THE FUTURE DEVELOPMENT OF AIR TRANSPORT IN THE UNITED KINGDOM

THE CIVIL AVIATION AUTHORITY'S RESPONSE TO THE GOVERNMENT'S CONSULTATION DOCUMENTS ON AIR TRANSPORT POLICY

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EXECUTIVE SUMMARY

The Government's consultation documents on air transport policy set out a range of complex questions about how best to deal with current and anticipated demand for air travel and the implications for the development of new capacity. In addressing these issues, the CAA brings together specialist knowledge from a number of different areas, including safety regulation, economic regulation, airspace policy and environmental assessment, as well as familiarity with the commercial drivers of airline and airport business.

Environmental Impacts

The CAA believes that the Government's approach to airport infrastructure should have the objective of ensuring that the long-term development of aviation maximises the expected net benefits to society in a sustainable way. Aviation should meet its full costs, including those imposed on the environment, and this must form a key element of any decisions taken in response to this consultation.

Aviation gives rise to a number of environmental impacts. The largest impact on the global atmosphere is connected with carbon dioxide emissions, whilst the two most important local impacts are noise and local air quality, both of which are key factors to be considered in decisions on the location of new airport capacity. The CAA believes that it is essential that Government finds an effective policy approach, internationally and nationally, that does more to make aviation meet these costs, and to do so on a timescale that matches that for the delivery of any major new airport capacity.

In considering whether new capacity is needed, and where such capacity should be built, the CAA's starting point is to look to market mechanisms to deliver the appropriate level of infrastructure. Efficient markets will usually provide accurate signals which will enable decisions to be made by private sector developers, airport operators and airlines that produce economically and socially optimal outcomes, as long as the environmental externalities, primarily noise and local air quality in this case, are fully taken into account in that decision-making process.

Regional Air Transport

In the case of regional air transport, the market appears largely to be working to deliver the necessary infrastructure investment. This is an important and welcome development. Coupled with the beneficial effects of airline liberalisation, this enhanced infrastructure has enabled substantial and sustained growth of regional air services in recent years, both in terms of the number of services and the choice of locations available, to the benefit of consumers and producers alike. There is nothing currently to suggest that normal commercial decisions will not be able to continue to deliver necessary enhancements to regional airport infrastructure in the future. There have been some problems in terms of access to London, and particularly Heathrow, from some regional airports, but these stem from capacity

constraints in the South East, rather than any problem in UK regions. The CAA therefore concludes that, within those regions, there are no obvious problems in provision of necessary airport infrastructure and that, in general, there is limited value in Government intervention.

The position in the South East of England

However, the position is very different for the South East of England where airports are already congested, there is a high level of unmet demand, and forecasts of demand growth suggest that both will become very much worse unless the UK develops capacity to accommodate that growth. In the CAA's view, and accepting the inevitable uncertainties in looking forward over such a long period, these long-term forecasts are reasonably robust, and experience suggests that long-term trend growth is resilient to shocks such as those faced by the aviation industry in recent years.

An efficient air transport system brings considerable wider social and economic benefits and is a major contributor to aggregate productivity levels. The cost of not acting to boost that system in a period of demand growth is hard to quantify, but it is likely to result in significant welfare loss. Constrained supply will tend to reduce competitive pressures, increase the cost of air travel for leisure and business passengers, reduce the ability of airlines to provide air services to the regions, and price some potential passengers out of the market altogether, with the impact falling most heavily on lower income groups.

The environmental impacts connected with new airport capacity must of course be taken fully into account. The CAA believes that the best approach to these questions is to seek the optimal balance between social and economic benefits and environmental costs, with the aim of ensuring that decisions are made having taken full account of environmental impacts rather than seeking to eliminate them altogether.

Although it is difficult to be precise about the value that should be attached to environmental impacts, the range of estimates available suggest that the very high economic and social benefits of new capacity in the South East (even without considering the costs to the UK economy of not building some additional capacity) are likely to outweigh the likely environmental costs. An accurate pricing-in of those environmental costs would result in some increase in the price of air travel to end-users. However, the level of that environment-related cost increase would be unlikely to act substantially to constrain the predicted increase in demand for air travel from leisure or business passengers.

The CAA believes therefore that the case for new capacity in the South East is clearly made. What is also clear is that there are particular constraints operating within the South East that prevent a purely market-based approach from successfully responding to this need. There are severe practical difficulties attached to seeing major infrastructure developments through to completion in the South East. In part this is linked to the way the planning system has traditionally operated. But it must also be recognised that major airport developments, particularly in densely populated regions, will affect a wide range of people and businesses, both positively and negatively. The sheer number of stakeholders with conflicting views also presents a major hurdle for potentially welfare-enhancing developments to clear. If the Government indicates the clear desirability of new capacity in the South East, having considered the social, economic and environmental costs and benefits for the UK, and can give a steer as to which of the commercially feasible locations for that new

capacity should go ahead, then this will introduce a greater level of certainty about the likelihood of a large infrastructure project getting beyond the planning stage. Similarly, there may be a case for Government indicating locations where new capacity may be unacceptable on environmental grounds. All this points to the desirability of Government giving a lead on this issue.

The CAA's approach

The CAA has considered the South East options discussed in the consultation documents against a framework covering the main relevant economic, commercial, safety, environmental and social issues.

This framework includes:

- the safety implications of the outline proposals and how those may constrain capacity usage;
- a comparison of the environmental impacts;
- the importance of ensuring that any indication of Government preference for a particular project or location is aligned with an assessment of the commercial viability of that project given the requirement for private sector finance;
- the particular characteristics of airline economics;
- the possible interaction with the way the CAA applies economic regulation to airports, and;
- an assessment of whether options are feasible in airspace terms.

We have used this framework to assess in detail the lead options for new airport infrastructure in the South East. This assessment helps to develop a balanced view on the attractiveness and feasibility of these options, but also raises some particular questions to which we believe Government will need to give more detailed consideration before the publication of the White Paper later this year.

Some of the options raise particular operational issues, especially the proposed close parallel runway options which, in order to meet safety considerations would largely have to be operated as if they were a single runway. Whilst the Government's economic assessment already discounts the value of close parallel options, in the CAA's view the extent of this safety constraint on the utilisation of those runways, in particular for the Gatwick option, would mean they would deliver limited additional capacity and seem therefore unlikely to be commercially and economically more attractive than the wide-spaced alternatives. And it seems highly unlikely that the option of a brand new airport at Cliffe would be viable, not least because of very considerable safety problems associated with bird hazard.

In respect of other options for South East expansion, the economic considerations would point strongly towards one particular ranking of the available choices of location. However, there are very much larger environmental impacts connected with some options than others.

Balancing these conflicting priorities is an extremely difficult task. Indeed, more detailed analysis of the costs and benefits involved for specific development

proposals would be needed before coming to firm and final conclusions on any of the proposals.

Commercial viability

There are many potential pitfalls for Government in seeking to give a lead on where new capacity should be located, and the CAA would wish to draw attention to two in particular. The first is that Government should ensure that it does not seek to promote projects that are not themselves commercially viable. In contrast with other infrastructure projects, airports in the UK are expected to be fully financed by the private sector. So to indicate a preference for a project that was not commercially viable would be to run a high risk that the investment for the preferred project would not be forthcoming, or that the runways were built but ended up under-utilised.

The second is to avoid being overly prescriptive. There is clear value in Government giving a steer as to where initial new capacity should be located. But in view of the uncertainties going forward and the fast-changing nature of the aviation market there is no need to define a precise “blueprint” or timetable. Beyond an initial increase in capacity the issue is likely to be one of safeguarding options for the future.

Given the necessarily limited detail provided in the consultation documents there will inevitably be uncertainty about the costs and benefits attached to the various options. Despite that, the Government should seek to ensure that its assessment of the desirability and viability of each is in line with the normal commercial considerations that any private sector company would take into account. There must be clarity about the scope of projects. Attention should be given to revenue risk, the assumptions made about airline reactions to individual locations, and the project risk entailed in the differing scale of individual projects, including the necessary surface access enhancements. The resulting commercial assessment should be set alongside the Government’s net present value calculations. Indeed, this commercial assessment should arguably be the key factor in considering whether developments could be delivered by the private sector. This will tend to favour incremental development ahead of major expansion at existing airports or the development of brand new airports, and will make more attractive those options that provide greater certainty about revenue streams flowing from the new investment.

Appraising the options

The Government’s decision will depend on the weighting given to the competing factors associated with any airport development. If the overriding concern for Government is environmental impact, then this may point to building no new capacity at all.

If the overriding concern were the economic benefits and commercial viability of projects, then this would point clearly to building new capacity at Heathrow. This option would in particular raise issues about the environmental impacts of such a development, which appear to be greater at Heathrow than at any of the other options.

Alternatively, of the three main options for new airport capacity in the London area, development at Stansted would have the least overall environmental impact. A decision in favour of Stansted would raise a number of further issues, whether the project is commercially viable, whether investment would therefore be forthcoming, and what potential there would be for connection with currently planned rail

infrastructure. Gatwick presents greater environmental challenges than Stansted whilst appearing to be less commercially viable than Heathrow.

Finally, if the Government seeks to address both environmental and economic issues, as the CAA believes it should, in line with the aims of sustainable development, then it will need to decide how much weight it gives to each, and how to balance economic and commercial benefits against environmental impacts for each option.

In the CAA's view, and taking all these factors into consideration, it seems likely that the construction of a new runway at Heathrow would produce very substantial economic benefits and would be a commercially viable project, assuming the necessary terminal facilities and surface access infrastructure would be built to enable full usage of capacity. In environmental terms, however, there are significant downsides to the Heathrow option, in particular, because of the increase in the numbers of households affected by aircraft noise and the risk of breaching statutory thresholds for nitrogen oxides (NOx). The CAA believes these costs should be fully taken into account when considering the desirability of Heathrow, and that those seriously affected should receive adequate compensation.

Valuing the potential costs of abatement, compensation or mitigation measures to address environmental externalities such as noise is extremely difficult. For example, the projections in the SERAS consultation document are that around 100,000 additional people could be affected by noise levels of 57 decibels or more if a new runway was built at Heathrow, but estimates for what would represent an accurate monetary value for that noise impact vary widely. Whatever value is attached to them will reduce the attractiveness of Heathrow, as there are bigger noise impacts attached to expansion there than at the other South East locations. Similar issues arise in connection with the possible deterioration of local air quality (NOx).

The Government will need to come to a view on the likely costs of those environmental impacts before concluding that the expected economic benefits of the Heathrow option would be sufficiently large to meet them, and that the net benefits for Heathrow would be higher than for the other South East options.

By contrast, the Stansted option would present fewer environmental challenges, but it is far from certain that it would be a commercially viable project. The Government's estimate of the economic benefits of Stansted as a hub relies on the assumption that major airlines would move large tranches of their services to Stansted once that capacity became available. However, in the CAA's view, this may be an optimistic assumption, and may take insufficient account of the benefits to airlines of a network of inter-connecting services, which exist at Heathrow and which would be difficult to re-create at Stansted. Even with the existing levels of excess demand elsewhere in the South East, Stansted is not being used at full capacity. Hence it is not clear that any new capacity, even a single runway, would be quickly used either, thereby negatively affecting the projected revenue streams from any capital investment raising questions over commercial viability. There are similar, though probably lesser (given the more buoyant catchment area), issues at Gatwick. Government would need to convince itself that private sector finance would be forthcoming for such projects (and at what price), or decide to fund them from the public purse, before indicating that either was the preferred option.

The CAA therefore believes that Government should build into its economic analysis a more detailed and commercially attuned assessment of each option. This will need

to consider whether an otherwise commercially non-viable project could be made feasible, as has been suggested, by cross subsidy from other, existing airports. The CAA would question whether there are simple regulatory fixes which do not in themselves present considerable problems, including how far users generally could be said to benefit from such arrangements, whether it is economically sound (and consistent with sustainable development) to be encouraging more marginal aviation activity and whether the extent and length of the regulatory commitment involved would carry sufficient credibility to deliver long-term financing.

Beyond the building of a first new runway, the amount of uncertainty attached to other projects increases, and the impact on those of the additional capacity that would be created from an extra runway would need to be factored in. However, it is very likely that capacity constraints in the South East would continue to be a problem even after a first new runway became fully operational. It will also be important for the Government to signal, and for the industry to recognise, that if the choice were a short third runway at Heathrow, then this would be the limit to what is feasible at that site, and that further runways would need to be constructed at other South East locations. Given this, it is important that Government should not rule out options of expansion elsewhere that could be viable, having taken full account of environmental impacts. Indeed measures should be taken to ensure they are safeguarded for the future. It is recognised that this will inevitably create uncertainty for those living near the relevant airports, but this is unavoidable if a future development path is to be kept open. To mitigate this as far as possible, Government should seek to give the maximum clarity possible, including ruling out options that are clearly not viable.

Whilst the CAA would argue that the private sector is likely to be best placed to decide whether and when future projects beyond a first new runway would be desirable, current conditions suggest that if a Heathrow runway were built first, expansion at Gatwick may produce extra capacity that would be more quickly utilised than at Stansted.

1. THE OBJECTIVE OF AVIATION INFRASTRUCTURE POLICY

The CAA believes that the Government's approach to airport infrastructure should reflect the objective of ensuring that the long-term development of aviation maximises the expected net benefits to society in a sustainable way. Aviation should meet its full costs, including those imposed on the environment. But it is also important that decisions on infrastructure take full account of the commercial realities of the aviation industry, to guard against sub-optimal investment and the associated loss to airlines, passengers and potentially the wider public.

1.1 The CAA's approach to aviation generally has long been one of liberalisation and a reliance to the greatest extent possible on market-driven mechanisms. This approach has already had significant success. The liberalisation of the airline industry within the European single aviation market has generated substantial benefits both for passengers and for society as a whole. The more that market approaches and mechanisms can be applied to airport development, and to the use of existing airport assets, the more likely it is that decisions by airport developers, airport operators and airlines will produce economically and socially optimal outcomes. However, there are a number of factors relating to the nature of the industry itself and the institutional framework in which it operates which currently constrain an entirely market-based approach to aviation infrastructure.

1.2 The main constraints are:

- the uncertainty about the way in which aviation demand and supply will develop in the future;
- the difficulty in assessing the environmental costs of providing additional capacity and ensuring that aviation faces those costs, together with inadequate means of compensating people living around airports who are adversely affected;
- the problems of assessing and accounting for the wider benefits of aviation;
- the long life, large scale and "lumpiness", and irreversible nature of many infrastructure investments;
- the possible difficulty airlines may face in responding to large infrastructure changes because of the characteristics of airline economics;
- deficiencies in the planning system;
- the existence of market power in the airport market and its implications for infrastructure development; and
- weak incentives for airport users in aggregate to make the best use of existing capacity.

1.3 The CAA recognises that in addressing these issues in the White Paper the Government has set itself an immense task. However, the task is a necessary one given the importance of aviation to UK consumers and to the UK economy generally. Whatever conclusions the Government reaches will not be risk-free. So, in developing its response to this consultation, the CAA

has focussed on how best to assess and manage that risk as effectively as possible, taking into account the different circumstances of aviation in different parts of the UK. Before turning to the CAA's views, the following sections describe in more detail the issues and constraints that the Government is facing.

Uncertainty

1.4 The Government has developed a set of highly sophisticated forecasting models based on the current pattern of demand, and the ways in which it may change in the future, in order to predict demand both at the aggregate national level and at the level of individual airports. However, any forecasts over a 30-year period are subject to significant uncertainty.

Aggregate forecasts

1.5 Aviation has long been a growth industry, albeit one suffering periodically from externally generated demand shocks, generally of relatively limited duration. Looking forward, the aggregate level of aviation demand is forecast to continue to grow over the medium to long term, although as an increasingly mature industry it is likely that the rate of growth will fall to lower levels than have been typical in the past. In broad terms therefore it seems likely that aggregate demand, both at UK airports generally and at the London area airports in particular, will increase substantially over the next 20 to 30 years.

1.6 The potential impact of internalising aviation's environmental costs is inevitably uncertain, but looks unlikely fundamentally to alter the growth picture. Aviation's impact on climate change is its largest quantifiable environmental cost. Government believes that introducing measures to deal with aviation's contribution to global warming could depress national demand by up to 10 per cent but that this could be more than offset by a greater reduction in airline costs than had previously been forecast, mainly as a result of more intense competitive pressures.

1.7 It could of course be the case that environmental costs prove to be greater than expected, or that other changes, for example to the general taxation treatment of aviation, would also have an impact on demand and Government should ensure that its forecasting takes this into account. However, the Government has produced a wide range of forecasts with the total throughput at UK airports in 2030 ranging from 400m to 600m passengers which suggests that demand at South East airports will double well before 2030, even at the lower end of the range. The CAA's own view is that these long-term forecasts are robust, accepting the inevitable uncertainties involved in such long-term projections. And CAA research has also pointed to the aviation sector's long-term resilience to shocks such as those it has suffered recently.

Airport forecasts

1.8 Experience shows that forecasting traffic volumes at individual airport locations, particularly at the smaller airports, can be hazardous even a few years ahead, let alone for 30 years. For example, in the 1980s few would have foreseen the development of the no frills carriers and the subsequent expansion of airports such as Liverpool and Prestwick. The prospects for further changes in consumer preferences and also for future innovation and

technological progress (e.g. in addressing noise) are equally difficult to predict now.

1.9 This said, it is clear that forecasts have to be made because of the long lead-time associated with infrastructure developments. The inevitable uncertainty surrounding forecasts does not imply that such forecasts should be rejected but rather that the conclusions drawn from them should reflect the necessarily simplified nature of forecasting models. In particular, the more detailed the conclusions drawn, the more risk that is likely to overlay them. Even so, some outcomes are more likely than others. For example, it would be implausible for the Government to forecast that by 2030 the throughput at Humberside will exceed that at Manchester since it is highly improbable that the massive discrepancy in the size of the catchment areas of the two airports will decrease significantly, nor is it likely that a major airline would seek to create a connecting hub at Humberside.

