

# **Response to the Airports Commission Discussion Paper on Aviation Demand Forecasting**

## **1. Relevant Personal Experience**

My name is Stanley Bryan Abrahams and I have been involved in aviation forecasting since 1968, first as a member of the Research Team of the Roskill Commission, then as Chief Statistician of the Civil Aviation Authority until I retired in 1999.

After retirement, I was employed as a consultant by the DfT to help them develop their forecasting and passenger allocation models which were based upon a 1990 CAA model developed for their own, earlier studies on the need for new runways in the South East (CAP 570).

In the interim, I was a member of the various governmental Committees investigating the need for new runway capacity in the South East and contributed to three White Papers on the future of aviation. I represented the UK on forecasting matters at the European Civil Aviation Conference (ECAC ).

I have given evidence on airport development on behalf of the CAA at 17 Public Enquiries into the development of UK airports including Heathrow Terminals 4 and 5, Gatwick Terminal 2 and Stansted.

You will realise that it has been a source of extreme frustration that so many hours of hard endeavour has produced so little, not so much as a lack of capacity preventing airport development but in providing a plan which would remove the uncertainty for the future of aviation and its industry.

## **2. Accuracy of the DfT Model**

As one of the originators of the DfT model, first at the CAA and subsequently as consultant, I consider the general approach to be sound, based as it is upon passenger choice related to generalised costs. However, it is possible to over-refine the model and go into too much detail. Greater detail can lead to greater understanding and allows sub forecasts to be made which are consistent with the overall forecasts. However, greater detail involves the forecasting of additional variables which leads to new potential sources of error.

It is better to be approximately right than precisely wrong.

Recent forecasts have been wrong, not due to the accuracy of the model but by the inability to forecast the variables, upon which the model depends, notably the economy.

### 3. **Modelling Interline Traffic**

This would be especially true of the modelling of interline traffic. It is possible to construct a route by route model based upon passenger choice and the multinomial logit (as in the main model) but the modelling of domestic X international traffic would involve assumptions about fares, frequencies and airline policy on every route within and out of the UK. Similarly, the modelling of international X international traffic on a route basis will involve modelling the world.

I consider it to be more profitable to spend time developing a model relating interline traffic to more general factors such as total number of domestic/ international passengers and routes at an airport, the mix of scheduled/charter and business/leisure passengers and the number of routes served.

This is an area where a Delphic approach may be of value.

### 4. **General Approach to my Response**

Given the inevitable uncertainty inherent in the forecasting process and the predominant causes thereof, my response does not apply to specific details of the forecast methodology but illustrates how difficult it is to make accurate forecasts ten years ahead no matter how expertly or detailed they are constructed.

The need for new airport facilities depends upon

- i) passenger demand,
- ii) aircraft size in terms of passengers per aircraft, and
- iii) airport capacity

all of which are sources of potential error.

At the time of Foulness (or Maplin as it was euphemistically renamed) , it was not just the recession which led to the Maplin review and its eventual abandonment but errors in all three factors. The Maplin Review saved the country from an extremely costly white elephant and the same mistake must not be repeated.

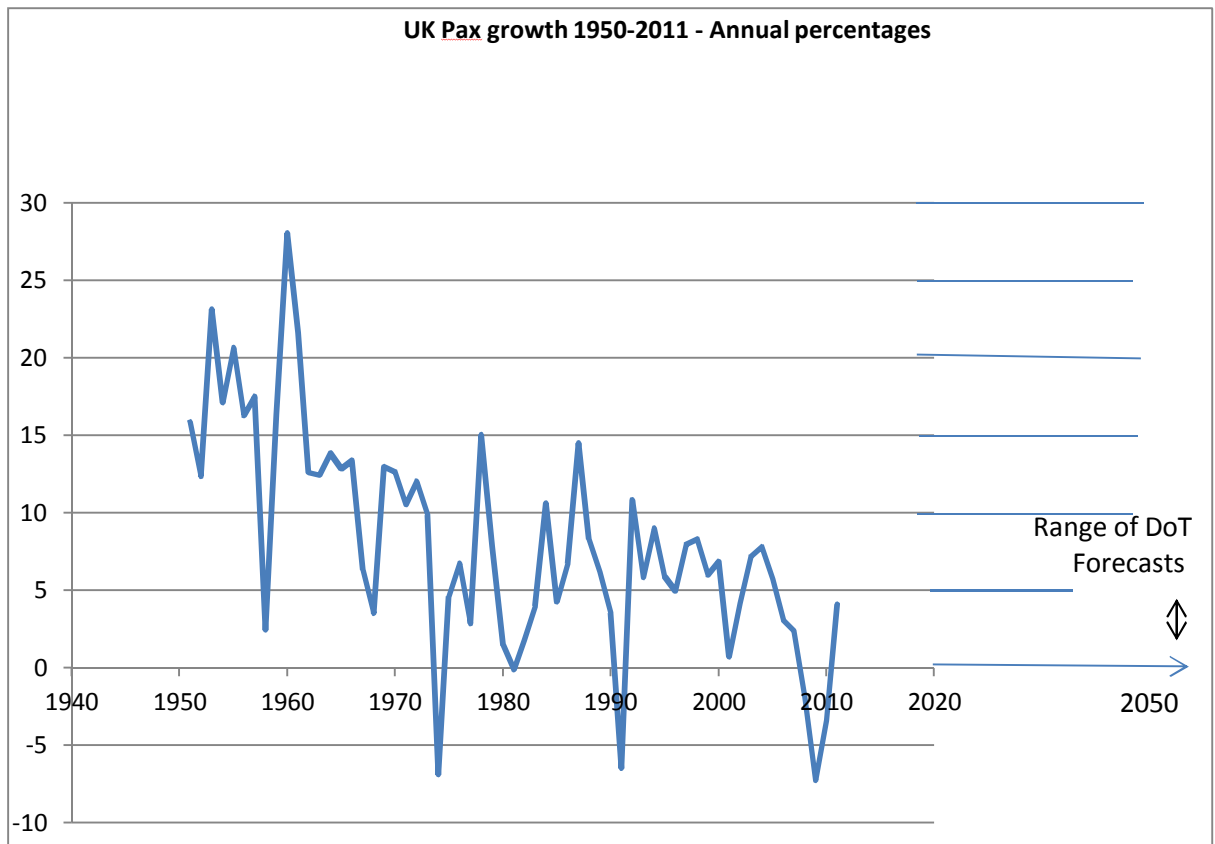
The only way to overcome this problem is not to try and improve the forecasting process (although, of course, the best possible forecasts will be required as a guide) but to produce a strategy which is sufficiently flexible to be able to react to the change in events as they occur within the lead time of any suggested solution.

