishment of the report. It does not say, "This will happen to the jobs in the UK" or where the future lies. I wonder if you could tell us what the implementation will mean for UK aerospace jobs?

Mr Maciver: You are referring to the original IGT report?

Q188 Mr Hoyle: Yes.

Mr Maciver: It did identify the fact that skills were seen to be very important. We did not attempt to forecast the numbers but very broadly we would see the level of activity being sustained if we maintain the technology. We would see the mix of the labour force moving towards the highly skilled end. We have to be very alert. There will be changes in the skills required. This is not static. We need engineers with different skills from what we might have needed 20 years ago. We did, in the original report, make recommendations that we should be very alert to that and very conscious of the changing skill needs and to work in partnership with government bodies or whoever in ensuring that those skills needs are met. We did also recommend a continuing dialogue with the teaching institution as to the sort of skills the industry would need for the future. That was very much in our minds. It may not have come across with sufficient emphasis but you cannot have technology without skills right across the board and not just purely the more academic skills. You cannot validate these technologies and you cannot have practical demonstration of them without skills at all levels.

Q189 Mr Hoyle: It can be good news as long as the companies recognise that there is going to have to be upgrading of skills continuously?

Mr Maciver: I think the companies recognise it. There are concerns about will the system deliver the people we need, which I am sure you are very familiar with, but if there is a will to do it we are sure it can be done.

Chairman: Thank you very much. If there is anything else, we will get back to you but you have been very comprehensive in your replies. We are very grateful.

Witnesses: Mr John Alty, Director, Business Relations, *Mr Malcolm Scott*, Director, Aerospace and Defence, *Mr David Way*, Director, Aerospace and Defence Technology, and *Mr Christopher Moir*, Director of Industrial and Economic Statistics, DTI, examined.

Q190 Chairman: Good afternoon, Mr Alty. Perhaps you could introduce your colleagues?

Mr Alty: I am John Alty. I am the head of business relations in the DTI which covers a number of different sectors including the aerospace sector. Malcolm Scott is the head of the aerospace and defence unit. David Way is the director aerospace and defence technology and Christopher Moir is director of our industry, economics and statistics unit.

Q191 Chairman: We have been trying to put UK aerospace into the international context in some ways. Where do you see our aerospace industry, where it enjoys a competitive advantage over other countries involved in this area? How do we compare internationally and where are our strengths in that area?

Mr Alty: As others have said, the UK aerospace industry is a highly successful, high-value added and knowledge intensive manufacturing industry in the UK. It is the second largest after the United States. The industry is a highly diversified industry. It has strength across the board. It is diversified between military and civil. It is diversified because we have some very large, significant prime contractors and we have a very sophisticated, wide ranging supply chain. It is also diversified in the types of products that it produces: Rolls-Royce engines, Airbus wings and also systems and avionics. It is globally competitive in the sense that it is a significant earner of foreign exchange for the UK. That is what gives it some of its strengths. There is this national cluster of aerospace expertise and technology in these different areas.

Q192 Chairman: To what extent do you think we will be able to sustain this? This is where we are now. Where will we be in 10 years' time? What does the future hold?

Mr Alty: I guess that was really why the Innovation and Growth Team was set up. There was a recognition by Government and the industry that this was a success story but how are we going to sustain that success story over the next 20 years, which is what the IGT looked over. It identified a number of areas where action was needed to do that. As you have heard from others, we have very strong positions in areas like engines, in the technology for wings and we would agree that sustaining those is going to be critical for maintaining a successful aerospace industry into the future. There will be changes in defence procurement patterns and the way that the industry and the MoD, I hope, with us as well, work together on that will be critical in setting the framework for the future development on the military side. The IGT looked ahead at the factors which were important for competitiveness over that period.

Q193 Mr Clapham: As you say, this is a highly diversified industry, but that must make it rather difficult to make comparisons with our competitors. Has the Government done any surveys to try to come to grips with how we compare, for example, with some of our European competitors, the French, the Germans and the Americans?

Mr Alty: Again, the IGT looked at that in some detail. There are all sorts of ways you can look at comparisons, in terms of the competitiveness and productivity of those activities. You can look at where people specialise and, as your earlier witnesses said, the industry in the UK has taken quite a hard headed view of that. The analysis done in the IGT and the recommendations in the IGT took account of what is going on around the world. It is a global industry, the issue is where are our particular strengths and how can we build on those strengths.

Mr Scott: You can look at the broad size of the industry. We are the second largest. You can look at competitiveness and productivity. Those are probably the main things we are interested in. There are of course issues with data but broadly, looking at trends, we think that data is probably reasonable to go on with.

Q194 Mr Clapham: The trends would indicate that the UK aerospace industry is healthy and that we are able to compete well into the future, provided of course that we get the National Aerospace Technology Strategy in place?

Mr Alty: I think there is a whole range of things that the IGT identified, of which technology was one. As others have said, Government and industry need to work together because there are certain things that the industry recognises that it will need to continue to improve and there are things that the Government can do which are important to the success and competitiveness of the industry.

Q195 Mr Clapham: In order to have that information about competitiveness, has the Government thought about how it might improve the evidence base for the industry so that we are much better able to see how we compare?

Mr Alty: I would ask Christopher Moir to comment in broad terms on what evidence we currently have, certainly in terms of the overall productivity and size trends.

Mr Moir: The short answer is we would like to know an awful lot more about how technology is translated into product and how product is translated into productivity and how that then is translated into profits for the business and wages for the worker. We would like to know that principally for the United States but also for the UK and Germany. Then we would be able to say whether the high degree of specialisation which we have in, say, wings or engines can be sustained. You only know that by the way in which you have

this transfer of science and technology into a product, into manufacture, into sale, into reliability and into service.

Q196 Mr Clapham: It would be fair to say that we are looking to improve the evidence base?

Mr Moir: At the moment we have fairly crude numbers on labour productivity for seven countries which we are proposing to give to you in a memorandum. These show that the US productivity is about 33% above the UK. France is about 16% but you can change that figure, depending on which numbers you believe. It comes down. Germany is about 6% above the UK and that is measured in terms of gross value added per worker. If you measured it in terms of gross value added per worker hour, you would get a slightly bigger gap. We have this broad picture of relative productivity, but we do not have a very good explanation in detail of what explains these differences in labour productivity.

Q197 Mr Clapham: You say that that information is going to be made available to the Committee?

Mr Moir: Yes. I understand a memorandum has been sought from the Department which asks for information on the size of aerospace sectors in seven countries, which we will give to you, measured in terms of value added as a percentage of total economy. You have also asked for the numbers on value added per worker for these seven economies and you have asked for both sets of data to be over a period of years from 1991 to 2002. We will give you that data. What stops us giving it today is the quantity and there are questions over the reliability of some of the numbers. We have to make sure we give you the right numbers.

Q198 Judy Mallaber: The evidence we had from the Society of British Aerospace Companies emphasised the aerospace sector punching above its weight in terms of its contribution to the economy but they did tell us that the private return on investment and R&D in the aerospace sector is low, in spite of strong growth, increasing share in world markets, high levels and growth rates of productivity. If the returns from investment in R&D are so low for the private sector, why does the Government still invest public money in the aerospace industry?

Mr Alty: In terms of the returns to the companies, these are manufacturing companies. Manufacturing, certainly over recent years, has been uniquely exposed to global competition and therefore, if you compare across the economy, probably the returns to manufacturing overall are not as high as some other parts of the economy. Nevertheless, many of the companies we are talking about are big, successful, well established companies and they have clearly been able to generate profits and succeed over the long term. There are peaks and troughs in terms of profitability but over the long term these companies have grown and enjoyed success. I am not sure how you would measure very easily the return on R&D

except in terms of the success or the profitability of the companies over a long period of time. We have heard that aerospace is a long time frame industry. If you are asking why do we invest money in aerospace, the answer to that is that the value added created by the industry is significant, particularly the value added per worker. That results in large measure from the fact that it is a high technology, high investment industry. It is an industry where we can see the route to market in the UK. If you are asking where do we invest in the UK to generate this exploitation of the science base, aerospace has been a pretty successful example of that. Those are the sorts of reasons why we have invested in the aerospace sector.

Q199 Judy Mallaber: I do not want to discourage you as I have many constituents who work at Rolls-Royce and in the supply chain. Could you conceivably foresee a time when the UK aerospace industry did not need financial support?

Mr Alty: I would be pretty surprised if a time arrived when they were not asking for some financial support.

Q200 Chairman: That does not mean to say you would give it. Past experience would suggest that.

Mr Alty: Indeed not. I think there are different types of support and there are different justifications for those. The DTI provides support—I am not just talking about aerospace here—to small companies to help them improve their lean manufacturing. Indeed, it has done that in some of the aerospace supply chain. It has the particular example of Launch Investment in the aerospace industry. It has the research and technology support. The mix of support may change over time but the reason for giving support generally is that we are persuaded that there are economic benefits accruing from that. The companies will not go ahead and do these things without that support. It is not simply a question of saying, “Well, it is the aerospace industry so we will support it.” It is based on a series of criteria which we think are justified.

Q201 Mr Hoyle: Maybe that is what is wrong. Do you not feel that the time has come for aerospace to become a strategic industry for government?

Mr Alty: It depends what you mean by “a strategic industry.”

Q202 Mr Hoyle: It is one of the industries that we want to be there. We recognise it is a world leader and we do not want to get out of it. Therefore, yes, we are going to support it in the future. We have seen it in other industries but I would have thought it is strategic, personally. I think it is time the Government recognised that.

Mr Alty: The fact that we set up the Innovation and Growth Team does recognise that it is an industry that we expect to be an important contributor for the future in the UK. In that sense we have, but what I was explaining was that what we have moved away from is programmes which

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are geared to supporting particular sectors to programmes which are cross-sectoral in nature. If you take technology programmes, that is probably to the benefit of the aerospace industry because the amount of funding that they were able to access under the previous DTI technology funding was relatively limited, about £20 million a year. They do not have a special fund for aerospace but they have access to a technology fund and as one of the two sectors in the UK, along with pharmaceuticals, which are high R&D, that gives them probably more opportunity than they have with a smaller, dedicated fund. We do not tend to operate on the basis of sectoral support programmes but we do want to work with the aerospace industry to enable them to access the support that is available on all sorts of things: skills, technology and best practice.

Q203 Mr Hoyle: It is about jumping through hoops and seeing if you can get some money at the end. That is the danger with that and that is why I think you ought to consider having a strategic industry. You did mention repayable launch aid. One of our witnesses was quite clear: without Repayable Launch Investment, they do not believe we can compete with the US subsidised industry and they really do feel it is a crucial issue. What is your view on the future of Repayable Launch Investment and how extensive is it within the industry?

Mr Scott: I think we would agree that Repayable Launch Investment has been a successful policy and we believe it has been essential in establishing the UK sector today as a leader in large wings and aero engines on the scale it is today. We believe it has enabled the UK to play a major role in a lot of highly successful, international projects. It has also enabled the Government to share in the success of those projects and the portfolio of Launch Investment contracts that we have outstanding at the moment is valued at some £2 billion in the DTI's accounts. We have invested some £1 billion in launch investment since 1997 and got back just over £1 billion. That gives you some of the scale on which this has operated over the last few years. Your question really was about the future of Launch Investment. It is not a picture that stands still. The system, although it has been around since the Second World War, has evolved quite a lot over that time, particularly the 1992 EU/US agreement in on large civil aircraft, which was quite important in establishing a more common approach to Launch Investment. These things do not stand still. We were talking in previous evidence about the ways in which the financial markets might alter over time because the fundamental rationale for Launch Investment is to solve a market failure in capital markets, to fund very large, very expensive projects with high levels of risk in development and also market risk and very long pay back periods. It is conceivable that the capital markets may become more willing to step into this sort of area, particularly as they see the success of the most recent projects. The one thing we do have to refer to in considering the future of this is the development going on in the

World Trade Organisation right now. Just before this session started, I noticed the EU and the US said they were willing to try to negotiate a way out of the dispute that has been simmering there. That is hot news and we will have to see how that develops.

Q204 Mr Hoyle: How does UK government launch aid compare to EU governments' launch aid? What are the main differences? What are the main advantages?

Mr Scott: I suspect there are areas of commonality and of difference. The 1992 agreement played a major role in bringing commonality to this. It established that aid could not exceed 33% of the development cost of the project and that the support had to be repaid over 17 years at a rate of return that was above the cost of government borrowing. To that extent, it created something of a level playing field. Obviously we do not see individual contracts that are let by other governments so I do not have details of any contracts but I expect there are differences. As I explained, the rationale for our scheme is to redress this capital market failure. I do not know if that is necessarily the same as other countries apply.

Q205 Mr Hoyle: Do the EU governments have a slightly different way of giving launch aid? Better rates of repayment? Longer terms? Is there a significant advantage under their government compared with ours?

Mr Scott: I would be surprised if there were a significant advantage because of the operation of the agreement.

Q206 Mr Hoyle: There could be a slight advantage?

Mr Scott: There could be.

Q207 Mr Hoyle: Have you never checked?

Mr Scott: The trouble is that in order to get an idea of this you would need to see individual contracts. You would need to get into the detail of the agreements that the governments strike with the companies and of course that is highly commercially sensitive.

Q208 Chairman: How do you guarantee that there is not abuse of these arrangements, if you cannot tell us what the other people are doing? They might be subsidising them beyond reasonable bounds. You have no means of knowing.

Mr Scott: It is a difficult area. I guess there are a number of checks and balances in the system. For some launch investment the European Commission will scrutinise the details. Under the 1992 agreement, there are some transparency arrangements which we had with the US, where both sides would provide the other with details of support given to industry. It was not a perfect mechanism but it was the best thing we had ever had. In 1992, when it was agreed, it was a massive step forward.

Q209 Chairman: It is reminiscent of the politician who said of the House of Commons, "It is not the people in front of you that you have to worry about; it is the folk behind you." We get the impression it is the folk in Europe that we know less about than anything else.

Mr Alty: I imagine if Airbus thought they were getting so much better a deal out of the French and Germans than they were out of us, we would probably hear about it.

Q210 Mr Clapham: Launch aid has been very successful and it has ensured that we have quality jobs in UK aerospace and kept to the cutting edge, but do you worry about the transfer of work abroad and that British/UK taxpayers' launch aid money is subsidising jobs overseas? Do you have a view on that?

Mr Scott: One has to look at the big picture here. Most people regard Launch Investment as successful and the reason it is successful is because it has created in the UK a highly successful industry in wings and engines and obviously the supply chain benefits flowing from that. My sense is that one possibly cannot account for every single penny spent on Launch Investment but at a broad level it has clearly succeeded in its objectives.

Q211 Sir Robert Smith: Obviously things are moving at the WTO and it is quite a shifting target but have you made an assessment of what the worst case scenario is if the 1992 agreement were to fail?

Mr Scott: This case is at a very sensitive stage at the moment so I would rather not speculate on what the outcomes might be. As I said, just before we came in, the two sides agreed to negotiate, to give themselves three months to try to negotiate an agreement. The best thing for me to say now is that we will negotiate constructively in that forum.

Q212 Sir Robert Smith: On the aid that comes from government to the industry, how much does it improve the productivity and competitiveness of the UK aerospace industry?

Mr Alty: That is a good question. What we envisage when we give aid is that it will help companies to produce products, get products to market, which either they would not have got so quickly or in such volume. If you take that premise, the sorts of things that we are able to do are help companies remain globally competitive, for instance, through research and technology support, or help them to get economies of scale, for instance, through the Airbus models which have been introduced. Obviously, in doing that, that will have some impact on competitiveness and productivity. It will help them remain competitive in the marketplace or it will help them reduce unit costs as they gear up production. Drawing a very clear link to productivity levels is not always easy. I would see it in terms of providing a platform within which the companies can, if they organise effectively, if they use the skills of their people effectively, improve their productivity and remain competitive. That is the sort of linkage I would see.

Q213 Sir Robert Smith: It is not something you directly measure, as such?

Mr Alty: It is quite difficult to measure the productivity impact of a research programme. In helping companies launch the products through Launch Investment, that is a bit closer to market and a bit further down the chain. We certainly looked at that with the industry but it is not easy to reach totally conclusive answers.

Q214 Chairman: Already this afternoon we have had almost a passing reference to China taking an interest. I say "a passing reference" because the consequences of it are going to be quite considerable. It does suggest that lower cost economies are going to come into the frame in ways that they have not in the past. We are talking about almost between equals but how do you envisage the prospect of Chinese competition? We were speaking earlier about you taking the longer term view, 15 or 20 years. Okay, we can imagine that Chinese wage rates will rise but they may not rise as quickly as we would like them to. How do you envisage us being able to keep a pace ahead of what is obviously going to be a very big market and a very effective operation, as we have seen in so many other activities?

Mr Scott: This has been discussed with a couple of other witnesses and Ken Maciver and Kevin Smith both dealt with this very reasonably in their evidence. I think we see China posing a mix of opportunity and threat. In the short term, it is probably mainly opportunity. I think we have all read the extraordinary statistics about the way in which the Chinese aviation market is set to grow over the next few years potentially with enormous construction projects and new airports and so on. We are seeing that sort of opportunity coming through already with orders for, say, Airbus aircraft. In the medium to longer term, China is increasingly becoming a location for suppliers and, longer term, it may become a manufacturer of competitive products at prime level. There is perhaps a little more potential threat in this area. They are working at the moment on a 70 seater regional jet, scheduled to have its first flight next year I believe. There may be some threat in that, but at the moment that project is very dependent on western firms to provide kit, avionics and equipment. All we can do is remain at the cutting edge of innovation and ensure that our own industry concentrates developments at high-value added level. That is what the IGT was all about.

Q215 Chairman: One of the things that strikes you when you go to Beijing, or would strike you if you stepped off the pavement, would be a Passat car built by VW. Some of our European partners/competitors are already there in other areas of engineering and we are getting, let us hope, more than faltering steps made by MG Rover to get alongside one of the Chinese car companies. Outside of BP's investment in the oil and gas reserves, there is not a fantastic British presence in manufacturing in China at the moment. Do you

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take China seriously? I realise that we can go through the mantra that there is a challenge and an opportunity and they will be customers in the immediate short term but it is a bit more serious than that, is it not?

Mr Scott: There is quite a lot of movement under the water. Rolls-Royce have been active in China for many years as a supplier but in terms of doing joint ventures and working very closely with Chinese companies they have been there for at least 10 years. Smiths are quite active there. GKN are now active in the automotive side and may well go down the aerospace route too. Of course the Americans are there as well. I think there is a reasonable amount going on there.

Q216 Sir Robert Smith: Closer to home, there has been talk of R&D in manufacturing having been outsourced to countries such as Austria and Italy. Those are not low wage, competitive economies so what is causing the UK to be a more expensive option than other western European partners like those?

Mr Alty: We noticed that this was raised in earlier discussions. We were a little surprised. It is not our perspective or our experience that we are particularly more expensive than Austria or Italy. Our immediate reaction was that this may be linked to particular joint ventures. If you look across Europe, there is quite a lot of rationalisation going on. I am not using "rationalisation" as a euphemism; I mean that people are saying, "We have two centres here of one thing and two centres of something else. Let's swap assets and build them up." That is generally a positive thing because particularly in the defence market the individual countries in Europe are just not on a scale that could possibly provide the sorts of economies of scale that the US can. Other than that, we would be surprised if there was any serious outsourcing going on to countries like Austria or Italy.

Mr Scott: It is a global industry and you would expect to see a lot of cross-border activity and investment flowing both ways. You also have to recognise the reality that in order to get market access to particular countries you have to place work there and that may be what underlies the Austrian position.

Q217 Mr Clapham: Picking up the market access issue, we do know that there is a particular difficulty in the American market and this has led a number of British companies to buy into subsidiaries, thus locking in new technology. It has been suggested and we heard from the Aerospace Technology Steering Group that that they see, for example, the leading edge of technology being retained here if we have the kind of strategy that we talked about but other than that is the Government doing anything to assist getting over those barriers? If so, could you tell us what we are doing?

Mr Scott: The investment in technology runs both ways. There is clearly a lot of activity by British companies who acquire US companies as well, perhaps particularly at the moment with the dollar

at the level it is at. It cuts both ways. I recognise what you are saying about a fairly restrictive US regime in terms of technology transfer to the UK, particularly on the military side. The Ministry of Defence lead on this subject so I cannot speak for them but in terms of technology transfer coming to the UK there are a number of playing fields where we are trying to make progress. One is in terms of joint projects like the Joint Strike Fighter. The other is general stuff where we are trying to acquire a waiver to the international trade in arms regulations for non-restricted information. Both of these are tricky. In terms of getting technology on something like the Joint Strike Fighter, you have to go through this process of technology assistance agreements. It is a very thorough process, quite bureaucratic, and people in the States will err on the side of caution. In a sense I do not blame them because there are very heavy penalties for them if they get it wrong. You just have to be patient and work through it. In terms of the ITAR waiver, it is fair to say that we are slightly disappointed that it has not been possible to conclude this yet but all we can do is continue in our efforts to work with the US authorities to try and achieve it.

Q218 Mr Clapham: Is it possible to say what similar protective barriers to technology transfer and market access the UK has imposed on overseas companies?

Mr Scott: I am afraid I do not know about that.

Q219 Mr Clapham: Given that technology is so important to the health of the British aerospace industry, we heard from the Aerospace Technology Steering Group that they feel they require the national strategy. Are you working with them towards the implementation of a strategy or is that something that is just left with the industry to try to convince you to come on board with?

Mr Alty: I would emphasise very much that we are working with the industry to implement that strategy. That was one of the key recommendations coming out of the Innovation and Growth Team. They are looking for increased funding. They did a lot of good work to prioritise the areas they thought needed that funding. We could not, as the DTI, simply say, "Here is a cheque for the extra money" but we did commit to working through the technology strategy which I mentioned earlier and with other partners, including the regions, but also MoD and research councils, to try and achieve what is in the strategy.

Mr Way: Very much reinforcing what Ken Maciver said, there is now a clear, united industry focus on what they want and what their technology priorities are. Increasingly over the last 12 months that has been translated into more detailed project proposals, particularly the seven pilot proposals. It is those pilot proposals that are going to be used to test the funding mechanisms and the coordination of funding which Lord Sainsbury's inter-government group is looking to set up. We are working with industry in that they are generating proposals and we have to test the funding

mechanisms now to show that they can work and deliver what is required. We heard a bit about the April 2004 call from the technology strategy. Although there were some concerns raised by industry over the types of project that were successful, aerospace and their partners, particularly universities, did in the end get something like a quarter of the funding from the initial £60 million so aerospace did pretty well out of that original process. There was a network on composites which brought together funding from the DTI technology strategy, and also funding from three RDAs, from the south east, the south west and Yorkshire Forward, to put together in the end a project with industry support that was a £30 million project. That is an isolated example, I agree, but it is an example of funding brought together from various sources to deliver a fairly large project programme. We have something to build on and we have a challenge to build on it. That is what we have set ourselves, industry and Government, and we have to deliver on it.

Q220 Mr Clapham: It is interesting that you mention the RDAs. You will have heard the discussion that went on around the RDAs. Given the importance of the RDAs in relation to an issue like technology in the aerospace industry would you liaise and advise them regarding their regional investment strategy or would they come to you for advice regarding a regional technology strategy for the aerospace industry?

Mr Alty: We were very clear that it was important that we worked with the RDAs in developing the whole of the IGT process. There was an RDA representative on the steering group for the IGT. When it became clear that technology would be a major part of the implementation, we were also clear that we needed to work with the RDAs to do that, partly because—you can characterise it as modest or not modest in terms of moving from £20 million to £70 million you could say that is over three times an increase in funding, which is not necessarily modest. We worked with the RDAs to understand what their strategies were. I will hand over to David to update on how that is being taken forward because it is involving a lot of work to get that coordination which industry is looking for.

Mr Way: On each of the seven pilots, we have an RDA representative at the working levels helping to shape them. I am dealing directly with the RDAs at typically enterprise director level to make sure they understand what the National Aerospace Technology Strategy is all about and that it is an important strategy to take forward, to see how we can work together effectively with them. They do a lot of support for manufacturing which includes aerospace so there are issues around skills, best practice and a broader innovation agenda, where they are already supporting, but there are areas like, for example, the North West Aerospace Innovation Centre where we clearly work together to gain maximum benefit and synergy with what has been proposed through the National Aerospace Technology Strategy.

Q221 Chairman: This is encouraging but we keep getting this kind of off stage noise that all is not well with the RDAs because the money goes into a pot. It is not identified. It is okay in areas where aerospace is big but if aerospace is not significant as an industry they do not recognise that they do not have money available and it is like getting blood out of a stone, trying to get the resource. Is this a vicious, irrelevant caricature or is it an accurate picture of what used to happen before the new dawn or is it sadly all too true?

Mr Alty: I hope it is not quite like that. First of all, we should remember that, in aerospace and other work that the DTI does, there is a partnership and we are trying to work in partnership with the RDAs. To take aerospace as an example, the technology funding which for DTI as a whole has increased during this spending round period remains with the DTI. There is a pot of national money there with the DTI. The Launch Investment and the policies relating to that all remain with the DTI. What we are talking about is what other resources are available, particularly in the context that we have heard on technology, to support. Those RDAs with significant aerospace interests and devolved administrations as well will have almost certainly taken a closer interest and probably done more because, as I am sure you know, they tend to designate a certain number of sectors as priorities for their region. In the north west and the south west aerospace would be a priority. In other areas where there may be some aerospace activity that may be in the supply chain and where it might not be quite so high profile, they may not be designated as a priority. Whether that matters or not depends on circumstances. It is not as though it is only the regions that are able to support this activity. If I look across the various sectors with which I deal, although I would not want to say by any means that we have solved all these problems and I recognise the points industry is making about trying to get the systems to work, we are still in the transition and I think aerospace does not fare badly in terms of focus because there are some very big aerospace clusters and the RDAs in those areas are pretty clear about aerospace being important. What is different and what your earlier witnesses were talking about is how they support the industry and how we can get the objectives of the RDAs, national Government and the industry all aligned. That does take some work, I agree, and that is the sort of task which we have been engaged on with the industry on the technology strategy.

Q222 Chairman: I am not thinking about the British Aerospaces or their various elements because they are big players and they have pretty effective mechanisms for getting things done, but the SME which is not very well placed; it is an accident of history, it is in a particular region. They go to the RDA who say, "We know nothing about it here, mate" so they then come to you. We all know stories of companies that do not really know to whom they should be turning. Are you confident

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you are getting the message down the line to these relatively small but not necessarily relatively insignificant SME supply chain members who could lose out because they have not been able to access the funding quickly enough or the person whom they have gone to within the RDA does not know that you have a pot of money that deals with that? All they know is that they do not have anything identified within their budget.

Mr Alty: It would be pretty bold to say that we have cracked the whole problem. There are a number of mechanisms. First of all, many of the regions have regional trade associations in the aerospace sector. Indeed, many of them are part funded by the RDAs. That ought to be a natural means of interaction. One of the other things which the IGT recommended which is being carried forward is what is called an aerospace portal. That is being worked up with the RDAs. The idea behind that is that there is a simple directory, if you like, electronically on the web that companies like that can tap into. There are lots of directories around already obviously and the DTI has a directory on business support but this would be aerospace-focused specifically. The final point is it does depend on what the company is looking for. If it is an SME, there are general manufacturing advice and support services which are now increasingly run by the RDAs, all of them pretty much which would be a good way in. There are mechanisms and I hope the portal will help.

Q223 Mr Hoyle: You have touched on the Aerospace Innovation and Growth Team Report of 2003 before and obviously the research and technology part of that and the objective of the recommendations. Does the Government believe that sufficient progress is being made by industry to fulfilling this and the four objective recommendations of the 2003 report?

Mr Alty: I think industry is making good progress and is really taking it seriously and to heart. One of the things which I am sure you will have discussed with the SBAC is that in two of the areas—best practice and skills—the SBAC has reorganised itself to take those issues and run with them because it was always recognised when the report was written that there were some issues that were more for government and some more for industry. That is not to say that both partners did not have to work across the piece but in those two areas industry has set in hand pilot projects on good manufacturing practice. There has been some DTI support to help disseminate the results of that. On skills, it is a model of how the industry should work together to try and reach some sort of sector skills agreement. That is built on the work done in the IGT. Finally, on the environment which was another important area, that is more of a joint activity. There has been a lot of contact between industry and the research councils to try and get a good network going—they are proposing to call it a centre of excellence—on the environment and aviation. This was a 20-year vision.

Things always take a bit longer than you think and we are not complacent at all but we think the momentum and commitment are still there.

Q224 Mr Hoyle: How is it monitored and reported to government?

Mr Alty: It is monitored by an executive group. Sir Richard Evans, who chaired the original IGT, has agreed to stay on to chair that group. That has met about once every six months. As the implementation gets going, that might be a bit less frequent. Beneath that there is a steering group which is more the day-to-day working and that has, I believe, the heads of the individual working groups on and people from aerospace. Kevin Smith chairs it. Without being heavy handed, there is a structure there.

Mr Way: There is also a secondee from industry who acts as a project director for the IGT.

Q225 Sir Robert Smith: You mentioned the environment and obviously the growing concern about aviation's impact on the environment and the plus side of being in there early if there are technological solutions. Is there any assessment at all that there is any kind of cap on the economic potential of civil aviation as environmental concerns hit and people start to talk about trading emissions and so on? Is there any assessment as to whether that is going to undermine the market in terms of its potential?

Mr Way: Yes, certainly. We are dealing with three issues around environment. One is the noise around airports. One is the local air quality around airports, which is as much to do with how you get to the airport as the aircraft itself. The third area is global warming. All three undoubtedly require significant, technological advance to take them forward. There is a European Advisory Council on aeronautics and that has come up with very challenging European targets for reductions in all three areas which the UK industry has fully bought into. Those need to happen and there also need to be changes in operational procedures, so as you do not waste fuel stacking over Heathrow or whatever, but on top of all that we also do not understand as far as global warming is concerned the effects of some of the emissions at altitude. You can sometimes watch cirrus cloud being generated as aircraft fly over. That potentially can have a significant impact but nobody really understands it. This issue of understanding atmospheric physics is absolutely key for industry, supported by Government, to provide technology to address the issue. There is also work primarily for academics hopefully with a strong international flavour to come up with an agreed understanding of what one needs to do. Will all that lot be enough? It will take us a long way down the road. You then get into potential issues of emissions trading and so forth which may lead to other ways of meeting the global warming requirements. Noise and local air quality I think technology stands more chance of tackling.

Q226 Richard Burden: My apologies for missing the early part of your evidence but from what I have picked up so far there has been a theme in the questioning to you which reflects that with other witnesses about just how government support is coordinated and brought together. I was a little surprised reading your evidence at the reference to the assignment of the job of pulling all this together being delegated from the Prime Minister to the Minister for Science and Innovation. That is on the last page of your report. Can you tell us a bit about what his remit is?

Mr Alty: Because we recognised that this was a challenging thing to do, it is fair to say at least in the areas that I deal with that it is the most complex coordination that we are trying to achieve, because we are trying to achieve an ambitious programme. That is why Lord Sainsbury was asked to take direct personal charge and he chairs this group which brings together all those departments: the MoD, ourselves, representatives of the RDAs and EPSRC, that have a potential interest as either funders or as interested in the technology strategy. That group has the particular remit to help deliver the strategy that was being talked about earlier. Lord Sainsbury holds meetings with industry and attends those meetings. We take stock of progress and say, "How did this call go? How are we getting on in developing the detailed programmes and projects" that we were talking about earlier. Once they have been identified, how can these be funded? Initially, as we imply, there is quite a lot of work for industry to do to get from a broad view of the priority technologies to carve those into programmes. We did not say, "Go away and do that." We worked with them so we understood it. Now, if you like, the onus is on us to coordinate the various public sector bodies that are potentially able to fund this. That is going some way towards achieving what Ken Maciver said which is to say to these people, "Yes, of course you have your own programmes and your own objectives but this is giving you the context as to why we think the aerospace projects are important."

Q227 Richard Burden: How do we know what progress is being made by the coordinators?

Mr Way: We will be testing it out by these pilot projects, seeing whether we can fund the activities which are identified.

Q228 Richard Burden: Let us say we produce our report with minutes of evidence that witness after witness says it is really important that all the different bits are brought together and coordinated and there are all these groups linking together to

ensure that coordination but it is really important it happens. Can we put anything in our report that says that the milestones for working out if that coordination is going to happen will be this? This is how the pilots are going to report. This is how we are going to know what the pilots do and what they have done. How will any of us know that?

Mr Way: The formal reporting process is through to the executive of the IGT. Industry will be very vocal if we do not deliver on the commitments which have been made.

Q229 Richard Burden: The point is not to know that you have not delivered; it is to make sure that you do deliver. I want to know how that process of reporting is going to happen. It would be quite nice for us to know, once we have produced our report, how it is going. How will we know?

Mr Alty: We track it ourselves because we are trying to act as the coordinators. There will be milestones. Given that this is tending to revolve around the DTI technology strategy calls and those are made every six months, one significant milestone is how successful are the projects that are put into that call, because it is a competitive bidding process, in terms of securing funding. That will be pretty clear and pretty public. Whether, for instance, the Aerospace Technology Group that produced the implementation report will want to have an annual report on how it is going I do not know. That is something that maybe they would want to do. I do not think we have discussed that with them particularly.

Mr Way: No. They do a review at their meetings. They did review the outcomes of the April calls. They regularly review progress.

Mr Alty: I take your point. The industry will know.
Chairman: Maybe we could ease your anxiety a bit. I could imagine there would be a consensus within this Committee that you make an annual report and that we will request that in our Report. It may well be one of the recommendations which the Minister will be minded to accede to. At the end of the day, you are not answerable to the people on the Committee; you are answerable to Parliament. I do not want to be heavy handed but we are losing our way a bit here. If these reports are important—and I think we all think they are or they are going to be; we hope they are going to be—and if we can blow the trumpet, so much the better. If it is not a trumpet and it is a faulty bugle, you guys are in the firing line! We do not want to finish on that negative note because we are very grateful for the evidence that you have given us. Prior to our Report being written, if there is any additional information we require, we have your number and we will get back to you. Thanks very much for your time and trouble.