1.10 The CAA would accept that the fundamental drivers of demand at particular airports – the size of the catchment area, the prosperity of the local population, the attractiveness to incoming tourism, and the attractiveness to airlines – will still play a prominent role in the future. But it is sometimes difficult to recall in an industry as dynamic as air transport that it can take many years to develop the image of an airport and its range of services. For example, it is now nearly 20 years since the CAA stated that “the aim at Gatwick must be the development of a strong...network of scheduled services such as the Government and this Authority has striven to build and sustain over many years.” To an extent this vision has never been realised and, arguably, is now further from realisation than it was a few years ago. Indeed, the business mix at Gatwick has changed dramatically in recent years with the disbandment of the BA hub and the entry of no frills carriers operating point-to-point services.

1.11 Government forecasts of capacity requirements at different individual airports can therefore be highly uncertain and attempting to impose roles on both airports and airlines may be difficult to achieve in practice. This emphasises the need for the Government in reaching its views to take full account of the complexity of the industry, the commercial realities, and the complex interaction between infrastructure and air service networks, and to take only those decisions which are required now and where there will be demonstrable benefit from a Government steer.

Assessing Environmental Costs

1.12 Like many other industries, aviation adversely affects the environment. Where these impacts are not reflected in the price users pay, they represent negative externalities. The CAA’s view is that aviation should face all its costs, including those arising from environmental pollution. The aim of internalising aviation’s environmental costs should not be to reduce demand as an end in itself, nor to prevent all pollution, but to establish the balance between pollution and beneficial aviation outputs that maximises overall living standards. If aviation does not pay for its externalities, or if they are not priced appropriately, there will likely be a net welfare loss to society.

1.13 The precise level of environmental costs is currently uncertain and the measures available to impose these costs on aviation less than perfect. The main options for internalising environmental costs have been to use quotas,

or to apply taxes or subsidies. There are problems with these options, as there is a high possibility of "getting it wrong" – i.e. setting the quota or the tax at too high or too low a level, or insisting on quota rules that are too prescriptive, or too lax, thereby giving rise to a welfare loss. Given that airlines tend to operate on thin margins, and given the considerable uncertainty surrounding the estimation of environmental costs, a gradual approach is preferable whatever mechanism or mix of mechanisms is used.

1.14 There is a distinction between, on the one hand, global externalities such as greenhouse gases that arise irrespective of the specific location of a development and, on the other hand, more localised externalities such as noise. National government is best placed to ensure that global issues are properly addressed, working through international fora, but local issues may often be best addressed locally to the maximum extent possible.

1.15 The impact of greenhouse gas emissions is by far the most significant in monetary terms and, as a global impact, is unaffected by choice of location for new capacity. Local impacts such as noise and NOx vary, with the greatest effects being projected for a new runway at Heathrow.

The Wider Benefits of Aviation

1.16 It is often argued that infrastructure projects such as airports should be seen as engines of economic development for a locality, a region or even for the country as a whole. Such economic benefits, when they cannot be captured by private developers and therefore play no part in their decisions, are called positive externalities, in contrast to the negative environmental externalities described above. The scale, indeed even the existence, of these benefits has been the subject of considerable debate, but if and where they exist there is a distinction to be drawn, as with the negative impacts, between local impacts and wider effects. However, unlike some environmental externalities, the benefits are unlikely to spread further than the country's boundaries.

1.17 If, for a given development the Government believed that such externalities are significant, but the developer were to conclude that the project was not worth pursuing, one policy approach would be to provide a subsidy either directly from the public purse or, through cross-subsidy, from users of existing infrastructure. An alternative option might be for those who would most benefit from the building of new infrastructure to provide funding to make a project viable. For example, this might involve local business consortia, Regional Development Agencies, local councils etc. Ultimately how far a project is truly beneficial from a social perspective will depend on its costs and benefits. An airport that remains under-utilised, both significantly and over the long term, seems unlikely to provide benefits that outweigh the costs of its development.

1.18 The Government and other bodies also need to consider whether some of the benefits which subsidised new infrastructure might bring could be generated by other, less costly, means. For example, the liberalisation of air services within Europe has led to the introduction of far more new services, including direct services to and from the UK regions, than Government would ever have been prepared or able to subsidise, whether directly or through airport construction or support.

The Nature of Investment in Aviation Infrastructure

1.19 The long life, large scale, “lumpiness”, and irreversible nature of many infrastructure investments increases the risk for developers. For example, it creates sequencing problems because the viability of expansion at one airport may be crucially dependent on whether or not expansion at a competing airport goes ahead or not. Moreover, a potential developer of a new airport must consider very carefully the intrinsic risks associated with such a large sunk investment. If the venture does not succeed commercially much of the investment will not be recouped. In effect, the cost of exit becomes the barrier to entry. In these circumstances, the quality of decision-making is improved by as much public policy and regulatory certainty as possible over the lifetime of the investment. However, the public policy and legislative framework needs to be flexible enough to cope with both projected and, more importantly, unforeseen changes in consumer preferences and in the structure of the airport and airline industries over a thirty-year period.

Airline Responses

1.20 Airlines may not regard two airports as substitutes even though many passengers may have the choice of using one or the other. For example, there has been for many years massive congestion at Heathrow but spare capacity at what appear at first glance to be the substitute airports of Gatwick, Stansted and Luton. The profitability of many routes is relatively low and switching a route from one airport to another may force an averagely profitable route into loss. Costs may rise if economies of scale or scope are lost and revenues may fall if discounts are needed to persuade passengers to change their choice of airport and if network feed traffic is lost. There are sunk costs in establishing a presence at an airport and of operating a base or a hub there. It may not therefore be commercially feasible for airlines to switch activity when new infrastructure is developed elsewhere, particularly if slot property rights are ill-defined, preventing airlines from realising the full value of any slots they voluntarily relinquish at airports with excess demand.

The Planning System

1.21 The current planning system has often presented a major obstacle to infrastructure expansion. Currently, new infrastructure developments are subject to the Town and Country Planning Act (1990). However, the current system has several shortcomings, most notably the length of inquiries and their lack of predictability. There seems widespread consensus that there is a need to speed up the planning system and prevent another Terminal 5 inquiry experience while fully respecting the rights of people adversely affected by environmental disturbance.

1.22 To a large extent the problems with the current system arise from a lack of clear objectives. This often results in planning inquiries devoting a considerable amount of time to assessing the “need” for a project and in the process imposing further sunk costs on developers. Arguably the main objective of the planning system should be to address environmental concerns where there are clear market failures. Where markets exist to match capacity with expected demand, they will work better than planning. Developers are normally best placed to address the need for a project, as it is their resources at stake.

Airport Market Power

1.23 In a competitive market, prices give firms the appropriate investment incentives. However, the market for airport infrastructure is not competitive everywhere. In some cases there are barriers to entry which give incumbents significant market power and could lead to their pricing above competitive levels, restricting output and under-investing. Airports in dominant positions are regulated in order to curb the potential for such behaviour. The problem with economic regulation is that it may distort the incentives for developers and its long-term effects on investment are unclear. The standard UK economic regulation model offers regulated firms the expectation that everything invested will earn over the assets' lives the regulatory cost of capital, but no more. This is input-focused and does not necessarily offer the strong incentives to innovate and invest to the level that would occur in a competitive market where some degree of supernormal profit may be an important inducement.

1.24 In its recent five yearly review the CAA has explored the issue of output-based incentives for efficiently-incurred investments at designated airports. However, no regulatory regime can ever fully reproduce the incentives for expansion at least cost that a competitive market provides.

1.25 The existence of a regulatory system is seen by some to give opportunities to facilitate non-commercial investment through system cross-subsidy. Such an approach has disadvantages in terms of distorting competition at the airport and the airline level, as well as promoting inefficient investment. In addition, in the CAA's view it is questionable whether finance could be raised for a project that is dependent solely or very largely upon a regulator's commitment to a particular pricing methodology over a timescale far greater than the normal regulatory review period.

Weak Incentives for the Best Use of Existing Capacity

1.26 The difficulties of significantly expanding airport capacity in anything other than the long term emphasise the importance of making the best use of existing infrastructure. However, there are several ways in which the utilisation of airport capacity falls short of best use.

1.27 Slot usage at airports declared as "coordinated" under the EC slot regulation is based on the principle of "grandfather rights" and so is governed to a large extent by historical developments, tempered by the use of slot exchanges (which may include informal monetary exchanges). Although airlines can to some extent optimise the use of slots within their own portfolios, the lack of a transparent market for slots has fostered inefficiencies in slot use.

1.28 Although air services have been liberalised within the European single aviation market, governmentally imposed restrictions apply to services between the UK and countries outside Europe. In the case of air services between the UK and the US, only two US and two UK airlines can operate from Heathrow. There is therefore significant suppressed demand for those Heathrow slots suitable for transatlantic services, which can only manifest itself when the bilateral restrictions are removed. There are also some other instances where airlines might add long-haul and medium-haul services at Heathrow if they were permitted to do so under the relevant bilateral.

Conclusion

1.29 There is a wide range of factors that Government needs to take into account in making decisions on airport infrastructure. There is a clear role for Government in getting decision making frameworks right, for instance on environmental costs and planning. Beyond that, the forecasting uncertainties and the fast-changing commercial nature of the aviation industry would point to Government restricting intervention to areas where such intervention is most likely to yield positive returns.

2. IMPLICATIONS FOR POLICY DECISIONS

The earlier discussion emphasises the complexity of the issues raised by the development of aviation infrastructure. There is a mix of market and non-market factors, an interaction between airport and airline economics, trade-offs between economic benefits and environmental costs, and the influence of a large number of institutional arrangements. Government should therefore seek to intervene in the aviation market only where there is clear value in its doing so.

2.1 Given the fast changing aviation environment, participants in the industry may face considerable risks when taking investment decisions even though they are close to the market. The Government is much further removed from the market and less able to react to market changes; this argues for relying on markets wherever possible. But it is necessary to recognise that Government itself is responsible for, or has influence on, some of the factors discussed above and also for market rigidities. The problems faced by developers are particularly stark in the London area because of the likely scale of any development and of the costs of obtaining planning approval. This suggests that Government could help by reducing uncertainty. However, this is not an area where any decision is better than no decision. In seeking to reduce uncertainty, the Government's decisions need to be well founded in economic and commercial realities.

The Dangers of a "Blueprint"

2.2 There is a risk that the Government's present approach, based on detailed forecasts and a comprehensive analysis of options over a 30-year period, could evolve into a comprehensive and detailed "blueprint" for the whole UK industry to 2030. However, this does not appear to be the Government's present intention. It clearly recognises the difficulty in forecasting thirty years ahead and, in exploring the possible consequences of its options has recognised the uncertainty and the difficulties of measuring both costs and benefits. The Government has also made clear that projects would have to be privately financed and hence developers would ultimately decide whether to make the investment or not.

2.3 Nevertheless, the Government will need to remain vigilant against any risk of the White Paper evolving into such a detailed blueprint. It should restrict itself to taking decisions, or giving a lead, where (as in the South East of England) it will add value. Elsewhere it should recognise that the costs of government action may well outweigh the advantages. For instance were Government to conclude that certain development options are desirable, then the probability of options which are not included in the consultation documents gaining planning consent in the future seems remote. It is possible for governments in the future to change their position on this in the light of new information but an unduly prescriptive approach now would seem likely to make such a change more difficult and contentious.

2.4 These risks are compounded by uncertainty over how the aviation industry will develop. A decision taken today might be very different from that on a similar project in ten years' time. In these circumstances the option to defer a decision can itself have value.

2.5 So an unduly prescriptive approach will carry real risks. However, to go to the other extreme and take no decisions may be even worse. It could potentially exclude the possibility of any significant development in the foreseeable future in the South East where there is the greatest need for, and returns to, increasing the level of certainty facing commercial developers. As noted above, any project with a lead-time of ten years or more involves risk, and decisions can only be taken with imperfect knowledge. But the length of the lead-time means that further delay to a worthwhile project could be costly so that some decisions will need to be taken in the short term despite the risk and imperfect information.

Appraisal of Options

2.6 The Department for Transport's appraisal of its leading options for the South East is based on whether they are potentially beneficial from an economic perspective. However, if development is to be financed by private developers, there may be a difference between the developers' view of the commercial viability of a project (which should include an assessment of environmental costs) and the Government's assessment of its social desirability. Private developers will make their assessment based on expectations about behaviour by other (potential) developers, local conditions, the reactions of airline users, and the cost of capital of the project. As a result, even when projects might seem desirable from a public policy perspective, they might not necessarily proceed.

2.7 This emphasises the importance of the Government taking decisions only where doing so will add value and where such decisions take full account of the commercial factors which will drive the necessary financing. In particular, the CAA would urge the Government to be cautious before supporting projects that would not be commercially viable in their own right. The effect of such a decision would be to create a situation where the new capacity could only be built if there were some form of explicit Government support, or possibly a cross-subsidy within the airport system - issues which are dealt with further in section 5 of this response.

2.8 Moreover, subsidising the expansion of an airport that would provide lower value opportunities for airlines would tend to incentivise marginal aviation activity. This would seem to be out of line with the stated aims of sustainable development, which suggest that locations that provide the maximum social and economic benefits relative to environmental costs should be preferred, rather than simply opting for a location that has lower total environmental costs.

2.9 The CAA believes that Government should build into the high-level economic assessment set out in the consultation documents a more detailed assessment of financial viability, adopting similar methodologies to those commonly used by private sector developers and corporate financiers. This would also need to factor in the interaction with economic regulation.

Guiding Principles for Option Appraisal

2.10 The CAA would suggest that:

- making the best use of the existing infrastructure is particularly important in aviation because of the long lead-time of developments;

- the Government should seek to minimise the costs to the industry of policy and planning uncertainty;

- as far as possible decisions should be left to the market but that in some instances the scale of, and wider issues surrounding, airport investment mean that this is not possible;

- elsewhere the Government should only intervene to express specific preferences where it will genuinely add value, given the difficulty of forecasting accurately the dynamics of the market, changing consumer preferences and evolving service provision options;

- where a Government steer is necessary, decisions on particular projects need to pay close attention to commercial viability, as well as economic and social desirability;

- calculations of desirability and viability of projects should take full account of the likely environmental costs; and

- in order to avoid the possibility of its policy being interpreted as a detailed blueprint, the Government should not close off other viable options, even options which are not part of the current consultation framework, unless there is a good reason to do so.

3. DEVELOPING A FLEXIBLE POLICY FRAMEWORK

The CAA believes that the White Paper should develop a public policy framework, consistent with the Government's objectives as set out in the Integrated Transport White Paper, that allows airlines and airports to provide in a cost-effective manner the services expected to be valued by their customers, whilst ensuring that environmental externalities are fully addressed and taking account of the relevant issues around the safety of airport operations, airspace configuration and the particular characteristics of aviation economics. The White Paper should address not only the possible development of new infrastructure but also ways in which the use of the current infrastructure might be improved.

Safety Considerations

3.1 The CAA's principal objective is to ensure that safety risks to UK civil aviation are properly controlled. The Safety Regulation Group (SRG) within CAA has responsibility for regulating air safety through the licensing of personnel and air operators and the certification and on-going airworthiness aspects of aircraft and aircraft products. Furthermore, it discharges its responsibilities for overseeing the safety standards of UK aerodromes and the air traffic service system by the licensing and approval of civil aerodromes and the licensing and approval of various elements involved in the provision of a safe air traffic service.

3.2 Any changes associated with the creation of new runways (at new or existing airports) and airspace and air traffic services infrastructure would be reviewed in detail by SRG. At this stage, the Government's appraisal of options in the consultation documents is based on indicative layout plans for the new aerodromes and the additional runways proposed at existing airports. In the absence of the detail required to offer a full assessment, and to apply aerodrome licensing criteria to the proposed options, the CAA can only assess the proposals in general terms. However, even on the basis of these outline plans, developers could be presented with some significant implementation challenges. For example, the need to meet the requirements for runway and other safety surfaces could require extensive civil engineering effort to remove, place underground or divert power cables, roads, railways and canals. Furthermore, in the case of existing airports, detail of how the proposed new runways would link into existing operations could add to the land-take shown in the proposals.

3.3 Although the CAA believes that the air traffic control system could accommodate any of the proposed outline scenarios, there are concerns in respect of potential hazards at some of the locations proposed for new aerodromes; namely, bird hazards associated with the proposed locations for the Cliffe airport and the new Midlands airport.

3.4 Finally, the safety constraints attached to the operation of the close parallel runway options floated at Stansted and Gatwick would restrict the extent to which they could be used to provide additional air traffic movements.

Airspace Considerations

3.5 The airspace over the UK is a national asset and a finite resource; it is divided into a number of different classifications according to user requirements.

Commercial air transport operations are mainly contained within those classifications which are known collectively as controlled airspace, the structure of which is divided into areas and zones of defined dimensions incorporating arrival and departure routes, airways and holding patterns.

3.6 The CAA is organised so that the exercise of its air navigation functions are discharged by the Director of Airspace Policy (DAP). The DAP, as the airspace approval and regulatory authority, has responsibility for the definition, development, approval, promulgation, regulation, monitoring and enforcement policy for the allocation and use of the airspace, and which also includes the provision of necessary supporting infrastructure for air navigation. This responsibility is to be discharged in a way which, as far as practicable, meets the needs of all users, having regard for national security, economic and environmental factors, while maintaining a high standard of safety. Consequently, any changes associated with the creation of new runways would be subject to this approach and, in particular, the Airspace Change Process which the DAP administers.

3.7 The Secretary of State has given Directions to the CAA under section 66(1) of the Transport Act 2000 in respect of all United Kingdom airspace which are concerned, amongst other things, with the environmental impact of air transport operations. In particular, the Directions require the CAA to perform its air navigation functions in the manner it thinks best calculated to take into account the Guidance given by the Secretary of State on the Government's policies, both on sustainable development and on reducing, controlling and mitigating the impacts of civil aviation on the environment, and the planning policy guidance it has given to local planning authorities.

3.8 The CAA recognises that the design and operation of UK airspace interacts with the airspace of neighbouring states and therefore collaborates with equivalent organisations in those states, the member states of the European region of the International Civil Aviation Organisation (ICAO) and Eurocontrol – the European air navigation organisation. In addition, the European Commission has an emerging role in airspace matters through the Single European Sky initiative. However, its impact on future UK airspace arrangements is uncertain as much of the detail of its implementation has yet to be determined.

