

Dublin Airport Passenger & Aircraft Movements Demand Forecast Report

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Final Version

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1 Current Forecast

1.1 Introduction:

Demand passenger and aircraft forecast data are produced for Dublin airport each year to feed into its long-term planning process. This assists the DAA in considering what investment in infrastructure is required to meet future demand and how this can be phased and funded. High and low demand forecasts are also produced to test the level of service the airport can provide if higher than expected growth occurs and to test the financial constraints implicit where growth is lower. These unconstrained projections, based on the best knowledge available, allow for a consistent and reasonable series of data to be used across the organisation.

After a series of traffic shocks in the early half of the decade (9/11, SARS, Foot and Mouth and the Iraqi War), 2004 saw a significant rebound in traffic, even though the price of jet fuel rocketed. The economic recovery, the return of business confidence, corporate investment and a pent up demand in worldwide leisure travel have all resulted in a much stronger recovery of air traffic than previously anticipated. Double-digit growth in worldwide traffic in 2004 is expected to be followed by 5% to 6% growth in 2005. Although, while the oil price has retreated from the all-time high seen in autumn 2004, the current price is still considered to be above the industry's break-even level. This means that if oil prices stay high, there will be lower levels of investment in new capacity until equilibrium is re-established.

This document details the approach used by the Dublin Airport Authority in 2004/2005 in the development of its passenger and aircraft movement forecasts both in terms of the methodology and the associated processes. The results of the centreline demand forecast are offered here.

1.2 Choice of Forecasting Methodology:

The first step in the production of a forecast is the choice of forecasting methodology. A wide variety of methodologies exist, ranging from the extrapolation of historical data using mathematical techniques (statistical), to the development of a forecast based on expert opinion (judgmental).

Many techniques are available today, and each has its strengths and weaknesses. These include a wide variety of time-series based approaches, econometric procedures, logit models and 'gravity' modelling.

No two forecasts methodologies approach the problem in the same way. But most models involve using historical information to predict future trends. This can cause problems in the case of exceptional events like SARS or 9/11, where the historical data gives a very unclear view of any future trends.

1.3 DAA's Forecasting Process and Methodology:

The Dublin Airport Authority's forecasting methodology is similar to that used in many other airports. It has been extensively reviewed and endorsed by external consultants in recent

years, while the Commission for Aviation Regulation accepted the Aer Rianta forecasts in its first determination process.

The company's forecast had also been reviewed in 1999 by SH&E as part of the Warburg Dillon Read review of the Aer Rianta Strategy for the Minister for Public Enterprise, and it was concluded that the methodology was sound. However, most experts, including Warburg Dillon Read, would agree that there is not a 'correct' methodology, only a reasonable one.

1.3.1 Forecasting Process:

The next step to produce the forecast involves inputting the historical data into the model on a route-by-route basis. The model parameters are then re-evaluated and updated.

In parallel to this, the internal Forecasting group is set up. This group is made up of Group Strategy, Traffic Development, Retail, Operations Planning, and ART. Its main objective is to agree on the set of assumptions to be used, initially concentrating on the short-term (2005-2009). Once the preliminary set of assumptions are agreed and the model updated, the first draft figures are produced. The Forecasting group then undertakes an intensive review process of these initial years, with all the major routes closely examined. Any adjustments or break in trends are fed into the model to replicate assumptions regarding fleet changes, new routes and services being opened/dropped and competition. This leads to new draft figures being produced and assessed. This continues until a stable set of assumptions is reached for the short-term. Once the initial years are agreed on, long-term forecast figures are produced. An iterative review is again undertaken until the final set of figures is formally accepted.

1.3.1.1 External Consultation Meetings for Forecast:

A key element in producing a forecast is meeting with Dublin airport's major airline customers, to ensure that the assumptions used as part of the forecast are broadly consistent with the strategies envisioned by these airlines.

For the current forecast, these users were informed that Dublin airport was producing a forecast and that it would welcome meeting with them to review the forecast methodology and listen to their future plans. The AOC was also informed that any user input was welcome. Meetings with Ryanair, Aer Lingus, CityJet and Aer Arann took place. These are 4 of the top 5 scheduled airlines in Dublin and they outlined how they see their development and main aims for the future. Some airlines do not take part in any discussions with airports on forecasting. For this forecast, only UPS availed of the opportunity to participate in the consultative program. A telephone discussion was held with it, regarding its development out of Dublin. The internal review process flagged issues relevant to the other carriers.

1.3.2 Aer Rianta Forecasting Model:

The main drivers of the Dublin Airport Authority forecasting model are economic growth (in terms of real GDP) and airfare trends. Other short-term adjustments can be made based on customer input or local market judgement.

The most important drivers of air traffic growth are listed below.

Table 1.1: Key Drivers of Traffic Growth

Primary Driver	Secondary Driver
Economic Growth	Exchange Rates
Yield	Fuel prices
	Population and Demographic changes
	Tourism
	Modal Competition
	Market Fragmentation
	Airline Route Mix
	Airline Fleet
	Airport Capacity
	Airline Strategies

Some of these factors are not explicitly applied in the forecasting model but they have been used when formulating the adjustments and trends fed into the model. These drivers may have a bigger impact on some route groups than on others.

1.3.3 Passenger Traffic Forecasting:

Detailed monthly historical information was loaded up to 2004 by major route and route group, with 2005 figures based on traffic estimates agreed with the local marketing department.

For subsequent years, the model produces a forecast traffic growth rate for each route/route group in the model. This growth rate is calculated on the basis of Origin & Destination passenger profiles by country of residence and projected exogenous parameters such as GDP per capita for each of these countries, airfare trends, airfare elasticities and GDP elasticities. From these passenger growth rates, the model produces the passenger demand.

1.3.4 Capacity, Aircraft Movements & Load Factor:

Passenger demand is converted into capacity and aircraft movements by using the projected load factors and the aircraft profile for each route and route group.