Tuesday 18 January 2005

Members present:

Mr Roger Berry

Mr Lindsay Hoyle
Judy Mallaber

Sir Robert Smith

In the absence of the Chairman, Mr Berry was called to the Chair

Witnesses: **Sir Michael Jenkins**, President of Boeing UK, **Mr George Hibbard**, Director, Industrial Participation Programmes, The Boeing Company and **Mr Steve Ford**, Regional Director, Product Marketing, Boeing Commercial Airplanes, examined.

Q230 Mr Berry: Sir Michael, welcome this afternoon. May I first of all invite you to introduce your colleagues for the record and for the benefit of the public?

Sir Michael Jenkins: The colleague on my right is George Hibbard, who has come over for this discussion from St Louis. He leads industrial participation programmes. On my left is Steve Ford, who has come from Brussels and is the regional director for commercial airplanes marketing. George is very much on the defence related side of Boeing and Steve on the civil aircraft side.

Q231 Mr Berry: You are very welcome. Thank you for your written evidence and for coming to give evidence to the Committee this afternoon. I explained that our Chairman, Martin O'Neill, is not with us this afternoon. You kindly asked whether he was in Toulouse. No, he is not, though it was very kind of you to ask the question. Could we start with an issue about which there has been much debate in the UK and elsewhere? Why does UK aerospace lag behind US aerospace in terms of productivity? How big is that productivity gap as you perceive it?

Sir Michael Jenkins: My first answer would be that as a commercial company in the marketplace we do not study productivity gaps economy by economy; we leave that to the academic economists. What we can say is that the extent of our supplier relationships in this country is a very strong endorsement of the capabilities of the UK aerospace industry. As we select companies to work with across the world, we obviously look very closely at the way they perform, their ability to deliver the right product at the right time and the right price and so on. The ones with whom we work closely in the UK—and I should like to say a bit more about that later on—are in our definition absolutely world class.

Mr Hibbard: We deal with companies around the world. We buy more from the UK than any other country except the United States. We buy more from the UK annually on average than we sell in the UK and those are very strong indicators that in fact the companies we work with are best in class. That is what we, Boeing, try to bring. We are not a vertically integrated company: we are horizontally integrated. That allows us to bring the best of industry and we

find that here in the UK. Our experience is that we find very good companies and institutions and universities here in the UK to work with.

Q232 Mr Berry: I appreciate your kind comments about the UK aerospace industry, but obviously from our point of view one of our interests in looking at the UK aerospace industry is this perceived gap in productivity between the UK and the States. I appreciate that you have your particular company interests rather than the overall research issue to address. Is your impression that UK companies are pretty diverse in their performance? Have you essentially been talking about the best? Are there some which are less good in a very significant way?

Sir Michael Jenkins: We have a network of 240 suppliers in this country. That ranges from Rolls-Royce or Smith's at one end through to a widget maker in Birmingham at the other. Clearly when you have a network of suppliers that big, there are variations in performance. We do have some pretty stringent performance targets which are made known to the companies. If they do not come up to certain levels, they know that and they know that they are to that extent at risk. There is a very stringent internal measurement process. If we look at the defence-related side, if I could venture one almost personal comment, I was struck by the relatively low number of primes in this country compared, say, with the United States, which is a highly competitive field. You have Boeing, Lockheed, Raytheon, General Dynamics and two or three others. When you have looked in this country at primes and said BAe Systems, you have almost said it all. I know that the MoD are concerned to spread out the number of primes as far as possible, but I would suggest that must have a degree of effect on productivity; but that is a personal comment.

Mr Hibbard: I might add, relative to other companies here in the UK, that we are concentrating our business on the high end design and systems integration. We rely more and more on our supply chain, our value chain, to do more for us. One of the things we do as a result is work with that supply chain to help develop them so that we can rely on them. Here in the UK we work with DESO and with the regional development agencies, reaching out to small- and medium-sized enterprises. We have worked with them all over the UK. It so happens tomorrow we have a team in town which will be

meeting 22 of the regional development agencies and associated organisations at DESO explaining one of our programmes which is inviting folks from the RDAs and from small- and medium-sized companies to come to our Boeing leadership centre to study management skills and also to network with US executives. We do take it upon ourselves to try to improve some of the companies which might fall in that lower echelon where they do need development.

Mr Hoyle: It is quite interesting that you just touched on defence. You are obviously quite right that there are many more prime contractors in America. You are also a very protected market in defence, so much so that if you win a contract in America you expect a minimum of 50% build in America. The last contract we won was the naval field gun contract and 83%, or 93%, was actually built in America. While you have a protected market like that and you are guaranteed that your money must also ensure that there is construction and development in America, you can understand why you have more prime contractors, who are not quite playing to the same rules as in the UK, in fact we are much more open. Maybe that works against us as well.

Mr Berry: Was that a question?

Q233 Mr Hoyle: No, it was just to clear up the fact that there is a protected market in America and we do not have quite the same protective rules and that ensures that you probably have more prime contractors in America than we have in the UK because we are an open market.

Sir Michael Jenkins: It is a bigger scale too, of course.

Q234 Mr Hoyle: Of course, it is a bigger scale, but you raised the question. May I just take you on to the Trent engines? People have quite rightly said that has had government assistance. We use launch aid which has been very, very successful, not only for aircraft but for the engines industry; in fact £450 million in the year 2000 was for development, but it is repayable as well. What forms of financial assistance does Boeing receive from the US Government, either direct or to help with the export markets?

Sir Michael Jenkins: On the civil side we do not receive any form of direct or even indirect assistance to civil programmes as such. In terms of other forms of economic development assistance, which may be provided state by state, I really do not want to be drawn on this for one very simple reason and that is that an extremely important negotiation has just been engaged between the United States Trade Representative and the European Trade Commissioner, Peter Mandelson, where exactly this issue is under discussion. As far as I am concerned it is therefore in one sense *sub judice*, not in a legal sense—

Q235 Mr Hoyle: No, I do not think we ought to mislead the Committee on that.

Sir Michael Jenkins: What I would not want to do is make comments here which would in one way or another prejudice the course of that negotiation because it is a very important one, it is one which we in Boeing much welcome. As far as we are concerned, the objective of the negotiation—which is stated to be to secure a comprehensive agreement to end subsidies to large civil aircraft producers in a way which establishes fair market competition for all development and production of large civil aircraft in the European Union and in the United States—is one we 100% endorse. If it ends in a level playing field and in a zero option, Boeing would be the first to be content with that. On the defence side, the whole way in which defence contracting goes is quite different and I would ask George to say a word about how the US system works, to see whether there are parallels.

Q236 Mr Hoyle: That is not the question I am asking. What you are saying to me is that directly, on the civil side, you do not get government support. What you are saying is that there is regional state support for development or whatever to create jobs within that state.

Sir Michael Jenkins: Correct.

Q237 Mr Hoyle: So indirectly there is support by the state. Also, in the case of civil exports, do you get US Government support there in subsidies to help with the market?

Sir Michael Jenkins: Now, the only support which would fall under that category is probably the operations of Exim Bank, which are very parallel to other export credit agencies such as ECGD and the other European ECAs.

Q238 Mr Hoyle: Presumably what is always stated about different American companies is that on the one hand the government, quite rightly, puts money into defence, but the cross-subsidy is hidden in the civil side because of the technology transfer from defence. Is that fair comment?

Mr Hibbard: Let me make a comment on that, if I might. First of all, in terms of R&D on the defence side, the US Government is our customer; 90% of our defence work is with the US Government. We develop technology on our own budget. We compete for technology contracts within the US Government. Typically, the US Government then owns that intellectual property, if we have done it under funding from them. A number of years ago, going back to the time of a B52 or something like that, you talked about the transference, where there were very large, relatively speaking, defence budgets, of the technology flowing over into the commercial side. Today it is far less than that perception which was created many years ago; in fact in our experience over the last few years, if you look at it, really the transfer is more the other way. We just recently won a multi-mission maritime aircraft programme in the US with the United States Navy. That is a P3 replacement programme. It is based on a 737 commercial aircraft platform. We sold tankers to Japan and Italy and it is based on the

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767 platform. We do VIP transports which are based on our 757 platform and we do an Airborne Early Warning and Control which is based on the 737 platform. Frankly, there has been more of a flow of us taking commercial products that we did not get that type of support for and adapting them to a military use.

Q239 Mr Hoyle: I think we all agree that it gets more expensive to compete in the civil aircraft market and development costs are much greater. Do you ever see a time when you believe, whether it is state subsidy or government subsidy, there will be no need for financial support?

Sir Michael Jenkins: I do see a time when that will come. What one has seen with the development of Airbus is that you now have a situation where there is virtually a duopoly between two international worldwide companies who arguably can stand on their own feet without government support and that is the view we take of Airbus as well as of Boeing, I may say. Obviously on the defence side there will always be an umbilical relationship between supplier and the single customer you tend to have, but on the commercial side it seems to me that it should be possible for large civil aircraft companies to operate in exactly the same way as large automotive companies, large pharmaceutical companies and so on.

Q240 Mr Hoyle: Previous witnesses have quite rightly stated that Repayable Launch Investment has been part of the success of Airbus and the development and without that UK's aerospace would not have had the ability to compete, whether in civil or defence, because it has certainly been successful. How important do you believe government financial aid, whether defence or civil, is to the supply chain as well as to Boeing—but probably more the supply chain? What part do you think subsidies play?

Sir Michael Jenkins: I find it very hard to comment on that myself, because I have not been in a position, as it were, to study the degree to which Launch Investment, which is peculiar to the European aircraft industry, does in practice flow down into the supply chain. There are certain major suppliers to the whole industry, like Rolls-Royce whom we know receives aid in its own right. An interesting question which you raise is how far Launch Investment to the actual aircraft manufacturer is then passed on to the suppliers in order to reduce the cost to the manufacturer of the supplies they acquire. It is an interesting question and I hope somebody will look into it. I have not been in a position to do so. The question you ask is a very valid one.

Q241 Mr Hoyle: Resting that with Airbus, and I can understand that at the moment, let us just tip it back a little bit. It would be fair to say that Boeing's supply chain has benefited because of state subsidies to attract new factories which are passing on those savings to Boeing for the completion of those airliners. Indirectly you would also benefit from state subsidies because it is going to your supply

chain, to attract them to set up new factories and to help with development costs. New factories mean cheaper products, therefore Boeing does benefit as well.

Sir Michael Jenkins: Only to the extent that state aids, which are normally not sector specific, are available across the United States in the same way that the regional development fund in the European Union provides aid to a large number of qualifying areas.

Q242 Mr Hoyle: I think we ought to stress “a large number qualifying number of areas”. In fact I think you will find there are very few areas which now qualify. If you think of the aircraft industry based in Lancashire, there are no subsidies.

Sir Michael Jenkins: That may be.

Q243 Mr Hoyle: Derby with Rolls-Royce as well and I could name many more.

Sir Michael Jenkins: The total volume of the regional development fund is still pretty significant by almost any standards.

Q244 Mr Hoyle: It is not beneficial to these companies.

Sir Michael Jenkins: You are speaking to the man who actually, with the now Lord Thomson of Monifieth, set the regional fund up. I have watched its growth with considerable interest.

Mr Hibbard: Really what is important in terms of the supply chain is that if you are talking, even on the commercial aircraft side, we share the supply chain between Boeing, Airbus, Embraer, Bombardier. As soon as you drop down into the supply chain Smith's supply us, they supply Airbus, Honeywell the same way, Messier-Dowty and B F Goodrich. We all share and lots of our suppliers on the commercial side have close to a 50:50 split in what they supply to Airbus and what they supply to Boeing and that supply chain benefits around the world, not just the United States, from that kind of assistance which is really up to the states and the RDAs because they are trying to get jobs in their area.

Q245 Mr Hoyle: We know that state is pitching against state. You mentioned Bombardier and everybody is trying to get that work in because there is a load of state money out there. One way and another it is awash with a lot of money out there to help the track companies and help with manufacturing in the States and I understand that. What effect do you think it would have on the US and Boeing in particular, if the 1992 EU/US agreement on support for large civilian aircraft were ended?

Sir Michael Jenkins: The whole object of the current exercise is to replace the 1992 agreement with a new agreement regulating assistance to the large civil aircraft sector. If I could just remind you again, the object of this agreement, which Boeing thoroughly supports, is an agreement to end subsidies to large civil aircraft producers. It is as categorical and unqualified as that and that is in the joint statement from Ambassador Zoellick and

from Mr Mandelson. We are comfortable with that objective. The president and CEO of Boeing, Harry Stonecipher is on record as saying that he is comfortable with a zero option—whatever that may prove to mean. One of the difficulties about this negotiation is going to be to define what a subsidy is and that is what the negotiation is going to be about. I am extremely heartened by the fact that both sides have agreed that rather at this stage than going to arbitration, they think that a new agreement is attainable and that is one which certainly my industry supports very strongly.

Q246 Sir Robert Smith: Earlier you mentioned you were bringing together a collection of RDAs to a joint meeting. From outside, how is your experience of the coherence of the message or the fact that you are bombarded with several RDAs saying they are the place to come if you want aerospace? How have you found the co-ordination between RDAs on a sector like aerospace?

Mr Hibbard: You just touched on it. Oftentimes they are trying to attract you, that is their job, so the co-ordination across RDAs is going to depend on the situation. Sometimes certainly they are competing. In our experience overall, that has not really been a deterrent to us working with them. We have been working with them for several years. We go into specific regions and do outreach briefings which bring in companies. Sometimes 100 to 130 people will come in and listen to opportunities with Boeing, how to work with Boeing, opportunities to become part of the supply chain. We are prepared to work with any and all of those. Tomorrow they are under the auspices of DESO, 22 different groups are being brought in, so in that way there is a co-ordination, but it is really just bringing the group together to hear a common message from us.

Q247 Sir Robert Smith: One of the messages we have had is that the private return on investment and R&D is still quite low in this sector in the UK, despite the fact that it is a strong growth, an increasing share of world markets and high levels of productivity. Is that an assessment you would agree with? Is there a similar problem in the US aerospace industry?

Mr Hibbard: We, as Boeing, invest annually about US\$1.7 billion of company funds in R&D and that represents about 3.3% of our annual turnover. We have had people say to us that it is low. We do not believe it is low. What is appropriate depends on what business you are in and what sector you are in. We are in a business with very long development cycles. We are in a business where it takes a long time to get a payout in developing a new product, a new commercial aeroplane, or a new defence technology. We have found that is an appropriate level for us on our broader business which is striving to get to a double digit margin. That is our goal as a company and we are a little short of that. We think that the payout on R&D is appropriate and that US\$1.7 billion is a lot of money for one company to be investing. We think it is appropriate and the payout is appropriate. What is key for us in some of this, and

we have focused a lot on the commercial market for Mr Hoyle, is that in the broader spectrum it is very important for the industry overall to see some consistency in funding streams, whether it is on the defence side or the space side, outside the commercial aircraft sector. When those markets jump all over the place, investment in R&D is very hard to justify if your programme is going to be cancelled the next year. That would be one message I would leave: outside the commercial aerospace sector, government funding and consistency of funding is important to the growth of the overall industry.

Q248 Sir Robert Smith: What proportion of Boeing's worldwide turnover does the UK represent?

Sir Michael Jenkins: Our gross sales are running on an annual basis of somewhere between US\$50 billion and US\$60 billion a year. Revenues in markets outside the United States, particularly on the defence side, tend to be very lumpy in the sense that you win a couple of contracts one year and then you have famine for three or four years. I should say that if you take together the civil and the defence business, sales in this country over a period of about the last five or six years are probably running at something between US\$2 billion to US\$3 billion. If you take that as a percentage of 50, you are looking at about four or five per cent, something like that. It is a big market for us; no question, it is a very, very important market for us. I should like to reiterate the point made by George Hibbard earlier; it was one of the ones which struck me when I took over this job. There have been periods when we have been net exporters from the United Kingdom because of the huge volume of sourcing that we do in Britain on an annual basis.

Q249 Mr Hoyle: Would you say it was feast and famine?

Sir Michael Jenkins: It tends to be feast and famine. It is one of the joys of the industry.

Q250 Sir Robert Smith: One of the messages of a UK challenge is the gap between the laboratory and the final product. The perception here certainly is that in the United States this is a gap which can be funded by the Government in terms of encouraging development, that you are more able in the culture there to take things to the point at which they become commercially attractive. Is that a fair observation?

Mr Hibbard: I do not know that it is Government funding that moves you from a research phase into application and development. Certainly on the defence side some of that is dependent, because the government is the customer. We certainly focus as a company on identifying technologies which we believe will integrate into new products and we do an annual planning exercise. All of our research and development is focused on one organisation called the Phantom Works and we do an annual exercise to map the technologies which will go into near-term programmes, those into mid-term development

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programmes and those we think would lead to the long term. We apply funding accordingly to try to move those forward. Then we work with outside organisations and one of the best examples was in the written testimony which was provided here with the advanced manufacturing and research centre in Sheffield. R&D is taking place there which is moving very quickly out of the laboratory into products. We were one of the founders of that, investors in it and we are delighted with the results we are getting out of it.

Q251 Sir Robert Smith: Obviously we are looking to make recommendations to government. Is there anything you think we should be recommending that the UK Government could do to reduce this perceived gap between research and the final commercial products?

Sir Michael Jenkins: I read with great interest the Innovation and Growth Team's report. One of the things which strikes you there is the multiplicity of funding and, if I dare say so, the lack of coherence between funding. The idea of trying to bring this all together from a government point of view into some kind of national technology strategy has to be the right approach, particularly in a market which, compared with the United States market, is relatively small. At the moment, if you talk to a number of our suppliers even, there is confusion about where to go. The degree of standing back and trying to produce something which is more articulated and coherent would seem to me to be a very important objective and within that the whole question of applied research, which is what I think we are talking about, is something which needs a great deal of focus.

Q252 Sir Robert Smith: Any other message?

Mr Hibbard: A couple of other things which do not necessarily affect the perceived gap but I think it applies in the US and it applies in the UK equally. One is that as a company and as an industry we are strong believers in free trade, in reducing barriers. We have very actively opposed some of the Buy America activities in the US. We are very active in promoting relief on the ITAR issues. Frankly, to work in our industry today, you have to develop new technologies and you have to be able to collaborate across borders to do it. We are certainly very supportive of that.

Q253 Mr Berry: You mentioned the meeting which has been arranged with the RDAs, which I think you said was DESO sponsored. Why is it DESO sponsored?

Mr Hibbard: We do industrial participation programmes here in the UK as a result of some of our large sales and DESO is the administrator and customer for those. A lot of our activity is to do development with small- and medium-sized industry and we use them as a focal point for helping us. Then they do some of the other co-ordination with DTI and others.

Q254 Mr Berry: The reason I was asking is that in the UK we have this interesting situation where the DTI is responsible for promoting commercial aerospace and the Ministry of Defence has responsibility for promoting defence sales. Given that in the aerospace industry these two activities are not unrelated, I was curious that the meeting with the RDAs was sponsored by DESO as opposed to jointly by DESO/DTI or DTI.

Mr Hibbard: The real reason is that my particular group, which is reaching out to the RDAs, has done it under the auspices of these offset programmes and DESO is the co-ordinator for those because they came about under defence contracts.

Sir Michael Jenkins: Effectively we have to build up credit. Every time we make a defence related sale that produces a credit which we have to work through by placing work in this country. The co-ordination of that is really under the auspices of DESO. Since the RDAs are really the bodies who are most closely in touch with SMEs, the change is a natural one. In all the meetings we organise outside in the regions, you always have a DTI representative there to see what is going on. There is a very close link between the two.

Mr Hibbard: Our offset agreements with DESO are to concentrate on the defence industry. As soon as you get down into the supply chain, you are a defence aerospace company, but you are supplying on the commercial side too and this is an opportunity for defence companies to get management training which will benefit them across the entire industry.

Q255 Mr Berry: That is very helpful. One witness we have had has made the point that overseas market access is still an issue in both defence and civil aerospace, that there are still barriers to trade in certain countries and so on. What is your current take on the market access issue?

Sir Michael Jenkins: On the civil market side, I would not really subscribe to that comment; we do not see particular barriers to our civil products, even really in those airlines which are still state owned. You are perhaps conceivably swimming a bit against the tide here and there, but on the whole it is not a significant feature of our commercial life. Let me put it that way. The defence side is of course completely different. There, most governments you come across are balancing—just as the British Government is in its defence industrial policy—the need to get best value for money on the one hand against the need to retain employment and skills in the aerospace sector on the other. It is sometimes a rather uneasy balance, but it is one which is consciously struck and one which we thoroughly understand. I might comment in passing that in the UK market we very rarely ourselves act as a prime. Our preferred route to market is to team up with a prime like Augusta Westland for Apache sales or BAe Systems for Nimrod, or whatever it may be, rather than competing with these primes in our own right. That could change one day and indeed some of our American competitors have done so, but that is our preferred strategy for the moment. We have no

direct investments in this country in that sense. We have subsidiaries which operate here, but we do not ourselves own large plant with Boeing-badged employees in them. We are, however, always on the lookout for direct investment opportunities. What I should say is that as the Boeing company is moving away from platforms to knowledge management and systems integration, which is what it is consciously doing, I personally see the United Kingdom as an extraordinarily interesting place where there are a lot of skills in this area and where investments might become possible.

Q256 Mr Berry: What about the rest of the European Union?

Sir Michael Jenkins: Do you mean in terms of investment possibilities?

Q257 Mr Berry: Yes, since we got onto that.

Sir Michael Jenkins: Indeed. I should say that the three countries at the moment where there has been the most investment in these kinds of skills are probably the United Kingdom, France and Germany, not to neglect Italy, it has to be said. They are all markets which we look at extremely closely and where we have strong supplier relationships.

Mr Hibbard: The one investment we made in Spain was in an R&D facility which is quite small; maybe 25 professional scientists and they come from all over the EU. We need an EU footprint in order to participate in some of the collaboration programmes and most of those programmes have to do with airline safety, air traffic control, environmental issues which we work out of there.

Q258 Mr Hoyle: It is interesting that we are talking about dominance by the EU, America, through Airbus and Boeing respectively. Where do you really see the next challenge coming from, or do you think the dominance will continue?

Sir Michael Jenkins: The big question mark has to be China. We are pretty active in China, as indeed are Airbus as far as I know, in terms of working the market, seeing where the demand is coming from. I heard the other day that within the next decade China is going to build something like 150 airports. That is fantastic.

Q259 Mr Hoyle: It is phenomenal, is it not?

Sir Michael Jenkins: It is phenomenal and obviously that means the demand. One of the interesting questions is how far China will decide she wants to become herself a major aircraft manufacturer. If you take the Japanese, they quite deliberately decided not to. They are very big suppliers to the industry, as we all know. Where will the Chinese decide to go? Whether they will decide in the way that, say, the Brazilians and the Canadians have done, to go for a particular segment of the market, which in their case is the regional jet end, or whether they will really try to take the duopoly head-on, it is much too early to predict. Certainly I would not see this as a prospect in the next four to five years, but looking out beyond there is always a bit of a challenge. Would you agree with that, George?

Mr Hibbard: I think in the near term on the commercial side you will see the duopoly continue. Longer term you have to look at the workforce issues. We have serious workforce issues across the aerospace sector with a greying of the workforce and lot of the aerospace engineers retiring and not nearly the same numbers coming into the aerospace industry, yet if you go to Asia or to China or India, the number of engineering graduates per year is staggering. The effect of that is going to be long term, but it is certainly going to change the dynamics of the industry long term. It is hard to predict how, but it is not going to stay stagnant.

Mr Ford: We cannot forget about the regional manufacturers as well. Embraer and Bombardier continue to build bigger and more capable aircraft and could easily grow into the market from a 100 seat area and present a very interesting challenge that way, developing their own infrastructure, their own customer network. They are very strongly positioned to move into larger aeroplane markets, at least to the extent, let us say, that Airbus and Boeing do not do a very good job in meeting the needs in those areas, that might present opportunities for the regional carriers as well.

Q260 Sir Robert Smith: I am just interested in Boeing's reading. There has been a huge growth in competition in the airline industry and low-cost airlines and a take-off of a lot more regional routes. But, there is also a growing awareness of the role aircraft can play in global warming and their environmental impact. At this stage there is still a lot of debate about emission controls and taxation of fuel. How factored into the forward projections for the civil aviation market is a growing awareness of its environmental footprint and what may be happening there?

Mr Ford: It is certainly becoming more and more important, particularly as it gains interest in terms of generating more fees and things like that, as it is taxed. Environmental awareness is a key part of our design objectives. When we build a new aeroplane such as the 7E7, for example, we strive continually to reduce fuel consumption, which has a direct impact on emissions and environmental factors, noise, those factors as well. We are quite proud of the progress we have made in those areas. We focus on it intently. The 7E7 will reduce the noise footprint on a neighbourhood by 60% over the quietest aeroplanes which are flying today. The 7E7 will burn about 20 to 30% less fuel than the most efficient twin-engined aeroplanes flying today. That has a direct bearing on the environment, emissions and those factors. It is very important to us, it is one of our primary objectives on our new programme and we are intending to reduce the fuel burn of the aeroplanes we sell.

Q261 Mr Hoyle: Very interesting. It sounds as though it has all the right credentials and it is where we ought to go. Why do you think you are struggling to sell the 7E7?

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Mr Ford: We are selling it.

Q262 Mr Hoyle: No, you are not selling the numbers you expected. You are way below in your own reports, everybody knows that.

Mr Ford: I am afraid I do not understand the question.

Q263 Mr Hoyle: I will deal with the question. You expected to sell 200 and you have not sold 200 yet. Why?

Mr Ford: We have firm commitments now for 126 aeroplanes.

Q264 Mr Hoyle: So you are below target.

Mr Ford: We have customer announcements for 126 aeroplanes; we have firm commitments for 56 of those 126. We have contractual arrangements; there is an unprecedented level of interest in this aeroplane programme from the community, from the airlines all over the world. This is a level of interest which we have never seen before on any other programme, Boeing or Airbus. To that point, the 7E7 is very real, it has generated a lot of excitement in the marketplace and it is going to have a phenomenal impact in terms of the environmental impact of reduced fuel consumption, reduced noise and emissions in the areas.

Q265 Mr Hoyle: The jury is out and we shall judge it next year if you come back.

Mr Ford: We shall be happy to.

Q266 Mr Berry: Thank you very much indeed. I assure you that we did not choose this date for the meeting to coincide with another event, to which you referred. Thank you very much. If we have any further questions arising from our considerations later, we shall get back to you, if we may, and drop you a line? Thank you very much indeed for your time this afternoon.

Sir Michael Jenkins: May I just mention one thing which is that one of our three top executives happens to be in London at the moment, Jim Albaugh. He runs the whole defence side of Boeing. He is giving a lecture tomorrow night at the Royal Aeronautical Society which by coincidence is covering many of the subjects on which you have been questioning us this afternoon. I should be more than happy to make the text of that lecture available to the Committee. Indeed, if anybody was minded to come and listen to Jim Albaugh, he would be more than welcome. Half past six tomorrow night.

Mr Berry: Thank you. That is the first advertisement we have ever had in the Trade and Industry Committee. Sir Michael, we appreciate it. Thank you very much indeed.

Written evidence

APPENDIX 1

Memorandum by the Aerospace Technology Steering Group (ATSG)

1. INTRODUCTION

The Committee has requested written evidence on the progress towards the implementation of the recommendations of the Aerospace Innovation and Growth Team (AeIGT). This submission addresses progress to date in respect of the AeIGT recommendations on Technology Strategy.

2. PROGRESS TOWARDS THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE DTI SPONSORED AeIGT ON TECHNOLOGY STRATEGY

The report of the AeIGT, published in July 2003, recommended the establishment of a National Aerospace Technology Strategy (NATS) as a partnership between Industry, Government and Academia. This recommendation was based on the following:

- The success of the UK Aerospace Industry depends on the ability to deploy world class technology which requires long term investment in research.
- Aerospace is a safety critical and highly regulated industry. New technology therefore requires a lengthy phase of focused research and validation before it can be applied in aerospace. The strength of the UK Industry today stems from a history of research and validation programmes promoted by Government in close collaboration with Industry aimed at bridging the gap between pure science and industrial exploitation.
- UK Government investment in this vital area has fallen over the years (despite the increased support for pure scientific research) and is now well behind the level of competitive nations.
- The major aerospace companies in the UK have a global footprint. While prepared to invest heavily in technology acquisition they will tend to do so where conditions are most favourable and, in particular, where they can work in close partnership with Government funded research and validation. Product development and production inevitably follow research and technology.

These points were also identified in Industry evidence to the Select Committee in January 2001 and hJuly 2003.

3. NATIONAL AEROSPACE TECHNOLOGY STRATEGY

The NATS envisages that investment should be concentrated on the major research themes and related technology validation programmes critical to the UK industry. The AeIGT established that this requires industry investment to be matched by an increase in Government civil expenditure and an increase in the proportion of MOD research funding spent with industry. The themes and validation programmes broadly address environmental targets (the NATS has adopted the EU ACARE targets for reduced emissions), defence (in accordance with Defence Industrial Policy), and product competitiveness.

4. NATS IMPLEMENTATION

Following acceptance of the AeIGT recommendations, implementation commenced in September 2003 under the leadership of the ATSG, representing Industry, Government and Academia. A comprehensive National Aerospace Technology Strategy Implementation Report was published in July 2004 and is attached as a supplement to this submission.

Intensive work has continued on developing specific research and technical programmes in detail and in assessing regional impact. Work has also continued in conjunction with the National Defence Industries Council Research and Technology Sub Group on harmonising the NATS with MOD Technology Strategy.

5. FUNDING THE NATS

In the past the DTI has funded aerospace research and technology demonstration through the Civil Aircraft Research and Technology Demonstration Programme (CARAD). Following the December 2003 Innovation Review, CARAD is due to terminate. In consequence the NATS will have to compete for funding on a non-sectoral basis, and is already doing so. It is already clear that the innovation funding available to the DTI is inadequate to support the NATS on the basis originally envisaged and that the public share of funding for the NATS will have to come from Regional Development Agencies (RDAs), Devolved Administrations and Research Councils as well as the traditional DTI and MOD Sources.

The challenge that this represents has been recognised, and in February 2004 the Prime Minister assigned the task of co-ordinating public funding for the NATS to the Minister for Science and Innovation who convened a National Aerospace Strategy Group for that purpose. Specific issues being addressed are.

- The ability and willingness of RDAs to participate in funding the NATS—this requires amendment to the existing Tasking Framework which does not provide for investment in research.
- MOD support.
- The relationship with the Research Councils.

6. CURRENT STATUS

The principle of a National Aerospace Technology Strategy has been accepted as vital to the continued success of the UK Aerospace Industry. It is now essential that real progress should be made in launching major elements of the Strategy in Spring 2005.

This will require:

- The UK Aerospace Industry to commit funding and resource as defined in the Implementation Report.
- Central Government to demonstrate its ability to deliver a long term national strategy which has to be, in large part, implemented and funded regionally.

W K Maciver

Chairman, Aerospace Technology Steering Group

APPENDIX 2

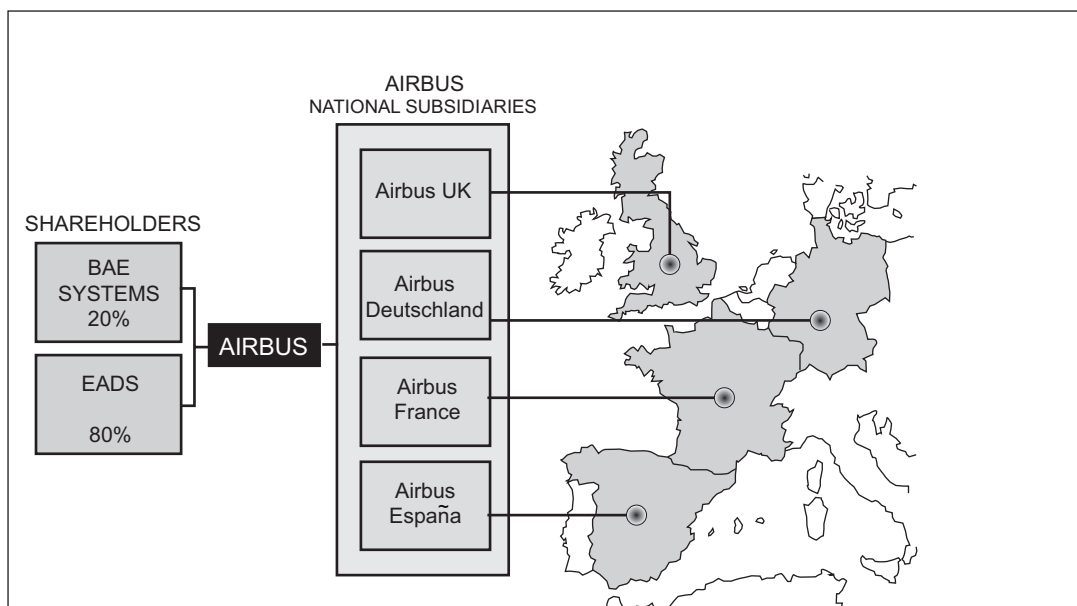
Memorandum by Airbus UK

1. INTRODUCTION

Airbus UK welcomes this opportunity to give its views to the Trade and Industry Select Committee on its contribution to the competitiveness of the UK aerospace industry and the associated key issues. In addition, we fully support the submission made to the Inquiry by the Society of British Aerospace Companies.

A company with substantial operations in the UK, Airbus is an operating company of Airbus SAS, which is a joint company owned by BAE Systems and EADS. Its share of the company is 20%. It is a global company with design and manufacturing facilities in France, Germany, the UK, and Spain as well as subsidiaries in the US, China and Japan.

