While opinions still differ over how the long-haul market will develop over the next 20 years, the growth and rate of development of new and young long-haul routes indicates a strong market potential for small & medium widebodies.

Long-haul market spells a bright outlook for small & medium widebodies

It is expected that the potential market for, and orders from airlines for 250- to 375-seat long-haul aircraft will reach several thousand units over the next 20 years. The main factors that will stimulate this demand are continued traffic growth, an increased level of competition in the long-haul sector, more relaxed bilaterals, a larger number of Open Skies agreements, and smaller aircraft with long-range performance.

There are a large number of new or recently introduced types in the 250- to 375-seat sector, which include the 787-8/-9, 777-200LR, 777-300ER, A340-500/-600 and the A350 family. These aircraft are categorised as small and medium-sized widebodies, and will replace 767s, A300s, A310s and MD-11s, and then earlier built A330s, A340s and 777s. These new aircraft types will also be acquired to satisfy demand for increased traffic volumes and potentially to service new routes and city-pairs that are opened in long-haul markets.

A potential development is an increase in the number of long-haul routes, which would draw traffic from established routes that are operated by large and ultra-large widebodies. These new long-haul types could therefore indirectly replace the 747 over the long term. The main issue affecting the likely market for small and medium widebodies is how long-haul markets will develop.

Historical perspective

The evolution of long-haul markets offers an insight into how future development will take place. It is well documented that long-haul markets were all highly regulated by bilateral air service agreements. A main feature of bilaterals is that governments limit the number of gateways that a foreign carrier can use, so airlines always operate to the largest and busiest airports. This has led to the development of large hubs, hub-to-hub operations, and a demand for large and ultra-large aircraft. This is the basis of demand for the 747 and A380.

There is already a well established pattern of development that long-haul markets follow when bilaterals are liberalised. This has been evident on the transatlantic routes for more than 20 years, and where small and medium widebodies have dominated for more than 15 years. Open Skies agreements are now in place between most European countries and the US, which has led to the market being operated predominantly by 767s, A330s, A340s and 777s. The bilateral between the US and UK is still in force, but growth in the market has led to the number of gateways to the US other than London Heathrow and Gatwick increasing from four to seven since 1994. The number of services has therefore increased and average aircraft size has decreased accordingly.

Recent developments

It is still early for the development in other markets following increased liberalisation to be fully assessed, although there are some indications. The arrival of the A340-300 in the early 1990s was expected to coincide with the relaxation of trans-Pacific bilaterals, and a burgeoning of new routes. Bilaterals remained under tight control, however, although they have become more relaxed over the past five to eight years.

The A340-500 and 777-200ER and -200LR have entered service in the past two to four years, and more services and flight frequencies across the Pacific have been added since. The increase in services has been relatively small so far, however. Singapore Airlines and Thai International both started flying more services to the US with the A340-500, although Thai has recently halted some US services with the aircraft. More routes are now being operated from the US to China by US carriers with the 777-200.

The significance of the A340-500/-600 and 777-200LR is that they have ultra-long-range capability. Combined with their seat capacities this has made some routes viable for the first time. There are 25 A340-500s in operation with Air Canada, Emirates, Etihad, Singapore Airlines and Thai. Thai, however, has ceased its A340-500 operations and will be selling its fleet to South African Airways (SAA).

The larger A340-600 is now in service with Cathay Pacific, China Eastern, Iberia, Lufthansa, South African Airways, Thai and Virgin Atlantic.

These airlines have either started new services with these aircraft, or replaced other types because of their inappropriate size or lack of range performance. Air Canada has used the A340-500 to replace 747-400s on its Toronto-Vancouver-Hong Kong route. Cathay Pacific is using the A340-600 on a similar basis.

Emirates has used the A340-500 to open new services from Dubai to New York, Melbourne, Auckland, Nagoya, Sydney, Christchurch and Zurich. All are longer than 5,000nm, and most are in excess of 6,000nm.

Iberia has launched new services from Madrid with the -600 to Cape Town, Guadalajara, Guatemala, Montevideo and San Jose. Lufthansa uses the A340-600 on several routes previously flown by other aircraft, but has also started new routes to Guangzhou and Cape Town over the past six years.

Singapore Airlines has started a new service to New York, and now flies direct to Los Angeles with the A340-500. SAA started new routes between Cape Town and Frankfurt and between Johannesburg and Washington DC with the A340-600. Thai International has opened new routes from Bangkok to Auckland, Munich and Milan with the A340-600.

So far only two 777-200LRs have been delivered, to Pakistan International Airlines (PIA). It will use them to start six direct services from Islamabad, Karachi and Lahore to Toronto and New York.