Historical load factors are inserted into the model at route level, with trends for the future based on carrier input and internal review. Load factors have climbed in recent years and it is expected that this trend will continue into the future, especially since one of the key elements in both the low cost-model and in the recovery of many network carriers, is high load factors. Similarly with the aircraft profile, the trend is to reduce the variety of aircraft used by each airline, with the size of the aircraft increasing. Furthermore, older aircraft are being replaced with more fuel-efficient and less noisy aircraft at a faster rate than previously.

Additional adjustments on routes may be made to take into account the situation at constrained airports.

1.3.5 Input Data:

The following table outlines the source data used in this forecast, and the origin of the data used. This basic data can then be modified by trends and adjustments. The values used are tabulated in Appendix 1.

Table 1.2: Input Data Sources

Input Category	Source
Historical Passenger Traffic	Aer Rianta databases Marketing Departments
Historical Movements/capacity	Aer Rianta databases Marketing Departments
GDP values	Ireland: -ESRI Medium Term Review 2004-2010 July 2004; Other countries: -National Institute Economic Review October 2004
GDP elasticities	Best practice from international forecasters & consultation
Airfare elasticities	Best practice from international forecasters, literature review & consultation
Market Share Data	IMS Passenger Tracking Survey 2003-2004
Aircraft Mix by route	Airline fleet plans where available
Airfare trends	Various – see below
Traffic Adjustments	Various – see below

1.3.6 Economic Data: (Table A1)

Given the series of economic setbacks that hit the international economy since the start of this decade, the Irish economy continues to produce exceptionally strong growth rates in both output and employment. 2004 saw a strong recovery in world economic growth (circa 4.5%) but this is likely to decrease in the coming years as the effects of the sharp fall in the exchange rate for the dollar kick in, as well as the imbalance of payments deficit in the US. But the prospects for the global economy remain positive and the Irish economy is reasonably strong, with the strength of public finances and the low debt position providing some room for manoeuvre in the context of a negative near-term shock.

With the international economy expected to climb (even at a somewhat more subdued pace) and with the factors that gave rise to the very rapid growth in the domestic economy in the 1990s not yet being exhausted, the ESRI, in its last medium term review, forecast good domestic growth into the second half of the decade before it reverted to a rate more comparable to European growth rates.

1.3.7 GDP Elasticities: (Table A2)

The GDP elasticity term describes the percentage change in passenger traffic with respect to a 1% increase in GDP. Quoted values used in most robust international studies vary depending on market maturity, but are usually in the range 1.0-2.0. In a mature market, traffic reacts more

slowly to economic growth than in a developing one. Thus GDP elasticities decline over time. Table A2 summarises the GDP elasticity values by market used in the model.

1.3.8 Base Airfare trend: (Table A3)

Where there is substantial growth on a route, airfares are likely to drop in the short term to stimulate traffic to fill this additional capacity. Thus, where we believe there will be sizeable growth, we have inserted a stimulating price trend. Table A3 summarises the main airfare trend assumptions made in the model.

1.3.9 Airfare Elasticities: (Table A4)

The price elasticity of demand describes the percentage change in demand in response to a percentage change in price, and it is normally negative. If the absolute value is greater than 1, demand is said to be 'price-elastic', if less than 1, it is said to be inelastic.

Airfare elasticity diminishes when absolute fares decline, since the same percentage change reduces in significance to the consumer. Furthermore, long-term elasticities will be more inelastic than those over a shorter horizon since consumers will be expected to compensate for a price change over the longer term.

Normally, price elasticity values are considered independently of quality elasticities, which might affect the modal dynamics.

1.3.10 Factors influencing the Forecast base trends:

1.3.10.1 Exchange rates & Oil prices:

2004 was noted for 2 major economic trends. The fall in the value of the dollar compared to the euro and the dramatic increase in oil prices. However these parameters are very volatile and there is little consensus about their long-term trends. In fact while oil prices have retreated from the all time highs in autumn 2004, one of the most notable aspects about the oil price increase has been the inability of analysts to agree at what level they will ultimately stabilise.

Thus, to avoid adding erroneous predictions to the forecast, Dublin Airport Authority does not forecast the likely trends in these variables and implicitly assumes that they will stay reasonably constant in real terms. However, the high and low growth scenario, characterised by higher and lower GDP, can represent circumstances where oil price rises/falls in the future significantly impact economic growth.¹

1.3.10.2 Population and Demographic Changes:

According to the CSO's Population and Migration estimates April 2004, the population of Ireland reached 4.04 million in 2004, which is the highest since 1871. This figure represents an

¹ Airbus stated in its Global Market Forecast 2004-2023, that in the unlikely event that oil prices stayed above \$45 a barrel throughout 2005, it would not affect world GDP growth by more than 0.4%, compared with the most likely scenario of a return to \$35-\$39.

increase of 1.6% over the previous year with the growth distributed fairly evenly between a natural increase in population (i.e. births less deaths) and net immigration.

Immigration has declined over the last couple of years after its highs in 2001/2002. Immigrants are divided quite evenly, with roughly one third being returning Irish nationals, one third of EU nationality² and one third from the rest of the world. Breaking down the latter, 9% of immigrants are Chinese and 8% are Central/Eastern European (i.e. countries that have either subsequently joined the EU or are applicants to join).

Emigration continues to decline, with 40% of emigrants going to countries outside the EU and the US. The age profile for emigrants is also different than for immigrants, with over half of emigrants being in the 15-24 age bracket, and half of immigrants being in the 25-44 age bracket, which reflects Ireland's policy of attracting highly skilled immigrants.

Based on preliminary figures for 2003, for every person emigrating from Ireland to the UK in 2002, 2 people moved from the UK to Ireland (from almost 3 in 2000). This continues to highlight the continued return of Irish emigrants (even at a decreasing rate). The impact of this will affect the level of VFR traffic to/from this very important UK market.