Airbus Structure



The two UK sites contain the Airbus Wing “Centre of Excellence”.

Design, wing component/sub assembly work and wing manufacturing for the A400M military transport aircraft is based in Filton, near Bristol. Whilst in Broughton, North Wales, all Airbus wings and large wing components are manufactured together with the production of wings and fuselages for Raytheon Hawker business jets.

The UK designed wing is core technology and the wing production facilities are of key strategic significance to Airbus operations. Thus, as well as extensive capability in aerostructures and aerodynamics, Airbus UK is a leading force in systems design and integration. The company is a key player in the knowledge economy, making a major contribution to the strength of the science and technology base of the country.

The findings of the Aerospace Innovation and Growth Team (AeIGT) are particularly relevant to any assessment of the competitiveness of the UK aerospace industry, as in 2002–03 this body prepared a 20 year vision for the future of the Industry and made recommendations on how to make the vision a reality.

Airbus participated fully in the AeIGT process and supports the recommendations made in the AeIGT report. Airbus UK wishes to work with Government, Members of Parliament, RDAs, Trade Unions, the UK Supply Chain, Academia and the Science base to achieve the AeIGT goals so that the UK aerospace industry’s competitiveness may be further enhanced.

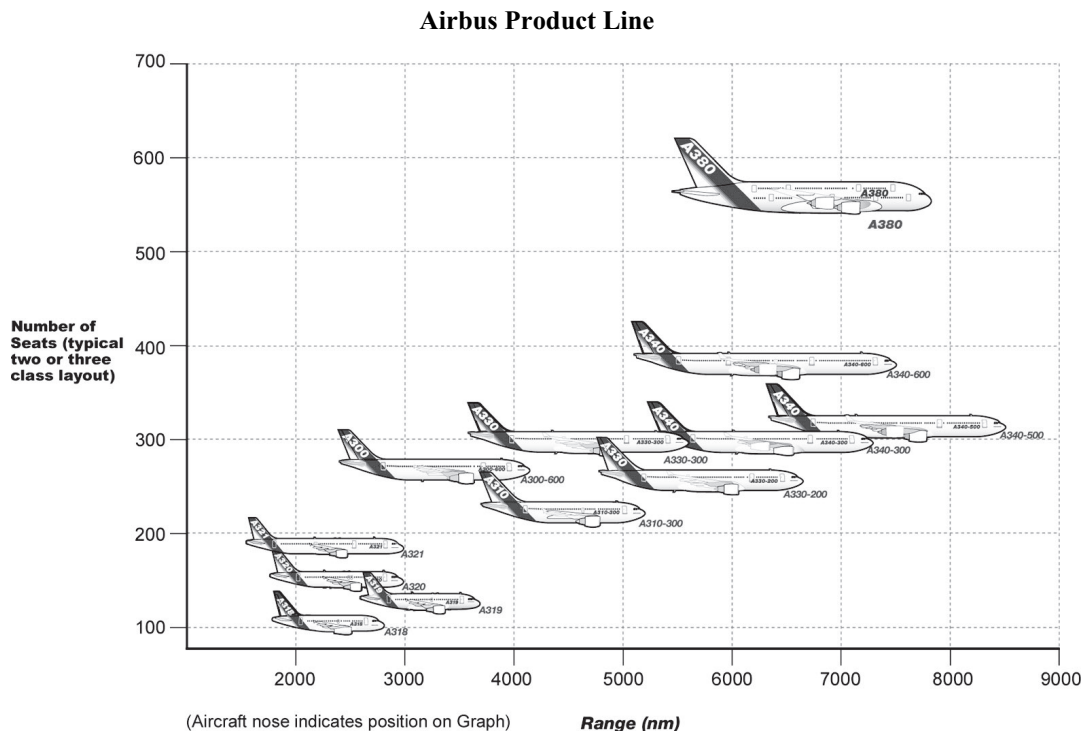
Key areas where further actions are needed to deliver a competitive UK industry are considered in Section 3.

2. AIRBUS: A MAJOR CONTRIBUTOR TO THE UK ECONOMY

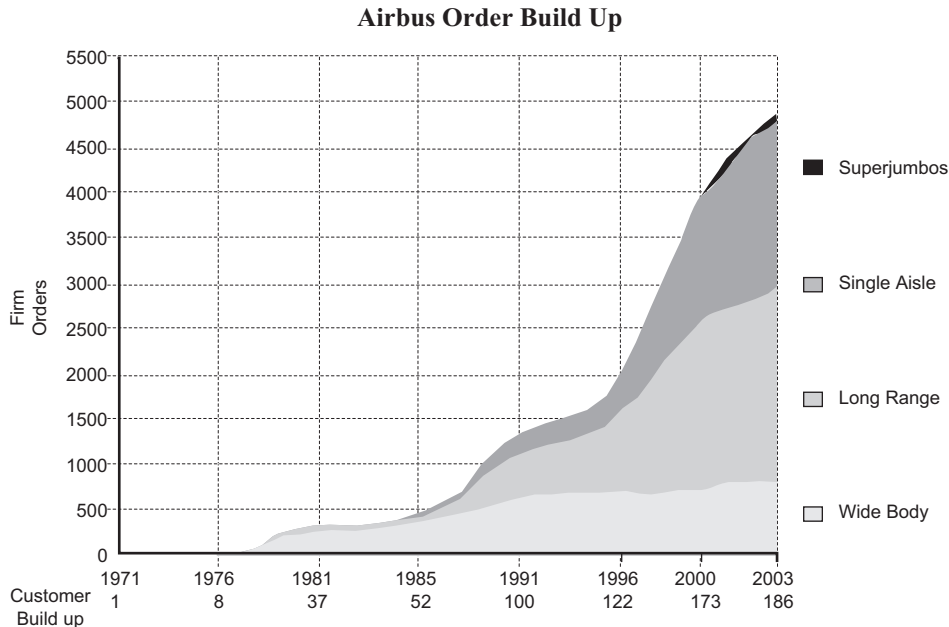
Airbus is a major European company that competes in the market for the design and manufacture of large commercial aircraft. When Airbus was formed in 1970 two US companies, Boeing and McDonnell Douglas, dominated the market.

However, over the last three decades Airbus has developed a product family that embodies the latest technologies to reduce operating costs and to cut noise and emissions to meet environmental targets. These products have been well received by airline operators, with Airbus gaining market share at the expense of its American rivals. Restructuring in the US led to the removal of McDonnell Douglas after a takeover by Boeing, with the latter company now ruling supreme in the US.

Airbus now has a comprehensive product range varying from the 100 seater A318 to the A380 with 555 seats. The products are modern and innovative with Airbus aircraft, for example, being the first to be developed with “fly by wire” technology. This means that it competes vigorously and successfully with the US competition. To illustrate this, in 2003 for the first time, Airbus produced and delivered more aircraft than its American rival, Boeing. Airbus has now sold over 5,000 airliners to 200 airlines worldwide. 667 of these aircraft are operated by UK based airlines.



Airbus has a large forward order book of over 1,500 aircraft, for delivery up to 10 years from now that will provide significant work for UK companies. In 20 years time it is estimated that air passenger miles will have nearly trebled (ie 5% growth per year) which could mean that nearly 17,000 new passenger and freighter aircraft will be needed over the next 20 years. Airbus can expect to win orders for at least half these aircraft.



The company has a strong presence in the UK, with its UK based subsidiary Airbus UK having been responsible for the design, development and manufacture of the wings for every Airbus aircraft ever built. Wing design is a particularly challenging activity, with Airbus UK having developed many innovative technologies to help to produce aircraft with superior performance. Airbus UK also embodies key systems integration capability, being responsible for both landing gear and fuel systems.

The company makes a significant contribution to the UK economy in many areas, which include:

2.1 UK Jobs—Airbus UK currently has a workforce in excess of 12,000 people. More than 400 companies are part of its UK supply chain located across the length and breadth of the UK. Current Airbus programmes are supporting more than 80,000 UK jobs from direct, indirect and induced employment. This will rise to around 100,000 UK jobs when the A380 and A400M projects reach full production. It is important to point out that these are long term jobs due to the nature of production schedules in this industry.

2.2 Training—Airbus UK operates in a high-technology sector that requires a highly skilled workforce to produce superior products. Therefore, Airbus UK is investing considerable time and money in the training of its people, and has excellent apprenticeship and graduate training schemes. Over 6,000 apprentices have been recruited over the last three decades, many of whom have progressed within the company. Indeed, over 60% of the senior manufacturing team having started their career as apprentices. Airbus UK currently has 360 apprentices and over 100 graduate trainees, with the apprentices at the Airbus UK Broughton site representing the highest number of apprentices of any manufacturing company in Wales.

The company has extensive links with both primary and secondary schools. Each year around 200 pupils take part in work placements within the company. Airbus UK has a dedicated schools liaison team which last year hosted 30 visits from schools involving 400 pupils, arranged 28 visits to schools involving a further 600 pupils and hosted over 50 visits by teachers involved in training days, careers awareness and workshops.

All employees are encouraged to use the on-site open and distance learning facilities. Interactive training modules are available in a wide range of vocational, key skills and educational subject areas. In addition, all employees are eligible for a £100 training “passport” to be used as a company contribution towards external Further Education training courses of their choice.

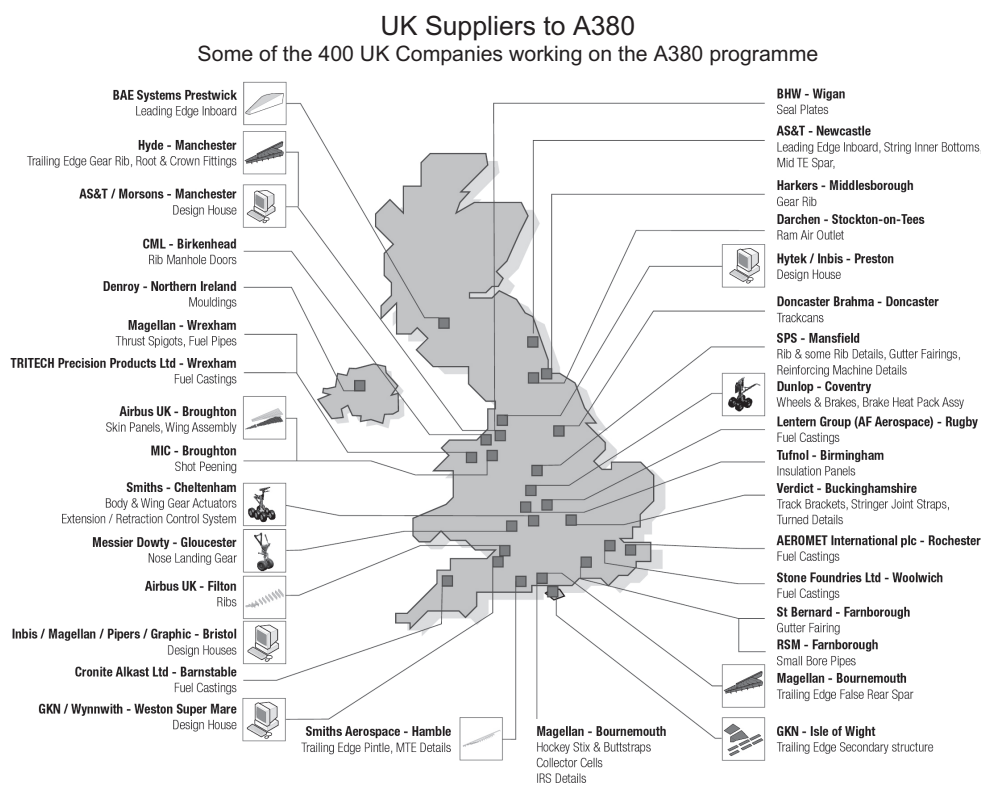
2.3 UK Investment—In the last decade Airbus UK has invested more than £2.5 billion in research and development and capital expenditure. This will result in the development of new technologies being embodied in innovative products and to provide new design and manufacturing methods, processes and equipment that are supporting the continuous improvement in productivity. An example of the rapid

expansion and development of the company is the fact that Production floor area at the Broughton site alone has tripled since the early 1990s, with more than 3 million square feet currently being used in the wing manufacturing process.

£350 million capital investment was made in the new West factory and the production equipment installed therein which was formally opened by the Prime Minister in July 2003.

The recently published DTI 2004 R&D Scoreboard shows that Airbus UK was seventh in the ranking of Top 700 UK companies by R&D investment, having invested £349 million in the previous year.¹

2.4 UK Supply Base—Airbus makes a considerable contribution to the UK supply base. On the A380 programme, for example, work to the value of £7.5 billion has been placed in UK companies. Over the life of the programme this is set to double to well in excess of £15 billion.



2.5 UK Economic Growth—Airbus UK is currently generating annual sales of around £1.6 billion, and this will increase to well over £2 billion per annum when new products currently under development reach full production.

2.6 UK Balance of Trade—Airbus UK makes a significant positive contribution to the UK trade balance, currently providing net exports of more than £1 billion and this is set to rise to more than £1.5 billion when the A380 reaches full production.

2.7 Technology Spill-over—Aerospace is a technology rich sector and Airbus UK is investing massive amounts in the development of new technologies for incorporation in future products. Many of the technologies, methods and processes pioneered by the aerospace sector are now being employed in a wide range of other UK business sectors. The benefit of this technology spill-over is likely to be large, as economic studies provide evidence of significant social returns from R&D. A DTI paper² has reported social rates of return to R&D considerably in excess of private rates of return. Typically, private rates of return were in the region of 25% (range 9% to 43%), with corresponding social rates of return of at least 50% (range of 10% to 160%).

¹ DTI R&D School Board 2004.

² DTI, Prosperity for All, p 28 September 2003.

3. UK AEROSPACE: THE COMPETITIVENESS CHALLENGE

Current market forecasts suggest that passenger traffic will grow by around 5% per annum over the next two decades, providing major business opportunities for players in the large civil aircraft sector. This is expected to provide a demand for some 17,000 new aircraft worth around \$1.6 trillion over the next two decades.

The UK, through its participation in Airbus UK, has a strong presence in this high-value, high-growth sector. However, the UK will need to attain world-class levels of competitiveness in a number of key areas if it is to secure a good share of this high-value business.

Particularly important challenges will be posed in the following areas:

3.1 Future Skilled Workforce—Airbus operates in a high-technology sector and requires a highly skilled workforce to produce world class products. Therefore the company is already investing considerable time and money in the training of its people. In conjunction with its partner training providers, Airbus UK runs excellent apprenticeship and graduate training schemes that are raising skill levels throughout the sector. Recognition of the success of these schemes was recently made when Airbus won the National Training Award, the top accolade for training and people development in the UK, the Welsh Training Award and the Education, Learning Wales Employer Award. All of Airbus' sites are accredited with Investor in People status.

However the company acknowledges that more well qualified people must be attracted to Aerospace. This will require a significant shift in both image and status. Airbus would like to see more of a focus on vocational training in schools particularly at the key 14–16 year age groups. There also remains the problem of the need to enhance the UK's abilities in basic skills. Professional engineers are highly regarded in France and Germany but this same recognition is not achieved in the UK. Further refinement of apprenticeship and graduate training schemes is required and improved lines of communications between industry, academia, government and trade unions need to be established.

3.2 Investment in Research and Technology—A key element of the AeIGT activity concerned the assessment of the future technology needs of the aerospace industry that would ensure the long-term health of this sector. This work culminated in the publication of an implementation report that focussed on one key recommendation, the development of a National Aerospace Technology Strategy. This would be a partnership between Government, industry and academia that would require enhanced co-ordination and investment on the part of all stakeholders if it were to achieve the desired objective.

The strategy has at its core, two new mechanisms for the delivery of technology:

- Aerospace Innovation Networks (AIN)—to bring together industry and academia in a working partnership to develop and transfer the core technology needs of the sector.
- Aerospace Technology Validation Platforms (ATVP)—to improve the level of maturity of technology through utilisation on large scale test beds, thus bringing technology closer to the point at which it can be certified and ultimately exploited by use in future products.

For Airbus UK the focus for technology validation will be on those aspects of the aircraft which are recognised as Centres of Excellence in the UK, notably wings, landing gears and fuel systems. Great effort has been taken to ensure the strategy supports the key technologies for these elements of the aircraft, specifically:

- Aerodynamics
- Structural Design and Analysis
- Materials Science
- Systems Engineering
- Manufacturing

and that each of these strands takes into account the environmental impact of products and processes that they generate.

To deliver this strategy the level of Government investment in the civil aerospace research and technology development for the sector needed to be raised to the order of £70 million per annum. (to be matched by Industry). This level of funding is unlikely to be secured solely through the DTI, but Government has suggested it may be reached through co-ordination of funds from DTI, EPSRC, RDA's and DA's. It was recognised by Government that whilst this level of funding could not be secured solely through DTI, by increased co-ordination of all key funding bodies (DTI, EPSRC, MoD and RDA's) a figure close to this target could be achieved. The task of providing this co-ordination was personally assigned to Lord Sainsbury by the PM.

To date, through the AeIGT mechanism the industry has co-ordinated its approach to the new Business Support tools from DTI and is also engaging with each of the funding bodies through the AeIGT. The AeIGT Technology Working Group are developing pilot AIN and ATVP proposals to test the funding co-ordination mechanisms for future investment by national and regional government. This approach has already had some success with significant funding (>£20 million) for aerospace sponsored projects from the recent DTI Call for Proposals are under negotiation. In addition, the establishment of the

National Composites Network, announced by Patricia Hewitt at the Farnborough Airshow demonstrates how industry, DTI and the RDA can join forces to support the evolution of critical technology and capability.

There are however, a number of concerns:

- the level of co-ordination between the various funding bodies remains low, and the process for application for funds is inconsistent. This makes it difficult to align bids into multiple funding sources at the same time; and
- the existing mechanisms are not yet in a format where they can support proposals that would qualify as an ATVP (similar size programmes at a European Level (FP6 Integrated Projects) range in size from 30–100Meuro).

To deliver the national strategy each of the stakeholders must fulfil their role in the partnership. Whilst elements of the strategy are being successfully addressed, the fundamental aspect of enhanced technology validation is still some way from being realised.

A further risk to the proposed strategy exists because the sector specific element of the EC Framework Programme 7 to support aerospace remains in doubt. There is intense competition for the establishment of European Technology Platforms from which sector specific programmes will be established. The projects that will form part of these platforms are key building blocks for the national strategy. Whilst industry can play its part, with the move of the Government Research Laboratories (notably DERA) to the private sector the UK has lost vital method of lobbying within Europe. It is therefore vital that Government proactively lobby the EC to protect the existing mechanisms to ensure stable funding continues for this sector and to allow European industry to compete on a level playing field within the global market.

3.3 Trade Regulations: the International Dimension—A further potential risk for Airbus concerns the WTO subsidies case, brought by the US government, at Boeing's behest, in September 2004. The US request for WTO consultations represents a unilateral violation of the EU/US 1992 Bilateral Agreement, which has governed public financing of the large commercial aircraft industry for the last 12 years. EU Government Repayable Launch Investment for Airbus programmes falls within the terms of the 1992 Agreement and exists to offset the huge and non-repayable financial benefits that Boeing receives from NASA, the US Department of Defense and national and state level tax allowances. On Boeing's new 7E7 aircraft combined US, Japanese and Italian financial support is worth US\$5.5 billion, about 50% of the programme's cost.

The EU has responded to the US WTO action by challenging American federal subsidies to Boeing. In the meantime Airbus would like to make clear that the public/private partnership embodied in the Repayable Launch Investment is a critical element in Airbus's ability to compete with the heavily subsidised US sector.

3.4 Further Productivity Improvement—The civil aerospace market is now emerging from the major downturn that followed the terrorist attacks of 9-11, the Iraq War and the SARS outbreak, with demand and output increasing. However, business conditions remain very difficult. Civil aircraft continue to be priced in US dollars, and the continuing weakness of the US currency is putting considerable pressure on margins of suppliers in the UK and the rest of Europe. Increasing competition is being felt from the emerging low-cost economies that are keen to gain work in this high-technology business sector.

Further improvements in productivity will be required if the UK civil aerospace sector is to remain competitive in this challenging business environment. The importance of productivity improvement was recognised by the AeIGT, with its final report recommending that the UK must systematically and continuously deliver productivity improvement at a rate faster than its competitors. The AeIGT put forward the need for concerted, co-ordinated action by all levels of Industry, together with continuing sector support from the Government, through facilitating schemes and efforts to ensure that information on best practice is shared across Industry. Airbus is supportive of these goals.

Airbus is responding to this competitiveness challenge by taking strong actions in areas that will boost productivity. In order to counter the adverse impacts of a weak dollar, the Company has launched its "Route 06" project that will reduce annual operating costs by €1.5 billion from 2006, with UK operations delivering their share of these savings. Airbus UK is investing considerable sums in training its people, in the acquisition of the latest design aids and manufacturing equipment and by adopting best practice processes to deliver continuous improvement in productivity.

We recognise that the UK cannot compete on labour costs with the low-cost economies that are now competing in the civil aerospace sector. Accordingly, Airbus UK is now focussing its efforts on the production of high-technology, high value added work packages rather than the previous practice of carrying out the complete spectrum of tasks "in-house", many of which can now be outsourced more cheaply. This move to the high value added end of the spectrum in turn requires a highly skilled workforce to deliver world-class engineering and manufacturing performance, operating in a knowledge-based economy that encourages the identification and adoption of innovative solutions.

Airbus UK is delivering positive results in terms of productivity gains. Gross value added per employee is well above the sector average and sales per employee have shown a sustained “real” growth rate of more than 7% pa over the last two decades. These improvements are being achieved in an environmentally sensitive manner, as evidenced by Airbus UK’s recent accreditation of ISO 14001, the international environmental standard.

Nevertheless, much more remains to be done by all levels of the UK aerospace supply chain if the AelGT’s vision of the UK being number one in the productivity stakes is to be realised. The Government has a leading role to play by delivering the right environment in the areas of education, training and investing in science and fostering innovation so that UK companies have the right base when striving to become more innovative and productive.

SUMMARY AND CONCLUSIONS

Over the last three decades Airbus has grown a successful business in manufacturing large civil aircraft. It has become a major competitor in an industry which otherwise would now be dominated by a US monopoly provider. In 2003 for the first time, Airbus produced and delivered more aircraft than its American rival, Boeing. Airbus has now sold over 5,000 airliners to 200 airlines worldwide.

Airbus UK is a key part of that success, with our world-class expertise in wing technology. We are providing high-productivity business, based on a high and continuing level of investment, which creates employment for a highly skilled workforce, with a significant and growing positive impact on UK growth, trade and the Exchequer:

- Current Airbus programmes are supporting more than 80,000 UK jobs from direct, indirect and induced employment. This will rise to around 100,000 UK jobs when the A380 and A400M projects reach full production.
- Over 6,000 apprentices have been recruited over the last three decades, many of whom have progressed within the company, with over 60% of the senior manufacturing team being represented by ex-apprentices.
- In the last decade Airbus UK has invested more than £2.5 billion in Research and Development and Capital Expenditure.
- The recently published DTI 2004 R&D Scoreboard shows that Airbus UK was seventh in the ranking of Top 700 UK companies by R&D investment, having invested £349 million in the previous year.
- Airbus UK is currently generating annual sales of around £1.6 billion, and this will increase to well over £2 billion per annum when new products currently under development reach full production.
- UK Balance of Trade—Airbus UK makes a significant positive contribution to the UK trade balance, currently providing net exports of more than £1 billion and this is set to rise to more than £1½ billion when the A380 reaches full production.

We aim to work as a partner with the UK Government to build upon that success. Our own efforts are crucial and we also need a positive policy framework.

APPENDIX 3

Memorandum by the Air League Council

THE COMPETITIVENESS OF THE UK AEROSPACE INDUSTRY

1. The importance of the UK Aerospace Industry should not be underestimated. It is the last engineering-based manufacturing industry that is world-class as evidenced by its success in supplying both Airbus and Boeing and by its positive contribution to the balance of payments. It provides hundreds of thousands of highly paid and high value-added jobs. It is the type of knowledge and technology-based industry that other countries envy.

2. The exemplary performance of this industry is hidden in the overall “average” of the UK manufacturing industry. The “average” is pretty lacklustre and is consistent with the steady decline in the UK’s manufacturing competitiveness. Whole sectors have been absorbed by more successful overseas competitors or have disappeared altogether.

3. During WWII, and for 20 years after, the UK Aerospace Industry had everything for airframes, engines and equipment in terms of innovation and technology. However, between 1957 (“no more manned aircraft”) and in the late 60’s (cancellation of TSR2 and withdrawal from Airbus) the collective nerve of both government and industry began to fail and the UK’s relative global position began to decline. Only collaborative projects were entered into and these turned out to be hugely wasteful, inefficient and slow. Their only advantage was that they were almost impossible to cancel.

4. In the early 90s, studies conducted by the SBAC, concluded that the UK was consuming its technological inheritance because of lack of investment by both government and industry exacerbated by the absence of an industrial policy and strategy.

5. In the past 25 years, the three aerospace sectors have behaved quite differently. The equipment sector was the first to realise that the domestic market was not the relevant market to address. So, after an exceptional record for exports, the equipment companies (Smiths, Dowty, Lucas, Cobham, Meggitt) all acquired subsidiaries overseas. No other country achieved this on the British scale. The consolidated jet engine companies (Rolls-Royce) achieved an exceptional export record and then set up overseas operations, firstly for overhaul and later for research, development and manufacturing (50% of Rolls-Royce R&D is now performed outside of the UK due to more attractive economic conditions) The consolidated aircraft manufacturers (BAE Systems), ironically, were slow in setting-up shop overseas mainly due to their preoccupation with collaborative programmes, but now have a substantial subsidiary in North America.

6. In the early 90s, the SBAC attempted to re-start a dialogue with government (DTI, MoD, No 10) about the future of the industry and the need for a joint plan including a substantial uplift in R&D spending. (Incidentally, the SBAC “discovered” that the government spent over £6 billion on Research and Technology but found no one was in charge of the total). This initiative proved largely ineffective because of a lack of resonance. Both of the top level government/industry committees, (DTI Aviation Committee and National Defence Industries Council) became mere talking shops.

7. In the mid 90s, The Technology Foresight Programme was a breathe of fresh air under the leadership of the Government Chief Scientific Advisor. At one time the Defence and Aerospace sector committee had more than 200 people working on the programme at no cost to the government. Technology road maps (including technology demonstration programmes) were prepared for the eight key technologies identified to be essential for the future of the Defence and Aerospace Industry. This really was a joint effort between Industry, Academia and the Government. The CSA concluded that the Defence and Aerospace Industry was “at the cusp” and could go either way.

8. Then in 1997 the government changed and despite protestations to the contrary the Foresight Programme for Defence and Aerospace slowly disappeared into the background.

9. Subsequently, the fresh approach became the Aerospace Innovation and Growth Team. Launched with much fanfare and promise, even this initiative has achieved very little. Industry frustration with lack of government response led to a breakfast at No 10. However, no commitments were made other than assigning another co-ordination task to Lord Sainsbury.

10. Perhaps the surprising thing is the continuing success of the industry in spite of the relative lack of government support. (Launch Aid is really Launch Investment with commercial returns to the government for taking a relatively longer view than commercial banks.)

11. Evidence suggests that properly structured aerospace manufacturing operations in the UK can still be world-class competitive and even the lowest-cost producer. One example is the Messier-Dowty plant at Gloucester which for the first time has won the complete landing gear system for the Boeing 7E7.

12. Rolls-Royce has been the outstanding example for successful implementation of a global strategy ever since 1971. This is a uniquely valuable enterprise and maintains the world’s most recognised prestige name. This company will be the bell-weather for the industry in terms of how it adapts to the new realities.

13. However, the industry has become anti-synergistic—the whole is worth less than the sum of the parts. This explains why so much of the industry has been sold to more successful overseas competitors (often partially government-owned) eg Airbus, Messier-Dowty, Lucas, Claverham, Westland, Ferranti, Plessey, Pilkington, Racal, and nearly Alvis-Vickers. And ownership does matter in the medium to long term.

14. Today’s position of the UK aerospace industry is comparable to that of British Leyland in 1968 when BL was still the fourth largest volume car manufacturer in the world. The remaining rump has recently been rescued by Shanghai!

15. Before it is too late, the Government needs to decide that a UK-owned Aerospace Industry is worth supporting for the long term. Substantial sums of government investment are required in research, technology and technology demonstrators. The allocation of these funds needs to be controlled by a joint council composed of industrial, academic and government members. It is quite straight forward—we just need to decide.

Tony Edwards

Visiting Professor, Royal Military College of Science
Chairman, The Air League
President, British Aircraft Preservation Council
Past President, The Society of British Aerospace Companies
Past President, The Royal Aeronautical Society

APPENDIX 4

Memorandum by Amicus

There are few industrial sectors in which the UK can claim to be genuinely world class. Aerospace is still one of them.

Employing over 147,000 directly and a further 350,000 indirectly, UK aerospace is second only to the USA in employment and turnover and consistently delivers a healthy trade surplus. Its workforce, almost a third of whom are university graduates, is also the most highly union-organised in the World.

Our intention as the representatives of that workforce and key stakeholders in the industry is to do everything in our power to ensure it remains both world class and a major contributor to UK plc. There are three areas we would like the committee to consider in respect of this goal. Whilst we will headline them separately they are all interrelated.

LAUNCH INVESTMENT

The situation surrounding complaints to the World Trade Organisation (WTO) over alleged subsidies to both Boeing and Airbus is of great concern. At a time when China and the far east are looking to increase their footprint in the aerospace industry a European-US trade dispute will only damage both parties.

Far east funding to the Boeing 7E7 project has achieved significant access to technology and work share. Indeed Japan, through crucial government investment, will not only receive 35% work share but this will be in the shape of the crucially important area of wing production. For the American aerospace worker this is seen as a body blow.

The impact of repayable launch investment reaches well beyond the primes to the supply chain and it is fundamental to maintain leadership in technology, skills, product innovation and environmental enhancement. Aerospace firms are international and will continue to be attracted by Government support. Without a repayable launch investment the UK civil aerospace industry will contract and the UK will lose a world-class industry. The UK Government must continue to work closely with the European commission to ensure the UK interests are considered at all stages.

The facts state that for the UK, reimbursable launch investment has been a genuine success story for the UK taxpayer. If we consider that investment for the A320 Airbus was made in full in 1999 and has since repaid almost double the original investment even Gordon Brown must be considering a wee smile. If we then consider that investment in the A330-340 will have tripled the original investment by 2017 his wee smile becomes a broad grin. If we add direct corporation and indirect UK tax revenues he positively bursts into fits of laughter. Given the potential in the new A350 this looks like being one happy man for the foreseeable future, at least in fiscal terms.

This is why it is imperative that all departments of Her Majesty's Government (HMG) combine to offer the best financial package possible of reimbursable launch investment to Bombardier Aerospace in Belfast in order to secure the lion's share of the work packages on the new C series regional jet. Almost certainly another great little earner for HMG.

CAPABILITY IN THE UK

The UK is one of only three countries with design and development capabilities across the whole spectrum of aerospace. The UK manages this largely through its investment legacy, its skill, innovation and the commitment of its workforce and the fact that the sector still has the critical mass necessary. The Defence Industrial Strategy has, to a degree, offered a vehicle in which to argue the vital importance to the nation's Defence Industrial Base of retaining vital capabilities. The Hawk Jet Trainer contract was a recent successful example and the future Lynx Helicopter Upgrade is a crucial current capability challenge.

Failure to commit to future Lynx, almost unbelievable given the MOD's financial investment to date, will very likely result in the UK losing its helicopter capability and at best, simply retaining a Maintenance Repair and Overhaul facility. Given the future export potential in both Lynx and Merlin this would not only be a social tragedy for the southwest, it would be a wholly unnecessary exiting of a vital aerospace capability.

ITAR WAIVER

The record of investment by UK companies in the US is increasing. This is largely due to companies overcoming the difficulties surrounding the International Traffic in Arms Regulation (ITAR) by buying US subsidiaries, thus locking in the technology to the detriment of the UK and its workforce.

The US requires approval of exports of components to a subsidiary of the same company and often this can result in the burden of red tape forcing UK companies to buy US subsidiaries.

Some nations however, such as Canada, have a much freer trade agreement with the US and do not carry this burden. Given the irony of the comparison of the UK and Canada's contrasting positions on Iraq this is a particularly bitter pill to swallow. The failure by congress to include provisions for ITAR waivers in the recent Defence Authorisation Act is wrong. It is wrong on political, industrial and military grounds.

There are concerns surrounding Duncan Hunter's assurances that the House Armed Services Committee will direct the State Department to review licensing applications faster. His integrity is not in question, however his vision, his strategy, his grasp of international politics and his belief that the American civil service will work faster, are. If his desire is to see the USA's defence industrial base grow stronger it will not be achieved by encouraging UK companies to look ever more towards industrial alliances in Europe and the far east because of myopic legislation in Washington.

John Wall
National Officer
Amicus

APPENDIX 5

Memorandum by the British American Security Information Council (BASIC)

1. SUMMARY

1.1 This submission will address two of the issues that the committee expects to consider, and will have a specific focus on the military aerospace sector:

- the importance of the UK-based aerospace industry to the UK economy; and particularly
- government support for the aerospace industry.

1.2 BASIC gave evidence to the committee in April 2004 on subsidies provided to exporters by ECGD, part of a wider ongoing project to more generally establish the level of subsidies received by companies exporting military equipment. The financial support given to military exports (over 90% of which are now accounted for within the aerospace sector) is significant, and is outlined in a recent September 2004 report published in September by BASIC, Oxford Research Group and Saferworld entitled: *Escaping the Subsidy Trap*.³ We summarise these subsidies here, that amount to between £450 million and £930 million annually.