The bilaterals between China and various European countries have also become more relaxed in recent years. Increased competition in the Europe-China market has seen the number of weekly frequencies in the two markets rise by 153% from 194 in 2001 to 492 in 2006. This is explained mainly by new entrants adding new services. Lufthansa, for example, had two routes to China and 14 weekly round trips in 2001, and this has grown to five routes and 47 round trips per week in 2007.

Finnair is another airline expanding its international route network with medium-sized widebodies. The airline has increased the number of cities it serves in the Asia Pacific from three in 2002 to 10 in 2007, and has increased weekly frequencies on the same network from nine to 59. "Our network strategy is to add one city in the Asia Pacific each year, and increase frequencies to a more optimal level," says Petteri Kostermaa, vice president of network strategy at Finnair. "The new cities we have added include Nagoya, Osaka, Guangzhou and Delhi."

Meanwhile, United has recently won traffic rights to China and is expected to order 777-200LRs to serve the market.

Virgin Blue of Australia has gained traffic rights to fly to the US, and Fly Asia Express has approval to operate several long-haul services from Kuala Lumpur. Further evidence that development of new routes is leading to aircraft orders is that Jet Airways and Kingfisher of India have ordered various long-haul types.

Important markets

Until five to eight years ago, long-haul services were dominated by three markets: the transatlantic, trans-Pacific and Europe-Asia Pacific/China. The intra-Asia Pacific market also has city-pairs that can be classified as long-haul.

Other markets are now growing in importance. The first of these to emerge comprises long-haul routes to and from major cities in the Middle East, namely Dubai, Abu Dhabi and Doha. The main regions served by these three cities are

CAPACITY PROVIDED FOR YOUNG & NEW LONG-HAUL ROUTES OPERATED WITH SMALL & MEDIUM WIDEBODIES

Route	Aircraft types	2007 Annual flights	Annual seats 'ooos	Average seat size
Cape Town-Frankfurt	A340-300, A340-600	528	167,437	317
Cape Town-Amsterdam	777	283	92,541	327
Guangzhou-Frankfurt	A340-600	365	125,925	345
Manila-Amsterdam	777	361	118,047	327
Shanghai-Munich	A340-300, A340-600	354	116,936	330
Nagoya-Paris	777	365	97,878	268
Bangkok-Moscow	767, 777, A340-500/-600	296	89,269	302
Singapore-Manchester	777-200	261	84,303	323
Shanghai-Helsinki	A340-300	279	82,465	296
Guangzhou-Paris	777, A330-200, A340-300	309	81,118	263
Narita-Munich	A340-300	313	77,311	247
Shanghai-Milan	767	337	76,499	227
Taipei-Frankfurt	A340-300	261	72,036	276
Saigon-Paris	777, A340-300	240	71,895	300
Osaka-Helsinki	A340-300, MD-11	242	71,617	296
Dubai-Glasgow	777, A310	389	137,420	353
Muscat-London	A340-300, A330-200	579	134,865	233
Doha-Frankfurt	A330-200/-300, A300-600	428	102,599	240
Dubai-Casablanca	A330-200	365	86,505	237
Doha-Manchester	A330-200/-300	335	84,371	252
Dubai-Hamburg	777, A330-200	306	80,650	264
Delhi-Milan	767, 777	324	78,047	241
Hyderabad-Frankfurt	A340-300	311	76,817	247
Delhi-New York	777	365	103,295	283
Delhi-Chicago	777	365	90,155	247
Phuket-Seoul	767, 777, A330-200/-300	492	164,285	334
Denpasar-Tokyo	777	268	88,806	331
Denpasar-Seoul	A330-200/-300	302	88,771	294
Dubai-Perth	A340-300, 777	592	163,877	277
Dubai-Shanghai	A340-300, 777	365	127,387	349
Dubai-Beijing	767, A330, A340-300	483	117,428	243
Bahrain-Bangkok	A340-300	365	106,945	293
Abu Dhabi-Jakarta	767, 777, A330-200	272	94,455	347
Dubai-Osaka	A340-500	365	94,170	258
Dubai-Melbourne	A340-500	365	94,170	258
Dubai-Sydney	A340-500	365	94,170	258
Abu Dhabi-Jakarta	767, 777, A330-200	271	94,077	347
Doha-Singapore	A330-200/-300	364	87,598	241
Muscat-Jakarta	767	317	81,469	257
Atlanta-Lima	767-300/-400	370	102,615	277
Washington DC-Sao Paolo	767-300	472	91,096	193
Dallas-Fort Worth-Buenos Aires	767	365	82,125	225
New York-Delhi	777	365	103,295	283
New York-Dubai	777, A340-500	730	198,092	271
Madrid-San Jose	A330, A340-300/-600	335	107,073	320
Denver-London	777	363	81,312	224
Chicago-Shanghai	777	639	161,848	253
Atlanta-Seoul	777	365	121,833	334
New York (Newark)-Beijing	777	361	102,163	283
San Francisco-Nagoya	777	365	94,170	258

Some market forecasts predict that the global fleet of small and medium widebodies will grow from 2,500 units to 6,000 over 20 years. This will be split equally between the two categories.