3.9 The impact of individual new runways or airports on any existing airspace structure or environmental constraints would need to be reviewed as part of more detailed design plans. In particular, the safety requirements for operations to or from parallel runways (for example where there was previously a single runway) would require reconfiguration of existing operational procedures and the associated environmental requirements. In this context, modern navigation technologies for area navigation (RNAV) provide the capability for aircraft to navigate with a high degree of accuracy along any suitably designed route irrespective of the positioning of ground-based navigation aids.

3.10 The European Civil Aviation Conference (ECAC) Navigation Strategy provides the framework for the eventual mandating of RNAV operations in terminal airspace throughout the ECAC region. The CAA considers that RNAV solutions will be a desirable and in some cases essential component in the design of the airspace structures necessary to accommodate additional runways and associated traffic growth whilst, at the same time, striking a

balance with the environmental impact of such growth. RNAV will enable decreases in fuel use and emissions through optimal routing and height profiles. It will also enable improvements in aircraft track keeping but this will result in a redistribution and concentration of aircraft noise impact.

3.11 Overall, the CAA believes that there are significant benefits to be gained from implementing RNAV routes in terminal airspace whilst ensuring that UK airspace arrangements reflect agreed European and ICAO strategies on navigation standards. In particular, the CAA contends that its introduction would provide for a balance of operational, financial and environmental benefits whilst enabling UK airports to maintain their competitive position in relation to other European airports. Work is now underway to provide the technical data to support this.

3.12 Outside of the immediate terminal airspace environment, and notwithstanding any airspace developments that would anyway be required in the interim, the implementation of additional runways is likely to trigger the need to introduce new holding patterns and/or to reposition existing holding patterns serving the airports concerned. This is inevitable due to the interaction with existing, complicated procedures. The siting of new or revised holding arrangements would inevitably introduce additional environmental impact of varying degrees through the possible requirement to revise the dimensions of existing controlled airspace, the establishment of routes to the new hold locations and in respect of aircraft descending from the holds to the final approach areas of the runways in use. However, in the longer term, the use of four-dimensional RNAV and flight management capabilities, together with advanced computer assistance tools for air traffic management, and alongside additional runway capacity may reduce or eliminate altogether the requirement for holding.

Current Infrastructure

Slot allocation

3.13 The CAA has long believed that transparent secondary trading in slots involving money payments is necessary to improve flexibility and efficiency in the slot allocation process at congested airports. It also believes that the ownership of slots by non-airline entities, which is currently forbidden, may help in the working of the market and in assisting regional access to congested airports.

3.14 The current Slot Regulation attempts to foster competition by giving priority when allocating available slots to “new entrants” defined in terms of their having no, or only a small, presence at a congested airport or on intra-EU monopoly or duopoly routes. In the CAA’s view the Regulation has fallen well short of its objective based on a detailed examination[1] of the effects of the new entrant provision at Heathrow and Gatwick. Essentially the slots which are available and of commercial value are spread too thinly across a wide range of relatively small carriers to have any real impact on competition.

[1] *“Slot Allocation: A Proposal for Europe’s Airports”*, CAP 644, Civil Aviation Authority, February 1995.

3.15 The European Commission is reviewing the Slot Regulation and National Economics Research Associates (NERA) is carrying out a study for the Commission of the application of market mechanisms to slot allocation. This study goes much wider than secondary trading and one of the options NERA is considering is the auctioning of pool slots. The CAA believes that, in principle, an approach which would allow a developer to retain some or all of the proceeds generated by the auctioning of new runway slots in order to strengthen the incentive to increase capacity would merit favourable consideration. It recognises however that there are likely to be considerable practical issues to be overcome, and that a greater reliance on markets creates the opportunity for airlines and/or airports to exploit market power. The CAA believes that competition law and existing regulatory powers are adequate to deal with such problems.

Support for regional services

3.16 The CAA recognises that there may be wider economic benefits from air services, and that if these benefits are significant but cannot be captured by the operator of the air service in the form of higher fares, it may be reasonable for local or national government to seek to support the service. There are two possible requirements for support - ongoing operating and associated costs unmet by revenue and the availability of slots. In relation to the first, EU Member States are permitted to impose Public Service Obligations (PSO) which allow subsidy on essential routes. The CAA view is that any use of PSOs should be extremely limited and that a preferable solution in economic terms may be for those from the locality benefiting from the service (i.e. local councils, RDAs etc.) to pay airlines what is needed to provide services that would otherwise not run. Such subsidies should operate with maximum flexibility to ensure the market remains contestable. The current EU regulations fail in this regard, as they have the effect of giving monopoly rights to one carrier on a route for 3 years, thereby removing the possibility of a new player coming in during that period to offer the service at a lower level of subsidy, or no subsidy at all.

3.17 Slots pose different if related issues. In the longer term non-airline ownership of slots may provide a transparent route for public entities to support non-commercial services. However, at present a problematic aspect of PSOs is that a Member State is allowed to reserve certain slots at a fully co-ordinated airport when a PSO has been imposed on the scheduled services on a domestic route from that airport. By preventing the slots from being put to alternative uses, such ring-fencing could impose a high, and hidden, cost on the airline industry and on the economy generally. As such this approach should only be used in exceptional circumstances and where there is a need to protect a genuinely essential service. The number of ring-fenced slots should be kept to a minimum. In the event that any ring-fencing is deemed necessary, there should be full transparency of the opportunity costs involved.

3.18 It should also be recognised that a significant boost to regional services could be provided if the Government were to indicate a preference for a new short runway at Heathrow, the airport where regional services have come under greatest pressure. This would provide for greater capacity for short-haul routes, including to the regions, and thereby could alleviate some of the current problems they face.

Mixed mode

3.19 According to the SERAS Stage Two Appraisal Findings Report, the use of mixed mode at Heathrow could increase the airport's annual passenger ATM capacity from 480,000 to 551,000. More significantly, it could add additional capacity to the peak hours and could be of benefit both to incumbents at Heathrow and airlines wishing to enter the market. However, given recent Government statements indicating that it has no plans to introduce mixed-mode operations at Heathrow, the CAA has not considered this issue further.

New Infrastructure

3.20 As regards new infrastructure, a crucial element of any policy framework is that it should set out clearly the role of national government, of local and regional government and the planning system, and of developers. And, on a more practical level, any new infrastructure options must be considered against the safety requirements that may constrain the usage of such infrastructure, and must take on board any implications for airspace configuration.

The role of developers

3.21 As set out in its response to the Future of Aviation consultation document (April 2001), the CAA believes that a commercial approach with the maximum amount of competition is most likely to result in the most appropriate level of airport capacity level. Airport development should be driven by developers assessing the commercial benefits and costs – including environmental costs – as well as the actions of all other airport operators and developers. This approach places decision-making with firms which are close to airlines and air users, and are able to respond quickly to new information, and bear the commercial risk and the responsibility for raising finance. It is these firms that will propose projects, have to obtain planning consent and will face strong incentives since they bear the financial risk if projects are not as profitable as envisaged.

3.22 Projects would then only proceed if the developer still considers them commercially profitable after environmental costs are properly taken into account. This maximises the prospect of the development producing net benefits to the UK. If commercial developers do not consider a Government-endorsed project profitable then, in the absence of subsidies or regulatory support the project is unlikely to proceed, nor should it.

The role of national government

3.23 There are important roles for government in setting the broad policy framework and ensuring that aviation faces the external costs it imposes. Issues such as global warming need to be addressed through national policies and instruments, to implement international agreements. It is inefficient, and probably ultimately ineffective, to seek to address global impacts by putting specific conditions on a particular project; approaches based, for example, on carbon taxes or permit trading schemes are likely to cause far less distortion.

3.24 It is important to distinguish clearly between the role of national and local government. For example, it would be undesirable to overcompensate by

applying a national environmental tax and then imposing local restrictions to address the same problem. In a similar vein, in some cases it may be that the benefits of airport development may be national, rather than local, again creating a role for national, rather than local or regional government.

The role of local and regional government and of the planning system

3.25 The CAA endorses the Government's preference for local solutions to local problems as far as possible. For example, where there are localised problems such as noise, a uniform approach to different locations is likely to result in sub-optimal outcomes. It would not necessarily ensure that environmental costs are taken into account in an appropriate manner, as populations in different localities may make different trade offs. It should, however, be noted that in the case of air quality the UK will be subject to limits determined at European level.

3.26 The present planning system addresses the problem of external local costs but often goes much wider, examining in particular the need for the project. In doing so, it imposes high costs not only on the developers of large infrastructure projects but also on those who may be adversely affected by that development, in emotional costs as well as in money and time. A more focused system would therefore benefit both sides and help achieve a better, more balanced, outcome.

3.27 The CAA therefore believes that the Government should modify the planning system so that it focuses, as far as possible, on identifying the local and regional environmental costs and external benefits of developments, rather than on scrutinising the commercial need for such developments. However, the adverse consequences of a development tend to fall on a relatively few people whereas the external benefits, if they exist, will tend to be spread more widely across the population. From an economic theory perspective this may not be of concern but it is important from political and equity standpoints. The absence of compensation could slow the planning system considerably and possibly cause some worthwhile projects to be rejected. Government should therefore seek to address the issues of compensation and mitigation before indicating a preference for any option.

Surface access issues

3.28 Another important aspect of the planning system is surface access to airports. The CAA believes that airports should not be treated any differently to the developers of other projects of equivalent scale for the purposes of surface access. Not all airport developments have surface access implications that are so great that they require additional surface access connections. Where they do the CAA believes that the developer should not be required to pay for road access improvements to deal with existing deficiencies in the road system which would not be made worse by the development. Nor should the developer have to pay for improvements already programmed by the highway authority within the same timescale as that of the proposed development. The emphasis should be on the developer meeting the additional costs deriving from the development.

3.29 As regards public transport, the CAA believes that airports and third parties should be encouraged to invest in projects on a commercial basis. To the extent that there are externalities associated with such developments that

would not be internalised by a commercial appraisal, the CAA would not want to prescribe in advance any specific solution for how these should be treated. This would depend very much on the circumstances of the case.

3.30 The CAA set out its policy in respect of new surface access projects in the recent decisions for the three BAA London airports. The CAA would expect the designated BAA airports to provide a clear demonstration that significant new surface access projects that are proposed to be funded in part by regulated airport charges can be expected to generate benefits in excess of their costs (in terms of the objectives of the Airport Act 1986) compared to the next best alternative, before that part of the project's costs are incorporated in the cost basis for the purpose of setting regulated airport charges. In practice, this is likely to require the airports to demonstrate that any subsidy to surface access is in the reasonable interest of users or is required to encourage investment in new facilities in time to anticipate user demand.

4. REGIONAL AIRPORT DEVELOPMENT

As noted earlier, the CAA's approach to aviation is one of liberalisation and reliance to the greatest extent possible on market-driven mechanisms. Of the regional airports, only Manchester is price regulated. In the CAA's view, the more that market approaches and mechanisms can be applied to airport development, and to the use of existing airport assets, the more likely it is that decisions by airport developers, airport operators and airlines will produce economically and socially optimal outcomes. The CAA sees no reason why this approach should not be effective where there are no undue problems in the operation of the airport market and where the benefits of aviation and its localised external costs are felt reasonably close to the airport. Broadly speaking, this is true of the regions.

Developments in the 1990s

4.1 The development of regional airport infrastructure in the UK has generally proceeded successfully without any need for special government intervention. Coupled with the beneficial effects of airline liberalisation, this has led to substantial and sustained growth of regional air services. This growth has been particularly strong in recent years driven by the establishment of regional bases by no frills carriers. Liverpool provides the clearest example with international scheduled traffic growing from 189,000 passengers in 1997 to over 1.7m in 2002.

4.2 Since 1991 the regional (i.e. excluding all London airports) share of UK international scheduled services has increased from 12% to 19% while the regional share of charters has risen from 54% to 64%. The average annual growth rate in passenger throughput at Liverpool was 18% per year over the 1991 to 2002 period and was 29% a year in the last five years. Bristol, Edinburgh, East Midlands and Humberside have all recorded double-digit annual growth rates over the last decade.

4.3 The traffic increase has been generated not only by growth on existing routes but also by the introduction of new scheduled services giving a much wider choice of international destinations from local airports. In 1990 there were 15 international destinations with frequent[2] scheduled services from Manchester; by 2002 the total had risen to 41 with the new destinations including capital cities such as Stockholm, Madrid, Rome and Vienna.

4.4 Where no frills airlines have established bases the increase in the spread of destinations served has been even more dramatic. In 1990 there were three international scheduled destinations at East Midlands (Amsterdam, Paris and Dublin) and in 1996 there were four, but by May 2003 the total had risen to 18 with the addition of cities such as Barcelona, Brussels, Geneva and Milan to the original three.

[2] Defined as having more than 500 flights a year, the equivalent of a daily service each weekday.

4.5 At Liverpool, choice for scheduled passengers has grown even more dramatically. Table 1 compares the international scheduled departure board at Liverpool on a Wednesday in June 1993 with a Wednesday in June 2003.

Table 1 - Scheduled international services from Liverpool

9 June 1993				11 June 2003			
					06:00	Palma	
					06:15	Amsterdam	
					06:30	Malaga	
					07:00	Nice	
					07:50	Barcelona	
					07:55	Dublin	
	08:50	Dublin			08:00	Paris CDG	
					09:45	Amsterdam	
					12:00	Geneva	
					12:35	Amsterdam	
					12:35	Madrid	
					13:55	Malaga	
					13:55	Paris CDG	
					14:00	Dublin	
					14:15	Alicante	
					15:45	Amsterdam	
					16:00	Charleroi	
					16:55	Nice	
					17:55	Barcelona	
					19:05	Amsterdam	
					19:15	Paris CDG	
					21:05	Malaga	
	21:55	Dublin			21:40	Palma	
					22:15	Dublin	

Source: OAG Database of BACK Information Services

4.6 Even an airport such as Bristol which was reasonably well established in 1993, handling more than twice as many passengers as Liverpool, can now offer its passengers a much wider range of international services (Table 2).

Table 2 - Scheduled international services from Bristol

9 June 1993			11 June 2003		
				06:30	Amsterdam
				06:30	Paris CDG
				06:30	Faro
				06:35	Brussels
07:00	Amsterdam			07:15	Paris CDG
07:55	Paris CDG			08:00	Alicante
				08:15	Dublin
08:30	Brussels			08:40	Dublin
09:00	Dublin			09:40	Amsterdam
09:35	Paris CDG			10:05	Palma
				10:20	Malaga
10:20	Amsterdam			10:25	Barcelona
				10:55	Brussels
				10:55	Munich
				11:40	Paris CDG
				12:30	Paris CDG
				12:35	Cork
				13:15	Nice
				13:50	Dublin
14:35	Brussels			15:35	Frankfurt
15:00	Frankfurt			15:45	Paris CDG
15:05	Amsterdam			15:55	Amsterdam
15:05	Paris CDG			16:00	Dublin
16:35	Dublin			16:20	Brussels
				17:15	Paris CDG
				17:40	Venice
				18:20	Prague
18:55	Brussels			18:50	Amsterdam
18:55	Paris CDG			19:25	Malaga
19:50	Dublin			20:10	Alicante
				21:40	Dublin

Source: OAG Database of BACK Information Services

The longer term perspective

4.7 The development of regional services is not just a recent phenomenon. Since 1973 international traffic at regional airports has grown at an average rate of 8% a year, considerably greater than the growth of 5% a year at London. This has significantly reduced the historic dominance of London's airports as the UK's source of international air services. In 1973 the share of the UK's international traffic that was served at regional airports was 17% but by 2001 the regional share had nearly doubled to 30%. Passengers are now less dependent on having to make what was often a long road or rail trip to London. In 1973 some 5.2m passengers flew on international flights from regional airports and only slightly fewer passengers from the regions, about 4.1m, travelled by surface to take flights from London airports. In 2002 although 16m passengers travelled from the regions to London airports, that number was far outweighed by the 45m passengers taking international flights from regional airports.

4.8 The surge in international passengers was fuelled in the 1970s by the expansion of charter services from local airports. In the 1980s and 1990s regional charter services have continued to increase, but it is international scheduled services that have been the main engine for growth even before the advent of the no frills airlines.

Connections to London

4.9 There has been a particular concern over regional connections to London. In fact, the number of flights between regional airports and London airports increased by 45% between 1993 and 2002. Of the airports with a daily service to London in 1993, only Birmingham has lost its service while services from Dundee, Londonderry, and Prestwick have been introduced. The frequency from all the regional airports has increased over the period except from Teesside, Guernsey and Plymouth. The number of flights from Belfast International has also fallen but London-Belfast flights overall have risen by 41% because of the expansion at Belfast City.

4.10 Over the decade, access to Heathrow has deteriorated not only with the loss of the Birmingham service but also with the transfer of the services from Guernsey, Inverness, the Isle of Man, Jersey, Newquay and Plymouth to Gatwick. However, even in 1993 most Channel Islands' flights were already at Gatwick and by 2002 there was a new service between Jersey and London City while the Guernsey-Stansted schedule had been greatly strengthened. The Isle of Man is now served from London City as well as Gatwick and Luton. Inverness now has a Luton service and Newquay a Stansted service in addition to the BA operations which were transferred to Gatwick. Although Heathrow is the closest airport to central London, it is by no means clear that passengers travelling from the affected regional airports to London itself are worse off.

4.11 Heathrow does, however, remain a prime transfer point, especially for passengers connecting to long-haul flights, even though there are now good connections from many regional airports to hubs such as Amsterdam and Paris in mainland Europe. Loss of the Heathrow link is a disbenefit to such passengers and the problem is not necessarily that domestic services are unprofitable, rather that they are less profitable than other options. The choice is forced on airlines because of the overall constraints at Heathrow

and, in the absence of a transparent and efficient secondary slot market, the difficulty of expanding their slot portfolio within these overall constraints.

4.12 But the issue of access to Heathrow is essentially a problem of the infrastructure at Heathrow, not at the regional airports where infrastructure issues loom less large, at least as regards incremental development at existing locations. The forecast demand at regional airports is in some cases heavily dependent on whether or not there is additional infrastructure at London airports. Heavy constraints placed on London airports would significantly increase the demand at Bristol, and could cause the airport be full before 2030. However, generally runway capacity would not appear to be a problem for the medium term at any of the airports and although the Midlands, the Scottish Central Belt and Manchester might require more runway capacity at some stage it would be towards the end of the forecasting period, i.e. towards 2030. In many cases taxiway improvements might be required at some time and runway extensions at some airports might be desirable to enable a wider range of destinations to be served. Terminal capacity is more likely to be a pressure point but planning approval has already been granted for some projects and other applications are in the planning pipeline.