1.3 According to SBAC around half of aerospace production is defence-related, so that it is obvious that future defence posture and procurement policies have a significant impact upon the industry. In aerospace at least, government intervention in the civil sector remains highly significant; while the European Airbus project stands out as a successful assault on the dominance of civil aerospace by US companies, the cost of achieving this success needs to be factored in when considering whether this objective was worthwhile. But it is the military sector that is far more subject to government protection, procurement practices that favour domestic producers, and government subsidies to exports.

1.4 Simply put, economists generally agree that government subsidies distort the efficient allocation of resources unless they correct a market failure or are used for specific policy objectives that are independent of industrial policy. Subsidies simply designed to protect particular jobs or economic sectors for their own sake will actually end up costing jobs and harming the economy. If the aerospace industry is indeed as competitive as suggested by those within the industry, it will survive and thrive without government support. There are dynamic issues that affect this conclusion, which are discussed in further detail below.

2. BASIC

2.1 BASIC is an independent research organisation that analyses government policies and promotes public awareness of defence, disarmament, military strategy and nuclear policies in order to foster informed debate. BASIC has offices in London and in Washington and its Council includes former US Ambassadors, academics and politicians. Further information is available on our website, www.basicint.org

Contact details: Paul Ingram, Senior Analyst, BASIC, The Grayston Centre, 28 Charles Square, London N1 6HT; email: pigram@basicint.org tel: 020 7324 4680.

3. THE IMPORTANCE OF MILITARY AEROSPACE TO THE UK ECONOMY

3.1 Much has been made by SBAC and its members about the contribution of the aerospace industry to the UK economy, and in particular its contribution to technology, research and development, and high-skilled employment. There is no doubt you will be receiving submissions reminding you of these arguments.

³ Paul Ingram and Roy Isbister, *Escaping the Subsidy Trap: Why arms exports are bad for Britain* (BASIC, Oxford Research Group, Saferworld, September 2004).

3.2 Figures supplied by SBAC suggest that the UK aerospace industry is competitive within the global market. It records a long-term average net £2.8 billion balance of trade surplus, and direct employment of some 130,000 people around a third of whom are highly skilled (rising, they claim, to an estimated 275,000 if supply-chain employment is accounted for).⁴ UK-based aerospace firms have also managed to break into US production, employing 30,000 people generating an annual turnover of around £4 billion.⁵ The military share of aerospace has been growing recently, partly due to the downturn in civil aerospace (caused by a fear of terrorism) and partly to increases in defence spending, particularly in the US and UK, and now account for around half of total production.

3.3 These figures do not in themselves prove the case for aerospace. Crucially they take no account of “crowding out” investment effects, nor the impact upon the civil economy of a skilled workforce lost to the military sector. Nor does it take account of positive and negative externalities. It would take a detailed analysis of alternative investment opportunities and broader costs and benefits to account for the genuine aerospace contribution to the economy. Market investment choices are distorted by government intervention; subsidies attract market investment away from other potentially more efficient uses of the capital and skills and make any genuine comparison of contribution to the wider economy more difficult to measure. The need to undertake an analysis of this kind is all the more vital given the prospects for the future of the military aerospace sector.

3.4 BAE has until now been remarkably successful in staying within sight of the leader pack in global military aerospace, but one has to ask how long this can continue without continuing their trend by leaping with both feet into the North American market and losing its strong connection with Britain. Military aerospace companies in North America enjoy three key advantages:

- Access to a large and protected domestic market, that accounts for over 60% of the global market by value, and a much higher %age of the cutting edge aerospace that requires significant R&D spend;
- Access to leading-edge military technology within the US whose export is tightly restricted, and which is increasingly superior to military technologies in Europe;
- Larger firms, achieve greater economies of scale.

3.5 Will the government continue to see the company as benefiting the UK economy if most of its activities are sited in North America, producing military equipment for the US armed forces? Can the government continue its extensive support for such companies as it becomes increasingly clear that their operations are no-longer focused upon the UK? Just as importantly, will export controls be further compromised and government support increase as it becomes clear that military exports become increasingly crucial to the survival of any UK-based military aerospace?

4. LEVELS OF SUPPORT FOR MILITARY AEROSPACE

4.1 Studies recently into the subsidies received by military exporters do not Noneseperate out the support received by aerospace companies, but as the majority of military exports are aerospace related, and the support offered is received by saeropace exporters, these studies give an indication of the level of subsidy involved. Estimates of the financial cost to the UK taxpayer vary mainly because of different approaches to research and development spending and export credits but they all show that exports benefit from considerable subsidies—between worth at least £228 million and possibly up to up to a possible £990 million a year.⁶ Most recently a September 2004 BASIC/Oxford Research Group/Saferworld report, “Escaping the Subsidy Trap”, concluded that government subsidies to arms exports are worth at least £453 million and possibly up to £936 million a year.

4.2 The recent export of BAE *Hawk* trainer jets to India and the related decision by the Defence Secretary, Geoff Hoon, to buy *Hawk* in the face of reported opposition from his own Permanent Secretary and other government departments, clearly demonstrates the erroneous assumptions driving current policy. Internal government estimates reported in the press indicate that export and employment considerations actually added, rather than saved, £1 billion to the price tag for the advanced trainer jet procurement over the lifetime of the project.

4.3 UK Government support for defence exports is made up of direct subsidies, export credits, distortion of Ministry of Defence (MoD) procurement and a proportion of government spend on development costs. Explicit financial (and political) support of £31 million per year is provided through such organisations as the Defence Export Services Organisation (DESO) within MoD. Export credits are

⁴ Employment figures are notoriously difficult to accurately estimate. MoD estimates that a total of 65,000 people are employed directly and indirectly on arms exports in the round. SBAC do not estimate the numbers employed in military aeropace exports directly.

⁵ Figures derived from SBAC website, “Highlights of UK Aerospace Facts and Figures 2003”.

⁶ Ben Jackson, *Gunrunners Gold: How the Public's Money Finances Arms Sales* (London: World Development Movement, 1995); Stephen Martin, “The subsidy saving from reducing UK arms exports”, *Journal of Economic Studies*, 26:1 (1999), pp 15–37; Paul Ingram and Ian Davis, *The Subsidy Trap: British Government Financial Support for Arms Exports and the Defence Industry* (Oxford Research Group and Saferworld, July 2001); Campaign Against Arms Trade (CAAT), *Arms Trade Subsidies Factsheet*, May 2004 <<http://www.caat.org.uk/information/publications/economics/subsidies-factsheet-0504.php>> Last accessed 13 July 2004.

provided as insurance to exporters and purchasers of UK equipment at premium rates well below the market rate, an annual subsidy that amounts to £215 million. The cost of the distortion of MoD procurement to accommodate export promotion is more difficult to estimate, but if the experience of the *Hawk* deal is in any way indicative, our estimate of £200 million is extremely conservative.

4.4 In addition, there is a subsidy to arms exports that accrues through government contributions to defence R&D. The government spends £1.5 billion on the development aspect of military R&D. Approximately 40% of defence equipment produced in the UK is exported. Yet last year MoD succeeded in clawing back only £12 million of these contributions from the exporting companies. This represents a form of subsidy, though there is major disagreement as to how this should be calculated, as R&D costs may be partially offset by exports and—some commentators argue—this money would be spent regardless of export sales or prospects. If, however, one does assume that 40% of R&D spending relates directly to exports (the same percentage of total UK defence production that is exported), this would give an upper estimate of the R&D subsidy of £483 million.

4.5 We estimate that the subsidies provided to UK companies involved in defence exports are therefore worth at least £447 million and possibly up to £929 million; in other words, between £6,900 and £14,300 for each job supported by exports. At a time when public spending is under pressure the onus is on the Government to withdraw the subsidies and encourage similar withdrawals in other countries.

5. JUSTIFICATIONS FOR SUPPORT

5.1 The government claims that defence exports, in their contribution to covering fixed costs and in the sale of surplus equipment, saves MoD £300 million annually in its procurement budget. This figure has never been justified in public, and has remained at the same level for at least the last 10 years. Any dependency upon such a figure requires justification using recent figures, and needs to address a number of criticisms, namely:

- As the world market in arms is so competitive, exports are frequently sold near the marginal cost of production, with suppliers competing against each other after their fixed costs are covered by protected domestic defence markets.
- Defence exports are highly unpredictable in advance of investment in, and development of, the system, and tend to lengthen the life of production lines rather than the scale (so that some economies are lost).
- Many “fixed costs” are not fixed, and actually vary with the scale of production. This makes sense in managerial terms in that the scale determines the revenue (or expected revenue), which in turn determines the level of investment in so-called fixed costs.
- MoD procurement rules inadvertently allow some level of cross-subsidy for marketing, servicing and risk abroad (in that costs are shared as a proportion of production even when the costs of selling abroad are greater).

5.2 Employment from arms exports as a whole account for around 0.2% of UK employment, under half the level some 10 years ago. Although some localities like Yeovil and Brough may be hit hard by a sudden end to military aerospace exports, unemployment rates in traditional manufacturing areas would only be marginally affected according to a 2002 study by Ian Goudie.⁷ This is partly because short-term, targeted government assistance for redundant military workers in such localities can be effective, and partly because of new opportunities created by the diversion of resources towards industries with far greater long-term job-creating prospects. This is why a 2001 study written, in part, by two MoD economists concluded that a halving military exports would result in the loss of 49,000 jobs, and the creation of 67,400 jobs in non-military sectors.⁸

5.3 The justification that has perhaps the strongest efficacy is that any dependency on foreign suppliers may lead eventually to a reliance upon a single monopoly. The obvious scenario is a dependency upon Boeing and Lockheed for our military aerospace requirements. This dependency, if our armed forces are to acquire leading technologies, is inevitable, for the reasons given in paragraphs 3.4 and 3.5, even if BAE remains one of the North American based suppliers. Of course, we may rely upon British-based companies for second-level technologies, but such would not require the level of support received today.

6. CONCLUSION

6.1 It is broadly accepted by economists both in and out of government that subsidy and protectionism leads to inefficiency and waste. Yet aerospace appears to be treated as an exception to the rule, and enjoys levels of significant support from a number of government departments, in a manner that remains uncoordinated and therefore uncontrolled.

⁷ Goudie, “The Employment Consequences of a Ban on Arms Exports” (CAAT, September 2002).

⁸ Chalmers, Davies, Hartley and Wilkinson, “The Economic Costs and Benefits of UK Defence Exports” (The York Report), (University of York, 2001).

6.2 We recommend a review of the support offered to military aerospace with a view at the very least to rationalising it, and eliminating those subsidies that serve no clear policy function independent of industrial considerations.

Paul Ingram
Senior Analyst, BASIC

Emma Mayhew
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APPENDIX 6

Memorandum by The Boeing Company

The Boeing Company would like to contribute to the Trade and Industry Select Committee's inquiry into the competitiveness of the UK aerospace industry. As such we have enclosed our written submission, based on the terms of reference, to help with your investigation.

As the largest aerospace and defence company in the world, Boeing is acutely interested in the competitiveness of the UK aerospace industry and the specific issues raised by the terms of reference. The following information demonstrates our strong support for a highly competitive business environment in the UK, our support for the innovation that this engenders and for the opportunity to operate in a fair and open market system.

The reasoning for this support is based on two pillars. First, as Boeing is a significant customer of the UK aerospace industry, purchasing some £1.6 billion annually from British businesses, it has an unparalleled stake in supporting competitiveness across the sector. Second, our company is a major investor in Research and Development in this country, and has also established a number of important industrial partnerships. Our commitment to the British Aerospace sector is deep and long lasting.

M R H Jenkins

24 November 2004

INTRODUCTION

1. With a heritage that mirrors the first 100 years of flight, Boeing provides products and services to customers in 145 countries. Boeing has been the premier manufacturer of commercial jetliners for more than 40 years and is a global market leader in military aircraft, satellites, missile defence, human space flight, and launch systems and services.

2. Boeing employs nearly 156,000 people in 70 countries. The Society of British Aerospace Companies estimates that in the UK Boeing supports directly or indirectly some 30,000 jobs, making it a major stakeholder in the national economy and making Britain one of the most important countries in which the company operates. With a history in pioneering safer, faster and better flight, Boeing is committed to working for a competitive aerospace industry that continues to develop cutting edge innovation and operational efficiency.

3. Boeing is organised into two major business units: Boeing Commercial Airplanes and Integrated Defence Systems. There are two further important business units, Connexion by Boeing and Boeing Capital Corporation. Boeing's Integrated Defense Systems provides end-to-end services for large-scale systems that combine sophisticated communications networks with air, land, sea and space-based platforms for global military, government and commercial customers. The Commercial Airplanes part of the company is well known for its 717, 737, 747, 767 and 777 families of aeroplanes, and the Boeing Business Jet. New product development efforts are focused on the Boeing 7E7, a super-efficient aeroplane that is expected to be in commercial service in 2008.

4. Boeing is happy for all or any part of this submission to be reproduced or published subject to written approval by the company or its representatives.

Term of Reference:

“the importance of the UK aerospace industry to the UK economy;”

Boeing Response:

THE UK AEROSPACE MANUFACTURING FOOTPRINT

5. Boeing shares the assessment of the Department for Trade and Industry that the UK aerospace industry is an important part of the UK economy with its turnover of £18 billion per annum. The exceptional engineering expertise, the range of aerospace product offerings, and the breadth of sector specialist companies make the UK an international centre-of-excellence for aviation services and equipment.

6. The importance of the aerospace industry to the UK economy can also be seen from the long and proud relationship Boeing has with Britain, that stretches back more than 40 years. Boeing purchases an average of £1.6 billion of equipment and services every year from the UK, supporting some 30,000 jobs across more than 240 companies. Boeing enjoys a number of important partnerships, most notably with BAE Systems, GKN, Rolls-Royce, Messier-Dowty, Cobham and Smiths. These partnerships have been built up over many years.

7. The success of the relationships and the world-class quality of work from British companies have meant that Boeing's new aircraft, the 7E7 Dreamliner, will see key components manufactured by British based firms. Messier-Dowty will be providing the landing gear; an important element of the fuel system is coming from Cobham; Smiths is developing and producing the core computing system and actuation systems; and Rolls-Royce has been chosen as one of two engine partners.

Term of Reference:

“Its industrial performance in the current economic climate;”

Boeing Response:

Post 9/11

8. Following a downturn in the wake of the terrorist attacks of 11 September 2001, there are now clear indications of recovery in the civil aerospace sector. The major low cost carriers serving the UK (Easyjet, Ryanair, BMIBaby, Flybe and FlyGlobespan) are all pursuing active expansion plans, adding UK hubs, increasing routes and expanding their networks. The major carriers have seen long haul traffic levels finally return to pre-September 2001 levels. Interest in the next generation Boeing airplane, the 7E7 is very high and given the number of aerospace companies in the UK who will participate in this programme this bodes well for the overall economic climate.

THE IMPACT OF GLOBALISATION

9. In an age dominated by global interaction, the performance of Britain's aerospace industry not only depends on the economic climate in the UK but on the condition and competitiveness of the industry at large. Britain has proven itself to be one of the most successful locations for aerospace engineering, design and manufacture in the world. For the UK to maintain this prominent position, Britain will have to continue to invest in this sector and British governments will need to place support for Research and Development (R&D) high on their future agendas. Boeing itself firmly recognises the importance of R&D in this country, and has led private sector investment into academic partnerships, amongst others, to further the course of innovation, research and product development. A leading example of this in the UK is the Advanced Manufacturing and Research Centre (AMRC) which began as a joint venture between the University of Sheffield and Boeing and has since attracted significant investment and endorsement from various public bodies, together with a long list of major private sector aerospace companies (see paragraphs 14–19 below).

Term of Reference:

“The challenges faced by the sector in domestic and international markets, including barriers to trade;”

Boeing Response:

FREE TRADE AREAS

10. Boeing operates in almost every country in the world. The company sources parts for its aerospace products and services from around the globe. As a global enterprise, Boeing supports minimal barriers to trade in order to maximise competitiveness in terms of costs and of the promotion of the most innovative products and services available. In developing an optimal market system, Boeing supports common and free access to information as required, and the conduct of business as laid out in the Boeing company's own code of practice as well as in the Department for Trade and Industry's toolkit for best practice.

SUPPORTING INNOVATION

11. With the future of aerospace driven by developments in technology, this is also one of the core challenges that the sector faces domestically and internationally. Through wide public sector partnerships, Boeing is involved in supporting innovation in the UK and investing in a sustainable future.

BOEING'S COMMITMENT TO ENVIRONMENTAL GOALS

12. A core responsibility of every major multinational is to recognise its role as a stakeholder in the environment, as well as the environmental impact resulting from its activities. This applies not least to the aerospace sector. Moreover, Boeing attaches particular importance to its role as a corporate citizen. We are committed to building long term relationships in the communities in which the company operates. One example of this is the on-going involvement of Boeing with the Prince's Trust in South Yorkshire.

Term of Reference:

“Investment in research and technology;”

Boeing Response:

INDUSTRY-ACADEMIC RESEARCH

13. Boeing is investing in multi-year research and technology programmes with the University of Cambridge, the Cranfield University and the University of Sheffield. These partnerships are designed to stimulate innovation, to obtain access to the best technology and research talent, and to exploit resources for long lasting mutual benefit. In Cambridge, we have an agreement to conduct R&D in the area of information technology. Cambridge is a recognised leader in IT research, and its work in such areas as automated reasoning, intelligent systems, natural language and information processing, information manipulation and information security are of particular interest to Boeing. With Cranfield University, Boeing is working on a variety of projects that reflect this university’s reputation and expertise in the areas of aviation, aeronautics and aircraft development. One is the design and production of a sub-scale (21-foot wingspan) demonstrator of a Blended Wing Body aircraft, which is being developed by Cranfield’s wholly owned commercial subsidiary, Cranfield Aerospace Ltd.

THE AMRC

14. In this changing aerospace business environment, research ventures such as the AMRC (see paragraph 9 above), have a major role to play in developing new, improved manufacturing methods together with benchmarking and transferring good practice and knowledge through the supply chain. In particular, they have a role to support UK companies to meet the cost and productivity targets demanded.

15. The AMRC initially focused on machining but has developed to have a wider brief carrying out research into manufacturing technology in general. The centre is also the catalyst for the development of a 100-acre advanced manufacturing park, attracting other research centres and high value added manufacturing companies to the region. Following Boeing’s announced support of the AMRC, it was identified as a University Innovation Centre in the Government White Paper “Opportunities for All in a World of Change” published in March 2001 and was awarded a grant of £5.93 million.

16. In September 2001 the South Yorkshire Objective 1 Committee awarded the AMRC a grant of £243,800 for initial project work, administrative support and consultancy. This was followed by a second grant of £2.7 million in June 2004 towards the construction of laboratory facilities and to support the regeneration of South Yorkshire industry.

17. The AMRC has extensive research facilities, including “state of the art” industrial sized machine tools, and it is now recognised as one of the leading centres of expertise in machining in the world. The AMRC has a unique method of working with its partners. Research is carried out in “generic projects” supported by all the industrial partners. These “generic projects” develop the underpinning techniques which are commercialised and brought into practice in industrial case studies. Typical case study projects include the manufacture of engine casings for Rolls-Royce and the manufacture of under-carriage components for Messier-Dowty.

18. The Messier-Dowty case study is a good example of the work carried out at the AMRC. When Boeing announced the production of the 7E7 commercial aircraft they asked two major undercarriage manufacturers to quote for the design and manufacture of the main and nose undercarriage, one from North America and one (Messier-Dowty) from the UK. To meet the requirements to reduce weight and hence operating costs the undercarriage was to be manufactured in titanium 5553, a material not previously used for commercial undercarriage components.

19. Working with the AMRC, Messier-Dowty was able to meet the target price requested by Boeing and win the order to supply both the main and nose undercarriage for the 7E7. This is the first time Messier-Dowty has supplied undercarriage to Boeing commercial aircraft. Messier-Dowty, and the AMRC were able to manufacture prototype titanium 5553 components on commercial machine tools, transition the techniques developed into their own factory, and provide a competitive bid to beat the supplier from North America. This is an example of an academic-industry relationship, which has developed cutting edge technology that is tailored to suit the needs of business in a highly competitive industry. It constitutes a win for Messier-Dowty, a win for Boeing, and a win for UK aerospace.

Term of Reference:

“Progress towards the implementation of the recommendations of the DTI-sponsored Aerospace Innovation and Growth Team.”

Boeing Response: Sustainable Aviation

20. Boeing has hitherto not been directly associated with the work of the Aerospace Innovation and Growth Team (AeIGT), but the company is fully in support of the vision for 2022 that the team has presented. Boeing believes that its own plans for growth within the UK are consistent with the goals of the AeIGT. Below are Boeing's responses to each of the AeIGT's six recommendations.

1. *The UK must have a world-class Aerospace applied research and demonstration programme, sufficient to maintain and to enhance Britain's position in the global market.*

21. Boeing strongly agrees, and through its own investments in R&D in this country, as set out in this memorandum, believes that it is contributing actively to this objective.

2. *UK Industry must systematically and continuously deliver productivity improvement at a rate faster than its competitors.*

22. In recent years Boeing has focused increasingly on large systems integration. This has led to a rationalisation of the supply chain, with major manufacturers participating in a more responsive and flexible provision of major components for final assembly. Suppliers are also given overall cost targets, which must be achieved if they are to be considered as a long term supply partner.

23. Boeing and its UK suppliers have been incorporating Lean processes and productivity improvements throughout the aerospace supply chain. However, to become or remain one of our Preferred Suppliers, ever more challenging quality and schedule goals must be met. In the past, a 95% quality rating was allowable for a Bronze rated supplier, now the quality must be 97% or above.

3. *UK Industry must continuously develop a world-class workforce.*

24. Boeing has around 500 employees across the UK. Moreover, as already stated, Boeing's £1.6 billion spend on equipment and services every year supports an estimated 30,000 jobs across more than 240 companies located in the UK. In general, these jobs are highly skilled, qualified and well paid.

APPENDIX 7

Memorandum by Bombardier Aerospace, Northern Ireland

INTRODUCTION

Bombardier Aerospace, Northern Ireland, [Short Brothers plc] is one of the UK's largest designers and manufacturers of structures for civilian aircraft with an extensive UK supply base of 800 companies. Regionally it is the largest manufacturer in Northern Ireland, producing some 12% of Northern Ireland manufacturing exports.

Short Brothers was acquired from the UK Government in 1989 by Bombardier of Canada and together with three other companies, Canadair and de Havilland in Canada, and Learjet in the US, forms one integrated Group, Bombardier Aerospace.

The Northern Ireland operation is now a world-class centre of excellence in the design and manufacture of fuselages, engine nacelle systems, flight control surfaces, advanced composite structures, metal bonding and computer-aided design/manufacture processes.

Bombardier Aerospace in Northern Ireland has received 16 Queen's Awards to Industry, Investor in People accreditation, ISO9001 quality assurance approval, the AS9100 international quality standard, and ISO14001 Environmental Management Systems certification. In 2000, the company received the MX2000 UK Manufacturer of the Year Award.

1. CONTRIBUTION TO THE UK ECONOMY

1.1 Bombardier Aerospace Northern Ireland makes a significant contribution to the local and wider economies. Since privatisation it has been consistently profitable with annual sales of approximately £500 million which are virtually all exported.

1.2 It has annual contracts worth £110 million, with an extensive UK supply base of 800 suppliers, subcontractors and other service firms, most of which are SME's. Bombardier is the only aircraft structures manufacturer on the island of Ireland. It has actively encouraged the formation and enabled the increased capability of a regional cluster of aerospace companies in Northern Ireland. Currently, the company employs 5,600 people, representing 6% of the Northern Ireland manufacturing base. Of these, 3,457 are skilled and semi-skilled, 877 direct support (Engineering, Methods and Quality) as well as 1,279 indirect support and managerial employees. Given an average multiplier of 1.3, Bombardier also supports 7,280 jobs further down the supply chain, and a further 1,400 jobs based on an induced employment multiplier of 0.25, giving a total employment supported figure of 14,280.

1.3 The company has an annual salaries and wages bill of £160 million. According to a late 2003 study by the Engineering Employers Federation, Bombardier's pay rates contain an aerospace premium which results in pay rates which are on average 20% higher for skilled and 30% higher for semi-skilled jobs than the rest of Northern Ireland. Since 1989, Corporation and payroll taxes totalling £614 million have been paid to the Exchequer.

1.4 Within the recruitment catchment area of Bombardier in Northern Ireland there is a shortage of aerospace manufacturing skills and reluctance in schools to recommend engineering/manufacturing as a career. To address this issue that is key to competitiveness, Bombardier established a dedicated training building in the centre of Belfast, and has invested £100 million in training at the Belfast operation over the last 15 years to provide the necessary skills to meet its business objectives. We have the largest apprentice training scheme in Northern Ireland and cross community training projects, and in this regard the Company has developed strategic links with all levels of education and sponsors education programmes in schools, training programmes in conjunction with the Belfast College of Further and Higher Education and community training organisations, research projects at Universities as well as a Chair in Aerospace Engineering at Queen's University, Belfast. The excellence of the development courses offered by Bombardier Belfast have been recognised through 11 National and 24 Regional Training Awards since 1990. Support by the regional training authority, particularly through the Company Development Programme, has been an essential part of ensuring a competitive skills base.

1.5 There are regional issues that impact negatively on the competitiveness of Northern Ireland manufacturers. These include energy, waste disposal, and transportation costs that are significantly higher than in other parts of the UK, and have been exacerbated by the recent Government decision to abolish the 100% manufacturing de-rating that applied in Northern Ireland.

2. INDUSTRIAL PERFORMANCE IN THE CURRENT ECONOMIC CLIMATE

2.1 Pre-2001 our sector of the industry was operating at full capacity with record production levels of business and regional aircraft. The impact of the economic slow-down exacerbated by 11 September 2001, SARS, Middle East uncertainty, the Iraq situation, and the oil price increase, has significantly reduced demand. However, during the period, the regional airline industry remained profitable and continued to expand, mainly due to the operational success of 50/70/90 seat regional jets, a sector that Bombardier leads. Regional aircraft deliveries were therefore maintained at high levels between 2001 and 2004, until recently when financial challenges faced by several large North American airlines have resulted in aircraft on order being delayed or cancelled. During the same period, demand in the business aircraft sector, in which Bombardier is also a world leader, significantly reduced between 2001 and late 2003, but is now showing signs of recovery.

2.2 Due to increased competition for fewer aircraft orders, the margins of suppliers have been squeezed, necessitating continual focus on improving productivity and profitability through cost reduction/ process improvement measures. With lower production levels, our employment throughout the period has reduced significantly (by 27% or some 2,000 people post 2001), in order to maintain our competitiveness and safeguard the business.

3. THE CHALLENGES FACED BY THE SECTOR IN DOMESTIC AND INTERNATIONAL MARKETS, INCLUDING BARRIERS TO TRADE

3.1 Bombardier Aerospace, Northern Ireland competes with other international manufacturing companies when bidding for work on Bombardier or other manufacturers' programmes. Unfortunately due to the level of support being offered by other Governments to their indigenous aircraft industries, the competition for this internationally mobile work does not take place on a level playing field. This support can take the form of both direct and indirect intervention and is prevalent in Europe, USA and Asia.

3.2 The entrance of low-cost suppliers to the market, also with strong financial backing from their Governments, has made it essential for Western companies to move up the value chain in order to maintain a competitive advantage. Contracts for aerostructures are mobile and can be transferred to other countries for reasons other than price competitiveness eg to satisfy offset obligations. The strategic intent expressed by Governments, as well as the actual level of support provided by them is a prime factor in maintaining and developing a thriving aerospace industry.

3.3 These circumstances underline the importance of continued UK Government support for its aerospace industry to enable UK industry to compete on a level playing field.

3.4 In the regional aircraft market the support by the Brazilian Government for Embraer through the aircraft sales mechanism "Proex", found on many occasions to be illegal by WTO, has had a significant adverse impact on sales of Bombardier regional aircraft, thereby reducing the amount of Bombardier Regional Jet work undertaken in the UK.

4. INVESTMENT IN RESEARCH AND TECHNOLOGY

4.1 Bombardier is the largest inward investor in Northern Ireland. Since 1989, it has invested £653 million in R&T including product development, and a further £473 million in plant and machinery, facilities, and training. The investment has helped ensure that its Northern Ireland operation is highly competitive and at the leading edge of aerospace technology within its market sectors. Bombardier Aerospace is unique in that it has brought 15 new aircraft products to the regional and business aircraft markets in as many years, employing the latest design and manufacturing technologies. Investment in its Northern Ireland operation has enabled it to compete against stiff international competition and to play a leading role in the design and development of 12 of these aircraft programmes, as well as to undertake work for Boeing, International Aero Engines, Rolls-Royce and General Electric.

4.2 The company is an active participant in UK and EU strategic research programmes which are essential to further developing UK aerospace capability and the maintenance of our international competitiveness.

5. PROGRESS TOWARDS THE IMPLEMENTATION OF THE DTI-SPONSORED AEROSPACE INNOVATION AND GROWTH TEAM

5.1 Bombardier Aerospace, Northern Ireland has been fortunate to play a significant a role in the design and manufacture of many new aircraft. This has enabled us to be at the forefront of innovative technologies that are embraced by the AeIGT Report, including the design and manufacture of large aerostructures such as fuselages, engine nacelles, wing/empennage control surfaces, and processes such as advanced composites. It is essential for UK industry to continue to be involved in new aircraft programmes in order that the innovative technologies referred to in the AeIGT report can be further developed and applied.

5.2 In the development of advanced composites technologies, we are working in collaboration with other UK companies through the National Composites Network. In the EU Framework 5 TANGO research initiative, soon to be followed with the Framework 6 ALCAS project, we have been involved in the design, manufacture and testing of large composite aircraft structures with the objective of reducing weight and cost. Arising from this experience we have recently invested in new facilities to allow us to expand our composites expertise into resin transfer moulding and resin transfer infusion, which will increase value added and allow us to maintain our competitive advantage in this area.

5.3 We are developing our engine nacelle capability through the EU SILENCE[R] programme which will have a significant environmental impact on reducing engine noise and fuel consumption. Within Europe, we are leading the development of nacelle lipskin acoustic liners and participating in other aspects of nacelle development. We are examining further novel manufacturing processes and will be applying these technologies in future applications, notably the proposed development of a 110–130 seat family of aircraft known as the Bombardier C Series. Nacelle products account for approximately 35% of our turnover making the ongoing development of enabling technologies to support this core business an integral part of the overall Bombardier Aerospace Strategic Technology portfolio.

5.4 The ongoing development of innovative manufacturing capabilities including robotics and automation to increase our competitiveness in fuselage manufacture is consistent with the AeIGT as well as Government Manufacturing strategies.

6. GOVERNMENT SUPPORT FOR THE AEROSPACE INDUSTRY

6.1 It is essential for UK industry to be involved in new aircraft programmes if it is to continue to develop and apply innovative processes, materials, and other technologies, move up the value chain, and secure employment and skills levels. Ongoing support through R&T and training grants is essential to this regard.

6.2 Launch Investment is key to the participation by UK industry in the development of new aircraft programmes. Bombardier Aerospace, Northern Ireland received Launch Investment of £17.9 million in 1993 [since fully repaid with 8% real interest to the Exchequer] in respect of the Learjet 45 platform [which is now the basis of the Learjet 45, Learjet 45XR, and Learjet 40 business jets]. This enabled the company to undertake the design and manufacture of the complete Learjet fuselage in the UK. The platform was only the second fully digitally designed civil aircraft [after the Boeing 777] and was the first business aircraft to be undertaken in this way. In effect, the Launch Investment enabled investment in key design and fuselage technologies and processes with consequent improvement in capability and productivity over traditional methods. Significantly, the technologies and experience gained enabled Belfast to subsequently win on a competitive basis further fuselage work on Global and Challenger platforms as well as to apply it to the 70 and 90 seat versions of the CRJ Regional Jet Series [Belfast was already involved in the 50 seat version]. Since the Learjet 45 programme, Belfast has become a world centre of excellence for fuselage design and manufacture. It is currently involved in fuselage programmes for 11 Bombardier aircraft.

6.3 In the future, the Company is seeking to play a major role in Bombardier's proposed family of C Series aircraft. This family is designed for the 100–150 seat market where forecasted demand for the next 20 years is for 6,000 aircraft, about 4,000 of them being required to replace aging out-of production aircraft such as the DC9 and MD80. If launched in early 2005, the C Series will employ the latest aircraft technologies and will be designed to either fully comply or exceed the requirements of future environmental standards.

Launch Investment, Regional Selective Assistance, training grants, and support for aircraft sales financing, will be essential if Bombardier Aerospace Northern Ireland is able to win work packages on the aircraft in competition with other international companies that are receiving their Governments' support.

6.4 In addition, aircraft sales financing support from ECGD in proportion to our programme workshare will be prerequisite.

APPENDIX 8

Memorandum by the Campaign Against Arms Trade

1. The Campaign Against Arms Trade (CAAT) is working for the reduction and ultimate abolition of the international arms trade, together with progressive demilitarisation within arms-producing countries.

2. The aerospace industry is one which raises major ethical and environmental questions and CAAT is disappointed to see that these are not listed as being amongst those issues your Committee expects to consider. Although yours is the Trade & Industry Committee, nonetheless it is in the interests of "joined up Government" that you should begin your deliberations by looking at the impact of the products of the aerospace industry on peace and security and on the environment.

3. In 2003, exports of "identified defence equipment" from the UK totalled £992 million, of which £734 million was military aircraft and parts. A further £3,256 million was estimated by the Society of British Aerospace Companies to have been received for "additional aerospace equipment and services". It is surprising that the Government cannot put in place commodity classifications which allow it to produce official figures on this and be sure how much military equipment is exported. Given the estimates, the products of the aerospace industry therefore account for nearly 94% of all the UK's military sales. (UK Defence Statistics 2004) According to the Society of British Aerospace Companies, just over 50% of UK aerospace production in 2003 was military.

4. It is the military side of the aerospace industry which is of concern to CAAT. The production and possession of armaments may not in itself cause conflict, but it can add to insecurity, contribute to the escalation of violent conflict and give tacit approval to repressive governments. CAAT believes the products of the UK's aerospace industry have done this.