Europe, India and the Asia Pacific. The fast expansion and large orders for widebodies placed by Emirates, Etihad and Qatar Airways underlines the fast growth in these markets. A main role of these three cities and carriers is to provide connecting routeings from Europe to the Asia Pacific and Australasia.

Routes have been added from the Indian sub-continent (especially India, which is seeing high growth rates) to North America, Europe and the Asia Pacific.

Other markets that have also shown some expansion and development are those from North America and Europe to Latin America.

Potential developments

Long-haul markets are predicted by some to splinter as traffic growth and increased competition continues. More new routes are expected to open, and in some cases will be hub-to-secondary city services rather than the current hub-to-hub services. Examples are more routes between major North American and Asia Pacific cities and secondary UK cities such as Manchester, Birmingham and Glasgow.

This is in contrast to a more extreme development of new routes opening between two secondary cities.

To gauge possible developments, long-haul routes, those longer than 2,500nm, in all markets have been analysed. The largest of these are summarised, and have been split between ones that have been opened since 2001 *(see table, page 31)*and those whose capacities grew the fastest between 2001 and 2007 *(see table, pages 35)*.

New routes

The group of new routes with the largest volume of one-way seats in several markets has been examined, and those with the highest volumes are shown *(see table, page 31)*. The largest group is the Europe-Asia market, followed by the Middle East-Asia Pacific market.

Examples of Europe-Asia routes are Guangzhou-Frankfurt, Manila-Amsterdam and Shanghai-Munich, while examples of Middle East-Asia Pacific sectors are Dubai-Perth, Dubai-Shanghai, and Doha-Singapore.

Also in the Europe-Asia Pacific market are two new routes from Helsinki to Shanghai and Osaka, which operate with at least 240 return flights per year *(see table, page 31)*. Finnair's strategy is to use Helsinki as a connecting hub between Europe and the Asia Pacific. It has expanded its route network to the Asia Pacific over the past five years. "We analysed the traffic on these connecting routes, and found that on our Helsinki-Shanghai service we are carrying passengers from 40 different countries. This shows that these new routes and connecting services satisfy a demand," says Kostermaa.

The other markets analysed are Africa-Europe, Middle East-Europe, India-Europe, India-North America, intra-Asia-Pacific, transatlantic, North-South America and trans-Pacific.

The largest number of new routes are to and from the three major cities in the Middle East. The smaller number of new services from India shows that this market lags behind the Middle East, and the small number of Chinese services indicates that traffic rights serving this country are still tightly regulated.

Most of the routes selected have a daily service, equal to 365 flights per year, indicating that demand on these routes is strong. Not surprisingly, the A330-200, A330-300, A340-500 and 777 are the most widely used types. A notable feature of these new routes is that the 747 is only used on a minority of flights for a small percentage of the routes.

A further 78 new routes, many of which also have substantial volumes of annual capacity, indicating strong demand, are not shown. Many have 150-200 annual return flights, with an average daily frequency of 0.4-0.5. Many of the services to and from the Indian sub-continent operate at this frequency level, indicating that they are still in an early development phase. Cities serving India are Sydney, Taipei, Singapore, Vienna, Birmingham, Amsterdam, Paris, New York and Chicago.

There are also a number of prominent but smaller new routes serving the Middle East, many from Doha to Hong Kong, Osaka, Shanghai, and Beijing.

The transatlantic is still a fast growing market, with 26 new routes that have substantial levels of capacity. Besides the four new routes shown *(see table, page 31)*, several have opened serving New York and Atlanta from Amman, Moscow, Copenhagen, Dusseldorf, Edinburgh, Milan, Tel Aviv and Venice. Most operate more than 200 annual flights using 767s.

Of the 150 new services analysed, the average route has 280 return flights per year, with 74,000 seats provided each way, and the average aircraft 262 seats.

Fast growing routes

The fastest growing long-haul routes of the past six years also show how the market for 250- to 375-seat aircraft may develop over the next 20 years. The same markets as those for new routes have been examined and summarised *(see table, page 35)*. The routes shown are those from each market in order of the largest increase in number of seats. That is, they have experienced an increase of at least 100% or a doubling of seats provided each way.