The CAA's view on regional airport infrastructure

4.13 Airports in the UK have developed over a long period of time and in theory it may be that a more socially optimal structure could be achieved if the whole system could be re-engineered. However, as emphasised above, new developments must be commercially viable as well as socially desirable.

4.14 Against this background, the CAA advocates a continuation of the decentralised, market-driven, approach towards regional airport development and thus has no particular view on the options set out in the consultation documents from an economic perspective. However, there are some specific safety issues relating to some of the options for the Midlands.

Safety considerations for the Midlands options

4.15 The Government's consultation documents propose a new airport between Rugby and Coventry, with the assumption that, when it opened, both Coventry and Birmingham airports would be closed simultaneously. The site proposed for the new airport would mean that the resultant aircraft flight lines would pass very close to the massive gull roost at Draycott Water. There is no mention in the documents of this hazard, nor of potential mitigation measures. The CAA would require evidence, through a similar study to the one undertaken at Cliffe, that bird hazard risks would be acceptable.

4.16 In the discussion about the need for additional runways, the study concludes that Birmingham and East Midlands Airports will each require a new runway when their Air Traffic Movements (ATMs) reach 190,000 and 220,000 respectively. The existing runway at Birmingham is not aligned with that of the prevailing wind direction, and aircraft can rarely take advantage of the wind in performance calculations. A second parallel runway at Birmingham would mean that a greater number of aircraft would have to take account of crosswind components when landing or taking off.

5. AIRPORT DEVELOPMENT IN THE SOUTH EAST

The position in the South East of England is very different from that in the regions. The scale of the development required, its broader national significance, the associated surface access and environmental issues all mean that a Government steer could reduce uncertainty and therefore improve the prospects – and potentially reduce the costs – of beneficial development. However, it will be important for Government to ensure that, if it wishes the private sector to finance new development, proper account is taken of the commercial issues which may not always surface in conventional economic appraisal but which will ultimately determine whether new capacity is built. The fact that the three major London airports are subject to economic regulation creates the potential for regulatory intervention to alter the pattern of returns. The CAA has doubts about whether such cross-subsidy is either wise in principle or will in practice make attractive to financiers what might otherwise be commercially unviable.

Airport market power, economic regulation and efficient price signals

5.1 Given their collective dominance and common ownership, London's three major airports, which together account for over 90 % of London area traffic and nearly 60% of overall UK traffic, are subject to economic regulation, including the direct application of price caps. Indeed, it seems probable that Heathrow at least would be subject to such economic regulation even if it were not jointly owned with Gatwick and Stansted.

5.2 The system of economic regulation mandates five-year price caps. However, major airport infrastructure has a life of many years and investors would look at expected returns over the life of the asset. In practice, when setting the price caps, the CAA has always allowed the three designated South East airports to make a return on their entire investment programme. BAA has invested about £3.6bn (in outturn prices) at the three London airports since 1992/93. Additionally, in setting the last two price caps for Heathrow, the CAA has bought forward revenue to assist BAA with financing the construction of Terminal 5.

5.3 However, charges at Heathrow and Gatwick have been below market clearing levels, and this has meant that airport prices have not provided clear signals on the value of future investment in new capacity. This has been exacerbated by the lack of a liquid market for slots, which has prevented the emergence of efficient signals for the best use of capacity.

5.4 So far as investment is concerned, further complication arises because new airport capacity often involves sizeable developments within an existing airport, which can create significant disruption to the operation of air services from that airport over the construction period, increase congestion and potentially reduce revenues.

External costs and benefits

5.5 As regards the trade-off between external costs and benefits, this too is far more complex for the major South East airports than for airports in the regions. To a large extent these major airports serve a national rather than just a local or regional market, thus making it difficult to trade-off such wider benefits against the (local) environmental costs. Essentially those bearing the

burden are relatively few compared with the potentially national recipients of the benefits.

Uncertainty

5.6 The difficult problems associated with forecasting demand over the long term, particularly for individual airports, were discussed in section 1. That said, the extent to which usable predictions can be made concerning future demand at the airport level will depend at least in some degree on the practical circumstances surrounding particular airports. For example, given the pronounced attractiveness of Heathrow relative to other London airports, especially for business passengers, and the resulting substantial excess demand which already exists for the capacity generated by the airport's existing two runways, any commercial risks associated with runway expansion at Heathrow should be relatively low. However, this would be less true for, say, further runway development at Stansted or at an entirely new airport such as Cliffe.

Aligning Government decisions with commercial reality

5.7 The benefit of the Government giving a steer on where to locate new airport capacity in the South East is to reduce uncertainty and enable private sector developers to make faster progress on projects than would otherwise be possible. However, if new airport capacity is to be funded by the private sector, then any such steer must be towards projects that are in themselves commercially viable. On the other hand, if the Government's decision were unnecessarily to restrict or rule out options for new capacity where there is a clear commercial case for it (or where that may be true in the future), then that could limit or delay the building of such capacity, leading to a longer period of excess demand.

5.8 More generally, it is essential to recognise that Government approval will not be sufficient for a project to be implemented. Unless projects are commercially viable, generating expected returns commensurate with the risks that developers face, they will not attract finance and will not proceed. The consultation documents include high-level cost-benefit analyses of the different options. In the CAA's opinion, the private sector's valuation of the different options may well be very different. Whatever the apparent ranking of options from a social point of view, none have any value unless they are capable of attracting funding from the private sector and being implemented.

5.9 By way of example, the discount rates[3] used in the Government's analysis does not represent the cost of capital for a private agent considering investment, which could be significantly higher and would certainly vary between projects. The use of private sector discount rates inevitably means that potential investors will place a significantly lower value on long-term traffic projections than would be derived from using the Government's discount rate. Hence options that appear beneficial in the Government's cost-benefit analyses may not be commercially viable. Furthermore, private

[3] Government's recommended discount rate has since been revised to 3.5 per cent

agents face risks when investing, and may also require higher hurdle rates for investment because of the option value of delay – early construction commits the investor to a particular project while delaying the decision preserves the freedom of action to do something else should circumstances change.

5.10 The CAA has not carried out any technical assessment of the risks associated with the different options presented for new runway capacity. However, it is worth noting that these risks may vary significantly between options. In particular, the risks associated with traffic forecasts will differ between, for example, projects such as construction of three new runways at Stansted (or an entirely new airport) and the much lower risk inherent in providing increased capacity for existing, commercially viable operations such as Heathrow. The former will be riskier because the future level of traffic is more unpredictable and there is a higher chance of significant under-utilisation in the medium term.

5.11 Even if the Government's cost-benefit analysis were to indicate that these two options were equally desirable, therefore, consideration of the risk of under-utilised capacity would lead an investor to favour the latter. In the recent quinquennial review, the CAA estimated that the cost of capital at each of BAA's London airports was the same. However, this may not be true for the risks associated with substantial new investment at each of the three.

5.12 The ranking of options by the private sector may therefore differ from the ranking produced by the Government's cost-benefit analysis. Construction of apparently viable options may not occur if the private sector fears being left with an under-utilised asset. And, even if such projects were built, it is likely that they would not be fully utilised for some time.

Regulatory Change to Reduce Financing Costs?

5.13 The risk of underused assets arises in part (but only in part) from the way that price caps are set under the current regulatory system. Broadly, price caps at each airport are based upon the annualised cost of the assets and operating costs expected to be incurred by the airport operator at that airport, divided by the expected traffic. Other things being equal, the higher the utilisation of capacity, the more the costs of that capacity are spread over a larger customer base and the lower the price cap. To counter this effect, allowed costs can be profiled within a quinquennium to prevent initial sharp price rises when new assets are under-utilised. In the determination of how BAA's charges at Heathrow should change to reflect the costs of T5, the CAA considered the profile of charges over ten years to reduce this effect still further. However, there are limits to the period over which such regulatory smoothing will be credible.

5.14 An unregulated company would seek to recover the costs of a large investment in capacity as quickly as possible. However, in the event, it may be forced to profile its revenue recovery over a longer period to reflect market realities. In that scenario, efficient prices in the early years after the capacity is in place would at least cover short-run marginal costs, increasing thereafter as traffic rises over time.

5.15 For a regulated company, the situation is different. The price cap in the early years will tend to be well above the profit-maximising level for the firm and so will not bite. However, whereas an unregulated firm would then expect to be

able to charge at higher levels once the airport was being more heavily used, for the regulated company, the price cap could prevent this, and so prevent the initial investment cost from being recovered.

5.16 Thus, the regulatory system could prevent the back-loading of revenue recovery that is open to an unregulated company. Of course, there is nothing to stop an investor in new capacity pricing initially below the cap. Indeed, at a new airport, or at Stansted and possibly Gatwick this seems almost inevitable[4]. However, without a high degree of certainty that this initial under-recovery would be compensated by the regulator allowing price caps subsequently to rise when capacity becomes tighter, it would be hard to attract finance for any investment that resulted in significant initial over-capacity.

5.17 In principle, the regulatory system could be adjusted to try to counter this problem, for example by giving a public commitment that recovery of costs could be “back-loaded” by profiling charges to fit better with traffic, or by allowing charges at a capacity-constrained airport such as Heathrow to increase in order to cross-subsidise new development at Stansted or Gatwick.

5.18 From a regulatory fairness perspective, long-term commitments allowing charges to rise as congestion increases raise no particular issues. However, the success of such a proposal relies on the assumption that such long-term regulatory commitments can be delivered in practice, and for airport infrastructure, the five year price review system does not fit well with such an approach. Nevertheless, the CAA will continue to seek to apply the best and most credible approach to profiling revenues over time so that regulation does not get in the way of commercially viable investments.

5.19 It is less clear that allowing cross-subsidy from charges at one airport to finance capacity enhancement at another would be desirable or justifiable from a regulatory perspective. Airlines based at Heathrow are likely to question why they should pay for capacity enhancement at Stansted, when they would receive little or no benefit from that additional capacity, and indeed could be improving the ability of airlines at Stansted to increase market share at their expense. Moving away from regulation based on individual airports could also result in a loss of transparency and management focus, as a result of the breaking of the link between costs at an airport and charges for use of that airport. There are differences between adopting a system approach to economic regulation of an existing resource, and using such an approach to enable new projects which may be difficult to finance on a stand-alone basis. The CAA stated in the last quinquennial review that it would expect compelling evidence to demonstrate that users in aggregate would be better off as a result of such a cross-subsidy, and that the impact would not be unduly distortionary or discriminatory as regards other airports in the South East of England.

5.20 Even if such regulatory concerns could be overcome, there would remain a question about how credible any commitments as to future regulatory

[4] Stansted is currently not expected to recover its allowed revenue and prices below the cap,

treatment could be. Any regulatory statements of intent made now about how price regulation will be implemented in ten, twenty or thirty years time will inevitably introduce a considerable level of uncertainty into any financing proposal. It is difficult for any regulator to make irrevocable commitments over such an extended period of time. Investors may heavily discount a promise that high returns will in practice be allowed to compensate for historical costs incurred long ago or that cross-subsidy from one airport to another will be allowed to continue over a sufficiently long period to enable recovery of the initial capital investment.

5.21 The CAA doubts that there are simple regulatory “fixes” available to deliver projects that would otherwise have difficulty attracting private finance. Any such changes would have to be fully justifiable as being in the interests of users as a whole, and even if that hurdle could be cleared, it is questionable whether the commitment of the regulator would be strong enough to persuade those providing the capital for such an investment to take on that risk. This would be particularly the case if the scale of the cross-subsidy were a large proportion of the total revenue streams projected for a new runway. Overall, none of these possible regulatory developments imply that the choice of solution to inadequate runway capacity in the South East can ignore the need to look carefully at the commercial viability of any option.

6. ENVIRONMENTAL IMPACTS

The aviation sector should face the full costs of the environmental impacts for which it is responsible. The local impacts of aviation, in particular noise and NOx, must be factored in to decisions on where to locate additional capacity, but this is complicated by the difficulty of attaching precise values to these impacts. However, it is essential that Government adopt an effective policy approach that does more to make aviation meet its environmental costs whilst maintaining a level playing field. The CAA in principle supports the use of economic instruments to tackle these problems where possible, but believes that more detailed analysis of how they could be made to work is needed before they could be seen as a robust solution.

6.1 Like many other markets, aviation gives rise to a number of environmental externalities. In the CAA's view, the three main environmental impacts are:

- noise;
- local air quality (especially NOx); and
- impacts on the global atmosphere (mainly carbon dioxide[5]).

6.2 The cost to the environment of other aviation emissions such as water vapours or small solid and liquid particles in the air is more disputed. Standards for noise and emissions at source are set by ICAO, in detailed annexes to the Chicago Convention, and these have been incorporated where appropriate into EU and domestic legislation.

6.3 Because environmental costs are not properly reflected in prices, those who impose them may not fully take into account how their behaviour impacts on third parties. This is a consequence of the rights to use some resources not being properly costed. The aim of internalising environmental costs is to deliver the optimal output level by 'making the polluter pay' so that customers then see the true costs of outputs.

6.4 The best outcome for UK society will come from airspace users having to face all the costs of their behaviour as part of their decision-making processes. The CAA therefore supports the Government's view that aviation should face all its costs, including environmental costs. In seeking to maximise living standards generally, this should remain the key aim, rather than the elimination of environmental impacts altogether, which would result in a sub-optimal outcome. The ideal is to set aviation activity at a level of output where the benefits of the marginal journey equate with the costs that same journey imposes on society. This could of course only be achieved through accurate pricing of environmental impacts.

6.5 At the extreme, banning all aviation activity would benefit those third parties who are presently adversely affected by aviation's environmental impact. However, this would come at a substantial cost to society as a whole. And

[5] Nitrogen oxide also has a global impact. However, due to its complex interaction with the oxides of nitrogen, methane and ozone, the main focus is on carbon dioxide in the context of global emissions, at least at present.

such an approach would ignore the fact that users of air services might be willing to pay for the cost of such impacts. The aim therefore is to strike the right balance by looking at all the costs and benefits involved. Ultimately, environmental costs should be treated like any other costs, neither ignored nor given preference. The resulting increase in costs to users may impact on demand. However, the intention of internalising environmental costs is not to "manage" demand. Rather, it aims to establish a balance between the economic benefits and the level of pollution at which living standards are maximised on a sustainable basis.

A level playing field for modes of transport

6.6 To achieve optimal output levels, the initial policy objective should be to ensure a level playing field between aviation and other markets, so that not only aviation, but also other transport modes and other markets, face the environmental costs they impose.

6.7 The starting point should be a full assessment of effective tax rates across markets. For aviation, this would take into account the effects of infrastructure costs, fuel tax exemption, VAT treatment, Air Passenger Duty and other relevant tax costs and benefits in order to establish a level playing field. The successful implementation of a more neutral general tax regime might itself offer gains for both economic growth and sustainability. But once broad tax neutrality is established, the question is how to address the remaining unpriced aviation externalities in the most effective and efficient manner, bearing in mind that international agreements may constrain the available options.

The international dimension

6.8 Given the global reach of the aviation industry, there are obvious limits to what any one country acting alone can achieve in addressing environmental issues. International agreements constrain the actions which national governments can take, and the industry's mobility limits actions which would affect only the carriers based in one country.

6.9 So a particular challenge when seeking to set the right level of taxation of aviation for environmental purposes is this international nature of the aviation market. If the UK were to take a unilateral approach of increasing taxation in this country to deal with global environmental issues, without there being similar changes to taxation in other countries, then the outcome would be to disadvantage UK airlines in comparison to their international competitors and, potentially, to negate any environmental benefits.

6.10 In the CAA's view, this points to the need for such tax changes to be agreed internationally. This will ensure a level playing field for all competing airlines whilst ensuring that the aviation industry across the world faces its environmental costs.

Uncertainty surrounding environmental costs and their abatement

6.11 A complication in dealing with these environmental issues is that there are trade-offs between different environmental impacts, such as NOx (which affects local air quality) and noise. Targeting one externality in isolation could increase another. It is also worth noting that considerable uncertainty

surrounds the estimation of the true cost of aviation to the environment. The long-term effect of many pollutants remains uncertain, as does the extent of aviation's contribution to the total presence of those pollutants. Clouding the picture further, a high level of uncertainty remains concerning possible abatement of environmental impacts, for example, what potential there is for new technology to deliver improvements and at what cost.

6.12 Because the valuation of environmental costs is so uncertain it is difficult to include specific values within any traditional investment appraisal and use this to select the most favourable option. Instead it will be necessary to balance the best estimates of the economic and social benefits against the best estimate of costs (including environmental costs). This difficult problem is exacerbated by the political problem of attempting to ensure an equitable distribution of benefits and environmental impacts, as those impacts are likely to be most keenly felt by groups in certain parts of the country, whereas the benefits may be spread more widely.

6.13 For existing infrastructure, the cost of noise to those living near the airport or under the flight path will already be reflected in house prices. Heathrow land prices for example should already have adjusted to the airport's locational advantages and disadvantages, and thus there should already be some degree of internalisation.

6.14 It is possible to use this information as a way of valuing noise – for example by comparing house prices in noise-affected areas with the prices of similar houses in unaffected areas. However, there are problems with using such house-price data as transaction costs, "stickiness" of markets and lack of direct comparators mean that these may not provide a good proxy for the valuation of environmental impacts.

Aviation's impact on the environment

Global emissions

6.15 Aviation affects the environment both at global and local levels. However, aircraft emissions at the global level are not materially affected by the specific location of new airport developments within any one country or even grouping of adjacent countries. Indeed, while the development of new airport infrastructure in the UK would clearly risk adding to the total of global aviation emissions, the global environmental effects of a decision on these grounds not to develop such infrastructure would probably be at least partly offset by additional development at potentially competing airports in other countries.

6.16 At present, the aviation industry is a relatively minor polluter with respect to global emissions compared with other modes of transport. Aviation's share of overall transport carbon dioxide (CO_2) emissions is 13%. But this is likely to change over the next few years: aviation is the fastest growing source of transport greenhouse gases. Air travel produces more grams of carbon per passenger km than trains or buses, making air travel one of the most carbon intensive means of transport.