### 5. **Forecasts of Passenger Numbers**

Discussion Paper 01 has highlighted how even recent forecasts of passengers have been wrong.

DfT forecasts made as recently as 2009 for 2012 have proved to be over 25% wrong and highlights just how forecasts depend upon a multitude of factors most of which are beyond the control of the industry.

The following graph illustrates the difficulty of forecasting growth for more than 10 years ahead.



An average error of 1% per annum over 20 years is equivalent to an accumulated error of 22% or the equivalent of 1-2 full runways.

#### 6. Forecasts of Passengers per Aircraft

The following table compares the forecasts of numbers of passengers per aircraft for the London Area airports made by Roskill in 1970 for 2006 and the CAA in 1990 for 2005 with the out-turn in 2005.

	Roskill	CAA	Actual
Year of Forecast	1970	1990	2005
Pax/Atm	284	142	129

Although the CAA 1990 forecast was quite good, the forecast of the Roskill Research Team, based upon advice from the Department of Trade was out by a factor of over 2, which had the effect of more than halving the estimated required number of aircraft.

Fortunately for Roskill, the estimate of passengers for 2006 was about twice the out-turn and so the resultant estimates of aircraft numbers was not too far out.

## 7. Forecasts of Airport Capacity

Forecast of airport capacity have also been grossly in error with Nats being increasingly able to get more aircraft onto one or two runways. It is understandable that Nats would not wish to forecast too optimistically with the pressure of having to live up to their forecasts. It is therefore expected that forecasts of runway capacity will always be on the pessimistic side.

The following table gives the forecasts of the long-term hourly and annual capacities of Heathrow, as made at the Stansted Inquiry in 1982, by the CAA in 1990 and by RUCATSE in 1993 compared with the out-turn figures for 2010.

	Stansted Inquiry	CAA	RUCATSE	Actual
Forecast Year	1982	1990	1993	2010
Hourly	67	73.3	79	81.4
Annual	280,000	370,000	410,000	449,000

## 8. The number of people affected by noise

The noise climate around airports, despite the increase in aircraft numbers has continued to improve. In the same way as technology in air traffic control has led to the increases in airport capacity, so improvements in aircraft and engine technology have led to improvements in noise generation.

In 1969, the 57db noise contours for an airport of two full runways forecast by Roskill covered 260 square kilometres. Roskill included a 10db allowance for future technological advances, which has since proved to be pessimistic. Additionally, Roskill' 'full' involved considerably less movements than is thought possible today

The present noise contours forecast for two full runways (at Heathrow) cover 149 square kilometres.

It should also be noted that when forecasting the numbers of people affected by noise, it is important to distinguish between those who have experienced noise over a long period of time and those who will be newly affected, with separate counts being made of those experiencing 'old' noise and those experiencing 'new' noise.

As time passes, populations around airports become self-selecting with those most sensitive moving away and those less sensitive willing to move into affected areas and getting the advantage of depreciated property values.

Those experiencing noise for the first time are thus more seriously affected and their numbers should be weighted accordingly.

## 9. Conclusions

No matter how competent are the forecasters or sophisticated the forecasting procedures, the forecasts will be wrong. Of course, this does not mean that the quest for better forecasts should not continue but *man proposes and God disposes*.

Although forecasting techniques have improved over the years, it is my experience that it is not the forecasting processes that have been the major contributor to discrepancies, some very large, when compared with the out-turns, but it is the external factors upon which the forecasts depend that have proved un-predictable. The inability to forecast the economy for up to twenty years ahead, world events, holiday fashions, improved electronic communication and the development of the industry itself (mergers, bankruptcies technological advances) make the quest for accurate forecasts an unobtainable goal.

The high costs to the industry and economy of under-forecasting demand and to the environment of over-forecasting demand together with the inability to construct accurately forecasts make it imperative that flexibility is built into any proposed solution with the ability to react to changing estimates in the minimum possible lead time.

Therefore, it is the planning process itself rather than the forecasts that must be able to react to changing circumstances.

With this in mind, one way to

- a) end the uncertainty on the future of the industry
- b) avoid building facilities too soon or which ultimately appear to be not needed, and
- c) ensure that the industry has sufficient facilities to enable it to fulfil its role in the economic development of this country

is to

- i) reserve the land (wherever is thought the most appropriate from the aspects of planning, surface access, noise and operational feasibility) capable of accommodating four full runways
- ii) fully and generously compensate all those affected either physically or from noise annoyance and to allow for planning blight
- iii) clear the planning processes in advance to expedite any construction
- iv) only build the runways incrementally when needed (a lead time of 2 years should be adequate given that stages i), ii) and iii) have been undertaken
- v) in the meantime, until required the undeveloped land can continue to be used for housing, agriculture or for whatever purposes are thought best.

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