But the presence of significant numbers of immigrants based in Ireland will clearly generate new potential passenger flows. Between May 1 and Oct. 31, nearly 30,000 people from the 10 new EU countries registered with the Irish Labour Office. Approximately 10,000 of these were Polish. This increase in immigrants from Eastern Europe runs in parallel with an increase in flights to these destinations. Furthermore, CSO predicted that Ireland would need a large number of immigrants in the coming years to meet its high-skills needs and, if rapid employment growth continued, to fill unskilled jobs as well. Declining birth rates further necessitates this. Without immigration, the population would begin to diminish in future.

But with the drop in Irish residents based abroad, it is unclear whether this increase in air traffic will compensate for the inherent drop in VFR traffic from the UK/US, as the ethnic Irish in the UK/US have a higher propensity to travel than many other groups.

Table 1.3: Estimated Emigration by Destination Region 1997-2003 (000)

Year	UK	Rest of EU	USA	Rest of World	Total
1997	12.9	4.1	4.1	7.9	29.9
1998	8.5	4.3	4.3	4.1	21.2
1999	11.2	5.5	5.3	9.5	31.5
2000	7.2	5.5	4.0	10.0	26.6
2001	7.8	5.6	3.4	9.5	26.2
2002	7.4	4.8	4.8	8.5	25.6
2003	6.3	4.3	2.5	7.6	20.7

The effect of the reduction in emigration has been supplemented by the influx of immigrants, often highly skilled and adding to the economy.

² Based on the 15 EU states before the May 2004 accession of the 10 Eastern European countries

Table 1.4: Estimated Immigration by Region of Origin 1997-2003:

Year	UK	Rest of EU	USA	Rest of World	Total
1997	20.0	8.1	6.6	9.3	44.0
1998	21.1	8.7	4.9	9.3	44.0
1999	22.3	10.2	5.9	10.5	48.9
2000	20.8	11.7	5.5	14.5	52.6
2001	20.6	10.3	6.7	21.5	59.0
2002	19.1	11.3	6.6	29.9	66.9
2003	13.5	9.7	4.7	22.5	50.5

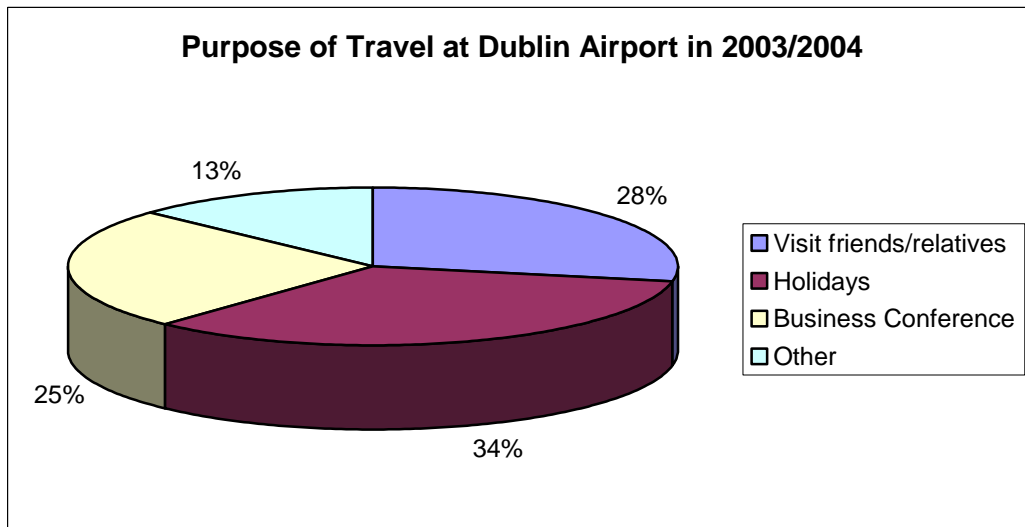
1.3.10.3 Business Leisure Mix

The business/leisure mix profile has been updated based on the 2003/2004 Passenger Tracking Survey prepared by TNS/MRBI for Dublin. A summary of the overall results from these reports are presented below:

Table 1.5: Purpose of Travel profile at Dublin Airport in 2003/2004

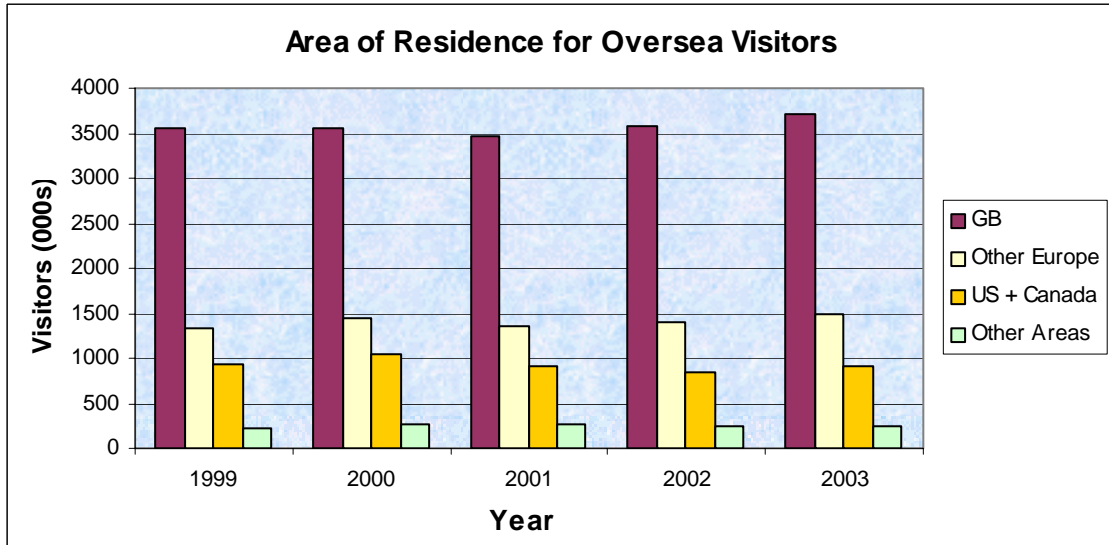
	Total	London	UKP	Europe	T/A	Domestic
VFR	28%	32%	32%	20%	26%	26%
Annual holiday	13%	12%	5%	18%	29%	9%
Additional holiday	21%	16%	23%	26%	21%	10%
Personal/Family	6%	7%	8%	4%	5%	8%
Funeral	1%	1%	1%	0%	0%	1%
Business/Conference	25%	28%	24%	23%	14%	40%
Study	2%	2%	2%	4%	2%	1%
Other	4%	3%	4%	4%	2%	5%