6.17 In dealing with global emissions, considerable uncertainty surrounds the 'true' social cost of emissions associated with global warming. Attention has focused on carbon dioxide emissions and hence carbon usage. Estimates of the social cost of carbon vary widely. Analysis is complicated by the global

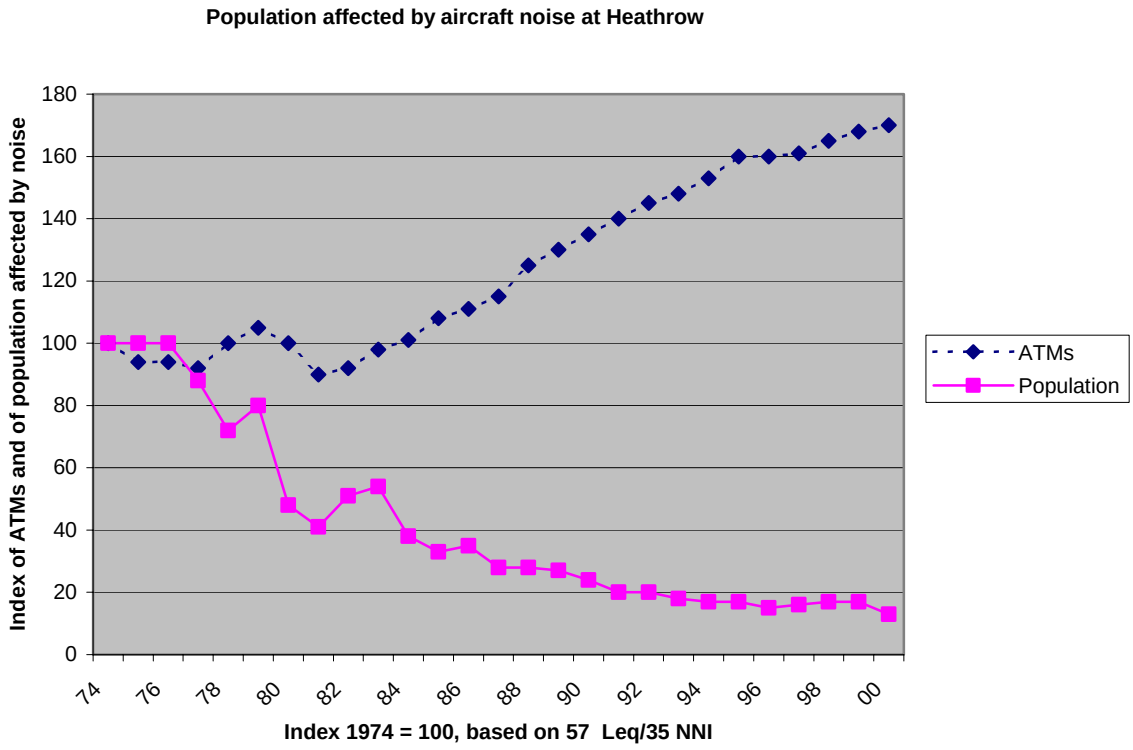
nature of the problem and the reality that one nation's response is unlikely to make much difference to global emission outputs.

6.18 The main available options for addressing global aviation emissions are to limit their extent through quotas or to levy a fuel or passenger tax. A quota could involve issuing a number of permits, allowing participants (not necessarily restricted to airlines) to buy/sell depending on how they value their 'right to pollute'. A tax or charge would not necessarily be directly imposed on passengers. It might for example be a tax on fuel, which would ultimately also be reflected in ticket prices.

6.19 Taxes and quotas both have their pros and cons. Given the considerable uncertainty surrounding not only the true extent of environmental costs, but also the extent of abatement costs, it is possible that a combination of the two would in practice be most appropriate. The CAA would recommend a gradual approach be adopted, which is flexible and can be adjusted over time as new information becomes available. Owing to the uncertainty around the true extent of environmental costs false precision might result in perverse effects.

Local Impacts: Aircraft Noise

6.20 In contrast with the impacts of aviation on climate change (and to a lesser extent local air quality), which are long lasting and cumulative, the noise impact of aircraft at an airport is transient. It ceases during periods when there are no aircraft movements. Further, noise and local air quality impacts are limited to the vicinity of airports. The use of more modern and quieter aircraft combined with improved operating procedures has led to a substantial reduction in overall noise. However, the scope for further reductions in noise through improvements in aircraft or engine design is uncertain.



6.21 The above graph, based on Heathrow data, demonstrates the considerable achievement of the aviation industry in reducing aircraft noise over the last 25 years. It shows that while flights have increased by over 60%, the population affected by noise at the 57 dBA $L_{eq,\ 16\ hr}$ noise level has reduced by over 80%. However, the public perception seems to have lagged behind the achievement. And increased traffic, even with quieter aircraft, might ultimately result in higher aggregate noise levels. This raises the question as to how best to address the noise issue in relation to both existing and new airport infrastructure. The perceived noise nuisance largely depends on where that noise occurs. For example, people living in different areas of the country may value 'peace at night' differently. Hence, rules and regulations at national level are not particularly appropriate. Noise might therefore best be addressed on the local/regional level.

Nitrogen Oxides (NOx)

6.22 The UK is bound by EU legislation that imposes an absolute limit on NOx emissions. Any property rights approach would thus have to ensure that the limit was respected. This could involve a permit system (with a permit giving the 'right to emit a certain amount of NOx'). However, a considerable amount of NOx around airports is caused by road users (and also by industrial activity), rather than by aviation activities. This raises questions as to how permits would be distributed, what aviation's permitted "share" of NOx would be, and how such a system would be enforced. All of this would need considerable detailed work before any such scheme could be introduced, and would be complicated further by the fact that the measurement of NOx created is technically difficult.

The main policy instruments

6.23 There are three main policy approaches available for dealing with these externalities:

- An approach based on tax, charges or subsidy;
- A property rights approach (which may include "permits" to pollute);
- A quota-based approach (prescriptive measures targeting levels of outputs or inputs, e.g. rules on choices of technologies, bans on night noise etc);

6.24 The choice of whether to rely on a quota (which will usually have the effect of adjusting price) or whether to rely on a tax, charge or subsidy (which will usually have the effect of adjusting quantity) will depend on an assessment of the welfare loss that will flow from those decisions, due to the inevitable errors in setting the optimal level of the quota or tax.

6.25 If the absolute quantity of "pollution" or the appropriate use of a natural resource is the overriding policy concern, then a quota might be a suitable option. However, the imposition of a simple quota might result in price spikes. Given that airlines tend to operate on thin margins, and given the considerable uncertainty surrounding the estimation of environmental costs, a gradual approach might be preferable. One option could be to set a quota, but then introduce a permit system beneath the quota limit. However, many issues would have to be addressed in designing such a system, including

how to handle the initial allocation of the permits, whether they would be short-term or long-term permits (or a combination of the two), monitoring and enforcing mechanisms and whether the system would offer open or closed trading options.

6.26 An alternative would be to rely on quantity adjustment through a tax or charge. The potential advantage of a tax or charge approach would be that it would remove uncertainty with respect to costs and might be easier to implement. However, it does raise a different range of issues around the legality of such an approach (given existing international agreements), its effectiveness, and whether and how the receipts from the tax or charge would be hypothecated to deal with the environmental impacts caused.

6.27 A form of pollution tax might be feasible for example. If such a tax could be set at the right level properly to price in the costs, this could result in a net gain to society, even if some projects became unviable because their costs would now outweigh their benefits.

Economic Instruments

6.28 In principle the CAA favours the use of economic instruments to address aviation-related environmental concerns. Such instruments can help to give market signals to the aviation industry to adapt its behaviour to reflect environmental costs; encourage, in a cost-effective way, new technology and innovation; and send long-term signals to the market and orientate decision-makers towards the long-term goals of sustainable development. However, in practice this is an area where considerable further research and development will be needed. Thus the use of economic instruments may for some time to come be limited essentially to a complementary role in relation to more traditional and tested regulatory approaches and voluntary agreements.

6.29 The object of applying economic instruments is to ensure that aviation output reaches the point at which its marginal social benefits equal its marginal social costs, including environmental costs. Measurement problems aside, this implies that where marginal environmental costs differ, the economic instrument should reflect these differences. In principle, the economic instruments should focus – to the greatest possible extent - on the externality itself. The variation in economic instruments is most likely to arise with respect to local external costs such as noise. An efficient economic instrument for noise, for example, should reflect not only the level of the source noise but also the time of exposure to that noise and the number of people affected.

6.30 One approach would be to encourage airports and those adversely affected to reach legally enforceable agreements. The clearer the definition of property rights, the more likely it is that the parties would be able to bargain their way to an efficient use of what are often perceived as ‘common’ resources. Such an agreement would centre on how different parties value the resource. With respect to airport infrastructure, local and regional externalities might be best addressed through such a property rights approach requiring the airport operator to ensure that those negatively affected by noise were appropriately consulted. Ultimately, this could result in contracting between the airport operator and those affected in order to achieve the best outcome through compensation or mitigation measures as a pre-condition to agreement to changes in operating procedures. However, it

must be recognised that such bargaining and contracting would only be likely to work in practice if the number of parties was relatively small. Given that this is not so for many airports in densely populated areas the scope for such an approach may be limited.

6.31 NOx emissions might in particular be an area where the early use of economic instruments in the form of permit trading would be feasible. A permit system would have the advantage that the number of permits would depend on the quota, whereas for a tax or charge it is price rather than quantity which fluctuates and thus the outcome might not meet the EU limit. Where a NOx limit has been set, and given the practical difficulty of applying a permit system to, say, road users, an intermediate approach might be to determine the respective contributions of aviation and other sources towards the limit, with a permit system exclusively for the aviation users and an administrative system for non-aviation users. Generally speaking, once a quota has been set, economic instruments such as permits are more likely to result in ensuring an efficient outcome, although the level of transaction costs involved might be large.

6.32 For noise, it could be possible to enhance systems applying variable landing charges at airports, so that airlines would pay more for noisier aircraft. This would disincentivise airlines from using noisier aircraft, or from operating their aircraft in a way that creates more noise.

6.33 In the case of new infrastructure, one mechanism would be to identify those seriously adversely affected by airport noise and incentivise airport operators to take measures directly to compensate them for the disbenefits they face, for example through property purchase. It would be necessary to establish the extent to which current structures, such as local/regional authorities, would be able in practice to represent those affected or whether other approaches could be found.

6.34 One alternative to the use of economic instruments, voluntary agreements, can take a great deal of time and effort to secure even the most basic consensus. Furthermore, there would be no assurance that the solution agreed would represent an optimal use of resources (including environmental resources). If suitable economic instruments could be made to work in practice, they should have the potential advantage that they could provide dynamic incentives to enable the aviation industry to minimise its effects on the environment. In contrast, voluntary agreements tend to produce static targets or limits on some specific aspect of environmental performance.

6.35 In summary, the CAA is in principle attracted to economic instruments as a means of treating environmental costs in an efficient and appropriate manner. The complex interaction between the two major local impacts, noise and NOx, would mean that a combination of different economic instruments may be necessary. For example, a form of permit scheme for NOx, operating beneath the level of the absolute EC limit, could be combined with a variable landing-charge scheme for different levels of aircraft noise. This would provide incentives for airlines to make the necessary trade-offs between the two impacts, whilst at the same time ensuring that the costs of those impacts was factored into airline decisions. However, whilst this may be theoretically attractive, the CAA acknowledges that a great deal more thought would have to be given to the practicality of such schemes before any could be introduced.

Noise Contour Caps

6.36 As discussed above, it is possible that economic instruments could be developed to provide an efficient solution to the difficulties of incentivising noise reduction and balancing the benefits of aviation against the cost of noise. However, until detailed proposals for such methods can be drawn up, noise contour caps provide some way of addressing the noise problem.

6.37 The CAA has identified four problems associated with the implementation of noise contour caps as a noise control measure. Firstly, the difficulty with setting caps or limits is that there could be no assurance that they would be set at an optimal level. Furthermore, having set a cap, it is almost certain that the aviation industry would consider it too low while local residents and environmental groups would argue the reverse. Even in the unlikely event that all parties agreed to the level of the cap, there would be no incentive to reduce the impact further.

6.38 Secondly, there is a trade off between various aspects of the environmental impact of aviation. It is not possible to minimise noise, fuel burn and emissions simultaneously. Noise could be reduced both at the aircraft design stage and in operation but at the cost of increased fuel burn and emissions. There is a complex set of interactions between noise, fuel burn and carbon dioxide and oxides of nitrogen (NO_X). There is some evidence that aircraft manufacturers are designing aircraft that meet the QC2[6] standard in order to be able to operate at Heathrow during the night hours but at the cost of increased fuel burn and emissions. Introduction of a noise contour cap might therefore induce manufacturers and/or operators to increase some other environmental detriment.

6.39 Thirdly, under the recently introduced European legislation[7] dealing with operating restrictions at community airports - performance-based operating restrictions must be based on the noise performance of the aircraft as determined by the certification procedure conducted in accordance with Volume 1 of Annex 16 to the Convention on International Civil Aviation. This legislation reflects the principles established in ICAO Resolution 33/7 which introduced the concept of a 'balanced approach' to noise management. The 'balanced approach' concept of aircraft noise management comprises four principal elements – noise reduction at source; land use planning and management; operational procedures; and operational restrictions. Noise contours reflect noise levels experienced in operation rather than noise measured during certification in accordance with ICAO regulations. Noise measured during certification will differ from that measured and modelled during contour production for a range of technical reasons. Also, certification

[6] The Quota Count system is described in the DfT paper – Review of the Quota Count (QC) system used for administering the night noise quotas at Heathrow, Gatwick and Stansted – published in February 2003.

[7] Directive 2002/30/EC of the European Parliament and of the Council of 26 March 2002 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports.

levels are measured using a different metric[8] to those shown in noise exposure contours. Noise contours are not based on certification procedures.

6.40 Lastly, there is the possibility that improved methods of measuring the impact of aircraft noise will become available during the next thirty years. The last thirty years have seen the UK change from using the Noise and Number Index (NNI) to L_{eq} (16 hours). More recently, the European Union has introduced the requirement[9] to use L_{DEN} – this metric uses L_{eq} methodology over 24 hours but applies a 5 dB penalty for the evening period and a 10 dB penalty for the night period. Scientists continue to search for better ways of describing the impact of aircraft noise and it seems probable that improved methods will become available within the timescale under consideration in the consultation. Implementation of a noise contour cap will need to be flexible enough to cater for changes in noise modelling methodology and metrics over time.

6.41 Nevertheless, while the CAA does not see contour caps as the ideal solution and would therefore be cautious about their widespread adoption as an optimal noise control mechanism, it does believe that they should not be dispensed with unless and until there are clearly identified and tested superior options. In the meantime, such caps do have the merit that they give some certainty for affected residents and a degree of reassurance with respect to newly generated noise exposure resulting from airport development.

Consultative Committees

6.42 Consultative committees can undoubtedly be useful in bringing together all the parties who benefit from or suffer the cost arising from local aviation activities, and in principle may produce outcomes to which all can subscribe. On the other hand, their processes can be prolonged and, even if successful in reaching agreed solutions, can lead to substantial costs being incurred. The effectiveness of consultative committees relies on there being sufficient trust between the various constituents and may be constrained by a lack of statutory powers. Nevertheless, the CAA recognises that some consultative committees promote open and honest dialogue to the general benefit and recommends that the Government take steps to encourage such committees to operate to a consistently high standard.

Noise mitigation and compensation

6.43 A key policy objective is to ensure that polluters are faced with the costs of the adverse environmental impacts they cause and that there are incentives to minimise those impacts and compensate the losers.

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[8] Certification is conducted using the metric Effective Perceived Noise Level (EPNdB). Noise exposure contours are produced using Equivalent Continuous Sound Level (L_{eq}).

[9] Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.

6.44 Existing compensation measures mainly cover noise insulation schemes and the distribution of the proceeds of noise limit charges to help the local community. (There are some other forms of direct compensation, for example the Vortex Protection Scheme, which compensates residents for roof damage by aircraft wake vortices.) Noise insulation schemes are limited to a relatively small number of people who live in the worst affected areas. While it might be argued that the aviation industry should compensate all affected citizens for any environmental damage caused, this would often be impractical given the number of households potentially affected.

6.45 It also has to be recognised that people are not driven solely by economic reward. Thus, it might be that many would simply prefer the source of the noise to be removed rather than to be financially compensated for enduring it. Thus appropriate mitigation might go some way to achieving what people may 'really want' and may have a more widespread and, arguably, more equitable impact on the community than other measures. The CAA believes that mitigation measures are in general best handled at the local level rather than the national level.

6.46 There is a danger of introducing perverse incentives if cash compensation were offered to people adversely impacted by aircraft noise. One-off payments not used for mitigation might be readily forgotten once that money had been spent. The benefits would accrue to the current householder – subsequent residents of that property would continue to suffer the impact without the benefits of the original compensation.

6.47 Alternatively the Government could examine schemes whereby compensation would be dispensed through local tax relief. The examination would need to consider how the scheme might operate across the various Council Tax bands (given that some of the more vulnerable members of society do not pay local tax). The immediate benefits of any such compensation scheme would of course accrue to the actual payers of Council Tax without necessarily providing compensation to other members of that community. However, such a measure would have the benefit of transparency. Prospective purchasers of property that might be affected by aircraft noise could request information concerning Council Tax levels and associated rebates to help them make an informed decision about their prospective purchase.

6.48 That said, the CAA believes that, where houses are very severely affected by aircraft noise, compulsory purchase provisions, i.e. compensation for the inconvenience of enforced removal and assistance with relocation should apply. The CAA believes that those newly exposed to noise levels above 69 dBA $L_{eq,\ 16\ hours}$ could be a suitable criterion for this form of compensation. However, where a community is divided by a 69 dBA $L_{eq,\ 16\ hours}$ contour it would seem inappropriate to adhere rigidly to the criterion and there should be discretion to include properties that fall just below the threshold.