MAKING THE WORLD LESS SAFE

5. The idea that armed force and increased military expenditure can address problems of insecurity in the world today has been challenged most recently by the invasion of Iraq. An action, which was allegedly to have made the world a safer place, has instead seemingly encouraged more individuals to resort to armed violence as well as killing, injuring and rendering homeless countless civilians. It cannot now be seriously argued, if it ever could, that launching high explosives from aircraft does anything other than cause death and resentment.

6. In the 1980's, it was well known that Iraq was engaged in a bloody war with Iran, that Saddam's human rights record was appalling and, in 1988, that his forces had gassed the Kurdish population of Halabja. However, whilst Iraq's biggest arms suppliers were the Soviet Union and France, UK companies sold radar, military vehicles and components. Throughout the decade, British Aerospace was promoting its Hawks and other aircraft to Saddam's regime. It exhibited its Hawk at the Baghdad arms fair in 1989.

7. During the 1980's CAAT supporters wrote to their MPs calling for an embargo on the sale of all military equipment to Iraq. Such an embargo may not only have prevented Saddam from acquiring some of the weaponry he did, it would also have sent him a strong message that his behaviour was not acceptable to the international community.

8. Unfortunately, CAAT's supporters were not heeded, and the UK's major aerospace company was given support by the UK government to court Saddam's murderous regime. The chance for strong, but peaceful, action against Saddam was missed.

LESSONS NOT LEARNT

9. This may appear to be old news, but the Government and the arms companies do not seem to have learnt from it. The quest for profits pushes the companies into exporting arms and to see the death and injury of human beings as irrelevant as long as their shareholders make money. The Government not only acquiesces, but actually assists them in this.

10. Saudi Arabia is the biggest customer for the UK's military aerospace products despite its appalling human rights abuses. The rule of the Saudi royal family appears somewhat shaky and the country is reliant on the skills of its expatriate workers. The UK government should stop supporting the Saudi royals and giving assistance to the UK aerospace industry in its endeavours to sell there. The message currently being

sent to the people of Saudi Arabia is that the UK is backing those who keep them repressed. Thanks to export credits, if the people do topple the regime it will be the UK taxpayer, not BAE Systems, who will foot the bill.

11. In Indonesia BAE Systems' Hawk aircraft bought from BAE Systems were used to intimidate the people of East Timor and Aceh. The UK government and aerospace industry were again seen to be giving succour to Indonesian governments and military with scant regard for human rights.

12. The UK government was prepared to amend its export licensing criteria so that BAE Systems could export Head Up Displays to the United States for incorporation into F-16s bound for Israel where they would be likely to be used against Palestinian people. At the BAE systems' AGM it was said that, in the end, Israeli components were used instead, but nonetheless the willingness to export once again shows the UK government and aerospace industry on the side of those who disregard human life.

13. India has finally bought BAE Systems Hawks after years of persuasion by the company and the UK government. This official sales pressure sent very mixed messages to the Indian government, particularly during times of tension with Pakistan. India also has major development needs with many people without clean water and sewerage.

14. Again, in South Africa, its Government was persuaded, after intensive lobbying by BAE Systems and the UK government that it should buy Gripen and Hawk aircraft despite its needs for financial resources to tackle HIV and AIDS, the housing crisis and many other necessary social programmes.

15. Even in the UK, with urgent need for spending on health, education and transport infrastructure, "white elephant" products of the aerospace industry such as the much delayed and over budget Eurofighter Typhoon are still supported by the Government.

NOT AN INDUSTRY TO BE PROUD OF

16. The military aerospace industry is not one people in the UK should be proud of—and many are not. An opinion poll by BMRB International in November 2004 showed the 44% of those surveyed said the UK should not sell military equipment to any other country whilst 35% disagreed.

17. Major sales by the military aerospace industry are now greeted with protests and even the press has admitted that they are "controversial". Most churches and many charities now have their investments in funds which exclude BAE Systems and other arms companies, and individuals are increasingly turning to ethical pension and other funds which do likewise.

A SUBSIDISED TRADE

18. Despite their unpopularity, the UK's military exports as a whole are heavily subsidised by the taxpayer. Since 1995, five studies have estimated the overall net costs of this support. These are World Development Movement's Gunrunners Gold: How the Public's Money Finances Arms Sales (1995); Stephen Martin's 'The subsidy saving from reducing UK arms exports', Journal of Economic Studies, 26:1 (1999); the Oxford Research Group and Saferworld's The Subsidy Trap: British Government Financial Support for Arms Exports and the Defence Industry (July 2001); Malcolm Chalmers, Neil Davies, Keith Hartley and Chris Wilkinson's The Economic Costs and Benefits of UK Defence Exports (York: University of York Centre for Defence Economics, 2001); and CAAT's Arms Trade Subsidies Factsheet (CAAT, May 2004).

19. Estimates vary, mainly because of different approaches to calculating the subsidy that is due to research and development spending as well as export credits, but four show that exports benefit from considerable net subsidies after taking into account any benefits to the Exchequer—between £228 million and £990 million a year.

20. Even the report from the University of York Centre for Defence Economics, whose authors included two Ministry of Defence economists, concluded that:

"The significance of our results for the wider debate about defence exports is twofold.

Firstly, they suggest that the economic costs of reducing defence exports are relatively small and largely one-off.

Secondly, as a consequence, they suggest that the balance of argument about defence exports should depend mainly on non-economic considerations."

21. BAE Systems and the Defence Industries Council (DIC) both commissioned Oxford Economic Forecasting to undertake surveys which were published in 2004. BAE Systems' was on the company's contribution to the economy whereas the DIC's was on the economic "benefits" of military exports. These surveys have, rightly, been questioned.

22. For example, BAE Systems' tax contribution of £1.1 billion is mostly made up of income tax and National Insurance paid by employees—this would be paid whatever job they did—and the DIC survey includes “induced” employment. This is employment supported by the spending of those employed in military exports, but, again, whatever job a person has (or does not have) that person will still need to make purchases.

JOBS

23. CAAT acknowledges that a refusal to grant export licences or reduction in public subsidy for military aerospace would probably result in the loss of arms export jobs. However, The Employment Consequences of a Ban on Arms Exports, (September 2002), produced for CAAT by Ian Goudie of Defence & Aerospace Analysts, found that employment dependent on the export of military equipment accounted for only 0.3% of total UK employment and that the jobs were concentrated in the South East, South West and North West of England.

24. However, as the South East and the South West have almost full employment, only a few individual localities are particularly dependent on military aerospace exports. Ian Goudie felt that specific assistance programmes directed at finding work for these often highly skilled workers, might require additional funding, but this one-off cost would be much less than the estimated annual cost of subsidising military exports.

A CIVIL INDUSTRY

25. Whilst opposing the military aerospace industry, many CAAT supporters would be happy for their taxes to fund research in the civil aerospace field, particularly cleaner and quieter aircraft, which would facilitate travel, but would reduce the associated environmental costs.

26. A wholly civil aerospace industry might well attract more young engineers and scientists since many, who contact CAAT, are reluctant to join an industry which currently has many products they see as unethical.

NEED FOR AN INDEPENDENT INVESTIGATION

27. When your Committee held an evidence session on the Aerospace Innovation and Growth Team (IGT) report, CAAT made a submission which emphasised the lack of independence of the IGT as it was dominated by the aerospace companies. These, unsurprisingly, did not ask the fundamental questions as to the desirability of the industry's products.

28. CAAT suggested then that the Government should conduct a thorough-going public investigation into the aerospace industry, including its impact on peace and security and the environment, and look at alternative ways the resources enjoyed by the industry could be used. CAAT argued that the future of the industry was too important for the debate to be left solely to those who work for it. This remains CAAT's position.

November 2004

APPENDIX 9

Memorandum by the Department of Trade and Industry

1. INTRODUCTION

The UK aerospace industry is a high value added manufacturing sector, generating turnover in the UK of over £17 billion in 2003 and directly employing nearly 122,000 people. The industry is also one of the UK's largest exporters adding £2.6 billion to the UK balance of trade in 2003. In 2002 it contributed over £5.5 billion absolute value added to the UK economy, a similar level to the pharmaceutical industry. Its strengths are a highly skilled workforce, research and technology, innovation and design.

The UK has a number of global players including BAE Systems, Airbus UK, Rolls-Royce, GKN Aerospace and Smiths Group. BAE Systems is a leading global defence contractor; Airbus UK is the centre of excellence for wings systems and Rolls-Royce for propulsion systems. GKN Aerospace is a leading supplier of composite materials and Smiths Group is a world leader in electronic systems for civil and military aerospace. The UK also hosts a number of important foreign owned companies such as Goodrich, Bombardier, Messier Dowty, and Finmeccanica, and has an extensive SME supply chain, estimated at 2,500 companies.

This submission describes the industry within the global and domestic contexts and sets out its contribution to the UK economy. It then deals with the performance in the economic climate, and the challenges that will face the aerospace industry in the future, before discussing the various ways the

Government is working with the industry—in particular through the Aerospace Innovation & Growth Team (AeIGT)—to improve its competitiveness and ensure the UK's continued presence as a significant force in the aerospace industry.

The key challenges are commercial competitiveness, the need to secure funds for research and technology, the development of affordable environmentally aircraft and the maintenance of the UK's defence capabilities.

2. THE IMPORTANCE OF THE UK AEROSPACE INDUSTRY TO THE UK ECONOMY

2.1 *The global aerospace industry*

The global aerospace industry is dominated by a small number of large firms operating on an increasingly global basis. The world's top 10 aerospace companies accounted for around 65% of global sales in 2002 whilst the next 20 companies accounted for a further 23%.⁹ Key amongst these are several US firms including Boeing, Lockheed Martin, Northrop Grumman and Raytheon. The European EADS (majority owner of Airbus) is the second largest aerospace company in the world whilst BAE Systems is ranked fifth as measured by sales revenue. France, Germany, Spain, Italy, Russia, Japan, Canada, China and Brazil are involved in various aspects of the design, manufacture and marketing of aircraft products. The chart below shows the top 30 companies by sales.¹⁰

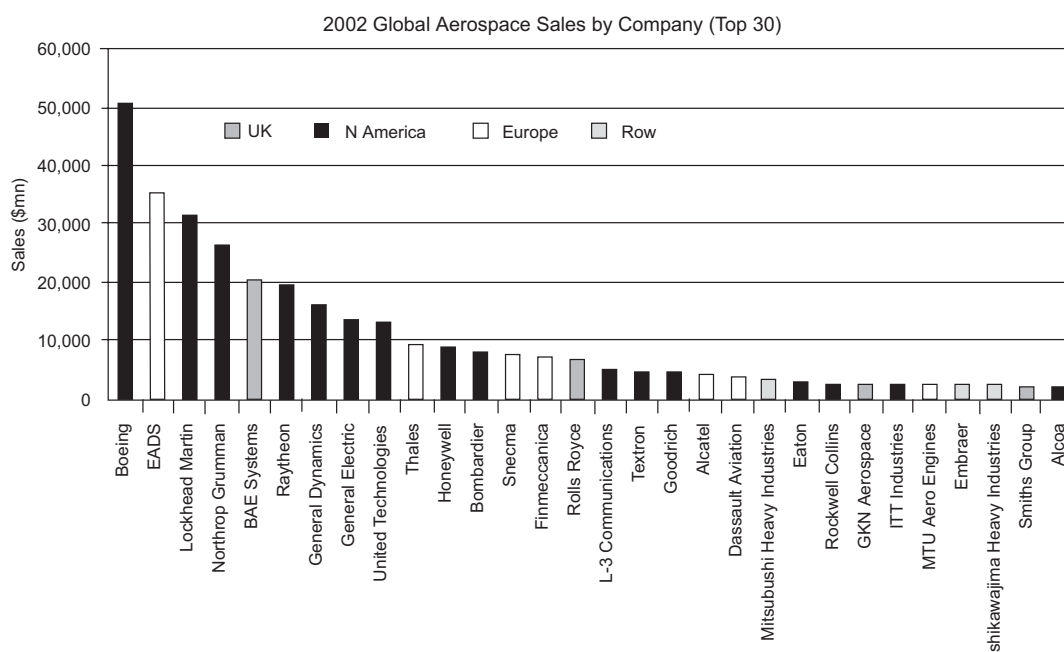


Figure i—2002 Top 30 Global Aerospace Revenues

The aerospace industry possesses a combination of industrial characteristics which taken together, differentiate it from other areas of manufacturing:¹¹

- High levels of technological and scientific intensity;
- High cost and high-risk programmes;
- Long development and payback cycles;
- Low volume, high value products;
- Civil-military links;
- International collaboration in design and development;
- Central role of Government as sponsor, customer, regulator and market gatekeeper;

⁹ Aerospace Top 100 Report: Roland Berger in Flight International 10–16 August 2004.

¹⁰ Aerospace Top 100 Report: Roland Berger in Flight International 10–16 August 2004.

¹¹ AeIGT report 2003.

- High barriers to entry;
- Highly safety critical; and
- Long service life.

2.2 The UK aerospace industry

In the UK, nearly 122,000 people are directly employed in aerospace. In 2003 the industry accounted for 4.2% of manufacturing value added to the UK economy. In excess of 8.8%¹² of industry turnover, totaling £2.1 billion, was invested in research and development in 2003. Operating profit margin was 5.8%, an encouraging performance indicating the beginning of a strong recovery following the events of 9/11. The industry is also one of the UK's largest exporters adding £2.6 billion to the balance of trade in 2003.

The UK aerospace industry is centred in four main areas of England the North West, South West, South East and East Midlands. That said it has capabilities most English Regions, and there are important sites in Northern Ireland, Wales and Scotland.

The UK industry is split almost equally between defence and civil markets with most companies operating in both segments but generally with a bias towards one segment or the other. The next section of the paper describes the main aerospace companies in the UK—BAE Systems, Airbus, Rolls-Royce, Bombardier, Smiths Group, Westland Helicopters, and GKN.

BAE SYSTEMS

BAE Systems is the UK's largest engineering company with 36,000 people in the UK (100,000 in total worldwide). It is now mainly a defence company although it owns 20% of Airbus. BAE Systems has a major interest in naval shipbuilding which it acquired from its takeover of GEC Marconi in 1999—this is not covered by this memorandum. The company's chief locations are the North West, Scotland, and the South East. BAE Systems consists of six main operating units—Programmes (including its work for the UK MoD), Customer Services and Support, International Partnerships, Avionics, North America and Commercial Aerospace. As well as Airbus, BAE Systems is involved in a range of international collaborations including MBDA (missiles) and AMS (avionics, radars and defence electronics). It is involved with partners in most of its programmes, the most prominent of which are the Eurofighter Typhoon, and the Joint Strike Fighter (JSF).

Eurofighter is a four nation European collaborative programme for 620 aircraft. Although late into service, the programme remains industrially significant for the UK. BAE Systems has designed and developed forward fuselages, including cockpit systems. The company is also responsible for the final assembly of the UK proportion of the order. This recognises BAE Systems as probably the only European aerospace company with the capability to undertake complex avionics, weapons and airframe integration work, sustaining the company's ability to develop future air systems. Some 16,000 direct UK aerospace jobs are estimated to be supported by Eurofighter Typhoon.

The *JSF* will probably be the largest global defence aerospace programme for the foreseeable future with the US expected to purchase 2,600 aircraft, the UK 150 and the rest of world up to 3,000. It is a US programme with Lockheed Martin acting as the Prime and the UK as the only "Tier one" partner; the programme is estimated to be worth over £20 billion to UK industry over its production life. BAE Systems is responsible for manufacturing the rear fuselage. One of the main issues remaining is technology transfer from the US to the UK, which is now hindering some contractors' ability to meet their delivery requirements.

BAE Systems also builds the *Hawk jet trainer*. The Ministry of Defence's decision in 2003 to select the Hawk 128 for the RAF's Advanced Jet Trainer (AJT) requirement was instrumental in securing an immediate future of the Brough site (East Riding of Yorkshire) and a contract for some 60 Hawk aircraft from India. It will also position the upgraded Hawk 128 aircraft as a future and credible export opportunity. Failure to gain the UK and the Indian order would have created a production hiatus that could have seen both the line and the plant close with the loss of around 2,000 jobs.

AIRBUS

Airbus is 20% owned by BAE Systems with the remainder owned by EADS. It has sites in Filton (Bristol), and Broughton (North Wales) and is the centre of excellence for all Airbus wing systems design and production. The health of Airbus UK clearly depends on the success of the company overall. Airbus is currently enjoying considerable market success, having achieved a 52% share of both new aircraft orders and deliveries in 2003 whilst also ending the year with 57% of the large commercial aircraft backlog. This represented the first year ever that Airbus had exceeded Boeing in delivery volume. This year Airbus is also expected to deliver around 320 aircraft compared to Boeing's 285 whilst also achieving similar order and backlog market share. The next milestone for Airbus will be the first flight of the *A380* super jumbo in the

¹² DTI—The 2004 R&D Scorecard—company only funded R&D.

first quarter of 2005. This is due to enter into service in 2006, and currently has 129 firm orders. Airbus is also considering how to respond to Boeing's new 250-seater 7E7 aircraft, and is thought likely to launch a rival aircraft called the A350. There are over 11,000 employees at Airbus in the UK and this is expected to rise as work increases on the A380.

Airbus is set to enter the defence segment with the A400M military transport (Strategic Transport Aircraft). This is a multi-national European programme and the UK will take 25 of the 180 currently ordered. The selection of A400M to meet the UK's future military airlift requirement was instrumental in securing the UK as Airbus's centre of excellence/production for composite wing technologies—an advanced capability that will inevitably flow back into Airbus's civil products.

Airbus, through the Air Tanker consortium, is also hoping to provide its *Future Strategic Tanker Aircraft (FSTA)* to the MoD. This is the largest UK defence Private Finance Initiative currently under consideration and is worth over £13 billion. Air Tanker was announced as the preferred bidder in early 2004 and will bring direct UK industrial benefit through the use of Airbus A330 airframes. Selection of Air Tanker has also been instrumental in placing A330 as a credible competitor in the air tanking market that up until now has been dominated by Boeing. Australia has since opted for an A330 solution. Negotiations over the signature of the contract are ongoing between MoD and Airbus.

ROLLS-ROYCE

Rolls-Royce is the second largest commercial aero-engine supplier with some 30% of the world market. Its increasingly successful Trent family of large high bypass ratio engines powers most of the world's leading airlines and most Boeing and Airbus wide bodies. Through its 32% stake in the International Aero Engines (IAE) consortium it provides engines for the Airbus A320 family, and it supplies the regional jet and commercial helicopter markets through US-based Rolls-Royce Inc. Medium sized production is based in Rolls-Royce Deutschland. Rolls-Royce recently achieved certification for the Trent 900 engine to power the first flight of the Airbus A380 early next year. Also in development is the Trent 1000 derivative which will apply several new technologies to power the Boeing 7E7. The Trent 1000 remains the only 7E7 engine option presently selected by airline customers; in particular launch customer All Nippon Airlines chose the engine in preference to General Electric's Gen-X.

Rolls-Royce is also a major defence company, providing propulsion for the majority of the RAF's aircraft and helicopters. The company has designed and manufactured the EJ 200 engine for the Eurofighter and has a key role on the JSF programme, particularly owing to its leadership in vertical thrust propulsion.

Rolls-Royce employs 21,000 people and its largest plants are in Derby, Bristol, Barnoldswick and Anstey.

BOMBARDIER

Bombardier is active in the UK (Belfast) through their wholly owned subsidiary Shorts which was acquired from the UK Government in 1989. Shorts is the centre of excellence for fuselage and nacelle design and production for the Bombardier group. Key programmes include the CRJ series of regional airliners and the Learjet 40/45, Challenger 300 and Global Express business jet aircraft. The CRJ series is presently experiencing some difficulties in the market driven by the ongoing poor financial performance of some US airline customers. These resulted in recent job reductions throughout the Bombardier group, including Belfast. There is a risk of further reductions should demand for the aircraft remain soft. Bombardier is presently considering the development of a new family of 110–135 seat aircraft, the CSeries. Shorts is bidding for several work packages on this new programme and has approached the Government for support. It is possible that the UK could manufacture in excess of 30% of the total value of the aircraft if it is launched. Shorts in Belfast employ 5,600 people.

WESTLAND HELICOPTERS LIMITED

The sale by GKN of its 50% share in Agusta Westland NV to Finmeccanica of Italy is imminent. Finmeccanica then will wholly own Westland Helicopters Limited. Westland has completed its programme of new build orders for the MoD, primarily Apache, and continues to build for export. Westland has teamed with Lockheed Martin to offer the US101 (a variant of the Agusta Westland EH101), in competition with Sikorsky, to win the order for the 23 aircraft of the US Presidential helicopter fleet, with a decision due in December 2004. The US101 helicopter will be built in the US but success in winning the order would also benefit the UK as it would provide opportunities for engineering and some components to be supplied from here, while increasing the prospects generally for securing more EH101 export orders. In the UK the MoD is currently reviewing its requirement for helicopters and its procurement strategy given the restrictions on its budget. Westland is based in Yeovil, Somerset, and employs around 4,000 people.

GKN

Following the sale of Westland, the majority of GKN's aerospace business is based in the US. GKN Aerospace is a leading supplier of composite structures, with an important UK base on the Isle of Wight, which employs 700 people. It manufactures structural components, assemblies and systems for aircraft and aero engine manufacturers as well as providing a range of engineering services for military and civil aerospace. Sales are 70% military and 30% civil markets. GKN also has plants in Germany and the US. Major customers include Boeing, Airbus, Sikorsky, Pratt & Whitney, Rolls-Royce and Lockheed Martin.

SMITHS GROUP

Smiths Group is a world leader in electronic systems for civil and military aircraft. It also specialises in actuation systems, precision components and detection systems. Smiths employ 5,500 people in 18 sites around the UK. It is a major supplier to Boeing and Airbus, of equipment on all large civil aircraft as well as on many business jets. It also provides a range of highly integrated systems for civil and military helicopters and has important positions on current military aircraft, including JSF, the Lockheed Martin F-22 and Hercules C-130J, Boeing F/A-18E/F and Eurofighter Typhoon.

2.3 *The Contribution of UK Aerospace to the UK Economy*

In 2002, the UK aerospace industry contributed £5.6 billion value added to the UK economy, amounting to 0.6% of the total value added but around 4.2% of the value added by manufacturing. Whilst lower than the value added in 2001, both absolute and proportionally, this figure had before then increased each year since 1996, as illustrated below.

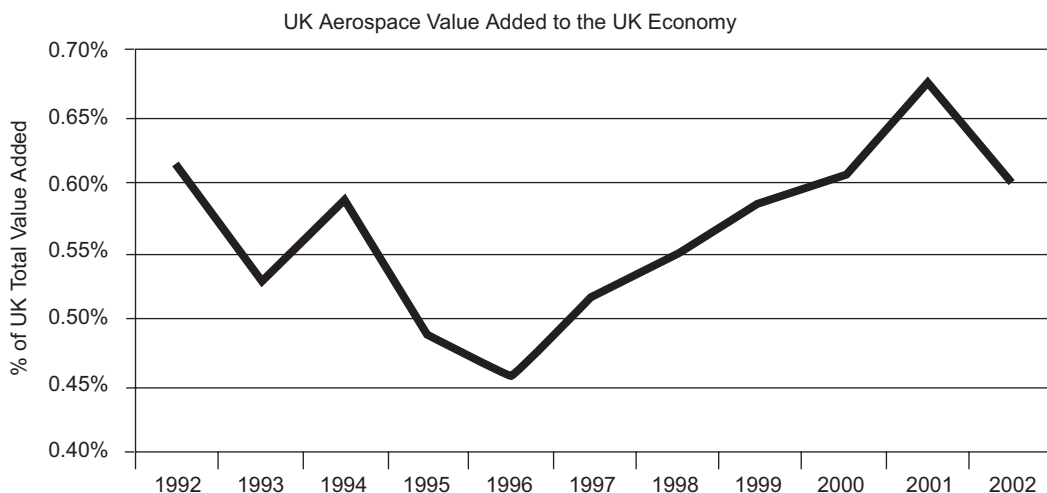


Figure ii—UK Aerospace Value Added¹³

The reduction in 2002 resulted from the relatively larger impact of the events of 9/11 on the aerospace sector than other sectors. But the growth trend is expected to be resumed once 2003 data is available (in August 2005) as the sector globally and in the UK has demonstrated a robust recovery.

¹³ OECD STAN database.

Employment in the sector has increased steadily from around 99,000 in 1995 to 120,000 in 2002¹⁴ although there was some reduction in 2001 resulting from the events of 9/11 before a recovery in 2002. However, it remains below the 130,000 employees active in the sector in 1992. But more importantly, the value added per employee in real terms has increased steadily since 1992 as illustrated below.

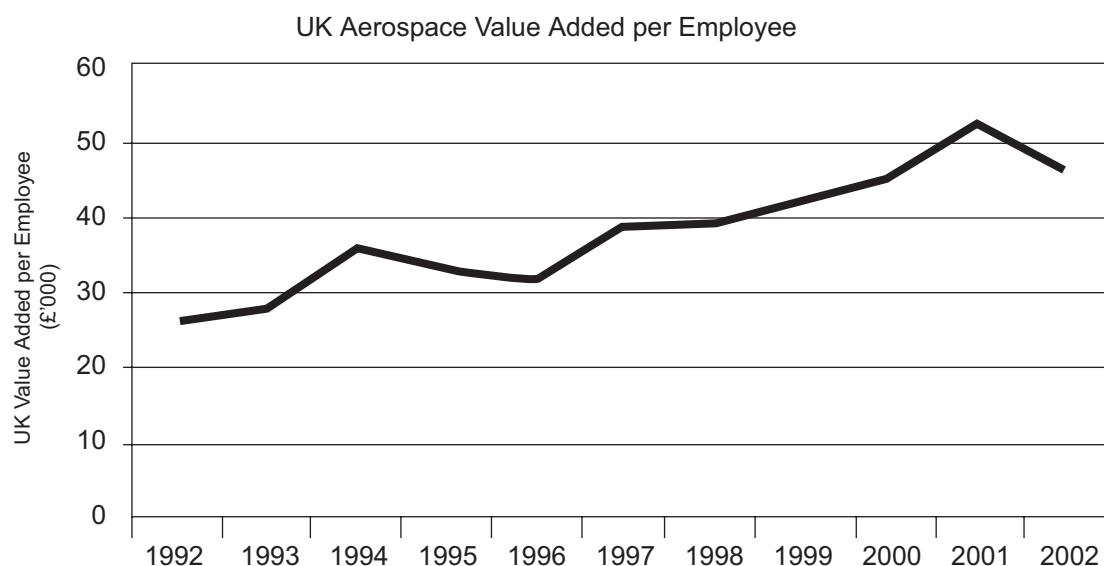


Figure ii—UK Aerospace Value Added per Employee (Current Prices)¹⁵

The value added per employee has also typically exceeded the national average over the past five years by between 21% and 46%. In 2001 value added was around £52,000 per employee compared to £46,000 in radio, television and other transmission equipment and motor vehicles and trailers, and £43,000 in medical and optical instruments. Value added per employee is also commonly used to measure sector productivity and thereby also denotes the growth in UK aerospace productivity experienced over the past 10 years.

2.4 Competitiveness of the UK Aerospace Sector

The three leading competitors to the UK aerospace sector are the US, France and Germany and comparisons between the gross value added are shown below. Although the US has consistently been the largest sector, driven largely by the size and value of its home market, the UK has generally ranked second in terms of share of value added. UK shares tend to be larger in more recent years indicating that the UK sector has become more competitive in the recent past.

	UK	USA	France	Germany	Total	UK Share (%)	UK Rank
2002	5,566						
2001	5,754	37,246	4,576	4,003	51,580	11.2	2
2000	5,340	32,856	3,685	3,317	45,198	11.8	2
1999	4,860	31,365	3,730	3,847	43,802	11.1	2
1998	4,379	28,067	3,594	3,107	39,147	11.2	2
1997	3,873	26,035	3,857	2,752	36,517	10.6	2
1996	3,208	25,749	2,323	2,753	34,034	9.4	2
1995	3,270	23,487	3,612	2,187	32,557	10.0	3
1994	3,701	25,662	2,484	2,287	34,134	10.8	2
1993	3,140	29,004	1,772	2,605	36,521	8.6	2
1992	3,424	27,091	2,092	2,850	35,455	9.7	2

¹⁴ OECD STAN database; SBAC survey statistics suggest that UK aerospace employment was around 147,000 at the end of 2001 and was reduced to 117,000 at end 2002 as a result of 9/11, before recovering to 122,000 at end 2003.

¹⁵ OECD STAN database.

Table i: UK, US, French and German Aerospace Value Added, £ million, current exchange rates¹⁶

International value added per employee comparisons are more difficult. Since prices are nominal the figures allow for variations in the price received as well as changes in the composition of output. Moreover the figures reflect changes in exchange rates; so comparisons over time are not as informative as changes in the ranking of the countries. Such comparison shows that the US industry has had the highest labour productivity whilst the UK sector has generally ranked third or fourth. Value added per employee is a function of a number of factors, including capital. As capital per employee increases so should productivity. Examining data which indicates the extent to which capital per worker is being increased or replenished in the UK and US, it can be demonstrated that UK investment per worker as a proportion of that in the US has generally been higher in the years since 1996. This indicates that lack of investment would not seem to be the reason for the relatively static level of UK labour productivity with respect to the US industry.

There are a number of overseas companies which have directly invested in or purchased UK aerospace firms. Examples include Messier-Dowty by SNECMA of France and TRW Aerospace (Lucas) by Goodrich of the US. According to Society of British Aerospace Companies (SBAC) estimates, in 2003 aerospace companies located in the UK but owned by overseas parent companies accounted for around 40% of total revenues generated by the UK aerospace sector whilst employing 45,000 people. The UK industry is similarly active outside the UK; the Aerospace IGT estimated that for every two people employed by UK aerospace firms in the UK another person was employed by those firms overseas.

Another indicator of the industry's competitiveness is its propensity to invest overseas. It has been highly acquisitive in the recent past, with almost 40 deals announced in 2004 to date worth in excess of \$3.5 billion. In particular BAE Systems have made five acquisitions in the US including Boeing Commercial Electronics and Digital Net Holdings, the latter being a \$600 million business that supplies software to the US Defense Department. Smiths Group has also made five US acquisitions, several targeting sensor and detection companies active in the rapidly developing safety and security sector. The majority of these acquisitions have been taking advantage of the present strength of sterling relative to the US dollar to acquire technology capability and US market access and this trend is expected to continue whilst economic conditions remain favourable.

3. THE AEROSPACE SECTOR'S PERFORMANCE IN THE CURRENT ECONOMIC CLIMATE

Global aerospace markets have typically been cyclical with the cycles closely linked to global economic performance. In particular, demand for commercial aerospace products is driven by the commercial aviation market, which has been significantly impacted by the events of 9/11, the wars in Afghanistan and Iraq and the SARS crisis in Asia. These resulted in a prolonged period of reduced demand, which drove the significant reductions in industry revenues and employment discussed previously. But the aviation sector is now beginning to recover and commercial aerospace manufacturers are planning to increase production rates in 2005 with further increases planned for 2006 and beyond. However, this recovery may be premature as airlines continue to struggle with on-going high oil prices which threaten their financial performance. Meanwhile, manufacturers continue to develop efficient new aircraft programmes such as the Airbus A380 and Boeing 7E7, which will deliver cost benefits to the aviation sector.

Defence markets are typically less cyclical with performance more closely linked to global defence budgets. The US defence budget is expected to increase by around 30% in real terms through to 2009 whereas the UK and European defence equipment budgets are likely to decline slightly in real terms. This will impact on the strategies of many UK companies, particularly those with major US and European companies. The nature of defence research and technology and equipment procurement will evolve over time to place a greater emphasis on the military capability of networked systems and a lower emphasis on platforms, although these will remain important and the change will be gradual given the UK's committed buys of aircraft, ships and land systems. However, access to defence markets is still subject in many cases to Government control so UK aerospace companies may not be able to gain their requisite market share of this growth. But UK companies are increasingly either forming international partnerships and collaborations or acquiring overseas subsidiaries to enable market access.

4. THE CHALLENGES FACED BY THE AEROSPACE SECTOR IN DOMESTIC AND INTERNATIONAL MARKETS, INCLUDING BARRIERS TO TRADE

4.1 *Environmental*

The aviation industry is growing at an average of around 4.5% per annum globally, however this includes the much higher growth rates of some developing nations (for example China at 8% per annum). Air travel is predicted to double by 2020 and treble by 2030. Environmental pressures therefore continue to exert a strong influence on the industry and its development. Noise around airports remains a serious issue, particularly in view of the anticipated growth of the industry, and the possibility of extended night operations. This is despite technological advances that have reduced noise by a factor of 2. The impact of

¹⁶ OECD STAN database.

aviation's emissions on the atmosphere affecting both global warming and the local air quality around airports are being addressed through supporting technical solutions and also working constructively with the international regulatory process.

The Aviation White Paper (2003) acknowledged that more must be done to reduce the effects of aviation. Its impact is small but significant on global climate change. The scientific understanding of the problem is incomplete, and it is not clear if future technology will provide all the answers. In addition, emissions around airports are now regarded as a potential barrier to airport growth given the European Union air quality limits that will enter force in 2010. A deeper understanding of aviation's contribution to this problem is needed to develop appropriate strategies to facilitate that growth and the benefits it could offer.

The environmental standards for current and future aircraft are being tackled internationally through the International Civil Aviation Organisation (ICAO) and they provide a spur for technology development. The UK has contributed to the development of European research targets for reducing fuel burn (CO₂), noise and nitrogen oxides (NO_x) by 2020. The climate change effects from carbon dioxide are now well understood, but the effect of water vapour emissions from aircraft, and its contribution to cirrus cloud development is less clear and could potentially be a greater contributor to climate change. The challenge needs to be addressed by all aspects of the aviation industry, not just manufacturers. For example, more efficient air traffic management could make a significant impact.