Figure 1.1:



1.3.10.4 Tourism Trends:

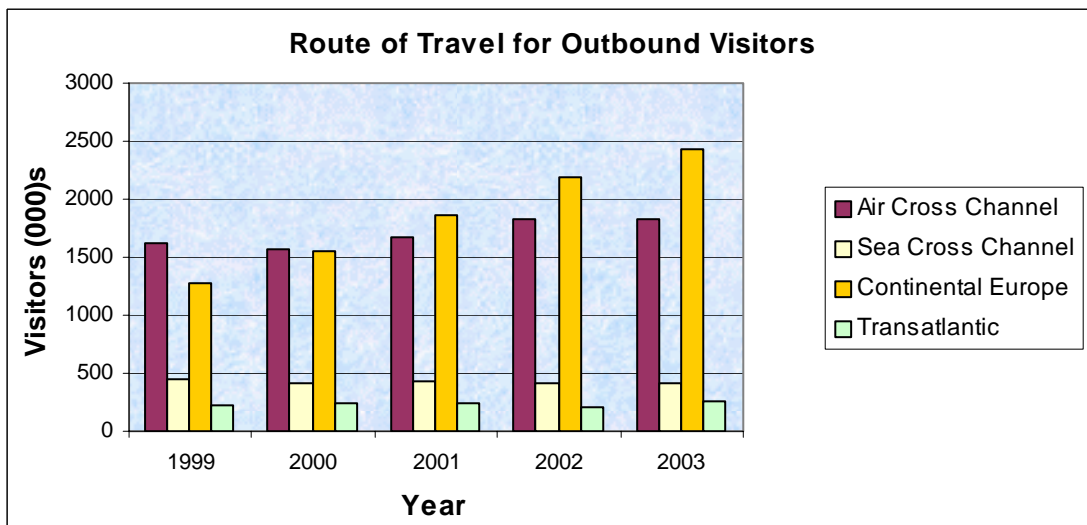
Figure 1.2:



An analysis of the most recent CSO tourism data³ indicates that the numbers to Ireland increased by 5% in 2003. Traffic has returned to 2000 levels. The number of overseas visits on cross-channel routes grew by 2.4%, while the number on continental routes grew by 9.7% compared to the previous year. But while the visits on transatlantic routes increased by 17.1% in 2003, the number of actual visits by US plus Canadian residents was still 13.3% below the value in 2000. The latter figure shows that tourism has still not recovered from security fears, the Iraq war etc.

The trend of tourist growth out of Ireland (6.4%) exceeding tourist growth into Ireland (5%) continued into 2003. The number of incoming visitors is still well ahead though, 6.369 million compared to 4.929 million. But when earnings from visitors to Ireland are compared to expenditure by Irish visitors abroad, there is a net outflow of €58 million.

Figure 1.3:



³ CSO Tourism and Travel Annual 2003, published 26th March 2004

Of this 6.4% growth in outbound travellers, Irish residents travelling on continental routes increased by 11.3%, while transatlantic numbers grew by 25.7%.

In terms of "purpose of travel" the major point to note was that business traffic to Ireland continued to fall, down to 13.4% in 2003. This is a reflection of the weakness in the global economy in 2003. This means that the Tourist and VFR traffic to Ireland continues to increase its market share, accounting for almost 80% of visitors. Thus, the concerns articulated about the competitiveness of the Irish tourist industry are of especial importance. Airfare trends are just one element in how price sensitivity affects the tourist industry. Thus, when constructing a traffic forecast, these effects also have to be considered at a route level.

1.3.10.5 Modal Competition: Dynamics of the Ireland-UK Air-Sea Market:

Modal competition is an important aspect of the Ireland-UK and domestic markets. For more than a decade there has been a gradual shift in traffic from sea to air.⁴ It is unlikely to shift much further though.

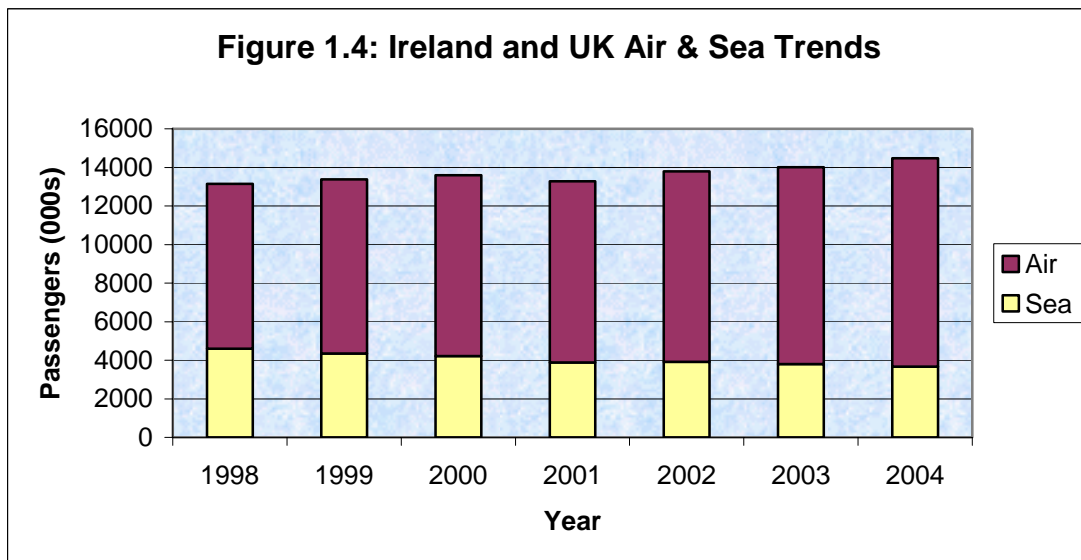


Table 1.6: Air and Sea Market Shares on Ireland-UK Market, 1998-2004:

