CSBUP

PRIME MINISTER 25 February 1987

SPACE AND AIRBUS

COPIED TO AGROSPACE : Space Policy PTZ

Paul Channon's note of 24 February.

SPACE

In my briefing note for the December E(A) (attached), I argued that BNSC had put forward an all or nothing programme and not set out a scientifically consistent menu of choices which could be tailored to the total amount that Minister's were willing to invest. Both Messrs Channon and Fairclough are still arguing the same case, the former laying greater political emphasis because of election considerations while the latter suggests a paring of the annual spend rate in 1989/90 from £302m to £250m.

Both are telling us that we have to choose between being in space 'properly' or not at all. I continue to believe that the categorisations of space expenditure have been made on the basis of what activities fit together **administratively** rather than what belong together **scientifically**. For example, the polar platform expenditure has been grouped as part of the general Columbus programme for the space station, whereas in scientific terms it is a separate entity which belongs logically with earth observation. I therefore do not accept the all-or-nothing argument but believe that the two guiding principles should be:

a. that what we do should be done well,

b. that we should build on past success which has already given us leadership.

In particular, we have clear leadership in satellite communications and the original E(A) paper identifies four significant contracts with British involvement that this area has already generated.

Conclusion and Recommendations

The space programme is imaginative and it would be good for Britain to play a strong leading role on the basis of selecting those areas where we are strong and building upon them. If the total level of expenditure proposed is unacceptably high then alternative programmes for our participation should be tailored on the basis of which topics are scientifically consistent. My earlier paper shows a table in which the overall annual total expenditures are regrouped on such a basis.

AIRBUS

The Market

The argument for this investment should begin in the market place. The A340 will be a wide-bodied four-engined aircraft with a passenger capacity of 290 and a range in excess of 7,000 nautical miles. It will need to penetrate new markets currently served by the Boeing 747 and the McDonald Douglas DC10. By contrast, the A330 is a twin-engined, wide-bodied aircraft seating between 300 and 400 passengers with a range below 5,000 nautical miles. It is the successor to the original Airbus A300 which has considerable but dwindling market share in the face of American competition.

A330

It is therefore logical to expect a reasonably good market performance from the A330 compared with the far risker 340. For example, the DTI have estimated most likely sales of 175 units which compares with Airbus Industrie's projection of 450 units. This is a far cry from their current order book of five airlines committing to 36 units.

Financial Risk and Reward

The total development cost, excluding engines, of both aircraft is $3½bn at 1986 prices. Because of common design features either project alone would cost over $2½bn so there is certainly economy of scale in building both together. British Aerospace, which has a 20% stake in the Airbus venture, would therefore have an £840m share of the joint development cost and they are asking for 90% Government support of £750m. Once development has been achieved BAe would fund production costs. (None of these figures include the £75m launch aid requested by Rolls Royce for the A340 engine).

If both aircraft are developed and achieve aggregate sales of 610 units by the year 2006 the cash rate of return on the project would be 9.4%. After allowing for inflation this represents a real rate of return of 5.4% which is marginally above the Treasury criterion for low risk public sector projects. These projects are undoubtedly high risk, particularly because of the marketing situation with the A340. It is therefore not difficult to see why Kleinwort Benson have been unable to find any bank interested in providing private sector project finance. It is correspondingly difficult to see why Government should provide all of it.

Second Order Benefits

Airbus is a joint venture where the true return to the shareholders needs to be measured in terms of the orders which they achieve through Airbus project development. For example, British Aerospace will, if it participates in the A330/340, be given the order for the wings. The real benefit from being in Airbus can therefore be under-estimated. Indeed, one wonders whether it is not

deliberately run with a cost structure which will always leave it in loss but its individual shareholders in profit!

Nevertheless, I am advised that the 9.4% return referred to above does take into account the profit element expected by BAe from the wings. Indeed, BAe will receive some 25% of the Airbus 330/340 component orders which is higher than its pro rata share in the consortium. Nevertheless, the formula structure that operates within Airbus makes it impossible for individual shareholders to identify what returns their partners are making out of their individual Airbus component orders. It is therefore possible for the French and the Germans to make significantly different real Airbus profits from ourselves. There is no hard evidence in either direction so there is a strong case in favour of tighter financial monitoring of each partner's real profits.

CONCLUSIONS AND RECOMMENDATIONS

The Airbus financial arrangements are founded on an uncommercial basis. It is unsurprising that no bank is prepared to lend money to the project without Government backed guarantees. The French and German Governments appear to be standing foursquare behind their own participating companies and there is clearly an element of steam-rollering to get Britain to fall in line by the proposed March deadline.

For the positive case, the recently launched A320 already has some 440 orders and looks as though it will achieve the target 600 orders necessary to produce a 7% return on the Government aid of £250m which it received in 1984.

I therefore recommend:

1. That the DTI push British Aerospace very hard to find more of the total development cost from their own resources. The DTI have suggested we be prepared to offer up to 50% (£420m) with an initial proposal of 40%.

2. If this is unsuccessful, the possibility of developing the A330 alone should be examined despite the capital economies of building both aircraft together.