Manufacturers are in the difficult position that they could develop more environmentally friendly aircraft, but the costs could be prohibitive to airlines. Regulation may be required to stimulate the market, for example in the area of fuel consumption. But this could lead to incorrect optimisation for overall environmental impact. As a regulatory option, an emissions trading scheme is currently preferred by many operators. There needs to be buy-in from all stakeholder of the Civil Aviation Sustainable Strategy, which will be launched in March 2005.

4.2 European Union/United States dispute on government supports to Boeing and Airbus

In October 2004, the US initiated the first step towards a World Trade Organisation dispute, by requesting formal consultations with the EU about alleged subsidies to Airbus. The EU immediately launched a counteraction on alleged subsidies to Boeing. The US objections focus around European levy based investment programmes (such as Launch Investment), which the US claims to be given at below market rates of interest, particularly for the A380 programme. The EU claims that the US government has subsidised Boeing, mainly through research and development grants from NASA and Department of Defense programmes, and that individual states within the US have offered tax breaks and grants to attract Boeing manufacturing plants. The European Commission is leading on the issue through close co-operation with the UK, French, German and Spanish governments.

4.3 Market Access in Europe for Defence Equipment

The Government is keen to open up competition in the European defence equipment market. It has been considering, with the UK defence industry, ways of creating a more open and transparent European defence equipment market. The Government has developed its ideas, which centre around the use of a Code of Conduct, into a non-paper which the Ministry of Defence is currently presenting to our EU partners. In addition, the European Commission issued a Green Paper on Defence Procurement in September 2004. The Government is considering our response, which is due by the end of January 2005. The Ministry of Defence submitted an Explanatory Memorandum on this in October and Lord Bach appeared before the House of Lords scrutiny committee on 4 November to discuss this issue.

4.4 Defence Industrial Strategy

The Ministry of Defence, together with the DTI and HM Treasury, has started to develop a Defence Industrial Strategy. This work builds on the Defence Industrial Policy and aims to identify the defence industrial capabilities needed to meet defence requirements now and into the future. It should enable Government to understand which capabilities it is most important to retain onshore for national security reasons, and which it is desirable to retain in the UK because they add significant military or economic value. In doing this we should derive a framework for understanding the relative value of different industrial capabilities and companies. Government recognises that to be fully effective the outcome of this work will need to be reflected in procurement and research and technology decisions.

4.5 Development of New International Competitors

Despite high barriers to entry, new competitors continue to emerge in developing economies typically driven by Government support and a desire to create an indigenous design and manufacturing capacity. Examples include the Chinese and Russian efforts to develop regional jet programmes, and in these cases partners such as General Electric, Boeing and SNECMA are assisting the design process in order to gain market access for their engine and systems products. Examples also exist in defence markets where Korea

has flown its own advanced jet trainer design and Taiwan has developed its own jet fighter aircraft, albeit with limited success. These efforts are also often assisted by licence build agreements where existing manufacturers licence the assembly or build of aircraft “kits”. Such agreements allow the customer to acquire the basic skills of aircraft integration and assembly, the first step towards developing a full indigenous capability.

5. INVESTMENT IN RESEARCH AND TECHNOLOGY

The UK is strong on aerospace research and technology, with a resilient academic science and engineering base, and significant industry funding for applied research and technology. The Government has provided £141 million of support for research and technology since 1997. The AeIGT identified the need to maintain and build on this capability and called for £70 million of public sector support per year for civil and dual-use applied research and technology validation, to be matched by industry. It also identified the need for a better co-ordinated National Aerospace Technology Strategy plan between industry and the public sector. The AeIGT produced an implementation report on the strategy in the summer outlining the need for technology validation programmes and applied R&T networks. To deliver the strategy, support will be required from key stakeholders, including Regional Development Agencies (RDAs), Devolved Administrations, Research Councils, the Ministry of Defence and Other Government Departments as well as the DTI to meet the challenge. Lord Sainsbury is chairing a cross government technology group to co-ordinate public sector support. Industry is currently working up a number of proposals for Aerospace Innovation Networks and Technology Validation Programmes for funding consideration. The Government has recently announced that £18.7 million of public funding (from the April 2004 DTI Technology Strategy call and from RDAs) would be made available for a National Composites Network to disseminate composites technology for the aerospace, automotive and other market sectors.

European Union funds are also available under the Framework Programmes for research and technology, of which about €800 million (over four years) is currently earmarked for aeronautical programmes. The UK tends to win between 10 to 15% of this figure. European funded research is characterised by the need to have wide collaborative consortia (often including natural competitors); projects tend to focus on very long-term blue skies research, and also on technology validation of complex systems. The National Aerospace Technology Plan recognises the importance of continuing EU Framework support for aerospace.

6 PROGRESS OF THE AEROSPACE INNOVATION AND GROWTH TEAM

6.1 *Aerospace Innovation and Growth Team report (AeIGT)*

In 2002 the Secretary of State asked Sir Richard Evans, former chairman of BAE Systems, to establish an Innovation and Growth Team to look at the future of the industry. He brought together a team of over 140 senior people from industry, government, universities and trade unions. The AeIGT report of June 2003 set a 20-year vision to enhance the global competitiveness and success of the UK industry. The report covered five key themes: technology; process excellence; socio-economic environment; skills; and environment, safety and security. Good progress is being made on implementing the report's recommendations. The heaviest area of activity is technology, covered in section 5 above. The environment is covered in section 4.1.

6.2 *Productivity and the Manufacturing Process*

Despite improvements over the past 10 years, the UK continues to lag behind other countries; for example, in 2001 UK productivity was 85% that of the US. The AeIGT acknowledged wide use of process excellence techniques within the supply chain, but urged greater take up to improve the UK's productivity ranking. The industry has conducted three pilot studies looking at how to achieve process improvements throughout a supply chain, and the results from these will create the basis for a directory of learning, which will be available to the industry and be added to as new experience is gained. Through the Society of British Aerospace Companies, the Government sponsored a productivity improvement programme called the Competitiveness Challenge until March 2004; the body of knowledge gained from this will also be incorporated in the directory of learning. Although the competitive challenge has now ended, it is open to the industry to seek support under the DTI's new Business Support product. The industry has applied to the Engineering and Physical Sciences Research Council for Grand Challenge support on project-based manufacturing, seeking £3.9 million in project costs. The Grand Challenge Programme will underpin the best practice process for additional pilot projects and develop innovative tools and technologies for process excellence deployment.

6.3 Workforce and skills

The AeIGT acknowledged the need continuously to develop a world-class workforce to drive through research and technology from innovation to production. The Science Engineering and Manufacturing Training Agency (SEMTA) is working with the AeIGT to produce the Aerospace Sector Skills Agreement by March 2005. There is already a clear view of the current and future skill needs which are:

- Software systems, modelling and simulation
- Systems design and modelling, advanced manufacturing design and simulation, advanced electrical systems design
- Advanced materials engineering
- Diagnostic and prognostic techniques; and
- Skills to support emerging technologies, particularly in relation to environmental impact.

Industry is now working on a gap analysis and costed action plan. This work will feed into the Department of Education and Skills' planning cycle next year. Government has funded a study by Templeton College into the constituents of a High Performance Work Organisation (HPWO). The process started in September. Regional seminars are being held to further spread and capture best practice in HPWO. Final results will be available in December 2005.

6.4 Socio-economic Environment

The AeIGT also recommended that the industry should develop a market observatory to create a single analysis and intelligence system for the benefit of industry, government and universities, and a portal to inform companies of all the sources and forms of support and advice that were available to them. These are under development. Finally, the AeIGT finance working group is drawing together a report to summarise its investigations into the productivity of the sector, the economic benefit of externalities (ie economic benefits to the rest of the economy that spill over from the aerospace industry), and the role of the capital markets with respect to provision of development capital for the aerospace industry.

7. GOVERNMENT SUPPORT FOR THE AEROSPACE INDUSTRY

One of the key roles of Government is to promote a partnership approach to research and technology, bringing together industry, national and regional government and universities to improve competitiveness. The DTI has launched two new products specifically to support this, the grant for collaborative research and development, and for the establishment of Knowledge Transfer Networks. As proposed in the DTI Innovation Report, an industry-led Technology Strategy Board, under the Chairmanship of Graham Spittle of IBM, has been established to make recommendations on priorities for future calls. New SME-focused business support products (Investigating an Innovative Idea, Research and Development Grant, and Knowledge Transfer Partnerships) have also been launched. With its focus on high technology, the aerospace sector is well positioned to benefit from these new initiatives. The rationalisation of the business support schemes meant that the Aerospace Research Programme closed for new applications on 31 March 2004. However, existing projects will run to completion until 2007, with funding in excess of £50 million during this period.

The aerospace sector has also gained considerable benefit from Regional Selective Assistance, which has been relaunched as Selective Finance for Investment in Assisted Areas, with greater focus on longer-term productivity.

Launch Investment is a UK government investment in the design and development of civil aerospace projects under the Civil Aviation Act 1982. It is repayable, usually via levies on sales of the product. The government shares in the risk, as the company may not achieve sales at the level or price forecast. Launch investment projects are characterised by high costs, long payback periods and a large number of private sector investors. Aerospace projects are highly international, and so launch investment enables the Government to secure valuable projects for the UK that might otherwise be carried out elsewhere. The Government has made a commitment to invest £530 million for the wings for the new Airbus A380 super-jumbo and £450 million with Rolls-Royce for Trent aero-engines.

The aerospace industry is a major user of ECGD's underwriting services to enable it to win overseas business. The industry was concerned that the change in ECGD's status to a trading fund would inhibit its ability to win international contracts. The industry has been consulted throughout and now appears to be more comfortable with the structures being put in place.

8. CONCLUSIONS

The aerospace industry experienced difficulties as a result of the events of 9/11 from which it now appears to be recovering.

The Government is keen to maintain the aerospace industry's capabilities in the UK, and to do so has provided £141 million of government support for aerospace research and technology, since 1997. The AeIGT identified the need to maintain and build on its capabilities and called for £70 million of government support per year for civil and dual-use applied research and technology validation, to be matched by industry. Lord Sainsbury is chairing a cross government technology group to co-ordinate public sector support. Industry is currently working up a number of proposals for Aerospace Innovation Networks and Technology Validation Programmes for funding consideration following the publication of a National Aerospace Technology Strategy.

The aviation industry is growing rapidly, and there is considerable pressure on industry and government to combat the effects on global warming and the air quality and noise around airports. These are being addressed through technical solutions and within the international regulatory process, but a huge amount of effort is required to combat the effects of the growth in air travel by developing more environmentally friendly aircraft.

The Government has started to develop a Defence Industrial Strategy to build on the good work started by the Defence Industrial Policy. The strategy will aim to identify the defence industrial capabilities needed to meet defence requirements now and into the future.

The Government and industry are working towards common strategic goals, as outlined in the AeIGT, with the prime objective of improving the UK's competitiveness. This has concentrated effort and activities of both parties and good progress is being made to tackle the challenges of commercial competitiveness, the need to secure funds for research and technology, the development of affordable environmentally friendly aircraft and the maintenance of the UK's defence capabilities.

APPENDIX 10

Supplementary memorandum by the Department of Trade and Industry

1. A BRIEF ON THE AID THAT IS AVAILABLE TO THE UK AEROSPACE INDUSTRY

Scope of operation (is application open to all tiers of the industry?)

Launch Investment is a mechanism for providing risk-sharing development capital for civil aerospace projects in the UK. It is repayable with interest.

Any company may apply for Launch Investment. Applications once received are subject to a rigorous evaluation—see below.

The process once an application has been made by a company, including how and when repayments are made:

Launch Investment is not a budgeted scheme and there is no application form or specified format for applications. Launch investments (LI) have tended to be large projects and relatively few in number—each case is different.

In applying for LI, companies need to set out in detail the nature of the project and their business plan for delivering the project. When an application is received it will be subject to rigorous evaluation. The DTI undertakes market, financial and technical analysis of the project and assesses the wider economic benefits to the UK. A key consideration for government is whether other sources of finance are available for the project.

Once the evaluation is complete, a recommendation is made to Ministers. There is no guarantee, however, that a positive recommendation to support a project will result in an offer of LI to the applicant. A decision to put public funds into an LI project has to be balanced against other public sector funding priorities.

If LI is offered to a company, a contract is negotiated setting out the terms and conditions. Each project is different and therefore the terms and conditions of the contracts are all different. They have also evolved over time to take account of policy developments and also to meet our international obligations.

Payments are made in the early years of the project for eligible development costs. Repayment is typically based on a per aircraft or per engine levy set at a level designed to achieve repayment with a target rate of interest within a specified period of time. An agreement between the EU and US regulating support for the development of large civil aircraft, concluded in 1992 (and of course a subject of the current dispute between the EU and US) set limits for LI in terms of amount, interest rate and repayment period.

After the contracts have been concluded, the DTI holds regular meetings with the companies concerned to monitor the progress of the project.

Expenditure on Launch Investment and repayments since its introduction (1982):

The government has provided Launch Investment/ Launch Aid to civil aerospace projects since 1946.

1982 is a significant date because of the passage of the Civil Aviation Act 1982. This in turn updated and repealed the 1949 Civil Aviation Act. The 1982 Act empowers the Secretary of State to invest in the design, development and production of civil aircraft.

A LIST OF PROJECTS THAT HAVE RECEIVED LAUNCH INVESTMENT

Since 1982 the following aerospace projects have received Launch Investment:

A320	Airbus UK
A330/340	Airbus UK
A380	Airbus UK
EH101	Westland Helicopters
RB211-535	Rolls-Royce
Trent 500/800	Rolls-Royce
Trent 600/900	Rolls-Royce
V2500	Rolls-Royce
Lear 45	Short Brothers

Expenditure on LI since 1982 to 2003–04 was £2,039.4 million and the repayments were £1,639.3 million in nominal terms.

2. A NOTE ON WHAT OTHER AID IS GENERALLY AVAILABLE TO INDUSTRY AND THEREFORE THE AEROSPACE INDUSTRY, ESPECIALLY R&D AND EXPORTING

The aerospace industry can apply for grants under the “Collaborative Research & Development” and “Knowledge Transfer Networks” of the DTI’s Technology Programme. The DTI announces twice every year a competition for these grants in specific technology areas.

Collaborative Research & Development is designed to help businesses take advantage of new technological developments and take out some of the financial risk, in the form of a grant for support of between 25% and 75% of the R&D costs.

Knowledge Transfer Networks aim to help businesses find out what is new in technology or national and international policies that may benefit or effect them—as well as enabling them to find suitable, collaborative partners or debate specific issues. Knowledge Transfer Networks will also play an important role in the development of Technology Strategies.

Selective Finance for Investment in England is designed for businesses that are looking at the possibility of investing in a European Union Assisted Area, but need financial help to go ahead. Assistance is also available to SMEs investing in “Tier 3” areas. Delivery of the scheme in England is primarily through the Regional Development Agencies.

The Export Credits Guarantee Department works with exporters, project sponsors, banks and buyers to help UK exporters of capital equipment and project-related goods and services to win business and invest overseas. ECGD helps manufacturers and investors trade overseas by providing them with insurance and/or backing for finance to protect against non-payment. Its largest operation involves underwriting the sale of capital goods, such as aircraft, machinery, and services and to help companies take part in overseas projects such as hospitals, airports and power stations. On average, ECGD issues around £4 billion worth of guarantees a year.

3. LABOUR PRODUCTIVITY IN AEROSPACE IN SELECTED G7 COUNTRIES 1991–2001

Labour productivity is defined as Gross Value Added per worker employed in that sector.

 CONVERTED FROM DOMESTIC CURRENCY USING PURCHASING POWER PARITIES

	Canada	US	Current prices in US\$ (thousand)			UK	Japan	Spain
			France	Italy	Germany			
1991	52	61	29	43	42	48	40	49
1992	60	61	36	40	44	43	41	52
1993	67	64	30	41	37	45	45	60
1994	71	65	45	47	37	55	43	55
1995	85	66	65	45	35	51	50	52
1996	83	72	43	42	45	50	52	58
1997	94	74	87	49	58	61	56	62
1998	79	75	82	70	67	60	66	64
1999	95	88	89	69	78	64	58	63
2000	110	92	93	94	71	70	52	67
2001	125	106	110	99	83	80	70	54

Source: Derived by DTI from OECD STAN Database and Groningen Growth and Development Centre, 60-industry Database, October 2004. Aerospace is defined as International Standard Industrial Classification heading 353.

Notes: Data should be interpreted as indicating broad orders of magnitude of differences across countries and over time as data taken direct from national surveys can give a quite different picture; there may well be legitimate reasons for at least some of these differences. For example, estimates for France in 2001 vary from 92 to 110 depending on source chosen.

 LABOUR PRODUCTIVITY LEVELS IN 2001 PRESENTED WITH UK EQUALS 100 AND
 AVERAGE GROWTH RATES 1990–1992 TO 2001

	Canada	US	France	Italy	Germany	UK	Japan	Spain
Labour productivity 2001 (UK = 100)	158	133	138	124	104	100	88	68
Annual average growth rate in labour productivity	3.2	2.1	1.4	0.1	5.9	4.7	4.8	-0.3

Notes:

Rates of growth in productivity are sensitive to base year chosen which is why productivity levels for have been averaged for 1990 to 1992. Also see notes above on variation between international and national sources.

Sources:

Derived by DTI from Groningen Growth and Development centre 60-industry database October 2004. Aerospace is defined as International Standard Industrial Classification heading 353.

 PERCENTAGE CONTRIBUTION OF AEROSPACE TO NATIONAL GROSS VALUE ADDED
 IN SELECTED OECD MEMBER COUNTRIES 1991–2001

	USA	UK	France	Germany	Canada	Italy	Japan	Spain
1991	0.9	0.8	0.3	0.3	0.4	0.2	0.1	0.1
1992	0.8	0.6	0.3	0.3	0.4	0.2	0.1	0.1
1993	0.7	0.5	0.2	0.2	0.4	0.2	0.1	0.1
1994	0.6	0.6	0.3	0.2	0.4	0.2	0.1	0.1
1995	0.5	0.5	0.4	0.1	0.5	0.2	0.1	0.1
1996	0.5	0.5	0.3	0.2	0.5	0.2	0.1	0.1
1997	0.6	0.5	0.5	0.2	0.6	0.2	0.1	0.1
1998	0.6	0.6	0.4	0.3	0.5	0.2	0.1	0.1
1999	0.6	0.6	0.5	0.3	0.6	0.2	0.1	0.1
2000	0.5	0.6	0.5	0.3	0.6	0.2	0.1	0.1
2001	0.6	0.6	0.5	0.3	0.7	0.3	0.1	0.1

COUNTRIES' SHARE OF TOTAL AEROSPACE GROSS VALUE ADDED IN THE EIGHT
COUNTRIES SHOWN (US\$ BILLIONS AND PERCENTAGES)

	<i>USA</i>	<i>UK</i>	<i>France</i>	<i>Germany</i>	<i>Canada</i>	<i>Italy</i>	<i>Japan</i>	<i>Spain</i>
2001	55.0 (60.0%)	9.2 (10%)	7.7 (8.4%)	6.8 (7.4%)	6.1 (6.6%)	3.6 (3.9%)	2.5 (2.7%)	0.8 (0.8%)

Sources:

Derived by DTI from OECD STAN database and Groningen Growth and Development Centre, 60-Industry Database, October 2004. Aerospace GVA converted to US\$ using Purchasing Power Parities.

Notes:

Aerospace is defined as International Standard Industrial Classification heading 353.

* Share of industrialised total value added in the(OECD) production of civil aircraft, engines and related equipment. Figures may not add to 10% due to rounding. Other non-OECD producer countries are Brazil and China. Comparable data are not available for these countries.

APPENDIX 11

Memorandum by QinetiQ Group plc

INTRODUCTION

QinetiQ, and its forerunner, the Royal Aircraft Establishment, has been at the cutting edge of innovation for Britain's aircraft industry for the best part of a century, at first under the auspices of the Ministry of Defence and now in the marketplace. It is currently involved in collaborative R&D projects with the MoD—its principal customer—the Department of Trade and Industry, BAE Systems, Rolls-Royce, Airbus Industrie and Boeing, among others. QinetiQ is involved through its Long Term Partnering Agreement with the MoD in the testing and evaluation of new aircraft for the Royal Air Force. It is a participant in the DTI-sponsored Aerospace Innovation and Growth Team (AeIGT), and is active in the Society of British Aircraft Constructors. It welcomes the Committee's inquiry as a timely opportunity to take stock.

THE IMPORTANCE OF THE UK AEROSPACE INDUSTRY TO THE UK ECONOMY

1. QinetiQ regards a strong and competitive UK aerospace industry as essential to the maintenance of a thriving modern economy and a sophisticated industrial base. The industry enjoys a world-class reputation which must be maintained.
2. Our aerospace industry will be of greatest benefit to the nation if it is competitive on all levels, from collaboration with other world-leading industries on joint airliner projects, through the manufacturing in the UK of smaller aircraft, to the involvement of specialised companies and SMEs in the manufacture of aircraft and components large and small.
3. This requires a totally integrated strategy for its development and a comprehensible route for funding. At present there is a risk of duplication and lack of pace. Such a strategy can only come into being if the activities of the various parts of the DTI, the MoD, the AeIGT, the SBAC, the Regional Development Agencies and the devolved administrations are all co-ordinated.
4. There is also a need, in parallel, for SMEs to form consortia to better enable them to compete and to facilitate access to funding.

INVESTMENT IN RESEARCH AND TECHNOLOGY

5. In the UK and most other developed nations, basic and fundamental research at low levels of readiness is fully supported by government, essentially because of the inherent natural level of risk. Qualification and certification at high levels of product or systems readiness are fully supported by industry, which stands to gain rapid competitive advantage.

6. The problem for the UK is that a gap is now perceived between the laboratory and the final product or system; this is not a problem confined to aerospace. Somewhere in between lies the need to test, develop and validate technology within its appropriate operating environment. This critical stage of R&D is regularly overlooked in the UK, yet is seen as central to industrial competitiveness in the United States, where it tends to be fully funded by government.

7. For example, with the development of a new material an extensive programme validating manufacturability and application is necessary before the material can be judged suitable for, say, a new aircraft structure. This process can take as long as 15 years and is inevitably unattractive to industry without some form of support from government, its agencies and collaborating industries.

8. The role of bridging the gap between technology generation in the academic community and its realisation by the nation's defence industries was one that the government's research establishments, from several of which QinetiQ evolved, were effective in carrying out. Indeed that process of translation, with government funding enabling the development of major demonstrator or evaluation programmes, was key to the development and continuance of a competitive aircraft industry.

9. Much of this applied research has disappeared, and the gap is being acutely felt. One obvious measure of this was the perceived need for major UK industrial concerns to take their technology abroad for development into product.

PROGRESS TOWARDS THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE AEROSPACE INNOVATION AND GROWTH TEAM

10. The AeIGT has been highly successful in defining a set of strategies for the UK aerospace industry, tracking routes to market growth. The collaboration between DTI and the SBAC has been exceptional, and a model of how an industry trade association can work closely with government. However the focus and drive need to be maintained and there is a need for greater involvement with areas with wider aerospace potential, such as security and environmental impact.

11. Three of the AeIGT's objectives relate directly to science and technology:

- That the UK must have a world class applied research and demonstration programme, sufficient to maintain and enhance Britain's position in the global market.
- That the UK must be in the forefront of sustainable development of aerospace technology in the areas of safety, security, capacity and the environment.
- The UK must continue to have a world class science base.

12. The approach adopted by the AeIGT is to develop a strategy to enable a National Programme of underpinning (essentially fundamental) research supporting an industrially led enhancement programme of applied research and demonstration. It is inherent in this strategy that a co-ordinated programme be developed and focused by a forum comprising industry, government and academia such that the strands of innovative fundamental research and technology validation are pinned together.

13. This strategy enables targets to be set for a significant but sustainable level of growth. The UK share of the global aerospace market is currently seen as 13% at approximately £25.4 billion, £18.4 billion of that being generated in the UK. A clear target has been set to achieve an 18% share of a global turnover that will itself increase by 25% over the next 20 years in real terms.

14. This visionary perspective for a united industrial sector presents a major opportunity for the UK to enhance its competitive position and strengthen and sustain an industry that supports approximately half a million people in high quality employment, 12 major companies of world standing and a broader based supply chain of some 3,000 companies.

15. Currently the AeIGT strategy is being developed to a level of detail that can be tested and validated in terms of its technical content or appropriateness to the National Strategy, its value, affordability and timeliness.

16. The mechanism adopted to build this major programme has been to separate the effort into interconnected initiatives, namely the formation of Aerospace Innovation Networks (AINs) to support the themes proposed for fundamental innovative research (twelve to date) and Aerospace Technology Validation Programmes (ATVPs) to develop the application of technology via the mechanism of validation (six of these so far). The former underpin and cross-link to the latter.

17. Among the AINs, the pilot programmes at a more mature state of development cover environmental technologies; advanced aerospace materials and structures, and advanced electrical power systems. The ATVPs which are furthest advanced are for the integrated (civil) aircraft wing, the environmentally friendly engine, the more electric aircraft and autonomous systems.

18. This National Programme would be of such a size that combined funding for it from industry, central government, the devolved administrations and the research councils would be essential.

GOVERNMENT SUPPORT FOR THE AEROSPACE INDUSTRY

19. The problem with funding the National Programme lies not with the programme values per se, which are not so large as to be unaffordable, but in the disparate and segregated nature of the funding sources, which even within the DTI remain complex despite having been simplified, with differing criteria applied.

20. Industrial combines, academic institutions and government departments will need to combine funding and resources and co-ordinate approval processes to enable the programme. This difficulty is particularly acute for the strand of applied research and validation.

21. Recommendations from the AeIGT were that an extra c £50 million in central government funding be deployed in aerospace each year, particularly via the DTI but taking into account the mounting importance of the devolved administrations and the regions, and that funding in aerospace within MoD and the UK defence industry be more sharply concentrated and focussed.

22. The current mechanisms of joint industrial and government funding of innovative programmes facilitated by the Science Research Council or through the DTI Technology Programme should be able to develop the underpinning innovative research that is required, particularly if the aerospace industrial drivers are combined with Government strategic perception to steer the programmes.

23. However, the applied research element typified by the validation of technology proposed by the AeIGT is a more difficult issue. Individual elements of the programme may amount to as much as £100 million each, albeit spread over perhaps five years. Securing this concentrated focus may be difficult to achieve in a climate of responsive, competitive funding of research elements.

24. In simple terms, individual research programmes facilitated by the DTI Technology Programme might stretch to perhaps £1 million a year, far less than envisaged by the AeIGT and its National Aerospace Technology Strategy.

25. Yet the key to industrial growth and the development of the UK aerospace skills base lies in the application of innovative technology, and the key element in realisation and application is validation at industrial scale.

26. The remit of the devolved administrations and the regions is obviously and correctly focused on regional issues, yet a National Programme must span regional boundaries and the matching academic programme needs to encompass a cross-Institute or University provision of appropriate technical capability.

27. It is important that the RDAs and the devolved administrations, in funding initiatives within their scope, take account of the priorities set by the AeIGT so that they are contributing to the National Strategy, rather than operating at a tangent to it.

28. There is also a role for the SBAC to play in helping to co-ordinate regional involvement in the aerospace sector, by forming links with the science and technology committees of regional trade associations.

29. The role of the Ministry of Defence dictates that it must serve the defence needs of the nation, orchestrating its research programme directly in support of these needs.

30. In our opinion the initiative led by Lord Sainsbury to undertake a study to effect cross-Department support for the National Programme is critical to its future effectiveness and consequently the future growth prospects for the UK aerospace industry.

31. There are also timing issues over the progress towards implementation of the National Strategy promulgated by the AeIGT, as it requires a series of activities to be carefully orchestrated in terms of their delivery.

32. For example, if a new material is to be fed through programmes investigating its manufacture and application in a structure or powerplant, such implementation and application being subsequently through a major test or simulation, the elements of this process must occur to an ordered timescale.

33. For many totally appropriate reasons, calls for R&D programmes emanating via different Government initiatives are set against either:

- Responsive mode calls with no particular theme for SRC research (unstructured timeframe).
- Subject multi-specific calls via the DTI Innovation Process.
- The requirements of regional policy as prioritised by the RDAs.
- Calls from the MoD serving particular timely defence needs.

34. Since most, indeed nearly all, of this sponsorship is on a competitive basis, the ability of the aerospace community to mount and maintain a structured time-based programme that is multi-faceted, multi-disciplined and serving potentially more than the aerospace sector must be questioned.

35. Within the DTI, it is vital that projects of importance to the aerospace industry for which funds are sought through the Technology Programme should not get lost in its competition process.

36. There are bound to be losers as well as winners, but QinetiQ and a major aerospace company recently had the experience of putting forward a programme which was acknowledged to be of strategic importance and indeed some urgency, only to see it turned down because fault was found with the details of the submission.

37. The DTI has worked hard to make the new funding system that has emerged from its Innovation Review more friendly to the aerospace sector than was originally the case, but its selection of winners must more adequately reflect the Department's wider priorities and those of the AeIGT.

38. The timeframe for the call process for the Technology Programme is also impossibly difficult. The schedule of two calls per year with the detailed content revealed for response within eight weeks or so is so short that no budgeted or structured programme can be envisaged.

39. It could be argued that in the drive for open, competitive, innovative research there is a risk that the new process impede attempts to realise technology through application, hampering the nation's ability to stay ahead of the competition and create the future generations of broadly-minded innovative scientists and engineers, well employed in quality careers.

40. We recommend that the process or research sponsorship be investigated to see whether, within the current framework of competitive, innovative responses, a means can be found to give long sight to co-ordinated themes that will enable national strategies to be effected, through the Technology Strategy Board for example.

41. While research into air safety is adequately funded, there is a problem over the responsibility and funding for research into aircraft and aviation security, a \$10 billion global market in which the UK potentially has world-leading capabilities. It falls on the periphery of the work of the AeIGT, is not accorded priority by the DTI's Technology Programme and cannot be adequately covered by the modest research budget of the Department for Transport.

42. While transport security is in the first instance the responsibility of the DfT, several other Departments—Home Office, Cabinet Office, MoD, DTI—have a finger in the pie, and the result is the absence of a co-ordinated approach to research in this very important field. In consequence, opportunities are in danger of being lost through lack of funding.

43. There is also a specific need for Government, in co-ordination with the AeIGT framework, to put more emphasis on finding solutions to the global challenges of the environmental impact of civil aviation. The automotive industry has progressed far more rapidly on this than has aerospace.

44. One of the limiting factors on airport capacity, and hence on the growth of civil aviation and on the demand by airlines for new aircraft and the maintenance of existing kit, is the environmental impact on the surrounding area, primarily through noise but also through air pollution. The performance of aircraft in both respects has improved in recent years, but still lags behind the expectations of public and legislators.

45. The UK has the R&D capacity to develop solutions that will relieve both these areas of concern to at least pull the designs of more efficient airframes and quieter engines (the more environmentally friendly engine ATVP referred to above is noted) ahead of the legislative curve.

46. Today leading companies such as Rolls-Royce, Airbus and Messier Dowty are working on these issues, investing in UK-based R&D; however such projects tend to follow the availability of budgets and external funding opportunities. The relevant funding sources need to take account of this.

- QinetiQ is Europe's largest integrated R&D organisation, with nearly 10,000 employees, over 7,000 of them scientists, throughout Britain. QinetiQ's involvement with the aerospace sector derives from almost a century of pioneering flight and avionics technologies as an arm of government. Now in the market under a PPP, QinetiQ is putting these technologies, for use in the air and in space, at the disposal of the industry, both in the UK and globally.

APPENDIX 12

Memorandum by Rolls-Royce Group plc

1. Rolls-Royce is the UK's leading engineering company and sole aero-engine manufacturer. It is Number 2 in the world aero-engine market competing against GE and UTC—a position that has strengthened substantially since privatisation in 1987.

2. At that time Rolls-Royce's turnover was approximately £2 billion, we employed 42,000 people and sales were predominantly in the defence and civil sectors.

3. In the intervening period, the company has achieved a balanced business portfolio. This has been underpinned by significant investment in research and development in common technologies applied across our four business sectors: civil, defence, energy and marine. While Rolls-Royce is world number two in civil aerospace, it is also world number one in marine, world number two in defence and a world leader in oil and gas compression.

4. Current annual sales of £6 billion are evenly divided between original equipment sales and high value added aftermarket services. Of the 35,000 people comprising our global workforce, 60% of our employees and 59% of our turnover is UK based.

5. We have manufacturing locations in 20 countries and customers in 150 countries. Around 60% of our total turnover is in US\$, with 25% in £ sterling.

6. Nonetheless, today Rolls-Royce is a relatively “immature” business compared to its US competitors. In the period since privatisation, there has been significant investment in major aero-engine development programmes, which by their nature are very long term; project breakeven taking around 15 years and programme life-cycles lasting 25 years and longer. This investment in new product development is only now beginning produce initial returns, enabling the company to focus on further technology diffusion throughout the business sectors.

7. INTERNATIONAL COMPETITIVENESS

A number of factors determine the international competitiveness of our UK operations. These include the quality and productivity of the UK supply base; availability of a skilled and flexible workforce; the quality of industrial relations, a stable economic climate; a supportive tax regime, effective central and regional government support mechanisms including a competitive ECGD; and our ability to generate and retain IPR within the UK.

8. PRODUCTIVITY

- (i) Rolls-Royce has made significant strides in productivity improvements through investment in world class facilities, the introduction of new working practices and supplier development programmes. Value added per employee has improved at 7.6% pa (real) over the last 10 years. This is significantly above UK average manufacturing and the aerospace sector as a whole.
- (ii) In the last two years we have announced some £230 million of investment in our UK facilities in Scotland, Derby, Bristol and Hucknall. The decision to make this investment has in some cases been against tough overseas competition. A key factor influencing investment decisions has been the flexibility demonstrated by our employees in adopting new working practices and our positive industrial relations.
- (iii) Investment decisions have become more complex. This is due to the overseas acquisitions which Rolls-Royce has made in the intervening years since privatisation but also because of the willingness of overseas Governments, who recognise the importance of high value added manufacturing industries, to offer an attractive environment for inward investment.