6.49 In order to preclude houses being built in the vicinity of airports where there may be a significant impact from aircraft noise, the CAA believes that the Government should be more positive in its policies with regard to encroachment. Notwithstanding the current policies, encroachment has occurred where house builders seek and are granted approval to build in areas where there is likely to be an aircraft noise issue. At the time of building, the nearest centre of population to Heathrow was the village of

Cranford. In order to protect the residents of Cranford from increasing noise as the airport developed and jets became more common, they were promised that aircraft would not depart from runway 09L – this is known as the Cranford agreement. Over the period this agreement has been in place, houses have been built in locations closer to Heathrow than Cranford. Encroachment is likely to offset improvements derived from mitigation as well as generating a pool of potential complainants who are likely to attempt to constrain future airport development.

Using the Planning system

6.50 The planning system provides an alternative method of ensuring that developers face the full costs that they impose, including environmental costs, when making their decisions. The planning system has an important role to play for those environmental issues which cannot easily be priced, i.e. those issues which remain after mitigation and compensation of those affected. It also has an important role in ensuring that developers take environmental costs into account properly when deciding whether and how to modify a project in the light of planning conditions.

Environmental costs: conclusions

6.51 One of the key difficulties when dealing with environmental costs is in establishing their true extent. Firstly, judgements will have to be made in identifying the main environmental externalities noting the considerable uncertainties involved in valuing them and that there is no consensus about their true extent. An additional difficulty is the uncertainty surrounding the costs and potential for abatement of those impacts. These types of uncertainty will influence which policy instrument might be most appropriate. This also implies that over time, when new information about these costs becomes available, other policy instruments might be preferable.

6.52 The international nature of the aviation industry is another key factor to be borne in mind. If global environmental concerns were addressed through increased charges only for airlines from one particular country or region, then this could create an unlevel playing field. It could allow some airlines to increase their activity at the expense of those facing those higher charges, and would therefore likely negate any environmental benefits.

6.53 The particular features of airline economics are also a factor here. Airlines tend to operate on thin margins and so need time to adjust to environment-related increases to their cost base.

6.54 It is therefore important that a gradual policy approach is adopted that could be refined over time. However, it is essential that Government finds an effective policy approach, internationally and nationally, that does more to make aviation meet the full environmental costs that it creates, within the timescale of the addition of any new capacity.

7. THE GOVERNMENT'S PROPOSED OPTIONS FOR LONDON AIRPORTS

7.1 The main options for the London airports which the Government has evaluated are:

- an extra runway at Heathrow;
- one or two extra runways at Gatwick, the one-runway option involving either a close or a wide-spaced parallel and the two-runway option involving two wide-spaced parallels;
- one, two or three extra runways at Stansted, the first wide-spaced, the second a close parallel to the existing runway, the third a close parallel to the first new runway;
- a new four-runway airport at Cliffe comprising two pairs of close parallels, and;
- combinations of the above.

7.2 The CAA has considered these options against the factors set out in the framework earlier, including safety (which must always be the primary consideration), airspace policy, economic benefits (to both users of air transport and to the wider economy), and environmental impacts. Other important aspects include accessibility to the general transport system, integration with regional and national transport, and land-usage. These issues should all be addressed in relation to the base case, under which there would be no more infrastructure than is currently in the planning pipeline.

7.3 The most important and complex interaction is between economic benefits and environmental impacts. The difficult task of balancing these costs and benefits is discussed in detail below. However, the first stage of any assessment must be to assess how safety and airspace considerations may constrain the nature of new runway operations at the various locations.

Priority for safety

7.4 In the CAA's view, safety must be the primary concern in considering the viability of any aviation infrastructure projects. Our analysis suggests that safety considerations may limit the number of effective options. For Cliffe, this is because of the risks presented by bird hazards. In addition, ICAO Standards for parallel runway operations could result in limited additional capacity from the close parallel options identified in the SERAS document.

7.5 The Government's calculations in the consultation documents already recognise that the close parallel options yield less in terms of capacity enhancement than the wide-spaced options. However, in the CAA's view, the value added from a single close parallel at Gatwick may be even less than predicted, because of the safety constraints.

Safety requirements

7.6 More detailed plans associated with the proposed development options, whether at new or existing airport sites, would enable full assessments to be made of the safety implications for air traffic service provision. Each new development would be assessed against aerodrome licensing requirements once a formal and detailed proposal has been submitted to the CAA.

7.7 However, the following generic safety considerations could prove to be challenging for some of the outlined proposals:

- The proposals for some South East airports could involve extensive civil engineering undertakings in order to comply with CAA licensing criteria. Consideration should be given to constructing any new runways and taxiways to the standards required to enable unrestricted operations by New Large Aircraft (Airbus 380 commercial operations are scheduled from 2006).

- The CAA would require that aerodrome licensing criteria vis-à-vis safety surfaces are met for all new developments. Some of the proposals may, when clearance criteria are applied, already present infringements into the required safety surfaces.

- The amelioration of bird hazard for some options could require rigorous habitat management and major mitigation measures to existing areas of open water within the bird hazard circle (13km), thus presenting conditions that conservation bodies may find unacceptable. In some instances it may not be possible to mitigate that risk effectively. New buildings should be constructed to be unwelcoming to prevalent species such as starlings and feral pigeons.

- All Weather Operations need approach lighting installations which require additional land or, at least, legal agreements for installation and maintenance.

7.8 In addition to these generic safety points, there are a number of issues specific to the London airport locations that are worth highlighting from a safety perspective.

Safety issues for a new Heathrow runway

7.9 The proposal for another short parallel runway at Heathrow presents the potential for new safety issues because all of the existing terminal buildings are south of either one or both of the existing runways. This configuration would require any aircraft using the new runway to cross at least one, if not two, runways to transit between the new runway and the terminals. The threat of unauthorised runway incursions is a recognised feature of complex, multi-runway airport layouts. A previous study was carried out in 1986 by NATS/CAA in relation to a third parallel runway at Heathrow. The study showed that the additional crossings of active runways by aircraft moving on the ground, together with the complexities of merging departing traffic from two runways into the existing route structure, could result in a reduction in overall capacity compared with existing arrangements. This is a subject that would require further detailed work. Although mention is made in the consultation documents of additional terminals and other facilities, there is no indication as to their likely location. The CAA believes that, in order fully to secure the potentially very large economic benefits of a new runway at

Heathrow, terminal and connected facilities would need to be constructed adjacent to the new runway.

Safety issues for the Gatwick options

7.10 As in other parts of the study, the use of close-spaced parallel runways without any longitudinal stagger is proposed. This runway proposal would be likely only to achieve a limited increase in movements, because the required separation between aircraft, even in segregated modes, would be such that the close parallel runway would largely need to be operated as one runway. And, as in the case of Heathrow, with all the existing terminals on one side, the need to cross one runway to use the other would further reduce the advantage of having two runways.

7.11 The CAA regards the wide-spaced parallel runway as reasonably viable from an operational viewpoint although, on the diagram shown in the consultation document, all terminals are north of the two runways and so runway crossing would reduce capacity, despite the plan to put aircraft stands between the two runways.

7.12 In the case of the two-runway option, the comments applicable to the wide spaced runway to the south of the existing runway still apply. The new runway proposal to the north would require extensive engineering works to enable the required safety surfaces to be achieved. Furthermore, the concerns of the Environment Agency over the culverting of watercourses is at variance with the requirements to make water features unattractive to birds in order to reduce the birdstrike risk.

Safety issues for the Stansted options

7.13 The CAA believes that close spaced parallel runways cannot in the main be used independently and so this constrains the amount of air traffic movements that can be achieved. Given this, as the Government recognises, the three and two new runway options at Stansted are likely only to produce limited additional air traffic movements.

Safety issues for a new airport at Cliffe

7.14 The CAA has serious concerns over the potential hazards to aircraft posed by the geographical location for the proposed new airport at Cliffe because of the concentrated indigenous bird population, which includes, in broad terms, over 130,000 waders and 100,000 waterfowl. In addition, the seasonal and migratory movements of birds across the North Kent Marshes, as well as the important daily dawn/dusk and tide related movements, further raise the potential birdstrike risk in the area. An early Central Science Laboratory (CSL) assessment concluded that, with respect to bird hazards, 'the site is probably one of the most hazardous locations in the country'.

7.15 A more detailed study, commissioned by the Secretary of State in 2002, has been undertaken by CSL and the British Trust for Ornithology which concludes that:

- without a comprehensive and aggressive bird management programme in place, incorporating careful and considered airport design, appropriate habitat

management and active bird control, an airport at Cliffe could not operate safely; and

- even with such world-class management and mitigation measures in place, the hazard proposed by birds is severe and would probably be higher than at any other major UK airport.

7.16 The CAA and its bird hazard consultants (Airfield Wildlife Management) endorses those findings and are of the opinion that there are currently no such proven world-class bird hazard management and mitigation measures that would be wholly effective in reducing the unacceptably high birdstrike risks presented at Cliffe. Added to this, the safety constraints of operating close parallel runways apply to Cliffe, as they do to the similar options at Gatwick and Stansted, thereby further reducing its attractiveness.

Airspace Considerations

Airspace Modelling

7.17 The CAA has concluded that it would not be possible at this stage to make a detailed analysis of the airspace structure as it will exist at the end of the period under consideration in 2030. This is because the potential scope for the redesign of the airspace structures concerned for all the possible options would be extremely extensive. Specifically, each airspace design change would impact on adjacent airspace structures, thereby causing the overall level of changes to be of such complexity that it is not possible to forecast the airspace structure as it will exist in 2030. As with previous airport development and growth, the CAA believes that the associated airspace changes will be evolutionary and dependent upon the prevailing circumstances.

7.18 However, the CAA, in association with NATS, carried out a simulation study in support of the SERAS work programme at the request of the Government. The study used the Total Airport and Airspace Modeller (TAAM), a Fast Time Simulation Tool, with the purpose of establishing the feasibility, in airspace terms, of four options:

- a new airport at Cliffe;
- an additional runway at Heathrow;
- additional runways at both Gatwick and Stansted; and
- an additional runway at Stansted, plus the re-alignment of the runway at Luton with the Stansted runways.

7.19 Fast Time Simulation is not a detailed procedure design process but provides analysis of options at a conceptual level only. The simulations assumed that improvements in navigation techniques would be sufficient to enable existing Noise Preferential Routes and other Noise Abatement Procedures to be discontinued. The modelling did not assess environmental impact, neither did it take account of any possible evolutionary airspace changes which may be introduced in advance of any additional runway options.

Airspace implications of the Cliffe option

7.20 The study concluded that establishment of a new site at Cliffe would produce an increase in the number of conflict areas due to the interaction with adjacent routes, severely impacting on the adjacent airports. In particular, since the airspace to the west of Cliffe would be extremely congested, there would be a complex interaction between the new site, London City, Heathrow, Southend, Biggin Hill and Manston airports. Another factor that would require careful consideration in respect of westerly operations at Cliffe (the principal operating mode) would be its relative proximity to Belgian and Dutch airspace and the consequent requirement for incoming aircraft to fly close to, or possibly across, the respective airspace boundaries. In addition, the sequencing of arriving traffic would need to be initiated in continental airspace and this would require co-ordination with, and co-operation from, neighbouring states.

7.21 Furthermore, comprehensive re-alignments of routes to airports in the region might be required together with associated changes within the London Terminal Control Area and surrounding airspace. This would involve considerable effort by NATS in design and simulation, both fast and real time, together with a carefully planned and phased implementation. In conclusion, it is likely that any of the options proposed would be feasible from an airspace policy perspective, although changes would have a knock-on effect on current airspace. However, this would be a complex exercise, and would require careful scrutiny of detailed plans before all the relevant issues could be settled.

Economic benefits and environmental costs

7.22 The arguments on safety and airspace set out above show that, although airspace could probably be reorganised to accommodate most options, safety concerns over birdstrike issues, and constraints on the operation of close parallel runways effectively limit the main options for a first new runway in the South East to three: the new short runway at Heathrow, the wide-spaced parallel at Gatwick and the wide-spaced parallel at Stansted.

7.23 In addition, particular safety concerns on aircraft having to cross runways to reach terminals, and how that might limit the usage of new and existing runways, raise important issues on terminal provision and its location.

7.24 In the CAA's view, Government decisions on which of these remaining options is the most desirable should be subject to the a full and careful assessment of the level of economic benefits and environmental impacts. This is a complex task, one made more so because of the difficulty of attributing precise values to either benefits or costs. However, allowing for margins for error, it will be important to try to weigh all the relevant factors in the balance to inform any decision.

7.25 In assessing each of the options, the CAA has considered:

- whether a project for the building of the infrastructure would be commercially viable (and financeable) under current economic and regulatory conditions, with only a low risk that capacity would not be taken up fully or only by marginal activity, and;

- the likely scale of environmental costs (in particular noise and NOx).

Economic and commercial considerations

7.26 The CAA believes that an assessment of the commercial realities of getting projects up and running should sit alongside, and inform, the more general appraisal of likely economic benefits of each option. In its economic appraisal the Government has calculated the net present value over 60 years of the benefits less the construction and maintenance costs of the additional infrastructure. The benefits included in the appraisal are those which passengers directly enjoy as a result of decreased congestion, which reduces fare premiums and allows some passengers to use the airport of their first choice. In all cases the options generate net benefits and in broad terms the Heathrow option generates the greatest benefits of the single additional runway options. But these economic assessments need to be refined by considering the commercial viability and attractiveness of the various options.

How quickly would new capacity be used?

7.27 In looking at how best to meet the known demand for capacity there seems little doubt that this points first to the Heathrow option. Heathrow has a long established position in world aviation because of its pre-eminent strength in international air travel. This in part reflects London's ability to generate international journeys and to attract business travellers and holidaymakers from overseas. But it also reflects Heathrow's agglomeration over the years of a wide network of frequent services operated not only by BA, Virgin and bmi but also by nearly 90 foreign carriers. In consequence of this position and its location Heathrow has a much larger and stronger catchment area for its services than any of the other London airports.

7.28 Heathrow also offers much greater opportunities than any other UK airport for passengers to connect and for airlines to capture feed traffic. Flights from Heathrow attract a much higher number of business passengers than comparable flights at Gatwick and Stansted. Passenger yields are therefore higher and services more profitable. Indeed, it has often been the case that a service at Heathrow is profitable while a service to the same destination from Gatwick has made losses. As noted earlier, the demand amongst airlines for slots at Heathrow has significantly exceeded capacity for many years even though there has been spare capacity elsewhere in the London area. There is no sign so far that this position will change. Indeed, the liberalisation of long-haul markets is likely considerably to increase demand for slots at Heathrow, particularly at the times within the operating windows for long-haul flights.

7.29 The evaluation of the options needs to take account of whether any other airport could be developed to take on the particular characteristics of Heathrow. This bears particularly on the option of building new capacity at Stansted. The attractiveness of the three or four runway Stansted options from an economic and commercial standpoint relies mainly on whether it could establish itself quickly as a new hub for the South East, and whether the seeding assumptions in the consultation documents, which presume that an operator or operators will move a major tranche of services to Stansted once a new runway opens, are realistic.

7.30 For a large hub to attain commercial viability, it would need to acquire a high level of utilisation relatively quickly. Substantial additional runway capacity might only be sustainable if a major network carrier or alliance were to move or develop there. At present this would probably require a major hub carrier to transfer all its services from Heathrow. A partial move would create the costs of a split operation for the airline and might not provide a high enough utilisation for the new hub.

7.31 However, on a practical level, the safety constraints that would apply to the close parallel options at Stansted make the model of a 4-runway Stansted less likely to be commercially or economically attractive. Even if Stansted could be developed in a different way to make full use of sufficient runways to provide hub capacity, it is not at all obvious that any large airline alliance would be prepared to re-locate its operations to Stansted on the scale required to operate a hub, even if all that were required was a sufficient density of that alliance's own traffic.

7.32 The risk to an airline or an alliance of such a move would be substantial. The transfer of a large number of flights from Heathrow would radically alter the relationship there between the supply of and the demand for airport capacity. Once the prospect of a move becomes clear, the marginal slot price is likely to fall to reflect the future balance of demand and supply at Heathrow and the airline or alliance which is about to move would lose much of the value implicit in its Heathrow slots portfolio. Indeed, although the airlines that remain at Heathrow would be able to move to better timed slots, the value of their slot holdings may fall as connecting opportunities decrease and as the airport loses some of its prestige and general attractiveness to passengers.

7.33 This would diminish the Heathrow premium but probably not remove it completely because Heathrow would still be the most easily accessible of the airports. So, although a new hub at Stansted would allow room for long-term expansion, in the short and medium term services there may prove to offer lower yields and less traffic than comparable services at Heathrow. Yields would be particularly affected if the airline failed to persuade its corporate customers to switch airports. The decision might be even more difficult for an alliance than for a single airline because the different members will have different interests; for some, Heathrow may be central to their operations while for others it will be important but not vital.

7.34 Another option would be to focus development at Gatwick, rather than at Stansted. Gatwick has historically been seen as London's second airport, well ahead of Stansted in the rankings of both passengers and airlines. Although the expansion of the no frills airlines at Stansted has narrowed the gap in terms of passenger volumes, in 2002 Gatwick handled 30 million passengers, nearly twice as many as Stansted. Even so, the economics of operating scheduled services at Gatwick have proved very difficult over the years, contributing at least in part to the demise of airlines such as British Caledonian, Dan-Air, and Air Europe and, more recently, to the inability of BA to sustain its putative second hub.

7.35 That said, Gatwick is by far the preferred airport for charter airlines and their passengers. In 2002 there were 11 million charter passengers at Gatwick but only one million at each of Stansted and Luton. Gatwick's southerly position offers operational benefits for charter flights which are mainly southbound and Gatwick's catchment area for UK-outbound leisure passengers is much

stronger than those of its rivals to the north of London. It is likely that expansion at Gatwick would be welcome to the charter carriers provided it does not come at the price of further restrictions on the level of night movements. Expansion would also allow the low cost carriers to introduce further services which enable them to tap demand south of London.

7.36 Gatwick would therefore have the advantage of a tranche of airlines who operate there from preference. Also, the catchment areas of Heathrow and Gatwick for UK and overseas-originating scheduled passengers overlap to a larger extent than those of Heathrow and Stansted. This suggests that a hub at Gatwick would be able to draw more easily than Stansted on the core sources of demand in the South East. However, the overlap of the catchment areas, together with Heathrow's acknowledged superiority, also suggests that, without restraining Heathrow, there might be still a long period before a large network of scheduled air services were viable at Gatwick and perhaps even longer before the infrastructure investment showed a return.