Year	1998	1999	2000	2001	2002	2003	2004
Air	65%	69%	69%	71%	72%	73%	75%
Sea	35%	31%	31%	29%	28%	27%	25%

1.3.10.6 Domestic Markets:

Aer Arann is currently the major operator on the domestic market; operating most of the PSO supported regional routes to Dublin, as well as services to Cork. Aer Lingus remains solely on Shannon. The Department of Transport will be inviting tenders for the operation of these PSO services this year.

⁴ Failte Ireland Ireland-UK Air and Sea Trends 1998-2004

1.3.10.7 Market Fragmentation:

An increasingly important consideration for any forecast is the impact of airports with overlapping catchment areas. This is particularly noteworthy with the increase in services by Ryanair on Shannon and the arrival of Easyjet on Cork, Shannon and Knock. But the main competitive effects of this capacity growth will be felt between these regional airports rather than by Dublin itself. The amount of passengers lost by Dublin to another airport is unlikely to be particularly significant since all the new services from these airports already have a Dublin service and the overlapping catchment areas with these airports have relatively rather small population. However if a regional or provincial airport lost the same amount of passengers, this would have a considerable impact on its numbers because its base is low in comparison with Dublin.

Also of note, is that Continental is starting a Belfast to Newark service this year, which is a reflection of how US carriers are focusing on international routes to improve profitability and how they are looking forward to a change in the Dual Gateway status before expanding services further in Dublin. The service has also been granted aid by the Northern authorities.

Due to the large amount of competition out of Dublin, fares remain quite low, so it is difficult for another airline in another airport to undercut fares to such a degree that it will attract a large number of passengers out of Dublin. Furthermore, considering the importance of Dublin as a destination and the growth in capacity envisioned by airlines for the next couple of years in Dublin (i.e. fares are unlikely to get considerably higher), no adjustments are made to the forecast to model any fragmentation effect. But it is a feature of the aviation industry that must always be considered during the formulation of the forecast assumptions.

2 Centreline Traffic Assumptions:

2.1 Overall Assumptions:

A number of assumptions were generally applied in preparing the forecasts, unless route level information indicated that these were not appropriate:

- As yields continue to decline, airlines will maintain their drive towards higher load factors as a means of combating costs. Aer Lingus has repeatedly emphasised that high loads factors are a key strategic objective for the airline. It has succeeded in increasing load factors substantially and we have continued in this forecast to push load factors up. Ryanair also continues to operate a high load factor⁵, while other full service carriers state that it is a necessary target to be achieved. This has the effect of ensuring that the number of aircraft movements over the period of the forecast does not grow as fast as the passenger numbers.
- As highlighted by Aer Lingus decision to replace its short haul fleet with a single aircraft family (the A320), airlines will generate economies of scale effects by reducing the number of aircraft types used. 2005 and 2006 are set to see a significant amount of growth as Aer Lingus and Ryanair both complete their migration to a single aircraft family/type.
- As London and UKP markets are already heavily developed out of Dublin, it is considered that new route opportunities largely relate to Europe and to a lesser extent to the transatlantic markets. From 2007 we are not assuming any further major traffic stimulation step change on the continent. This is because traffic will have grown so much on these routes in 2005 and 2006 (higher than in previous forecasts) that there will be a limited ability from airlines to further stimulate traffic by reducing fares even more i.e a rebalancing effect takes place. Thus growth to Europe in this period (after 2006) is not as strong as in previous forecasts. But this growth will remain considerably higher than in the UK market.
- Where major airlines convert to larger aircraft, this may mean that some small UKP routes become uneconomic for these carriers. It is assumed that where this occurs, smaller regional carriers will move in to pick up the developed routes thus vacated by the larger operators.
- There is expected to be a phased transitional change away from the current transatlantic Dual Gateway. This will involve a two Dublin to one Shannon step change in 2006, leading to full open skies in 2008. This will lead to substantial growth in the transatlantic market with a significant tranche of traffic being shifted from Shannon to Dublin.
- Cargo aircraft movements are projected to rise steadily (5% p.a.)
- GA and Training at Dublin have declined in recent years and this trend is expected to continue over the next few years. Increased capacity constraints militate against the

⁵ 80% on Dublin routes in 2004.

further development of such market segments. After this segment has been significantly curtailed, from 2009 we do expect small growth in the Business Aviation markets.

2.2 Route Group and Route Level Assumptions:

2.2.1 London Routes:

- Traffic growth constraints are applied at Heathrow to reflect the limited slot capacity. The DoT in the UK produced a White Paper on UK airport capacity, which proposes a new runway in Heathrow during the latter half of the next decade. This ensures that this airport will remain highly constrained for the foreseeable future.
- In 2011 we assume the introduction of a large 250-seat capacity aircraft on the Dublin-Heathrow route, to allow further growth on this route.
- Constraints are also applied on Gatwick from 2006, reflecting capacity limitations.
- London City airport is accessible only by smaller jets such as the B462 and smaller aircraft. The underlying assumption is that this constraint continues throughout the entire period, so that City is the only route not to see shifts towards larger aircraft. Its market share is subsequently expected to remain largely static.
- Traffic to Luton and to Stansted is not constrained, with a new runway expected in the first half of the next decade in the latter airport, to facilitate further growth.