3. Once the principle of State aid has been accepted, it does not very much matter in Government terms whether it is provided by way of guarantee or cash injection. Mr Channon's paper recommends the latter.

4. Tougher financial monitoring arrangements need to be established.

GEORGE GUISE

APPENDIX

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BNSC - SPACE PLAN

These greatly increased expenditure proposals have been strongly attacked by the Treasury, not only on the grounds of parsimony, but because there are no tests which demonstrate value for money. Ministers have not really been shown how alternative programmes could be tailored to different resources because of the manner in which topics are linked together administratively. A proper menu of choices should be put together and I have made a rough initial attempt below.

My other main concern is management and the extent to which opportunities are missed when development approaches the commercial phase through not obtaining adequate cost recovery over the financially unproductive years. For example, it is not until the very penultimate page of the E(A) paper under Annex D that we are shown four significant satellite contracts with British involvement that our space involvement has already generated. There are other areas where the paper does not exploit its strengths. For example, the overall programme presented shows an increasing UK national programme forming some 72% of the ESA programme by 1989/90 and that is nowhere pointed out.

Alternative Groupings of Programmes

The guiding principle is that what we do should be done well. Limited resources should not be spread thinly over everything. I have therefore tried to divide the programme up into self-contained groupings:

ESA £m (cash)	86/87	87/88	88/89	89/90
Budget & Science Programme	26	31	33	37
Satellite Communications	33	37	33	34
Earth Obs. & Polar Platform	24	40	49	54
Space Station & Microgravity	2	10	19	21
Launch Systems (Excl. Hotol)	8	16	20	27
Technology	-	1	3	3
	93	135	157	176
National Programme £m (Cash)	39	66	95	126
TOTAL	132	201	252	302
HOTOL if proved	-	2	3	22

This expenditure allocation differs from Annex B of the E(A) paper which groups expenditure into administratively separate rather than scientifically separate categories. For example, the polar platform is a natural fit with the earth observation programme but has been accounted as part of the general space station expenditure under the Columbus programme because this is how it is administered. Again, participation in the US space station programme gives access to microgravity work and there is little sense in planning to do one without the other.

Value for Money and Management

Return on capital projections are a hopelessly inaccurate method of measuring the effectiveness of R&D programmes. Once the underlying plausibility for ultimate wealth creation has been established, one efficiency measure is the expenditure fraction which is actually put into the field, rather than being frittered away on committees and administration. Perhaps a proper measure of this ratio should be agreed ab initio for each research programme and regularly reported. Another useful measure is how much expenditure on other items has been willingly foregone. Note that the major spending departments are very enthusiastic about the space programme but volunteer no expenditure reallocation of their own funds.

Tough professional managment is essential when large sums are being spent at the boundary of scientific and technical knowledge. Othewise there will be delay, waste and inadequate cost recovery from the technical successes. Scientists often ride off on hobbyhorses and dismiss economic issues with either jargon or pious hope. Wittgenstein once remarked that anything which can be said at all can be said clearly and that is a very good maxim when managing scientists!

Recommendation and Key Points

The UK should play a strong role in space development by building on its initial success in areas like satellite communication. If the funding requested is not available then specific programmes should be supported in descending order of importance as shown in my table:

1. A strong positive point is that the UK national share, as a percentage of the ESA subscription, rises over the four years quite markedly from 42 to 72 per cent.

2. It is possible to be selective in space activity but it is important to distinguish those items which are separable in the scientific sense from those that are linked administratively or bureaucratically.

3. The UK is a clear leader in satellite technology. When commercial exploitation is achieved adequate prices must be charged to cover the financially unproductive years of innovation. I suspect this is an area which should not be left to the scientists.

GEORGE GUISE

Attached is an appendix on HOTOL.

APPENDIX

HOTOL

This has not been included under launch systems because the idea of a space plane, taking off horizontally and using an atmosphere-breathing engine for the initial part of its flight, is purely conceptual. It began as a joint venture between Rolls Royce and British Aerospace and now BNSC has joined them in a two year 'Proof of Concept' study at a cost of £3m. The study will be complete by the autumn of 1988 when it should be clear whether the technological development of a space plane is an attainable goal. The project is currently a national UK project but if development appears viable it will be funded within ESA.

Any decision on HOTOL is unlikely before 1990. BNSC hopes that HOTOL will ultimately displace the French Hermes from ESA when the balance of funding would probably be 30% BNSC and 70% ESA. Hermes is a shuttle system with vertical take-off and pure rocket propulsion and therefore suffers from the traditional disadvantages and safety risks which were sadly demonstrated with Challenger.

If HOTOL is developed its main use would be the launching of satellites and manned transportation to space stations or other craft in orbit needing service. It might reduce the cost of putting satellites into low earth orbit by a factor of five and the cost of a geostationary replacement by a factor of two. The newspaper stories about ordinary passengers going to Australia for the weekend, although perhaps possible, are not the primary case for HOTOL. Total development cost has been estimated at £3 billion for a small manned capsule with a maiden flight in 1998.