7.37 Thus the possibility of making an existing airport into a new "hub" in the South East depends on highly uncertain assumptions about how the airline industry will respond. Although over a longer 20-30 year time horizon, such a development cannot be ruled out, there must be some doubt as to the likelihood of a large hub airport being a viable commercial proposition within a decade or so, unless Heathrow is closed or its operations restricted severely. The commercial prospects for Cliffe seem even slimmer.

7.38 If the Government were to limit the possible solutions to excess demand in the South East to such a radical change in the configuration of the London airport system, it would be taking a large gamble on the responses of particular airlines or alliances. In the CAA's view, a necessary condition for the development of a new hub should be explicit demand on the part of an airline or alliance for such a development. Without such pre-existing demand such developments are highly unlikely to represent viable investments and should not be the only approved options. Nor, under present circumstances, is it likely that any airline or alliance could make a credible commitment to using a substantial proportion of the capacity of a new hub ten or more years into the future. Even if economic circumstances were better it is still doubtful how far a commitment could be relied upon, given the dynamic nature of the industry and the uncertainty over corporate structures.

7.39 Perhaps the major difficulty for both Gatwick and Stansted in achieving hub status is the difficulty they have in attracting long-haul services which, currently at least, show an overwhelming preference for Heathrow. Since airport charges have less of an impact on the economics of long-haul costs, the development of costly new infrastructure would seem easier at airports which have a strong long-haul content. At a short-haul airport the ability to fund new infrastructure will perhaps more depend on the balance between supply and demand – so if demand is very high at such an airport then an infrastructure project at that airport may become viable. However, at present it is not clear that this is the case for either Gatwick or Stansted.

7.40 The growth of Stansted over recent years has been driven by low cost no frills airlines which now constitute the airport's principal users. So an alternative "non-hub" model for expansion at Stansted could be that it develops into a larger airport that services a much larger low cost market than currently exists. However, there is no guarantee that the fast growth witnessed at this

end of the aviation market over recent years will continue at a sufficient level to make such a business model a viable basis for the major expansion of Stansted, and there is some uncertainty over whether, if business models continue to be geared to price-sensitive utilisation of spare capacity, that can provide a sound basis for planning future major capacity increases. Indeed, it is particularly difficult to predict the likely level of such demand over the medium, let alone the very long term.

7.41 The airline mix at Gatwick is different from that at Stansted but it too is heavily reliant on the more price-sensitive end of the short-haul market and, as noted earlier, that dependence may well increase when UK-US services are liberalised. So, although Gatwick has a stronger natural catchment area than Stansted, the commercial viability of expansion even into a non-hub role will also depend on the balance of supply and demand and will therefore improve over time as demand grows, although, as with other options, the desirability of expansion on commercial grounds would need to be considered alongside the environmental impacts.

7.42 If there were no new runway at Heathrow, it is likely that demand at Gatwick and Stansted would increase and bring forward the point in time at which infrastructure projects at either airport may become viable. Even if a third runway at Heathrow were to be constructed, the aggregate demand forecasts would suggest that at some point further into the future demand could increase sufficiently to make new infrastructure projects at either or both of those airports commercially viable. This underlines the importance of Government safeguarding these options for the future.

7.43 The above discussion focuses on one very important element in commercial viability, namely the relative risks around expected revenue streams materialising in practice. It involves consideration of the dynamics of the aviation market and of the uncertainties therein. It is also possible to postulate different scenarios which would affect traffic distribution between airports. However, no one knows what the commercial reality will be in thirty years' time and although technological and business innovation may radically change the aviation market it seems to the CAA that the best basis for near-term decisions is current knowledge.

Commercial viability and financing of projects

7.44 The Government's assessment of the various options focuses on the likely economic benefits, including consumer benefits, available from those developments. However, in considering how any projects would actually get built, it is vital to go beyond this economic assessment to look at commercial viability, and to understand how these large and capital-intensive projects would be financed. As stated earlier, the CAA believes the Government should ensure that it does not seek to promote projects that are not themselves commercially viable, as to do so would be to run the risk that investment for the preferred project would not be forthcoming, or that runways would be built that would be under-utilised.

7.45 Any private sector company seeking to build a major infrastructure project would need to take into account a range of elements before going to the markets to raise the necessary finance. This would include their prediction of how that new infrastructure would produce reliable revenue streams in the future, and how quickly those revenue streams would cover the up-front

investment cost. It would also take into account any associated elements, such as the need for surface access enhancements.

7.46 Any propositions would then be likely to be considered by the capital markets against the level of risk attached to that prediction of revenue streams, and any project-specific risk attached, which would depend in part on the sheer size of the project and the extent to which risks on related projects could have a negative impact on the point at which the initial investment would start paying off.

7.47 All these factors would have an impact on the feasibility of getting the necessary finance, and the cost of that finance, and would change the real present values of the various projects from the net present value (NPV) figures set out in the SERAS document. Taking into account these commercial considerations will tend to make more attractive those options that provide greater certainty about the speed and size of returns on the initial investment, and would favour those options that are primarily concerned with incremental development, rather than very major expansion or completely new airports.

7.48 This links directly to the discussion above about take-up of new capacity. From a financing perspective, Heathrow would appear to be a good option, as demand for the new capacity would mean the new runway could be close to full usage early on in its operation. However, this depends on two key assumptions on terminal capacity and NOx.

7.49 As stated earlier in this response, the CAA's view is that maximum usage of a new runway at Heathrow can only be achieved if terminal and connected facilities can be constructed adjacent to the new runway. With regard to NOx, maximum usage of the new capacity would rely on the industry being able to deal with the problem of NOx emissions sufficiently to keep within the mandatory EU limit. If this were not achieved, one option might be for an airport operator to choose to restrict usage of the new runway to ensure the NOx limit was not exceeded. This is a commercial risk that would need to be factored in when considering the Heathrow option.

Regulatory change to enable financing

7.50 Financing a new runway at Stansted would involve a far greater level of uncertainty about whether the new capacity would be taken up quickly. It is therefore less likely that the project would be commercially viable on a stand-alone basis. A potential source of funding for an airport project which was not in itself commercially viable would be through cross subsidy from other airports within the same system.

7.51 However, there are important benefits in individual airports standing alone in economic terms and meeting their own costs without the aid of cross subsidy. If cross subsidy from one airport to another were to apply, it would be essential that this was fully transparent and properly justified in objective economic terms, including whether such cross subsidy would benefit users generally. Moreover, and as mentioned in more detail in section 5, there is a question-mark over the view which the capital markets would take of the credibility of the regulator in committing long term to the necessary cross subsidy, especially if the scale of the cross subsidy involved were large in

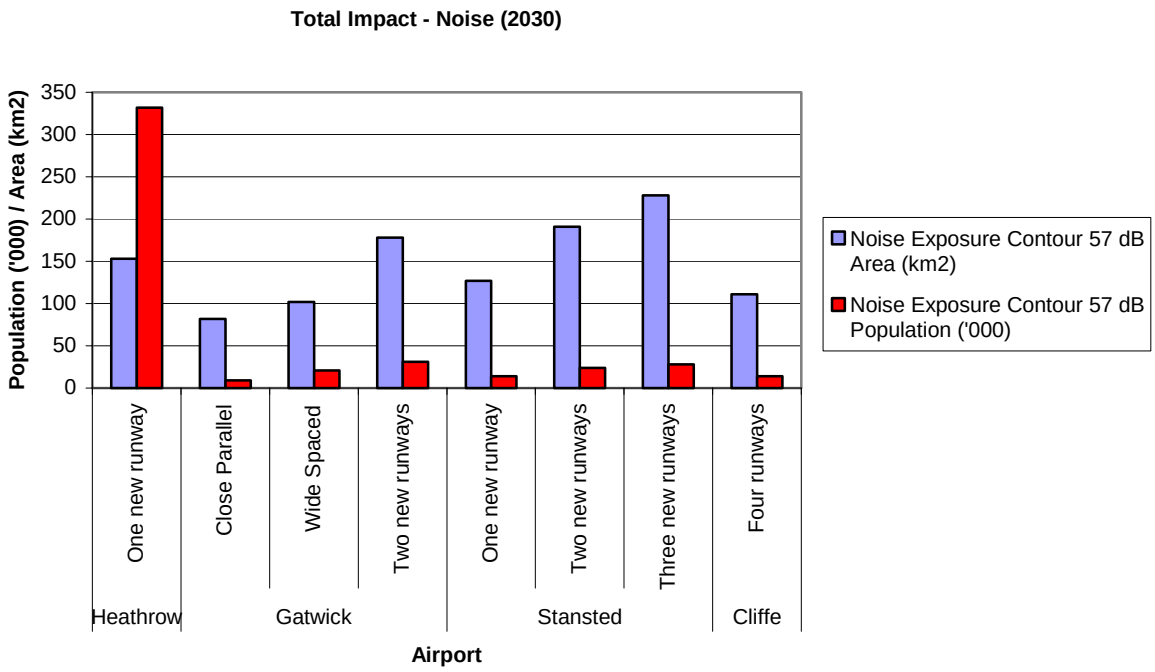
relation to the revenues which the airport would be capable itself of generating.

Environmental considerations

7.52 From an economic, commercial and financing perspective, as discussed above, the arguments would suggest that a third Heathrow runway would deliver a higher level of net benefits than for any other new runway. However, it is also clear that the environmental impact of a new runway at Heathrow would be greater, by an order of magnitude, than at any other location. From a simple environmental standpoint, Stansted is the option that would create least disbenefits overall, as the following paragraphs demonstrate.

Noise impacts

7.53 In comparing the total environmental impact of the options, the most significant impact for many local residents is that of aircraft noise. In terms of population exposed to aircraft noise, as shown in the total impact chart below, the largest impact by far would be from an additional runway at Heathrow. With one additional runway, a total of around 330,000 people by 2030 are predicted to be included within the 57 dBA $L_{eq,\ 16\ hr}$ noise exposure contour level for Heathrow – the level that marks the approximate onset of significant community annoyance due to aircraft noise. Of the single wide-spaced runway options, the one creating least impact is at Stansted.

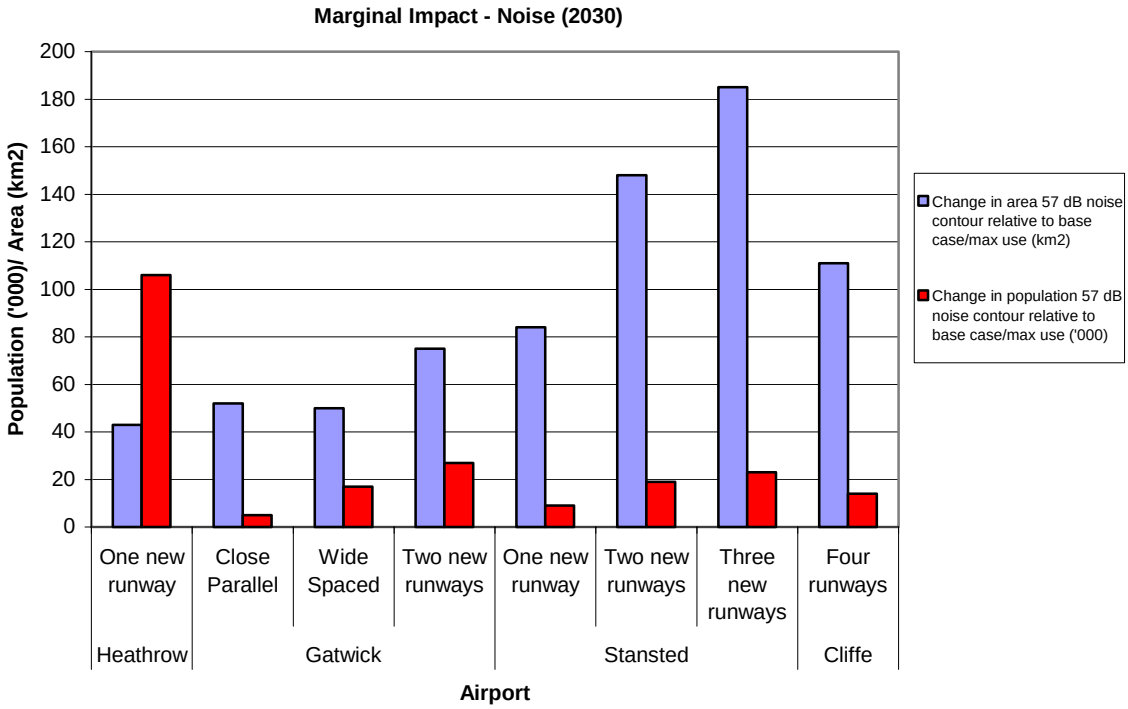


7.54 However, in considering the environmental impacts of any proposals for new capacity it is important to understand the marginal impacts, i.e. the incremental environmental impact of each option. It should be recognised that a proportion of the total impact would occur at existing airports even if new runways were not developed. Concorde is currently a dominant feature of the noise exposure contours at Heathrow and so its cessation will bring

considerable benefits in terms of noise at Heathrow. However, it has been excluded from assessments of marginal impact because it will have ceased flying when the White Paper is published and the public will be used to lower noise levels at the time any potential planning application is submitted.

7.55 An additional runway at Heathrow would cause easily the most significant marginal impact to local residents, resulting in a predicted increase in population within the 57 dBA $L_{eq,\ 16\ hr}$ noise exposure contour of 106,000 people by 2015. These numbers are far in excess of those affected by any other South East option as is shown in the marginal impact chart below. The lowest impact of the three main runway options in terms of population likely to be exposed to aircraft noise is one wide-spaced runway at Stansted, with around 9,000 additional people exposed.

7.56 Proposals for a new runway at Heathrow should take full account of the costs attached to mitigating or compensating for noise. As we have stated throughout this response, aviation should meet its full costs, including environmental costs. Noise represents one element of those costs. The price tag attached to dealing with noise will increase total costs for the Heathrow project and will reduce the extent to which the economic benefits outweigh the costs. It is very difficult to set a precise figure to that price tag at this stage, but it may be possible to consider a range of possible figures that could help to judge whether or not this would change the overall desirability of the Heathrow option, in comparison to the other airports where those costs, and other environmental impacts, are less serious.



7.57 The recent case heard by the European Court of Human Rights in respect of night flights at Heathrow may indicate possible future pressures on operations at Heathrow and the Government will of course need to take account of the outcome of the ruling in this case.

Local Air Quality (NOx)

7.58 Local air quality is subject to statutory EU limits for Nitrogen Dioxide (NO_2) levels. It is important to bear in mind that NOx is a complex issue, and aviation is only responsible for a part of the total of NOx levels. At Gatwick and Stansted, NOx does not present a problem in terms of new capacity. However, it is clear that there are risks of exceeding NOx limits at Heathrow if a new runway were to be built there

7.59 The modelling carried out on behalf of the Department for Transport is based on a conservative set of assumptions. More recent studies have relaxed some of those assumptions and used different modelling techniques. These substantially reduce the numbers likely to be affected, but there is still a risk of a significant residual problem at Heathrow.

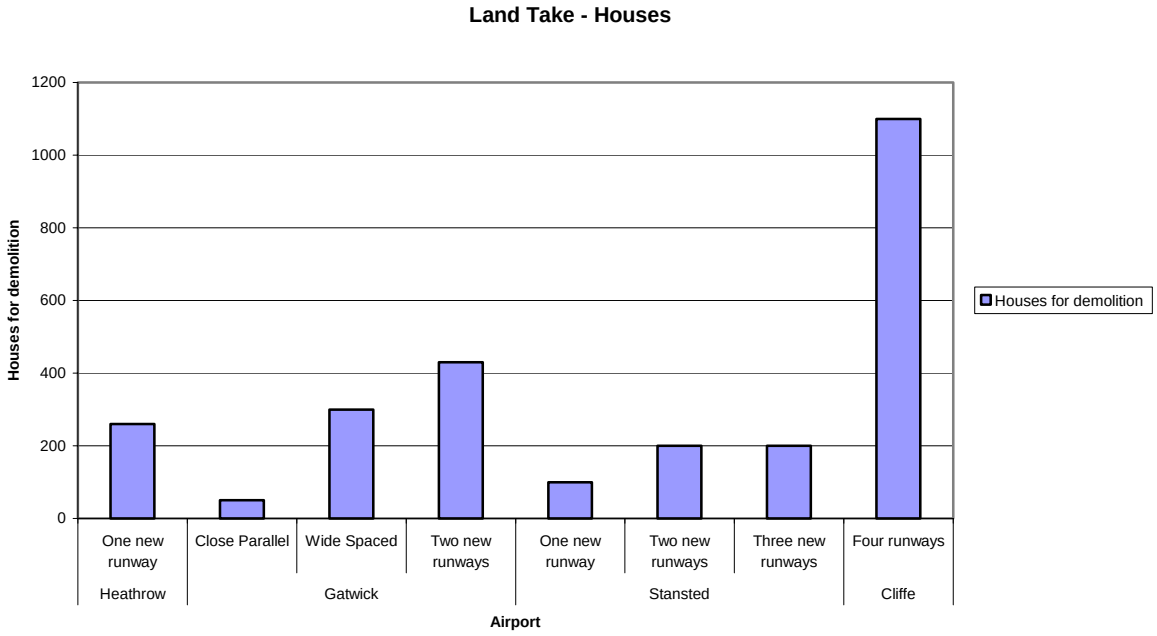
7.60 Mitigation measures proposed by the aviation industry rely amongst other things on more stringent international emissions standards, which the UK cannot guarantee will be accepted by the international community. Although future technologies may resolve this, at present any increased stringency of emissions standards would almost certainly result in increases in noise. It may be possible to incentivise the industry to bring forward improvements through some form of tradeable NOx permits operating below the level of the absolute limit on NOx, but such a scheme would need to be carefully thought through to ensure it could be made to work practically and efficiently before it could be introduced.

7.61 Any development at Heathrow would have to be taken forward with the legal limit for NOx in mind. There could be options for keeping within that limit by, for example, restricting the usage of the new runways, but, as mentioned above this would introduce an additional commercial risk that should be factored in to the Heathrow equation.