2.2.2 UKP:

- Ryanair and Aer Lingus will be operating larger aircraft (B738 and A320) from 2006 on all UKP routes.
- No further major step increase in capacity is factored into the forecast after this increase in capacity.
- Large aircraft may be uneconomic on minor routes but if any routes are dropped by major carriers, it is assumed that a smaller regional carrier would take advantage.

2.2.3 Europe:

- As in the UK, Ryanair and Aer Lingus will be flying the B738s and A320s from 2006 on all European routes. This causes a significant increase in capacity.
- Furthermore, new European routes are expected in 2006 and 2007.
- Charter traffic will continue to decline to compensate partly for the rapid growth in scheduled traffic.

2.2.4 Transatlantic:

- We expect a phased introduction of open skies between Ireland and North America from 2006. This causes a shift in traffic from Shannon to Dublin.
- No assumptions are made regarding a change of fleet. The new B787 and A350 long haul aircraft will be coming into service from 2008 to 2010 but the number of passengers carried on these aircraft will be similar to the current long haul aircraft.

2.2.5 Domestic:

- It is assumed that an operator will remain on all current domestic routes.

2.3 Low Growth Assumptions:

For financial planning purposes, a low growth scenario is explored, where all parameters remain unchanged relative to the centreline, except for the GDP values. In this scenario, the GDP values used for all economies are reduced by 1.5% relative to the centreline scenario till 2007 and then by 1% till 2013, to simulate a significant economic slump in Irish and international economies.

2.4 High Growth Scenario:

The high growth scenario is used to test Dublin Airport's ability to cope with above average growth in traffic. The level and timing of capital investment depends on the demand for facilities and services at Dublin Airport. Over the last decade there has been above average growth in Dublin airport except for 2001-2002 periods (when the aviation industry was recovering from 9/11 and an economic slow-down). This high growth continuing over the next decade would have a significant impact on demand. As a result, as part of the Forecast preparation, Aer Rianta reviews growth scenarios that are more challenging from a master planning perspective.

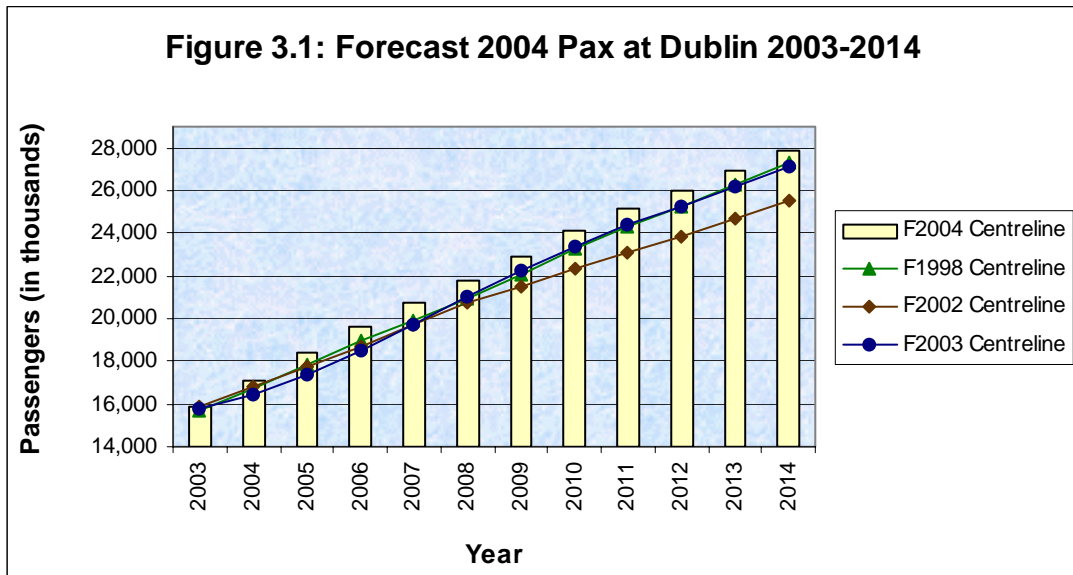
A high growth scenario is examined. This relates to increasing GDP to mirror a significant boom in the economy again. In this scenario, the GDP values used for all economies are increased by 1.5% relative to the centreline scenario till 2007 and then by 1% till 2013.

3 Forecast Results:

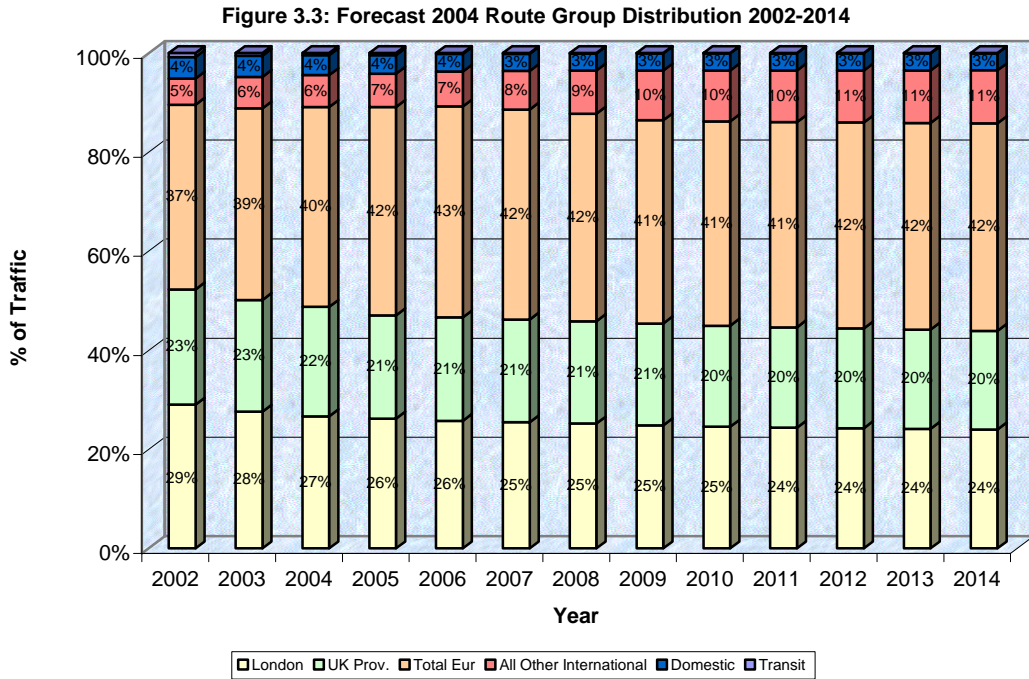
3.1 Forecast - Dublin:

Because of the unexpected quick recovery in passenger numbers in 2004, after a number of sluggish years in the aviation industry, the base traffic for 2005 is significantly higher than was forecast in 2003. This means that in the short to medium term, the new forecast is roughly one year up in passenger number, compared to the forecast done in 2003. In the longer term the expected economic conditions and the assumptions made are quite similar. In fact Forecast 2003 gradually closes to the gap on the new forecast, although it has not quite caught up by 2030.

The current forecast projects that traffic will reach 27.8 million by 2014, compared with 27.1 million in Forecast 2003. This equates to a growth of over 62% over the next 10 years, with a CAGR of 5% p.a., as compared with 5.2% p.a. in the next 10 years for Forecast 2003.



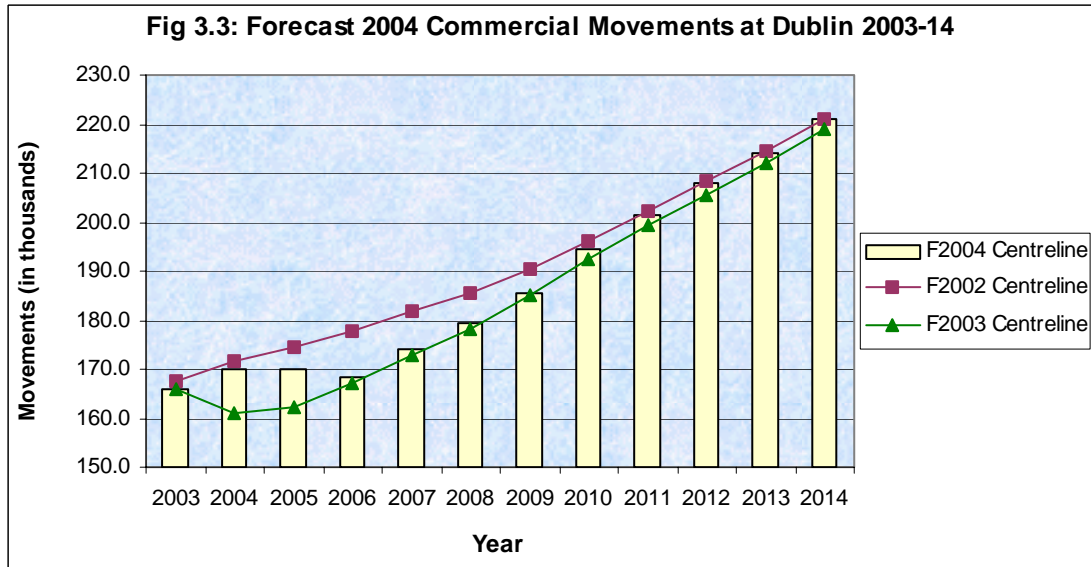
The composition of the traffic is expected to shift markedly even over the ten-year period. Traffic on European and transatlantic routes are expected to become increasingly significant because of the current expansion into Europe and transatlantic open skies later on in this decade. Currently Europe comprises 40% of the total traffic. This is expected to grow to 42% in 2014. Transatlantic traffic was 6% of the total in 2004, and is expected to be at 11% in 2014. UK traffic will become proportionally less important, with its overall share declining from 49% in 2004 to 44% in 2014.



The differential between this forecast's aircraft movements and those for Forecast 2003 is not particularly significant except for the opening years. This initial difference is due to the strong growth in 2004, which is eroded over the coming years by the rapid transition by Ryanair and Aer Lingus into a single aircraft type.

Figure 3.3 illustrates that although aircraft movements are expected to grow to accommodate increased passenger numbers, the rate of growth in aircraft movements is expected to be slower than the passenger growth rate. Thus up to 2006, the profile of aircraft movement changes reflect operators replacing their aircraft with larger types. This sees the number of aircraft movements flat-lining initially before it resumes climbing to reflect continuous increases in passenger numbers. (This is consistent with the preview of the summer 2005 schedule where the amount of movements expected at Jan 2005 for the summer 2005 season is marginally lower than the amount of movements expected at Jan 2004 for the summer 2004 season).

After this initial transition into larger types, this slower growth in aircraft movements is then mainly the result of higher average commercial load factors expected by airlines and aviation analysts alike in the future. The average load factor was 75% in 2004, but is forecast to reach 83% by 2014. The average number of passengers per commercial movement will increase accordingly, from 100 to 126 over the same period.