9. SKILLS AND EDUCATION

- (i) The availability of a highly skilled and flexible workforce is vitally important in maintaining our competitiveness. There is competition for talent from other sectors, for example the Finance sector, as well as shortages in certain skill areas such as qualified engineers in electrical and electronic disciplines, software and manufacturing. This demand is reflected in the higher value wages commanded by the sector, which are about 25% above the UK manufacturing average.
- (ii) Rolls-Royce currently invests about £28 million per annum on graduate, apprenticeship and vocational training as part of our ongoing efforts to maintain skills capability. Approximately 30% of our employees have a degree or equivalent.
- (iii) Recruitment from schools, colleges and universities onto Rolls-Royce training programmes is an important element in our overall resource strategy. There are currently around 196 and 255 trainees on graduate and apprenticeships programmes respectively.
- (iv) To ensure that we have a “pipeline” of talented youngsters with the right skills, we sponsor and support projects that will raise levels of education in science, technology, engineering and maths (STEM), and more recently “enterprise” skills. In 2004, we launched the Rolls-Royce Science Prize to encourage excellence and innovation in the teaching of STEM in the UK.

10. SUPPLY CHAIN

- (i) Rolls-Royce currently has around 504 UK first tier suppliers and our forecast UK procurement spend for 2004, is expected to be in the region of £860 million. In total Rolls-Royce supports some 1,400 suppliers throughout the UK, 50% of which are small to medium sized companies, with Rolls-Royce accounting for 35% of their average sales.
- (ii) Rolls-Royce continues to support improvement activity within the supply chain both directly and in association with local agencies. We currently have about 30 engineers working directly with suppliers and over 150 Rolls-Royce suppliers have benefited from funded support activities.

11. RESEARCH AND DEVELOPMENT

- (i) The company invests c £600 million (gross) per annum in research and development which would place us about sixth in the UK in terms of levels of R&D investment.¹⁷ The company owns its intellectual property rights from which flow significant benefits to the UK; principally through its collaboration with the UK science base but also, by providing small to medium sized companies in the supply chain with access to the international market place. Today about 70% of our new product development occurs in the UK compared with almost 100% 10 years ago.
- (ii) Research and technology acquisition represents about 20% (£130 million per annum average) of this R&D activity. Currently about 35% of this is undertaken in the UK compared with around 98% at the time of privatisation. This trend reflects the fact that Rolls-Royce has become a global company with major operations in Germany, the US and Canada. This has, in turn, provided more choice over the location of research work and associated capital investment.

12. UNIVERSITY TECHNOLOGY CENTRES (UTCs)

- (i) Rolls-Royce currently has 20 UTCs in the UK, one in the USA, two in Germany, one in Sweden and one in Italy. There is also a UTC Partnership between Oxford and Xian in China. Additionally, Rolls-Royce has designated centres of excellence in Germany and the USA which are not yet formally badged as UTCs.
- (ii) The UTCs were established as a means of creating centres with a critical mass of high calibre personnel capable of interacting with Rolls-Royce on detailed technical issues in key technological fields. Each UTC is lead by an academic with a world-class reputation in their field supported by a strong team of research associates/fellows, students technicians and facilities.
- (iii) The UTCs are provided with a clear exploitation route for their research via technology transfer to Rolls-Royce development programmes and products. As a result the UTCs are provided with a proven route to market for emerging new technologies, have certainty of funding through Rolls-Royce's commitment to five year rolling programmes and benefit from exposure to a commercial environment with opportunities for employment.
- (iv) Rolls-Royce's UTC programme was highlighted in Richard Lambert's recent report as an example of excellence in industry-university collaboration.

13. VALUE OF HIGH R&D INTENSITY INDUSTRIES

- (i) Companies like Rolls-Royce, which own their intellectual property and undertake significant research and development activity, give rise to substantial economic benefits to the wider economy. Social returns to R&D can far exceed the private returns to investing companies—an important market failure in the context of Government policy making.
- (ii) There is evidence that high R&D (as a % of GDP) economies are high productivity economies. Supply chain relationships in the key development and manufacture of new products may be a key channel through which these large economic benefits are realised—with prime producers such as RR providing access to international markets and driving the adoption of new technologies and processes.

14. THE ENVIRONMENT FOR INVESTMENT

- (i) Government policy has recently highlighted the importance of science and innovation and its role in contributing to economic prosperity. Following the Lisbon Agenda, a UK target has been established to reverse the decline in UK R&D—the Government's objective is for R&D to reach 2.5% of GDP over the next 10 years.
 - (ii) Rolls-Royce welcomed the Report of the Aerospace Innovation and Growth Team, an Industry-Government initiative, which set out the steps needed if the aerospace sector in the UK was to remain competitive. An important element was the development and implementation of the National Aerospace Technology Strategy, which recommended that Government provide an additional £50 million to match industry funding for the development of crucial aerospace technologies.
 - (iii) The AeIGT also highlighted the long-term erosion in the level of Government investment in Defence R&T and recommended that the MoD's spend on research should be better focussed and better prioritised to deliver long-term value and security to the UK taxpayer. Rolls-Royce and others have been working closely with Government on developing the components of this strategy.
 - (iv) At the same time, HMG has been increasingly devolving responsibilities to the regions—including responsibility for delivering the science and innovation agenda. The ability of regional government to deliver national technology and other economic strategies represents a major challenge.
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¹⁷ DTI 2004 R&D Scoreboard.

- (v) The essential role for central government must be to provide direction and co-ordination to enable these goals to be realised in practice. Industry requires a stable and predictable support environment as a backdrop for long run investment decisions.
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APPENDIX 13

Memorandum by the Royal Aeronautical Society

1. In respect of the committee's current inquiry into the competitiveness of the UK Aerospace Industry, the Society has a number of observations:

2. The competitiveness of UK Aerospace depends ultimately on the quality of its technology and the individuals who embody the expertise and knowledge needed to keep UK companies ahead of their competitors. The most recent DTI R&D scoreboard underlined the quantity of privately funded research undertaken by the sector. As one of the two or three world benchmarked sectors in the UK, UK Aerospace is confirmed as one of the UK's major contributors to and users of the national science and technology base.

3. However, while HMG generally endorsed the findings of outcome of the Aerospace Innovation and Growth Team report and subsequently made important commitments to aerospace research, the Society still believes that public support for the sector is constrained compared to its international competitors. We recognise the value of the R&D tax credit system, repayable launch investment and support through the MoD as a key customer and sponsor of R&D, as well as other mechanisms such as ECGD and RDA business support. We also accept that UK Aerospace should be well placed to bid for the cross-sectoral programmes supported by the DTI Innovation Strategy.

4. The key issue as we see it is the need for coherence and coordination across all of these programmes. The links between defence and civil aerospace R&D are improving. The emerging National Aerospace Strategy under the aegis of the AeIGT Implementation Team will provide a coherent and prioritised structure for UK Aerospace R&D. But unlike all of the UK's major competitors, the UK lacks a defined focus for aerospace R&D. The termination of CARAD has left the UK alone of the major aerospace producing countries without a dedicated publicly funded civil aerospace research programme. The UK no longer has a defined public institution such as NASA or ONERA in France, unequivocally to support and to undertake open-ended research. It appears to us that additional regional funding for research and business development that may be directed at aerospace is largely at the expense of national programmes. In France and Germany, such support is clearly additional.

5. It is also evident that the "tests" set by HMG to obtain support, are more onerous and rigorous than those of other governments. Aerospace clearly has to justify its value on economic grounds, but the requirements should not be so stringent as to constitute a barrier to investment. In particular, the difficulties faced by equipment companies in qualifying for Repayable Launch Investment will undermine UK competitiveness as their financial and technical risks increase.

6. Similarly, while DTI economists have recognised that the process of innovation in sectors such as aerospace is both very long term and complex, there is a belief in large parts of government that funding the science base alone will inevitably produce world-class goods and services. This approach fails to appreciate the importance of an iterative interaction between academia and industry through an extended period and across sectors. It also fails to recognise the long and complex supply chains that underpin development and production in aerospace.

7. In sectors such as Aerospace, the distinction between "pure" and "applied" research tends to lose its meaning. Equally, the need to "demonstrate" technological principles and, where necessary, to resolve basic scientific and engineering questions posed by the process of development is essential. Similarly, the role of large, research intensive companies in "pulling through" research into product and generally providing "routes to market" cannot be underestimated. This both encourages regional clustering effects and stimulates innovation vertically through supply chains. In this way industry performs a key role in exploiting the output of the national science base thereby helping to generate the returns from public investment. In short, innovation alone does not create wealth—the process needs intervention and encouragement at all stages with appropriate forms of public support.

8. The complexity and interactive nature of aerospace R&D is even more marked as the sector seeks to meet the challenge of sustainable development and detailed environmental challenges. UK industry must be supported by sound environmental science so that appropriate technological solutions can be explored. Difficult technical goals of lower emissions, quieter aircraft and fuel efficient operations have been set which will require both fundamental research and demonstration to achieve. Meeting this challenge will require a coherent programme linking the science base across disciplines (a specific challenge perhaps to the Universities Research Assessment Exercise as currently structured), with industry in several key areas and supported by several government departments and coordinated with EU-level programmes.

9. But without a well-trained and educated workforce, even the most coherent research programme will be undermined and competitiveness eroded over the long term. There is no doubt of the quality of the leading UK centres of academic excellence in aeronautical engineering and the other core scientific

disciplines on which the industry relies for scientific advance, advice and training. However, there is growing evidence that universities are struggling to find suitably qualified UK students, or to remedy deficiencies in basic skills possessed by UK applicants. This is a well-rehearsed complaint, but it is now approaching crisis levels that will sooner rather than later have a real economic impact.

10. At a lower, but still vital level, the closure of engineering and scientific departments in the UK threatens to limit the stream of qualified people entering industry as technical personnel in manufacturing and other technically literate functions. It also implies the loss of access at a regional level to academic expertise for businesses that do not require or would not attract the interest of five-star institutions. The Government has signalled its concern and has recognised the need to bolster strategically important disciplines. However this will need action either urgently to rethink the assessment principles on which Universities receive research funding, or some alternative means of arresting the contraction of the UK academic science base. This, for example, might imply the creation of regional “pools” or groups of institutions able to offer undergraduate and graduate training and support for companies.

11. This issue cuts across departmental responsibilities and is not the direct responsibility of the DTI. However, resolving this issue is fundamental to UK Aerospace competitiveness. Accessing a trained work force will certainly be another good reason for UK companies to invest overseas with the general loss of employment and high value-added wealth creation in the UK that this will imply.

16 December 2004

APPENDIX 14

Memorandum by the Society of British Aerospace Companies

EXECUTIVE SUMMARY

- The UK aerospace industry (UKAI) is the second largest aerospace industry in the world, a significant driver of regional and national economic growth and productivity. UK based aerospace activity in 2003 had a turnover of £17 billion,¹⁸ with a highly skilled workforce directly employing 122,000 people. UKAI is a major technology innovator and acts as a key stimulus to academic research. The retention and enhancement of the UKAI is vital for the economic, technological and social value it brings.
- The UKAI is a global and sophisticated industry, with world class companies at all levels of the supply chain. It is essential that the public support structures available to it are both strategically and tactically aligned, to deliver in particular the technology and skills development required to fulfil industry and Government’s vision of the future.
- The global aerospace market is increasingly competitive and sensitive to external factors, such as globalisation trends, de-regulation and growth of low-cost economies. Market access remains an issue both in the civil and the defence sectors, as do the continuing restrictions on US technology transfer.
- Levels of Government investment in aerospace R&D compare unfavourably with those in the US and Europe. The UK aerospace industry continues to invest heavily in R&D and is second only to pharmaceuticals in its R&D intensity. Government targets for increasing R&D levels cannot be met by industry alone.
- The industry has significant concerns that Regional Development Agency objectives lag behind industry requirements, in particular that RDAs collectively are not empowered financially, or as part of their remit, to support the National Aerospace Technology Strategy.
- This submission describes the value of the UK Aerospace industry within the global and domestic contexts, its contribution to the UK economy, its performance in the current economic climate, and how it is working with Government to face the challenges ahead. It details concerns about the Government’s commitment to industry investment in response to the Aerospace Innovation and Growth Team, and about the current regional funding structures and budgets that aim to deliver a regional component to the national aerospace strategy.

1. THE IMPORTANCE OF UK AEROSPACE TO THE ECONOMY

The UKAI is one of the most vibrant and significant sectors in the UK economy, adding high value in economic, technological and social returns both nationally, and across the regions.

¹⁸ UKAI Turnover 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

The UK aerospace industry is conservatively estimated to comprise in the region of 2,500–3,000 companies with a significant (more than 10%) proportion of sales dependent upon aerospace business. These companies are at all levels of the supply chain and operate at all phases of the aerospace lifecycle. The industry has a significant presence from global manufacturers covering large civil airliners, regional and business jets, helicopters; military combat, transport and training aircraft; satellites and guided weapons. The UK leads in a number of major aerospace systems including the wings for Airbus civil airliners and gas turbine engines, as well as in major aerostructures and nacelles. The industry remains relatively well balanced between civil (49.8%) and defence (50.2%).

Strong clusters of supply chain companies support both civil and defence activity providing world class products and services globally in areas such as avionics, electronics, fuel systems and landing gear to name but a few. Many of these supply chain companies are Small and Medium Enterprises (SMEs) in which aerospace represents one of a small number of high-technology clients. The direct economic contribution of the industry is nationally significant.

1.1 *Employment*

1.1.1 UK aerospace employs over 122,000¹⁹ people directly, with, one of Britain's most highly skilled workforces. That is 0.4% of total UK employment, and 3.1% of total manufacturing employment in the UK. There are a further 134,000 employees elsewhere in the UK supported in the supply chain to the aerospace sector. The total of both direct and indirect employees in the wider supply chain is therefore estimated to be over 250,000.

1.1.2 UKAI is the largest aerospace sector in Europe, accounting for 30% of total European aerospace employment.²⁰ Its significance nationally is comparable to that of the domestic aerospace industries of Canada, the USA and France. In 2003, 31% of all UK Aerospace employees held a first degree or equivalent and 14% were employed in Research and Development (R&D).

1.2 *Contribution to GDP*

1.2.1 In 2003 industry turnover for UK based aerospace activity alone stood at £17 billion. Using a measurement for "value added"²¹ the aerospace sector's contribution to the economy was worth £6 billion in 2003.²² That was approximately 0.6% of UK GDP, or 3.9%²³ of value added by manufacturing industry as a whole. However, this direct economic activity supports further, and even more significant, indirect contributions with an additional 0.7% of GDP being supported down the supply chain to the aerospace sector, raising its overall contribution to 1.2% of UK GDP.²⁴

1.3 *Contribution to UK Trade*

1.3.1 UKAI is an export-intensive and extremely competitive sector. It generated exports of £101,000 per employee on average between 1999 and 2003²⁵—compared with a manufacturing average of £42,000 per head (2001). During the same period UKAI boosted the UK trade balance, to the tune of £17,000 per employee per year, contrasting with manufacturing overall, which made the trade balance worse by an average of £9,000 per employee.²⁶ Moreover, UK aerospace exports have increased their share of world markets: up from 6.5% in 1992 to 9.8% in 2001.²⁷ The industry is one of the UK's major exporters, generating a trade surplus of over £2.5 billion in 2003, close to a long run average surplus of £2.8 billion.²⁸

1.4 *Spin-offs*

1.4.1 The national economic impact of the industry extends well beyond the above headline economic figures. Aerospace is a significant science and technology based industry which provides high technology, high value goods and services to a wide range of markets. Examples of spin-off originating from the UKAI include the design of racing cars, wind turbines, oil rigs and bridges. Other examples of technology transfer within companies include power management systems, composites and computer chip technology transferred from aerospace to telecoms, medical and other industrial applications. The automotive industry, for example, has been successful using "fly by wire" technology in their fuel cell vehicles.

¹⁹ UKAI Employment 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

²⁰ OEF Research, Nov 2004.

²¹ OECD definition that excludes avionics.

²² OEF Research, Nov 2004.

²³ OEF Research, Nov 2004.

²⁴ OEF Research, Nov 2004.

²⁵ OEF Research, Nov 2004.

²⁶ 1999–2002.

²⁷ OEF Research, Nov 2004.

²⁸ UKAI Trade 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

1.4.2 The criticality of Research and Development investment to underlying national productivity growth is widely reflected in Government policy. Aerospace invested over £2.1 billion in R&D in 2003, an increase of 18% annually and an average of 12.3% of turnover.²⁹ Three aerospace companies feature among the top 10 UK R&D investors: BAE Systems (ranked No. 3), Airbus (ranked No. 7) and Rolls Royce (ranked No. 10), investing £1.4 billion between them.³⁰

1.5 Regional Impact

1.5.1 Aerospace is significant to the economies and employment in a number of UK regions. Ten regional authorities have audited the economic importance of aerospace and identified it as a priority industry for generating economic growth. These include the Devolved Administrations in Northern Ireland, Scotland, and Wales, and the North West, North East, East Midlands, West Midlands, South East, South West, and East of England Regional Development Agencies. Each of these areas has supported the establishment of Regional Trade Associations to help accelerate the growth of aerospace in the region.

1.5.2 In a number of these regions, aerospace has been demonstrated to form the centre of high technology clusters of design and manufacture, with a large number of SMEs clustered around larger subsystem providers and primes. In the North West, for example, the aerospace industry clustered around Airbus, BAE Systems and Rolls-Royce accounts for some 54% of the high technology jobs in the region.

1.5.3 Clusters promote both competition and co-operation. They encourage investment in research, which is supported by strong industrial-academic linkages. The larger companies invest substantially in supply chain performance improvement programmes, such as “Supply Chain Relationships in Action”. These benefit the value proposition of the primes but also increase supply chain competitiveness in export and sales to other high technology industries. Around 60% of the work within these supply chains flows through the UK primes. However the capability developed is increasingly used in export markets.

1.5.4 Aerospace generates high quality, high value adding jobs. 31%³¹ of UKAI employees have at least a first degree. Productivity in the UK aerospace sector (value added of £54,000 per head, 2001) is 50% higher than the UK average (£36,000 per head) and 35% higher than the manufacturing average (£40,000 per head).³² Even more significant, however, is that UKAI features strongly in regions such as Northern Ireland, North West and South West England where the average value per head is 10–20% below the national average. Without the UKAI’s contribution the differential would be significantly worse.

2. INDUSTRIAL PERFORMANCE IN THE CURRENT ECONOMIC CLIMATE

Aerospace is currently one of the UK’s few globally competitive industries. The UK aerospace industry successfully helped itself overcome the impact of 9/11 through its labour flexibility and productivity.

2.1 Performance Post 9/11

2.1.1 By delivering consistent productivity improvements, averaging 4.2%³³ between 1992 and 2001, the underlying trend for UK Aerospace has been one of sustained turnover growth averaging 1.75% per annum. Productivity led growth, together with a significant increase in the proportion of the civil aerospace business has resulted in an increase in average profitability from 1% in 1992 to 6.5% by 2001.

2.1.2 The terrorist attacks of 9/11, led to a dramatic reduction in orders for civil aircraft and an immediate 20% drop in overall UKAI turnover. Concurrently, development issues in a number of defence programmes led to major delays. Employment fell significantly between 2001 and 2003 (from 147,000 to 122,000³⁴), and profitability plummeted with many companies failing to break even.

2.1.3 The civil sector market has taken time to recover and is only now, in 2004, starting to “bottom out” in turnover terms despite positive signs of civil aircraft orders. Fortunately a “bulge” in defence aerospace, driven largely by the Eurofighter and Merlin production programmes, has to some extent compensated. Last year, UK Aerospace turnover rose by 3.4% in real terms from its 2002 low, to £17 billion per annum.³⁵

2.1.4 The co-ordinated response to 9/11 of UK industry, unions, regional and national government was an important factor in sustaining and recovering the industry.

²⁹ UKAI R&D 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

³⁰ DTI R&D Scoreboard 2004 (By net investment).

³¹ UKAI Employment 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

³² OEF Research, Nov 2004.

³³ OEF Research, Nov 2004.

³⁴ UKAI Employment 2001–2003, UK Aerospace Facts and Figures, SBAC and Accenture.

³⁵ UKAI Turnover 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

2.2. Productivity Rates

2.2.1 The UK aerospace industry has shown rates of productivity improvement of 4.2% between 1992 and 2001. As already stated, in the UK aerospace sector the average value added of £54,000 per head (2001) is 50% higher than the UK average (£36,000 per head) and 35% higher than the manufacturing average (£40,000 per head). UK aerospace productivity remains behind both the US and France, though the gap with the US appears to be narrowing.

2.2.2 Both industry investment per employee and investment on fixed capital are close to the UK average across all sectors. Therefore the explanation for the strength of productivity must include both the industry's own R&D funding (see section 4) and the positive "agglomeration effects" that have come from the clustering together of firms engaged in similar activities.

2.3 Prospects

2.3.1 UK firms have continued to perform well in international competition. UK based businesses have won contracts, for example for actuation systems, landing gear, computing systems and also the engines of the new 7E7. The competitiveness of the industry is further reflected in its continuing overseas investment. In 2004, UK aerospace companies were involved in some forty deals overseas worth \$3.5 billion. The joint Government/Industry Innovation and Growth Team (AeIGT) report concluded that the UK was home to world class companies at all levels of the supply chain.³⁶

2.3.2 Recent history has highlighted the sensitivity of the industry to shocks and any hopes of a complete recovery may be premature as airlines come to terms with on-going high oil prices. The outlook is encouraging, particularly as prime manufacturers are developing new aircraft programmes such as the Airbus A380 and Boeing 7E7, which will deliver considerable cost savings to the aviation industry and economic direct and indirect economic benefits to the aerospace industry. The Airbus A380 project alone is set to deliver work to the value of £7.5 billion to 400 companies in the UK.

2.3.3 While the UK aerospace sector punches above its weight in terms of its contribution to the economy as a whole, the return that it generates for its own shareholders is relatively low. Gross operating surplus as a share of value added is lower in aerospace compared to the rest of the economy. Between 1992 and 2001, aerospace profits averaged 17% of value added, compared to 29% for manufacturing as a whole, and 38% for the economy as a whole.³⁷ Consequently, the private return on investment and R&D in the aerospace sector is also low—in spite of strong growth, an increasing share of world markets, and high levels and growth rates of productivity. Low profits and low private rates of return in aerospace threaten to undermine the productivity performance of the aerospace sector and the R&D that contributes to growth in the whole economy.

3. THE CHALLENGES FACED BY THE SECTOR IN DOMESTIC AND INTERNATIONAL MARKETS, INCLUDING BARRIERS TO TRADE

Whilst the current trends are positive, the market is increasingly competitive and sensitive to external factors, such as globalisation trends, de-regulation and growth of low-cost economies. Market access remains an issue in both civil and defence sectors. The expansion of low cost carriers, the rise in fuel prices and the continuing emphasis on fixed price development and production in the domestic military market is maintaining pressure on margins and increasing the transfer of risk to suppliers at all levels of the supply chain.

3.1 Civil Sector

3.1.1 Major civil prime contractors now competitively procure sub-contracts or risk-sharing partnerships on a global basis. This presents opportunities and challenges to UK aerospace; while companies can attack new markets, their "guaranteed" work-shares are no longer certain. Allied to this the challenge from the emergent Low Cost Economies (LCEs) and other developing economies is growing. Subcontracting abroad is increasing as a result of lower cost or more favourable incentives such as public R&D investment in more developed economies.

3.1.2 Post 9/11, the security environment continues to pose substantial challenges to the sector. Growing levels of both public and private investment in security technologies in the US and most EU countries have as yet not been matched in the UK. Air travel growth forecasts, which may result in increased environmental impact, have put civil aviation at the centre of the debate about sustainable development. Demanding noise and emissions targets set by the EC Advisory Council on Aeronautic Research in Europe (ACARE) represent a major financial, technological and operational challenge requiring a close partnership between industry and government on R&D investment and regulatory matters.

³⁶ *An Independent Report on the Future of the UK Aerospace Industry*, Aerospace Innovation and Growth Team, Department of Trade and Industry.

³⁷ OEF Research, Nov 2004.

3.2 *Defence Sector*

3.2.1 The UK still has a competitive defence industrial base but will need to transform itself to meet the changing requirements of its customers in both Government and export markets.

3.2.2 The defence market has changed since the mid-1990's. Products are increasingly complex, there are fewer big programmes for new platforms and market emphasis is moving to support and incremental upgrade functions. The armed forces have to deliver greater capability to a wider variety of missions under increasing financial pressure.

3.2.3 Globalisation of the industry on the supply side is unmatched on the demand side where, with the notable exception of the UK, national markets remain largely entrenched. Exports are significant and achievable but sales are becoming increasingly dependent on delivering and aligning strong government-to-government support, with a competitive product and price, and a persuasive technology transfer or offset package.

3.2.4 There is increasing evidence of capability loss from the UK and a clear need for Government and industry to focus effort on the areas that really matter to the UK. Sustaining specialist capabilities between less frequent design activities will become increasingly difficult as future defence aerospace development requirements diminish and remain unclear. Long term planning between Government and industry is required. UK Aerospace welcomed the advent of the Defence Industrial Policy and proposals to turn this into a Defence Industrial Strategy are encouraging. However, industry remains concerned that progress has been slow given that the original Policy was announced in October 2002. Industry would also like to be more engaged in the associated development of Government's requirements for homeland security.

3.2.5 Where the Ministry of Defence has invested in US programmes, UK based industry has established subsystem design and manufacturing positions as demonstrated by JSF, Astor, and Hawk fixed-wing trainers. Recognising that such programmes may be in service for 30 years or more, it is essential that the UK also achieves overall positions on these programmes to ensure that the systems concerned can be supported, upgraded and modified throughout their service life, with the necessary transfer of technology to enable this to happen. If UK based industry is to play a full part in US programmes, as opposed to migrating to the USA, it is critical that more effective mechanisms to allow transatlantic technology transfer are developed. The UK aerospace industry welcome the measures in the recent US Defense Authorizations Act, but wants to make a concerted effort in 2005, with US industry, to persuade all relevant authorities that concrete steps to improve technology access are needed and would benefit the Armed Forces of both the UK and the USA and would support the interests of coalition operations.

3.2.6 In parallel, the UK industry is supporting efforts by the Government to create a European Defence Equipment Market. Existing small national markets make no sense economically, but neither would a fortress Europe approach. The establishment of the European Defence Agency, led by a British official, offers an opportunity to put European collaboration on a sounder footing. Ministers should put real political weight behind the European Defence Agency as a means of improving the operation of the market, improving Europe's capabilities and generating the right kind of international programmes.

3.2.7 Industry would welcome a stronger indication of Government's international priorities to help UK businesses position themselves in the emerging global market for defence and security equipment and services, and in particular with specific help in reducing barriers to trade in terms of entry to foreign markets.

3.3 *Skills*

3.3.1 Despite the importance of the sector to the UK economy the industry believes it is insufficiently recognized and promoted within the UK education system and academia. Vocational routes of learning and entry into our sector are of great importance. It is of note that over 60% of Airbus senior management started as apprentices. Schemes such as Modern Apprenticeships need to be more adequately funded in recognition of the high cost of training relative to lesser skilled industries.

3.3.2 The sector requires greater workforce mobility to retain high-level skills and employees who represent a significant training and personal development investment. Complex routes to access funding for training and the artificial boundaries of RDAs or Local Learning Skills Councils have made retention, mobility and flexibility more difficult. UKAI is however, continuing to work closely with Science Engineering and Manufacturing Training Agency (SEMTA), the newly formed Sector Skills Council, to ensure an effective dialogue and improvement vehicle between Government, academia and our sector. The effectiveness of the Sector Skills Council is not yet proven.

4. INVESTMENT IN RESEARCH AND TECHNOLOGY

An internationally competitive level of investment in R&T acquisition stimulates innovation and maintains UK ownership of intellectual property. This allows UKAI to achieve sustained productivity growth and competitiveness to ultimately deliver a positive contribution to the UK economy both nationally and in the regions.

Industry is playing its part, but the Government's commitment to increase investment in response to the Aerospace Innovation and Growth Team, needs to be converted to tangible, focussed and effective research and technology validation programmes.

4.1 Trans-national industrial restructuring through mergers and acquisitions, outsourcing and rationalisation is reshaping the industry. Capital is globally mobile. Investment follows comparative advantage in skills, knowledge and favourable business and economic conditions. Decisions are made at the margin and are unaffected by national sentiment. Production investment follows R&D investment. Investment returns including jobs, direct and spillover benefits accrue primarily locally.

4.2 Between 1996 and 2003, aerospace R&D³⁸ spending has averaged 0.2% of GDP. That is 10% of total R&D in the UK—a very large contribution from a sector that makes up only 0.6% of GDP.³⁹ R&D spending contributes to productivity in the aerospace sector and elsewhere in the economy too. Oxford Economic Forecasting research estimates suggest that the cumulative effect of aerospace R&D spending at that level could have boosted GDP by around 2.5%—and most of that boost will have been felt outside the aerospace sector. R&D means that aerospace punches above its weight in terms of its overall contribution to GDP.

4.3 The UK aerospace industry continues to invest heavily in R&D. Second only to pharmaceuticals in its R&D intensity, industry-funded R&D investment increased in real terms in 2003 by 18% to £2.1 billion.⁴⁰ Overall in the last three years the proportion of turnover invested in R&T has increased by 50%.

4.4 Success in aerospace stems directly from technological leadership and a vibrant national technology base. R&T investment stimulates innovation and knowledge creation, supports research in universities, and has considerable spin-off benefits into non-aerospace activities. R&D spend in the larger companies in the UKAI is already operating at record levels. Government targets for increasing R&D levels cannot be met by industry alone.

4.5 UK Government investment in aerospace R&T has reduced substantially in recent years. For example, investment in civil aerospace research and technology demonstration via the DTI Civil Aircraft Research and Technology Demonstration (CARAD) programme fell from £104 million in FY1972 to £21.1 million in FY2004. CARAD has now been terminated with existing contracts due to be completed by the end of FY2007.⁴¹

4.6 Ministry of Defence air applied research funding has fallen from £250 million to £185 million in the last six years. Moreover, the level of investment by Government into defence related R&T has been declining over many years. This has a major impact on the overall aerospace sector. The increasing propensity to buy defence systems “off the shelf” from overseas ensures that intellectual capital in the UK is gradually eroded.

4.7 Levels of Government investment in aerospace R&T compare unfavourably with those in the US and Europe. For example the AeIGT has highlighted that in 1998 the US Government provided RT&D investment in civil aerospace worth £620 million, compared to £120 million in Germany, £50 million in France and only £20 million in the UK.

5. PROGRESS TOWARDS THE IMPLEMENTATION AND RECOMMENDATIONS OF THE DTI-SPONSORED AEROSPACE INNOVATION AND GROWTH TEAM

The AeIGT has provided a welcome focus for industry and Government discussion and there is a definite need for this to continue. Progress is being made, in particular on a National Technology Strategy (NATS); the UK Lean Aerospace Initiative; and the Directory of Learning to disseminate best practice. It is essential, however, to maintain momentum through a proactive partnership with Government at both national and regional level aimed at resolving the issues and challenges emerging as AeIGT implementation progresses.

5.1 Technology

5.1.1 Progress towards the implementation of AeIGT recommendations in the area of technology strategy is addressed in a separate submission from Mr W K Maciver, Chairman of the Aerospace Technology Steering Group (ATSG). The submission is accompanied by the ATSG Implementation Report published in July 2004. It highlights the establishment of a National Aerospace Technology Strategy and the assignment in February 2004 by the Prime Minister of the task of co-ordinating public funding for NATS to

³⁸ UKAI captures a value for Research and Development investment that includes in its total all R&T.

³⁹ OEF Research, Nov 2004.

⁴⁰ UKAI R&D 2003, UK Aerospace Facts and Figures, SBAC and Accenture.

⁴¹ DTI Data 2004. Using 1999 as base figure.

the Minister for Science and Innovation, Lord Sainsbury. It is essential that real progress should be made in launching major elements of the NATS by Spring 2005. The ability of central Government to address funding issues at both national and regional level will be key to the success of this initiative.

5.2 *Process excellence*

5.2.1 In response to the UK's continuing productivity ranking, in particular below that of the US, the AeIGT called for wider use and take up of process excellence techniques within the supply chain. The industry has conducted three pilot studies looking at how to achieve process improvements throughout a supply chain, and the results have created the basis for a Directory of Learning, to act as an evolving industry resource. The industry has applied to the Engineering and Physical Sciences Research Council (EPSRC) for Grand Challenge support on project based manufacturing, seeking £4.2 million in project costs. The Grand Challenge Programme will support these best practice processes for the next stage of pilot projects and help to develop innovative tools and technologies for further process excellence deployment.

5.3 *Skills and people management*

5.3.1 Work is continuing on the production of an Aerospace Sector Skills Agreement by March 2005, by the AeIGT and the Science Engineering Manufacturing and Training Agency (SEMTA). The industry has also completed a skills gap analysis and a costed action plan. The sector has received a grant of £233,000 in support of efforts to increase the uptake of High Performance Work Organisation practices, a plan being delivered by the SBAC in conjunction with Amicus.

5.4 *Safety, security and environment*

5.4.1 The activities of the Safety, Security and the Environment Working Group are moving forward in tandem with the technology strategy, of which sustainability is a central theme. The programme is aligned to meeting European industry environmental emissions targets hence the need to look at reduced emission combustion technologies. Research will initially be focused on the need to have a better understanding of the impact of contrails on the upper atmosphere and the role that advanced Air Traffic Management might play in mitigating that impact. The AeIGT is talking to National Environmental Research Council (NERC) and EPSRC about a jointly funded research project and others are already discussing plans for a new national institute for aviation and the environment. An industry wide sustainability strategy will be published in 2005.