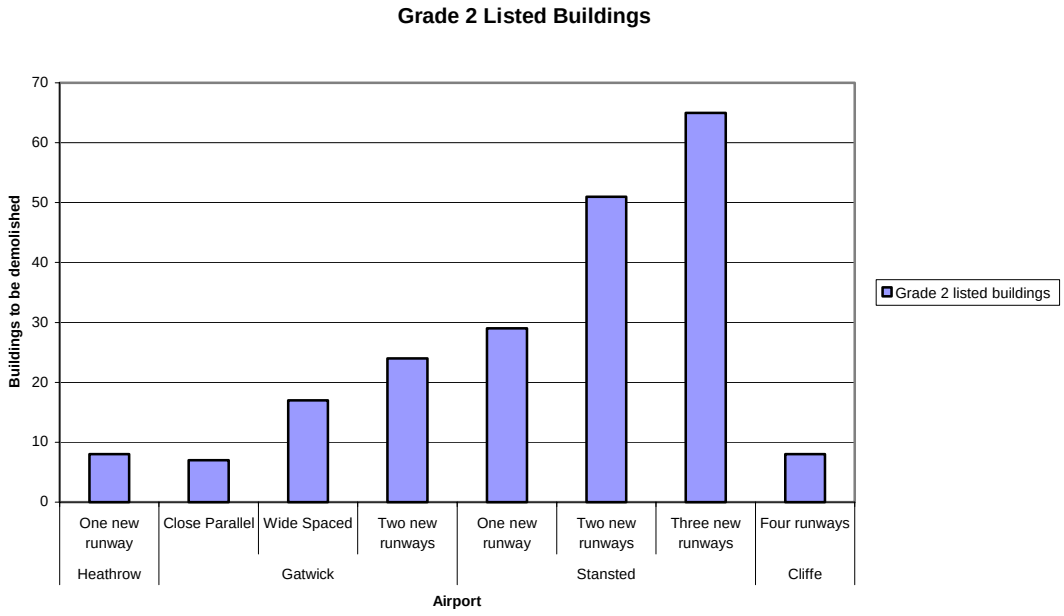
Land Take

7.62 *Declaration of Interest:* Two of the Gatwick options would require the demolition of Aviation House – home of the CAA's Safety Regulation Group providing accommodation for 806 staff out of a total of 1,082 CAA employees.

7.63 As is shown in the chart below, the most damaging option in terms of land take is Cliffe with four runways requiring 26 km^2 and 1,100 houses for demolition. These figures only include land and property required for airport infrastructure and exclude houses and land that may be required because aircraft noise and local air quality may be either intolerable or breach statutory limits.



7.64 As shown below, the Stansted options cause the most damaging impact in terms of numbers of Grade 2 and Grade 2* listed buildings[10] that would need to be destroyed. Heathrow, Gatwick and Cliffe require the least.



[10] Grade 2 listed buildings are those of special interest. Grade 2 * listed buildings are particularly important buildings of more than special interest (some 4 per cent of listed buildings).

Ecology

7.65 Ecological aspects are dominant for the Cliffe option. This reflects the fundamental problem with any new site option - minimising the impact on people by selecting a relatively remote location is almost certain to increase the impact on the ecology and have an impact on those individuals who have chosen to live in such locations that offer peace and quiet at a different pace of life.

Comparison of options – balancing the economic benefits against the environmental costs

7.66 To come to a view on the best option for runway development – one which takes proper account of all the relevant factors - it is important wherever possible to attempt to place a monetary value on adverse environmental impacts, to set against the estimated economic benefits of the various options. This will need to form part of the further financial appraisal – alongside work on commercial viability – that the CAA believes the Government will need to undertake in advance of any decision. It is clear that the Heathrow option creates more noise and NOx problems for the additional capacity than any other option, whereas Stansted and Cliffe create least. This outcome is not surprising, as it is largely flows from the differing densities of population at those locations. However, this is only the first level of analysis, as taken in isolation it does not help to arrive at solutions that achieve the optimal balance between economic benefits and environmental costs.

7.67 Achieving precision on the true extent of those benefits and costs is not possible with the information to hand, but it is possible to some extent to assess the attractiveness of the various options by working through a range of assumptions on benefits and costs. The potential costs of noise mitigation are one major factor that developers need to take account of in their project plans, and, although the scale of NOx-related costs is even more uncertain than noise, this could also be a major cost element.

Using Net Present Values (NPVs)

7.68 The NPV calculations for economic benefits as set out in the consultation document can provide a helpful starting point for thinking about the relative attractiveness of options, although potentially optimistic assumptions about how readily airlines might switch business to Stansted from Heathrow may give a higher value for Stansted than may be appropriate. These NPVs would of course then need to be overlaid with a more detailed commercial assessment of the feasibility of raising finance for these projects, taking account of project-specific risk attached to costs, the level of certainty the market would assume for revenue streams and so forth. These considerations would tend to increase the attractiveness of Heathrow in particular, as the level of unmet demand suggests that any new runway would be filled very quickly, thereby providing greater speed and certainty of revenues. The same considerations would also tend to favour incremental developments over major expansion.

Noise – absolute numbers affected

7.69 As shown in the charts above, the figures for those newly affected by noise suggest that:

- At Heathrow some 106,000 people could be newly exposed to noise levels of 57 dB or above;
- At Gatwick the figure is around 15,000, and;
- At Stansted it would be around 9,000

NOx – absolute numbers affected

7.70 The figures in the SERAS document suggest that, on DfT's conservative model about what could be done to mitigate NOx, around 35,000 people could be exposed to levels exceeding the EU limit in 2015 (against an assumption of 14,000 people so affected if no new runway was built). Assuming a more proactive approach to NOx mitigation within the model, this number was reduced to 5,000. And figures from other respondents to the consultation suggest that the figure could be reduced to zero. The NOx problem is specific to Heathrow, as the other locations would not seem to be much at risk in terms of exceeding current NOx limits.

7.71 So, more people are likely to be newly affected by noise and NOx at Heathrow than at the other options. The key issue in terms of assessing how this affects the choice of where to site new capacity is to gain a better feel for the likely monetary value of this negative externality, and then to try to balance this against the likely economic benefits.

Estimating costs attached to mitigation/compensation of noise/NOx impacts

7.72 As stated before, it is extremely difficult accurately to assess environmental costs. The SERAS document does not give detailed projections for the costs of dealing with noise impacts for a new runway at Heathrow. However, BAA's own assessment is that, on a mitigation-led approach, noise would cost £290m for the new runway at LHR, a compensation-led approach would cost £550m, and using a combination of all the measures suggested in SERAS (compulsory purchase at premium rates for houses at 69dB or above, noise insulation for those at 63dB or above, cash compensation for those at 57dB or above, and noise insulation for schools and hospitals) would cost around £1.2 billion.

7.73 Even taking into account the higher end of the range of costs for noise, it seems that, in the CAA's view, the Heathrow option could still rate above the other options, as the financial and commercial risks would strengthen the economic value of Heathrow, and weaken the case of the other options.

7.74 The very wide range of outcomes from the different models on NOx exceedence creates a bigger problem however. Depending on which of the models gives a more accurate answer, the estimates for the costs of dealing with that NOx problem (essentially through buying up houses in the affected area) vary from negligible or no cost through to around £0.4bn on the more optimistic model, to around £3bn on the conservative model. It should also be noted that measures to reduce background NOx, which makes up a large element of the total NOx problem could also help here, although again the outcome is very uncertain. Another way of ensuring that the absolute limit on NOx is adhered to could be to reduce the capacity at which the airport operated, although this would then need to be factored in as a commercial risk for the Heathrow option.

7.75 If the assumptions on noise are correct, and the Government's more optimistic modelling on NOx represents a more accurate prediction, or if other measures to reduce background NOx can help to mitigate or remove the problem, then this could mean that although the environmental costs of Heathrow would still affect many more people than the other options, and would come at a higher cost, the larger economic benefits and clearer commercial viability could still make it the most attractive option.

7.76 This view should be treated with caution, as there is a high level of uncertainty about both costs and benefits and, as stated above, Government should seek to undertake a proper commercial appraisal in relation to these options, and come to a considered view on which end of the range of environmental costs it believes is most accurate before coming to a decision.

Extra capacity beyond a first additional runway

7.77 If Government decided that additional capacity was to be limited to only two runways, say, one at Heathrow plus one at either Stansted or Gatwick then the relative desirability of those options needs to be considered alongside the impact that a first new runway, especially if that were to be at Heathrow, would have on the South East aviation market as a whole.

7.78 Because of the long shadow that Heathrow casts, any development there would have an impact on the other London airports. There has historically been more of an interplay between Gatwick and Heathrow than between Stansted and Heathrow; Gatwick's catchment area has always been viewed as stronger than that of Stansted, Gatwick's southern location is better for most short-haul traffic flows and, other than bmi at Heathrow, Gatwick has always been the base for full service scheduled carriers seeking to challenge BA and, indeed, for BA's putative second London hub. Additional capacity at Heathrow is therefore likely to impact Gatwick more than Stansted.

7.79 Combined with long-haul liberalisation, a third runway at Heathrow could mean the loss of the bulk of Gatwick's long-haul scheduled services. As a consequence, the economics of some of its short-haul scheduled services will suffer to the extent that they act as feeders to the long-haul network. This could free slots at Gatwick and allow no frills carriers more room for expansion. There may therefore be a shift of these carriers from Stansted and Luton towards Gatwick. However, this is difficult to predict in the short term, let alone ten years ahead. For example, some observers doubted whether no frills airlines would enter Gatwick when slots became available in the aftermath of 11 September 2001. In the event Ryanair, despite having a presence with its Dublin route, did not acquire more slots but easyJet entered and has expanded significantly. Additional capacity at Gatwick would also allow greater access to charters, for whom Gatwick is by far the preferred London airport.

7.80 It is difficult to draw hard-and-fast conclusions from this analysis but it does perhaps suggest that a second runway at Gatwick may create capacity that has a higher certainty of being used quickly than a second runway at Stansted, although environmental impacts are likely to be greater at Gatwick. Arguably, such a decision need not be taken at the present time unless the Heathrow option is rejected either by the Government or by the planning system.

7.81 However, even if the Heathrow option were approved and the new runway began operations in 2011, the extra capacity that it will provide, although highly valued, is relatively small. Hence it could be appropriate for the Government to signal a preference now for where a second runway should be built. An alternative approach would be for the Government to express the view that there would be a need for a second runway in the London area in addition, say, to an extra one at Heathrow, that this should be at Gatwick or at Stansted, to take whatever steps are necessary to preserve those options, and then leave the outcome to the private sector to pursue.

The Need for Further Developments

7.82 In 2002 the London airports handled 117m passengers and the central forecast for the unconstrained demand at these airports in 2030 is 306m passengers. The forecasts generally assume by 2030 that the range is around 20% either side of the central point, i.e. the high forecast is around 370m and the low, 245m.

7.83 If Terminal 5 is included, the capacity of the four main airports with the existing infrastructure is 154m passengers a year. The Government estimates that this could increase to 202m if Luton's runway is re-aligned or re-sited and terminal capacity expanded and if more intensive use is made of the facilities at Gatwick and Stansted and larger aircraft used. A third runway at Heathrow would increase the aggregate capacity of the four airports to 229m and a second, wide-spaced, runway at Gatwick would increase the aggregate capacity to 260m, i.e. around the low end of the forecast range. A further runway at either Gatwick or at Stansted would take the London capacity close to the central unconstrained forecast level, assuming there was no impact from these developments on the capacity of existing infrastructure. This suggests that three additional runways may at some stage be needed to cope with demand but there must be uncertainty as to whether that will occur before 2030.

7.84 As indicated above, there would appear to be evidence that an additional runway at Gatwick would be commercially more attractive than one at Stansted. The analysis above suggests that it is possible that Gatwick (even with three runways) may not develop into a hub-type airport rivalling Heathrow. For example, long-haul services are important to a London hub and it still may be difficult to attract them away from Heathrow with an established, albeit congested, feeder network. If this is so, then Stansted's business case would rely much more on short-haul services, serving a local market. This would mean that surface access would become a more important guide to the economic benefits available, and it should be noted that Stansted serves a different and smaller catchment area than Gatwick.

7.85 Given the uncertainty about developments in the long term, there is no need to make precise decisions on the location of a second or third new runway for the London area as yet but there could be losses to society unless the ability to make such choices in the future is preserved.

8. CONCLUSIONS AND RECOMMENDATIONS

Policy Implications

8.1 Decisions on airport infrastructure should seek to ensure that the long-term development of aviation maximises expected net benefits to society in a sustainable way. Aviation should meet its full costs, including those imposed on the environment. But it is also important that decisions on infrastructure take full account of the commercial realities of the aviation industry, to guard against sub-optimal investment and the associated loss to airlines, passengers and potentially the wider public.

8.2 The issues raised by the development of aviation infrastructure are complex, with a mix of market and non-market factors, an interaction between airport and airline economics and trade-offs between economic benefits and environmental costs. Government should therefore seek to intervene in the aviation market only where there is clear value in its doing so.

8.3 The White Paper should develop a public policy framework, consistent with the Government's objectives as set out in the Integrated Transport White Paper. This should enable airlines and airports to provide services in a cost-effective manner, whilst ensuring that environmental externalities are fully addressed. The relevant issues around the safety of airport operations, airspace configuration and the particular characteristics of aviation economics should also be given full weight. The White Paper should address not only the possible development of new infrastructure but also ways in which use of the current infrastructure might be improved.

8.4 The more that market approaches and mechanisms can be applied to airport development, and to the use of existing airport assets, the more likely it is that decisions by airport developers, airport operators and airlines will produce economically and socially optimal outcomes. There is no reason why this approach should not be effective where there are no undue problems in the operation of the airport market and where the benefits of aviation and its localised external costs are felt reasonably close to the airport. Broadly speaking, this is true of the regions but not of the South East.

8.5 The aviation sector should face the full costs of the environmental impacts for which it is responsible. The local impacts of aviation must be factored in to decisions on where to locate additional capacity, but this process is complicated by the difficulty of attaching precise values to these impacts. However, it is essential that Government finds an effective policy approach to these environmental issues. This could involve the use of economic instruments, but whatever approach is adopted should be gradual, to recognise the particular features of airline economics, and should take account of the importance of maintaining a level playing field between airlines from different countries.

Airport Capacity in the South East

8.6 The CAA believes that there is an urgent need for new airport capacity in the South East. The scale of the development required, its broader national significance, the associated surface access and environmental issues all warrant the Government giving a lead on this issue now. The CAA has not

come to a firm conclusion in favour of any particular option, as we consider that only Government can reach conclusions on the balance between the main factors involved. Instead, the CAA wishes to point out the key issues which Government needs to take into account before making any decision.

8.7 Of the options available, it would seem that Heathrow could yield the largest economic benefits, and seems least uncertain in terms of project viability and the likely swift take-up of the additional capacity provided. However, it also seems to present by far the largest environmental challenges, with more households likely to be newly affected by noise, and where the problem of keeping NOx levels beneath the required EU limit is greatest. These environmental impacts will impose a level of cost on the Heathrow option which is hard to ascertain precisely, but Government will need to take a view on this, and be confident that these can be adequately addressed before signalling support for the Heathrow option.

8.8 By contrast, Stansted would, overall, have the lowest environmental impact in terms of both noise and local air quality, and can accommodate the most flexible airspace arrangements that would benefit operators and the environment. But it is far from certain that it would be a commercially viable project. Given that the private sector would be expected to finance any new capacity, Government would need to convince itself that such finance could be forthcoming, before signalling a preference for Stansted. In order to facilitate the development of Stansted as a larger airport, the Government would also need to consider what would be needed to improve surface access to Stansted, in particular through enhanced rail links. The CAA would question how far, as has been suggested, the regulatory system currently applied to BAA's London airports could be used to make otherwise non-viable projects financeable. It is also questionable how far users at one airport should be expected to pay for the creation of economically marginal capacity elsewhere, whether this is compatible with sustainable development, and whether the extent and length of the regulatory commitment involved would carry sufficient credibility to deliver long-term financing.

8.9 The Gatwick option appears to fall between these two options. The environmental impacts appear to be less problematic than at Heathrow, and the commercial viability of development at Gatwick, while still uncertain, may be less so than at Stansted.

8.10 Wherever the Government signals its preference for a first new runway to be constructed, the impact on the other major airports in the South East of that new runway would need to be factored in when considering what further developments might be necessary in the future. If capacity constraints in the South East continue to be a problem in the period up to 2030 and beyond then it will be important that Government should preserve the options of expansion at the other major London airports.

8.11 If there was a decision now in favour of the Heathrow option, it would be necessary for both Government and the aviation industry to recognise that a third runway would realistically be the most that the site could accommodate and that any future runways would need to be located elsewhere. Under current market conditions, it looks likely that expansion at Gatwick may produce extra capacity that would be more quickly utilised than at Stansted. However, there is no pressing aviation need to come to a view on this now.

Principal Recommendations

8.12 The CAA therefore recommends that the Government should;

In relation to the South East:

- recognise that there is a pressing need for some additional capacity in the South East and therefore signal a preference for early development at one of the three main options;

- encourage the best use of current capacity at all the London airports, in view of the long lead time for the development of runway capacity in any location in the South East, in the main by continuing to argue strongly within the EU for an open secondary market in slots;

- recognise that, if new capacity is to be delivered by private sector funding, it is crucial to understand whether the preferred option is commercially viable. This should include further analysis of the commercial returns available and the likely financing feasibility and costs which should also cover the impact on economic regulation; and

- indicate that at some stage in the future further runway capacity in the South East will be needed and take steps to safeguard such options, including potential surface transport connections.

In relation to the rest of the UK:

- allow normal market mechanisms to continue to deliver necessary infrastructure enhancement, but help developers to safeguard the most likely options in some cases;

In relation to all airport development:

- take full account of the importance of surface access and weigh up the costs and associated project risks of the transport connections before concluding in favour of any particular option, and;

- continue its efforts to reform the planning process to make it as effective and streamlined as possible, and;

In relation to the environment:

- take full account of the environmental impacts of all options, and seek to ensure that aviation covers its full costs at both the global and local level by developing ways in which those who suffer significant loss from both actual and potential development are compensated.

- take a gradual approach to these issues, and ensure that a level playing field is maintained between UK and overseas airlines, particularly as the airline industry operates on thin margins and has suffered a number of shocks in recent years. Nonetheless, it is essential that Government finds an effective policy approach, internationally and nationally, that does more to make aviation meet the environmental costs that it creates within the timescale of the addition of any new capacity.