Forecast Passenger and Aircraft Movement tables

Table 3.1a: Passenger Traffic Forecasts (000) for Dublin					
Year	F2002	F2003	F2004	F2004	F2004
	Centreline	Centreline	Centreline	Growth rates	Absolute Growth
2000	13,840	13,840	13,840		
2001	14,334	14,334	14,334	3.5%	494
2002	15,000	15,085	15,085	5.2%	751
2003	15,916	15,786	15,856	5.1%	771
2004	16,780	16,409	17,138	8.1%	1,282
2005	17,711	17,350	18,418	7.5%	1,280
2006	18,725	18,532	19,586	6.3%	1,168
2007	19,688	19,691	20,730	5.8%	1,144
2008	20,710	21,005	21,779	5.1%	1,049
2009	21,514	22,204	22,947	5.4%	1,168
2010	22,319	23,378	24,147	5.2%	1,200
2011	23,097	24,396	25,178	4.3%	1,032
2012	23,876	25,281	26,037	3.4%	859
2013	24,681	26,198	26,927	3.4%	889
2014	25,514	27,150	27,849	3.4%	922

Table 3.1b: Commercial Aircraft Movement Forecasts (000) for Dublin					
Year	F2002	F2003	F2004	F2004	F2004
	Centreline	Centreline	Centreline	Growth Rate	Absolute Growth(000)
2002	165.9	166.9	166.9		
2003	167.5	165.8	165.8	-0.7%	-1
2004	171.5	161.0	170.0	2.5%	4
2005	174.5	162.2	170.0	0.0%	0
2006	177.6	167.3	168.5	-0.9%	-1
2007	181.9	172.9	174.1	3.3%	6
2008	185.5	178.1	179.3	3.0%	5
2009	190.5	185.0	185.4	3.4%	6
2010	196.3	192.5	194.3	4.8%	9
2011	202.3	199.3	201.6	3.7%	7
2012	208.2	205.4	207.8	3.1%	6
2013	214.5	211.9	214.2	3.1%	6
2014	220.9	218.8	221.0	3.1%	7

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5 Appendix 1 Exogenous Parameters:

Table A1: GDP Growth Rates by Country⁶

Year	Ireland	USA	Japan	UK	Germany	France	Italy	Canada	Other Europe
2003	2.6	3.1	2.5	2.2	-0.1	0.5	0.4	2.0	0.5
2004	3.1	4.3	3.6	3.3	1.4	2.3	1.2	2.8	1.8
2005	6.1	3.3	2.6	2.7	1.7	2.5	2.0	3.6	2.3
2006-10	5.7	2.8	2.3	2.6	2.1	2.4	2.6	2.9	2.4
2011-20	3.1	2.4	1.5	2.5	2.4	2.3	2.5	2.8	2.4
2021-30	2.4	2.3	1.4	2.4	2.3	2.2	2.4	2.7	2.3

Table A2: GDP Elasticity by Route Group 1996-2030

Route	Application Duration	Forecast 2002
		All
DUB- LON, UKP	1996-2000	1.7
	2001-2005	1.4
	2006-2010	1.2
	2011-2030	1.0
DUB - EUROPE	1996-2000	1.7
	2001-2005	1.5
	2006-2010	1.4
	2011-2030	1.3
DUB - TRANSATLANTIC	1996-2000	1.7
	2001-2005	1.5
	2006-2010	1.5
	2011-2020	1.5
	2021-2030	1.3
DUB- DOMESTIC	1996-2000	1.7
	2001-2005	1.5
	2006-2010	1.4
	2011-2020	1.1
	2021-2030	1.0

⁶ Irish GDP data was sourced from the ESRI (Quarterly Economic Commentary, Summer 2003). Other data supplied by NIESR NO 189 July 2004.

Table A3: Airfare Trends

Route	Year	Airfare Growth Trend (%)
DUB-LON	2005-2006	0.6
DUB-PAR	2005-2006	-1
DUB-FRA	2005-2006	-1
DUB-AMS	2005-2006	-1
DUB-BRU	2005-2006	-1
Dub-OSE	2005	-1
	2006	-2
Dub - ONE	2005	-1
	2006	-2
Dub - NYC	2006-2010	-2
Dub - BOS	2006-2010	-2
Dub - ORD	2006-2008	-2
Dub - OTA	2006-2008	-2
Dub - ORK	2006-2008	2
	2009-2010	1
Dub - OEI	2006-2007	3
	2008	2
	2009-2010	1

Table A4: Airfare Elasticities

Route	Current Forecast
	2000-2010
Dublin - London	-0.957
Dublin - UKP	-1.000
Dublin - Domestic	-0.987
Dublin - Europe Scheduled	-1.037
Dublin - Transatlantic	-0.966

6 Appendix 2 Calibration Discussion:

One of the key validation procedures in the Forecasting process is reviewing the performance of the model. This can be considered in two dimensions, an internal calibration process and an external calibration exercise.

The internal calibration process involves reviewing the output of the model in terms of a number of parameters, and comparing the results with those obtained in the previous Forecast 2002 study.

The obvious comparators include absolute traffic levels and CAGR values, but in addition a number of output parameters have been examined in terms of values and predicted trends over time in comparison with previous forecasts.

The key performance indicators derived for use in this calibration were as follows:

- Average number of passengers per commercial movement
- Average number of passengers per commercial air traffic movement
- Average load factor
- Average commercial load factor
- Average aircraft size
- Average commercial aircraft size
- Traffic proportion by region
- Movement proportion by region

These factors have each been considered for each airport, and the results are comparable. Trends are consistent with previous analyses, except where assumptions have changed with a consequential effect on some parameters.

External calibration comprised three basic components:

- Methodology comparison with alternatives (discussed in Chapter 1).
- Comparison with external forecasts produced by Boeing and Airbus. (It must be noted that they give growth in RPKs and not passenger numbers).
- The Boeing Current Market Outlook 2004 predicts a 20-year CAGR of 5.2% with 4.1% for European routes and 4.9% for Europe-US routes which are quite comparable to the 20-year CAGR of 4% from the current Dublin Airport Forecast.
- The latest forecast from Airbus is the Airbus GMF 2004-2023. Airbus is predicting an overall annual growth rate of 5.3% till 2023 in passenger traffic, with intra-European traffic showing an average annual growth rate of 5%, and Europe-US traffic growing at 4.9% per annum.

In summary, having reviewed the output of the model under a range of internal and external criteria, the results appear to be robust and reasonable, and broadly consistent with the results of alternative methodologies.