5.5 *Socio-economic environment*

5.5.1 The AeIGT recommended an industry developed market observatory to create a single analysis and intelligence resource for the benefit of companies, government and universities. The Market Observatory and Aerospace Portal concept demonstrators were launched at Farnborough International 2004. The Aerospace Portal helps to inform companies of all the sources and forms of support and advice that are available to them. The Market Observatory by contrast looks at sources of fact based information and analysis and will generate its own research for stakeholders in the industry. The AeIGT finance working group is also working on the final stages of a summary of its investigations into the productivity of the sector, the economic benefit of its externalities and positive spin-offs.

6. GOVERNMENT SUPPORT FOR THE AEROSPACE INDUSTRY

Significant uncertainties surround future funding for the industry. Central government has devolved responsibility to the regions without clear policy approach. It is placing too high a priority on the science base when it comes to R&T support, tending to neglect the potential for innovation in the manufacturing sector and the significance of routes to market without which investment in research cannot develop into successful products.

With the sensitivities of global decision making it is vital to the future of the industry that the UK remains an attractive environment for investment. At present it is as if the taps of the old sources of public funding have been turned off at one end, with only the emergence of a new trickle coming from the other.

6.1 *Regional funding structure*

6.1.1 Regional support is welcome but funding of aerospace R&D at the regional level through the English RDA's and the Devolved Administrations remains modest. Such funding should not be at the expense of national programmes or the cause of duplication and fragmentation. The industry has significant concerns that RDA objectives lag behind industry requirements; and that the DTI despite being the lead department for RDAs only directly influences 15% of their budget. RDAs are not set up to understand the

strategic national importance and requirements of locally funded R&D projects, and this situation is unsettled further by the future of the DTI continuing to come under electoral scrutiny. A number of RDAs have not budgeted to support the AeIGT process and will not have a technology remit within their terms of reference until 2005. The industry does, however, recognise the financial constraints placed on some RDAs, and accepts that it needs to do more to communicate to RDAs how they in turn can fit into the UKAI vision.

6.1.2 Many of the leading aerospace “primes” have good bilateral relationships with RDAs working closely with regional trade alliances delivering programmes with defined economic benefit to their regions. There remains concern, however, that RDAs collectively are not empowered financially or as part of their remit to support the National Aerospace Technology Strategy. The leadership of aerospace across the regions needs to work closely with the DTI to ensure a joined-up approach to programme delivery.

6.1.3 We would welcome these deficiencies being drawn to the attention of those who set the policy direction of RDAs and their wider sponsoring departments.

6.2 Support for research and technology

6.2.1 Industry and Government are continuing to work together closely through the AeIGT process. The original AeIGT report published in June 2003 foreshadowed the need for an additional £50 million per annum in R&T support from Government to match an equivalent investment from industry and ensure the industry maintains its competitive position in the global marketplace. Although welcome, there has, however, only been limited Government funding provided on a number of the AeIGT initiatives such as the Directory of Learning, Greener by Design, and the National Composites Network.

6.2.2 UKAI industry recognises the importance of meeting the funding challenge to support the National Aerospace Technology Strategy. Industry commitment may prove fragile should the Government prove unable to deliver on its contribution to the investment partnership at the heart of AeIGT recommendations in this area.

6.3 Repayable launch investment

6.3.1 Repayable launch investment (RLI) is open in principle to any UK-based manufacturer. The recent abrogation by the US of the 1992 US-EU bilateral agreement on the application of the GATT Agreement on Trade in Civil Aircraft on trade in large civil aircraft creates further uncertainty. Although focused on Airbus and Rolls-Royce, the impact of repayable launch investment reaches well beyond the primes to the supply chain. It is fundamental to maintaining leadership in technology, skills, product innovation and environmental enhancement. Aerospace firms are internationally mobile and will continue to be attracted by government support. Without repayable launch investment the UK civil aerospace industry will contract and the UK will lose a world class industry. It is important that the Government continues to work closely with the European Commission to ensure that UK interests are considered at all stages.

6.4 ECGD

6.4.1 UK aerospace is a major customer of the Export Credit Guarantee Department (ECGD) and the provision of competitive export credit support remains a vital element in the UK investment climate. We welcome the resolution of the issues that have caused an unsettled environment for ECGD—this provides some certainty for industry. However, we are cautious about how the new Trading Fund arrangements will work in practice and expect to have an ongoing, constructive dialogue with ECGD and Ministers about the performance of the Trading Fund.

Annex 2

LIST OF MEMBER COMPANIES

Accles & Pollock	INSYS Ltd
Aeroengine Bearings UK Ltd	Jonathan Lee Recruitment Ltd
Aeromet International plc	JS Chinn Holdings
Air & Ground Aviation Ltd	Kearsley Airways Ltd
Air Parts Ltd	Kembrey Wiring Systems
Airbus UK Ltd	Kidde Gravinger Ltd
Aircraft Equipment International Ltd	KPMG
Aircraft Maintenance & Support Services Ltd	Leach International UK Ltd
Aircraft Tanks Ltd	Linread Northbridge
Airtechnology Group Ltd	Lockheed Martin UK Ltd
Alcoa Europe Flat Rolled Products	Magellan Aerospace (UK) Ltd
Allvac Ltd	Magnesium Elektron Ltd
ALSTOM Power Limited	Marshall of Cambridge Aerospace Ltd

AMPEP plc	Martin-Baker Aircraft Company Ltd
Apollo Hitech Ltd	MB Aerospace Ltd
Apollo Metals plc	MB Faber Ltd
APPH Ltd	McBraid Plc
Armstrong Fastening Systems	Meggitt PLC
BAE SYSTEMS PLC	Messier Services United Kingdom
BAS Components Ltd	Messier-Dowty Ltd
BAX Global	Mettis Aerospace Ltd
BCF Designs Ltd	Microfiltrex Ltd
BM Engineering	Microturbo Ltd
B-N Group Ltd	Moog Controls Ltd
Bowmill Engineering Ltd	Morgan Advanced Ceramics Ltd
Bridport Aviation	Muirhead Aerospace
Bulwell Precision Engineers Ltd	Nicholsons Sealing Technologies Ltd
Caledonian Airborne Systems Ltd	Odgers Ray & Berndtson
Centrax Ltd	Pacific Scientific Ltd
Claverham Group Ltd	Page Aerospace Ltd
Clico (Sheffield) Tooling Ltd	Pascall Electronics Ltd
CML Group plc	Pattonair International Ltd
Cobham plc	Penny & Giles Aerospace Ltd
Com Dev Europe Ltd	Poeton Industries Ltd
Corus Engineering Steels	Polamco Ltd
Cranfield University	PPG Aerospace, PRC-DeSoto Ltd
Cross Manufacturing Company (1938) Ltd	Praxair Surface Technologies Ltd
Darchem Engineering Ltd	PTC (UK) Ltd
Defence Aviation Repair Agency	QinetiQ Group PLC
Delcam Plc	Raytheon Systems Ltd
Deutsch Ltd	Reliance Gear Company Ltd
Doncasters Ltd	RFD Beaufort Ltd
Dunlop Aerospace Ltd	Rockford Components Ltd
Dunlop Aircraft Tyres Ltd	Rolled Alloys
Eaton Ltd	Rolls-Royce PLC
Electronic Data Systems Ltd	Satair Hardware Ltd
ERA Technology Ltd	Saywell International Ltd
Farsound Engineering Ltd	SEA (Group) Ltd
Ford Aerospace	SeniorAerospace BWT
Freeman & Proctor	Serco Ltd
Gardner Aerospace	Short Brothers PLC
GE Druck Ltd	Signature Industries Ltd
GEDSitec Group	Silcoms Ltd
General Dynamics UK Ltd	Sira Electro-Optics Ltd
GKN Aerospace Services	Smiths Group plc
GKN Aerospace Transparency Systems (Kings Norton) Ltd	Specialist Technologies Ltd
Glenair UK Ltd	St. Bernard Composites
Goodrich Corporation	Stone Foundries Ltd
Gould Alloys Ltd	Surrey Satellite Technology Ltd
Greene, Tweed & Co Ltd	Thales UK Plc
Griffonage	The Barden Corporation (UK) Ltd
Hammonds	Thermal Engineering plc
Hampson Industries plc	Tiernay Metals Ltd
Helmet Integrated Systems Ltd	Timet UK Ltd
Honeywell Aerospace Yeovil	TW Metals Ltd
Horton Consulting Services Ltd	Tyco Electronics Raychem
HPL Prototypes Ltd	Ultra Electronics Holdings PLC
HS Marston Aerospace	WCI Group
Hurel-Hispano UK Ltd	Westland Helicopters Ltd
IGG Component Technology Ltd	Weston Aerospace Ltd
INBIS Group plc	Weston EU Ltd
Independant Forging & Alloys Ltd	WL Gore & Associates (UK) Ltd
Industrial Acoustics Company Ltd	Wynnwith Engineering Co Ltd

APPENDIX 15

Supplementary memorandum by the Society of British Aerospace Companies

1. *Comparative international statistics (Q5)*

1.1 Data on the competitive position of the UK aerospace industry is contained within the original written evidence submitted to the committee. This can be found in sections 1–3.

International comparisons are extremely difficult to make with any certainty or robustness. There are two principle reasons for this:

- first, such comparisons are extremely sensitive to exchange rate calculations and the range of economic assumptions which surround such calculations;
- secondly, there are significant definitional issues around what constitutes the aerospace industry. For example OECD data, from which productivity comparisons may be drawn, do not include avionics in their standard classification of the sector. Hence, the exclusion of this significant sector of the industry renders productivity gap comparisons open to question.

Nonetheless, both industry and government recognise the importance of developing a dataset, including robust international comparisons to better understand the competitive position of the UK industry. This is therefore a priority workstream as part of the AeIGT programme.

2. *Figures given, definitions and sources of statistics on R&D provided by Dr Howes in the evidence session (Q20)*

2.1 The source material for Dr Howes' statistics on R&D is referenced in the written evidence provided to the committee. This is contained in section five of the submission.

In addition to this, however, the committee may find the following detail on R&D funding contained within the AeIGT report useful.

2.2 The AeIGT report estimated that a minimum viable National Aerospace Technology Strategy would require just over £300 million a year, split fairly evenly between research themes and technology validation. This requires an additional £50 million in Government funding for civil aerospace sector compared to the (then) existing fund levels (£20 million) in recent years from CARAD, and a higher and more efficient use of MoD spend with industry.

(Data provided by SBAC for: *An Independent Report on the UK Aerospace Industry*, Aerospace Innovation and Growth Team, DTI, June 2003).

Summary of Recommended vs Today's Funding Split, (An Independent Report on the UK Aerospace Industry, Aerospace Innovation and Growth Team, DTI, June 2003)

	Today £ million per annum		Recommended £ million per annum		
	Total	Spent with Industry	Total	Spent with Industry	
Civil	20	20	Civil	70	70
MoD	165	40	MoD	165	92
Industry	147	147	Industry	147	147
Total	332	207	Total	382	309
EC	23	13	EC	23	13
Total	355	220	Total	405	322

3. *The role and performance of regional development agencies (Q31)*

3.1 As stated, both in our submission and oral evidence, regional support is welcomed by the industry. Many of the leading aerospace companies have existing good bilateral relationships with RDAs, working closely with them directly and through the regional trade alliances delivering programmes with defined economic benefit to their regions. RDA's continue to be of supportive value on issues such as re-deployment, capital investment and learning and skills issues where there is strong expertise.

3.2 The industry is keen to build on this into other areas, notably research and development. However, the industry recognises that this is not an easy exercise and notes that the current levels of funding of aerospace R&D at the regional level, through the English RDA's and the Devolved Administrations, remains modest.

3.3 Our specific concern is that RDA objectives lag behind industry requirements; and that at present RDA's are not remitted to deliver advancement in technology or innovation. By their very nature they are not set up to understand the strategic national importance and requirements of high technology programmes, and this situation is being unsettled further by the future of the DTI continuing to come under electoral scrutiny.

3.4 We acknowledge that the Sainsbury Committee has made progress in joining up the leadership of the industry across the regions and the DTI to ensure a joined-up approach to programme delivery. However, there remains concern that RDAs collectively are not empowered financially or as part of their remit to support the National Aerospace Technology Strategy. We would wish to see a greater urgency behind this agenda and a quickening of the pace at which the deployment of R&T funding is allocated through a devolved strategy.

4. *A note on how significant it is to UK aerospace companies that civil aircraft are purchased in dollars whereas the costs of production are largely in other currencies? What are the EU and UK authorities doing to aid UK companies in overcoming such exchange rate problems?*

4.1 There is no doubt that the current levels of exchange rate against the dollar are causing severe difficulties for the industry, given the dominance of dollar in purchasing civil aircraft. Whilst we recognise that this is an issue of macroeconomic management, there is currently little assistance being provided to the sector in overcoming these issues.

4.2 Traditionally member companies deal with such fluctuations through treasury management and currency hedging policies in the short term, and through careful management of the cost base in the longer term.

4.3 The role for government must continue to be to provide a positive environment in which the sector can do business and compete successfully. The provision of supportive macro-economic conditions is something that is welcomed by industry at all levels of the supply chain. However, we would like to see more consideration being given by government to the impact of dollar exchange rates on this vital and high-value added sector of UK manufacturing.

5. *Comparative figures you may have on R&D intensity (R&D as % turnover) for the UK vs other countries*

(All the data and analysis in this section is taken from Oxford Economic Forecasting work commissioned by SBAC November 2004.)

5.1 There is very little data on sources of funding specifically for aerospace R&D (different from R&T in that it includes development spending as well as research and technology).

The OECD produces detailed statistics on sectoral R&D funded by industry (ANBERD). This data suggests that business funded aerospace R&D in the UK is lower (both in absolute terms and as a proportion of GDP) than in the US, Germany or France. Considering that the UK aerospace industry makes a bigger contribution to GDP than in the other countries in the table below, the business funded R&D intensity in the UK is likely to be even lower relative to the other countries.

BUSINESS FUNDED R&D—AEROSPACE

	UK	France	Germany	US
<i>Business funded aerospace R&D as a % of GDP 2001 (estimate)</i>	0.08%	0.14%*	0.11%*	0.09%
<i>Business funded aerospace R&D \$ billion, 2000</i>	1.7	2.3	2.5	10.3

Source: OECD ANBERD

* 2002

5.2 We do not know the extent of government funded aerospace R&D in other countries and would welcome more data from the DTI on this in the future. However, we do know the extent of government funded R&D across the whole economy for other countries—again, the source for these data is the OECD (Science and Technology Statistical Compendium 2004).

Government funded whole economy R&D is lower as a proportion of GDP in the UK than in Germany, France or the US (see table below).

R&D BY SOURCE OF FUNDS—WHOLE ECONOMY

	UK	France	Germany	US
<i>Government funded whole-economy R&D as a % of GDP 2001</i>	0.6%	0.8%*	0.8%*	0.8%
<i>Business funded whole-economy R&D as a % GDP, 2001</i>	0.9%	1.2%*	1.6%*	1.7%

Source: OECD Main Science and Technology Indicators

* 2002

5.3 The tax subsidy treatment of R&D in the UK now compares well with other countries. However, this has not yet been sufficient to bring industry-funded R&D up to the average of other countries as a proportion of GDP, either in aerospace or across the economy as a whole.

It could be that a more important driver of business R&D is government R&D itself. Some of the literature in this area (see for example “The impact of public R&D expenditure on business R&D”, Guellec and van Pottelsberghe, OECD STI Working Paper 2000–04) finds a positive association between the two, suggesting that a \$1 increase in government funded R&D performed by industry encourages a further \$0.7 increase in business funded R&D on average.

This contrasts with the general view of fixed investment, where government investment tends to “crowd out” business investment. We don’t know how well-founded that research is, but it certainly makes sense in the context of trends in government/business R&D in the UK, Germany, France and the US.

APPENDIX 16

Memorandum by the South West of England Regional Development Agency

The South West Regional Development Agency is pleased to respond to the House of Commons Trade and Industry Select Committee inquiry into the competitiveness of the UK aerospace industry.

SOUTH WEST RDA

Our goal is to improve the economy of the South West. This involves giving people the skills they need, encouraging enterprise and improving communications. We also promote the strengths of the region and help people to regenerate their communities. All our work is guided by the Regional Economic Strategy. The aerospace industry is one of our priority sectors and we are working very closely with the DTI, AelGT and industry to promote the continued growth and strength of this sector.

1. THE IMPORTANCE OF THE UK AEROSPACE INDUSTRY TO THE UK ECONOMY

1.1 South West England has one of the most important and diverse aerospace regions in the world. It has enormous expertise in the design and manufacture of—amongst other things—jet engines, wings, propellers, under-carriages, avionics, rotary wing aircraft, fuel systems, materials, missiles and aircraft testing services. At least 43,000 people work directly for companies in the industry, many undertaking highly skilled engineering design, development and manufacturing tasks (Mair and Mair Report, *South West Aerospace: the challenges ahead, the regional agenda 2002*).

1.2 This long-standing and respected expertise is evident in the role the region’s companies are playing in the development of the Airbus range of civilian and military aircraft, the US-led Joint Strike Fighter (JSF) aircraft and the EH101 helicopter.

1.3 The South West is home to some of the world’s most respected prime contractors, a highly developed supply chain, excellent universities/colleges, and the West of England Aerospace Forum (WEAF)—one of the most dynamic industry groups in the aerospace industry offering practical help to the 700+ member businesses. The region also houses the UK’s largest procurer of manufactured goods, the Defence Procurement Agency, part of the UK Ministry of Defence.

1.4 Of the 11 largest aerospace companies in the UK (by employees), nine have major facilities in the region (see those underlined). This demonstrates the region’s attraction for major national and international companies looking for critical business advantages.

<i>Prime Organisation</i>	<i>UK based aerospace employees</i>
<u>BAE Systems</u>	<u>25,000</u>
<u>Rolls-Royce</u>	<u>23,500</u>
<u>Airbus</u>	<u>11,000</u>
Bombardier Shorts	6,300
<u>Smiths Aerospace</u>	<u>5,000</u>
Thales	5,000
<u>Cobham</u>	<u>3,500</u>
<u>GKN Aerospace Services</u>	<u>3,500</u>
Goodrich	3,500
<u>Westland Helicopters</u>	<u>3,500</u>
<u>MBDA</u>	<u>2,500</u>
Astrium	2,000

(Source: SBAC)

Highlights include:

1.5 *Airbus UK*: It is headquartered in Bristol and employs over 5,000 highly skilled employees involved in the design of wings, fuel systems and landing gear and the manufacture of trailing-edges for the Airbus family. It is well into a £300 million investment at the Filton site which makes it one of the most important sites within the Airbus group.

1.6 *Rolls-Royce*: The Bristol Patchway facility is the headquarters of the Rolls-Royce military engine division and is the second-largest R-R site in the UK and third-largest in the Group (after Derby and Indianapolis). The company recently announced the redevelopment of the current site at a cost of £75 million.

1.7 *Smiths Aerospace*: Headquartered in Cheltenham, the company is playing a leading role in the move towards the “more electric aircraft” and announced major contracts for Boeing 7E7 and Airbus earlier this year.

1.8 *Messier-Dowty*: Part of the SNECMA group, the company has won two major contracts in the past six months, winning both the Boeing 7E7 and Airbus A400M landing gear.

1.9 *Westland Helicopters Ltd*: Following the sale by GKN of their 50% share in the company, the business is now wholly owned by Finmeccanica of Italy and employs almost 4,000 people in Yeovil.

1.10 *Supply chain companies*: The West of England Aerospace Forum is a trade association for the South West Aerospace Industry and represents over 700 organisations. The forum works in partnership with its members on many levels to promote the sector both in the UK and worldwide. WEAFF champion the interests of all aerospace companies in the region, particularly the SMEs that help make the South West a region of global excellence. WEAFF is funded by the SWRDA for £5 million over three years.

2. INDUSTRIAL PERFORMANCE IN THE CURRENT ECONOMY

2.1 The region has an even balance between civil and military activity which has provided some protection against the impact of 11 September.

2.2 In the defence sector Westland, Rolls-Royce, Cobham, Claverham and Thales are all major contractors and significant exporters. The UK MoD remains the key market for these and many other smaller companies. Rolls-Royce has a major share of the Eurofighter engine programme and a central role in the huge JSF contract by virtue of its pioneering work on the lift fan.

2.3 Airbus overtook Boeing as the world’s leading supplier of large civil aircraft in 2003. The design of the A380 and A400M has increased the activity at Filton and the volume of work in the supply chain. Some of the region’s leading first tier suppliers have also announced substantial contracts for forthcoming Airbus and Boeing programmes.

3. CHALLENGES IN THE DOMESTIC AND INTERNATIONAL MARKETS/BARRIERS TO TRADE

3.1 Certain defence contractors are concerned by slippages in the timing of major defence orders including:

3.2 *Typhoon/Eurofighter*: Rolls-Royce and Cobham have both faced difficulties as a result of delays in the awarding of the second tranche of orders. The latter commented that this contributed to the 140 job losses announced in September 2004 (Source: *Financial Times*).

3.3 *Future Air Tanker*: the EADS-led consortium (which includes Cobham, Rolls-Royce, Thales and VT Group) are affected by the delay/possible cancellation of this programme.

3.4 *Helicopters*: The delays/possible cancellation of the BLUH and SCMR versions of the Lynx, and the effect this could have on the Merlin programme give rise to serious concerns.

3.5 *Exchange rates*: The strengthening of Sterling and the Euro against the US dollar (in which aircraft are sold) is eroding margins and resulting in price pressure in the supply chain.

BARRIERS TO TRADE

3.6 Concerns over the level and type of support offered by other nations to attract high value work remain, specifically France, the USA and Canada.

4. INVESTMENT IN RESEARCH AND TECHNOLOGY

4.1 According to the AeIGT report, the industry nationally spends £150 million on R&T—second only to pharmaceuticals. The bulk of all R&T work in the region is undertaken by aerospace companies either using their own resources, in collaboration with others under a variety of UK or EU funded programmes or by commissioning research with universities.

5. PROGRESS TOWARDS THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE DTI-SPONSORED AeIGT

5.1 In October 2004, the RDA agreed to contribute over £3 million towards a £14 million Airbus led investment in composites materials in the region. This facility is a direct response to the AeIGT report which stated “. . . the UK is now falling behind in the rate of technology acquisition The consequences of this can be seen in the migration of R&T activities on small and medium size aero engines . . . to the USA, Germany and Canada, and the threat posed to the UK position on civil aircraft wings by the heavy investment in composite technology in Spain and Germany”. These facilities will form part of the National Composite Network which will be formally launched on 30 November.

5.2 The Agency and West of England Aerospace Forum is supportive of the AeIGT process. Agency staff are active on the Integrated Wing Aerospace Technology Validation Project (one of the four pilot ATVPs) and the Advanced Aerospace Materials and Structures Aerospace Innovation Network (one of the three AINs) as a representative of the RDAs and DAs.

5.3 The ATVPs and AINs envisage the RDAs and DAs making significant financial contributions to supplement those of industry and other public sector bodies. The Agency is actively working with AeIGT, DTI and other RDAs to find ways of engaging constructively in this process. It will be a very significant challenge to find the sums of money envisaged from existing sources but we are actively engaged to find solutions if possible.

6. GOVERNMENT SUPPORT FOR THE AEROSPACE INDUSTRY

6.1 Whilst CARAD has been abolished it seems that the new DTI business support products of Collaborative R&D and Knowledge Transfer Networks can be used to deliver at least some of the needs of the AeIGT working groups. There are concerns however that the government/public sector will be able to deliver the additional £50 million per annum identified in the AeIGT report.

6.2 The Agency works closely with the DTI Aerospace and Defence team. A reduction in the capability or capacity of this team would be of concern.

APPENDIX 17**Memorandum by the Unmanned Aerial Vehicle Systems Association****THE IMPACT OF THE DISRUPTIVE UAV SYSTEMS MARKET ON FUTURE COMPETITIVENESS WITHIN THE AEROSPACE MARKET**

The Unmanned Aerial Vehicle Systems UAVS Trade Association was established some six years ago to promote the creation of an environment in which a UAV systems market could flourish and, significantly, the development of a UAV systems industrial and commercial capability in the UK to derive value from this evolving market. Creating such a capability has been identified by the Aerospace Innovation and Growth Team (AeIGT) as a high priority for the aerospace sector.

It is the belief of the UAVS Association that the UAV systems technology is disruptive and that this couple with a disruptive innovative approach to deploying the technology poses a threat to the established aerospace market. Any threat also offers opportunities which, in the case of this market, are many and varied. The greatest prize is the possibility that UK industry could re-position itself in the world market place.

Tim Willbond
Chairman

8 December 2004

INTRODUCTION

1. The UAVS Association is a small trade association funded by some 44 companies to provide an industrial focus for the development of a broadly based UAV systems market and to promote a UK industrial capability in response to this fast evolving market. The association membership ranges across the spectrum of companies from major prime contractors to individual consultants.

2. At the top level the UAV systems market can be segmented into three broad areas: military, civil and commercial. The military market predominates at the moment but civil applications are emerging rapidly. There are two impediments to market growth in the civil and, especially, commercial markets in Europe and the US; these are the lack of certification standards and the ability of UAV systems to operate routinely in all classes of National airspace. Both Europe and the US are addressing the former but only the US has a firm programme to achieve routine operations. Outside Europe and the US the same impediments do not necessarily apply.

THE MARKET

3. The market potential for UAV systems across platforms from under a kilogram to sizes up to large wide body airframes is enormous. The military market has been growing at a rate between 12% and 15% per annum. Projections of a military market value between £15 billion to £20 billion covering some 6,000 systems over the next 10 years have been forecast by reputable market analysts. This forecast does not cover the period that could see a wide deployment of high value combat UAV systems or the probable emergence of high growth civil and commercial markets.

4. There are now a number of hard indicators that point to the emergence of third generation systems from about 2010 and rapid growth in the civil and commercial markets from about 2012. The third generation systems will result from a technology discontinuity window which starts in about 2008 and they will be very different from the systems that are deployed today. A major technology strand in third generation systems will be increasing levels of autonomy over time and this will apply to military, civil and commercial systems to a greater or lesser extent.

5. In essence, the technology is disruptive to the current aerospace market and the application of disruptive technology to the market, sometimes known as disruptive innovation, is likely to drive the creation of new delivery models. Understanding the opportunities and the risks of failure to respond coherently is crucial if industry is to position to generate value and growth in the future.

ISSUES

6. Industry in the UK is lagging behind the US and other parts of Europe; however, there is a limited window of opportunity for UK industry in position to generate value and growth but this needs a more focused and integrated approach than is currently being adopted.

7. The Aerospace Innovation and Growth Team has identified autonomous systems as a key growth area and is developing a technology validation programme. However, the structure of the AeIGT, whilst ideal for addressing growth in established markets, is not entirely suited to addressing disruptive markets. Hence, the approach has been to consider UAV systems as part of the evolutionary market process and not as a disruptive process; further, it seems to have underestimated the potential impact of the emergence of civil and commercial markets.

8. Three fundamental things have to happen to enable a UAV systems market to develop in Europe; first, there has to be agreement on certification standards for the airframes and command and control systems to drive safety standards necessary for defined operating environments. One size does not fit all. The creation of certification standards is being actively pursued by industry and the regulators at both National and European levels but the creation of the European safety organisation EASA has slowed progress as it positions to take on its wide ranging remit. National pressure must be applied to ensure momentum in this area is not lost.

9. Second, the ability for UAV systems to operate routinely in the National airspace must be delivered. The US has a programme to start delivering this access for large systems from 2009. There is no such parallel programme in Europe at the moment; however, the proposal for the AeIGT autonomous systems validation programme is designed to identify and deliver technology and processes necessary to open the airspace to UAV systems. This is a key programme which must be supported. The problem with this initiative is that the funding process is convoluted and the lead times mean that real work is unlikely to start until 2006.

10. Third, UAV systems need to be provided for in the electro magnetic spectrum allocation. The World Radio Conference 2007 will set the spectrum map for several years ahead. The need to address UAV systems has been put on the agenda by the UK. The UK needs to develop a position by the end of 2005 because all the positioning work is done during 2006. Funding is necessary to help industry and the regulators develop a robust position on this topic.

11. An important enabler for achieving the above and for longer term Research and Development (R&D) and training is the initiative by MoD and the Welsh Assembly Government, supported by industry, to open military restricted airspace in Wales for civil and commercial use. Continuing ministerial level support across the MoD, DfT and the DTI is crucial to the realisation of this initiative which has the potential to become a national asset.

12. The issues outlined above are concerned with delivering the conditions for market growth. Achieving the above without UK industry positioning to exploit the opportunity would mean that "off shore" systems, technology and capability would serve the market and UK industry would be left with only a limited market share. The US and Israel are already well ahead of the UK across the whole scope of supply and parts of Continental Europe are positioning more coherently and much more rapidly than UK industry. A number of parallel actions need to be put in place covering investment in key enabling and supporting technologies and skills that will deliver competitive advantage, market development and support for the creation of new delivery models.

13. The UAVS Association and the SBAC are drawing up a joint programme of work to address the problem of positioning UK industry and supporting the proposed AeIGT technology validation programme. As yet funding streams have not been identified to support this extensive and necessary programme of activities and the need for such a programme is not yet fully understood across the government and industrial aerospace communities.

CONCLUSION

14. The UAV systems market is disruptive but offers a major growth and re-positioning opportunity for the UK aerospace industry. There is a window in which industry can establish a competitive position in the world market. The factors that must be addressed coherently and in parallel are creating the environment in which the market can evolve, realising a market in the UK and developing an industrial capability to respond to this International market.

UAVS Council

9 December 2004

APPENDIX 18

Memorandum by the West of England Aerospace Forum

- The importance of the UK aerospace industry to the UK economy;

The aerospace industry and the technology it encourages and develops takes many forms and spins out to many parts of UK industry, in the South West the sector employs 43,000 directly and 100,000 indirectly the sector is split almost equally between aerospace and defence activity the latter being approximately 27% of UK exports. The South West is home to 12 of the worlds major aerospace companies, Rolls Royce, Airbus, Westland Helicopters, BAE Systems, Thales, Smiths, MBDA, Allied Signal, Cobham, Messier-Dowty, Raytheon and Honeywell, and has in fact the largest concentration of aerospace companies in Europe.

Nationally the industry comprises more than 3,000 companies, and employs nearly 150,000 people directly and nearly 350,000 indirectly. The industry is one of the UK's largest exporters, adding about £2.8 billion annually to the balance of trade. Over the past decade turnover of the UK Aerospace sector has shown only modest growth in real terms, being mainly due to the post cold war decline in defence business. Civil sales growth has however grown steadily through the period, with turnover circa £18.42 billion for 2001, 58% of which was civil.

- Its industrial performance in the current economic climate;

Those companies taking up the challenge of performing within the new supply chain structure are finding the market far more difficult to operate in, and are having to adopt new working practices in order to compete. Where companies have taken on board these working practices key steps forward are being taken with the acquisition of new contracts being achieved and the release of resource to enable the tendering for new work. The ability of these companies to perform and make profits in this new environment is key, margins are drastically reduced and many companies are finding it difficult to generate capital to reinvest into new products/services and equipment. Companies that are not facing up to this challenge are beginning to see declining order books and a change of emphasis on the type of work they are able to achieve from their usual sources (company closures are now common place).

- The challenges faced by the sector in domestic and international markets, including barriers to trade;

Low cost and emerging technology economies are the major threat to our 800 plus companies in the southwest, as are the companies taking up the challenge of lean enterprise throughout the world (particularly in the USA, with the current currency rates and drive to export). Countries such as China and India provide the long-term threat with an increasing number of graduates being produced and going into the sectors industries. This influx provides a low cost, highly trained and potentially innovative workforce capable of introducing new technologies and products to the marketplace. Various barriers exist in the market place but the main problem exists within our own companies in their ability to market their capabilities and to offer a greater range of service to their customers.

- Investment in research and technology;

The ability of the UK to transfer technology and knowledge from Universities and Science Parks into industry will be crucial if the UK is to maintain a competitive edge in the global marketplace. Previously dedicated aerospace R&D/R&T funding streams such as CARAD have now disappeared, replaced by a "Single Pot" funding stream that is designed to capture multi sector opportunities. Although this approach will capture technology spin off to other sectors, it will leave the UK aerospace industry to fight its own corner at a time when emerging technology economies are being able to access dedicated national funding. The AeIGT identified the need for specialist R&D/R&T Centers of Excellence to be established in the UK and Government support is already being given to establishing composite research facilities, notably at Airbus Bristol and GKN Isle of Wight. The concept of Centers of Excellence can be used to break down the economic barriers of access to dedicated facilities currently faced by SMEs. Where possible SMEs should gain access through shared facilities, thus enabling them to engage with the innovation and technology agenda at minimum levels of business cost. The UK Government must lend the support and economic weighting to this important area of future wealth creation if it is to retain and grow the economic benefits that UK aerospace currently delivers.

- Progress towards the implementation of the recommendations of the DTI-sponsored Aerospace Innovation and Growth Team; and Government support for the aerospace industry.

The WEAFF strategy document produced in 2002 has extremely close synergies with the AeIGT report and the strategy for 2005–06 and 2007 further supports the AeIGT agenda and action plan. WEAFF have in place programs to develop business competitiveness, Skills required within the region and a program to promote the sector to young people, returnees to work and ex services personnel. Future programs are being justified to promote the export potential of UK companies and the identification of technology appropriate to Small to Medium sized enterprises. All in line with and supportive of the recommendations of the AeIGT report, WEAFF recognize that the region will be faced with a disproportionate amount of the burden to support the sector in line with industry expectations and are working closely with the SWRDA to ensure

they are kept informed as to the potential costs. However our programs have delivered excellent results to date and will continue to do so given the support of the National Government, SWRDA, industry and our partners.

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