Some of these routes have strong growth rates. Examples are Abu Dhabi-London Gatwick, Shanghai-Vienna and Lima-New York. The growth rate in seat numbers is explained by their only being opened in 2000 or 2001 at low levels of capacity, while the number of seats they provide in 2007 is not actually large.

The Middle East/Africa- Europe and Asia Pacific markets account for a large number of these fast growing routes, while the India-Europe market also has several city-pairs with high growth rates.

Most of these routes opened shortly before 2001, and were started as a result of increased competition and more relaxed bilaterals. Only a minority are established routes, and have experienced high growth and capacity expansion rates in recent years because of the high traffic growth rates from certain regions. An example is London Heathrow-Delhi.

Another notable feature is that the main aircraft types on these fast growing routes are the A330-200, A330-300, A340-300, A340-500/-600 and 777.

The 747 only accounts for a minority of seats provided on a small number of fast growing routes, but it contributes a large percentage or a majority of the seats on established routes, such as London-Hong Kong, Paris-Johannesburg, Bangkok-Sydney and Bombay-Frankfurt. All these routes have experienced a relatively low rate of capacity increase over the past six years. That is, less than 100% or a doubling of seat numbers.

Opening new routes

While there are many signs that airlines are generally interested in opening new routes and expanding their networks, a more detailed examination of the criteria airlines require before making this step is required.

Relaxed bilaterals and increased competition generally result in new routes being opened, but airlines still require a minimum volume of traffic and revenue to justify new services. The view has been that large aircraft types have the advantage of lower seat-mile costs over small and medium widebodies. Although smaller long-haul aircraft have lower trip costs, these are too high on a per seat basis compared to passenger yields. The market philosophy of the 787 and A350 is to provide airlines with aircraft that are more efficient in fuel and maintenance cost terms than previous generation types, and so offer seat-mile costs that are more competitive with large widebodies. Their competitive costs combined with seat capacities and range capability would make a number of unserved routes economically viable. Airlines still have to consider minimum service levels and traffic volumes.

Some airlines expect the dominance of major hubs to remain, and believe that there are only a limited number of point-to-point routes that are actually viable. KLM, for example, only considers a few new city-pairs to be viable for it to open, including Amsterdam-Hartford USA,

CAPACITY DEVELOPMENT OF FASTEST GROWING LONG-HAUL ROUTES OPERATED WITH SMALL & MEDIUM WIDEBODIES

Route	2007 Annual flights	Annual seats '000s	Average size-seats	6-year Change flights	6-year Change seats	6-year Change seat size
Abu Dhabi-Singapore	130	41,990	323	465%	523%	10%
Bahrain-Manila	284	83,183	293	446%	446%	0%
Addis Ababa-Bangkok	346	83,732	242	349%	349%	0%
Dubai-Accra	286	68,442	239	361%	306%	-12%
Abu Dhabi-Bangkok	590	209,352	355	154%	215%	24%
Abu Dhabi-Manila	207	71,585	346	88%	131%	23%
Abu Dhabi-London LGW	364	126,252	347	9,000%	7,693%	-14%
Abuja-London	362	81,088	224	1,805%	1,316%	-26%
Dubai-Vienna	365	86,505	237	1,159%	1,040%	-9%
Doha-Paris	495	124,795	252	597%	685%	13%
Conakry-Paris	768	162,584	212	611%	616%	1%
Male-London LHR	173	53,976	312	565%	565%	0%
St Denis-Marseille	152	59,819	394	390%	463%	15%
Lagos-London LHR	813	240,208	295	461%	351%	-20%
Abu Dhabi-Munich	288	62,208	216	488%	293%	-33%
Bahrain-Paris	364	88,176	242	250%	257%	2%
Dubai-London LGW	1,095	340,638	311	163%	244%	31%
Dubai-Dusseldorf	610	185,301	304	118%	234%	53%
Mauritius-London LHR	442	138,897	314	180%	199%	7%
Dubai-Amsterdam	625	198,914	318	101%	191%	45%
Doha-London LHR	1,375	360,302	262	148%	188%	16%
Abu Dhabi-Frankfurt	365	96,295	264	181%	182%	0%
Johannesburg-Paris	903	270,517	300	147%	172%	10%
Dubai-Manchester	730	227,493	312	100%	163%	31%
Dubai-Munich	895	223,101	249	145%	162%	7%
Almaty-Amsterdam	464	101,056	218	161%	158%	-1%
Delhi-Mauritius	355	86,125	243	463%	608%	26%
Bangalore-Mauritius	365	103,168	283	602%	703%	14%
Karachi-London LHR	157	51,571	328	461%	587%	23%
Bombay-Moscow	166	36,188	218	419%	419%	0%
Bombay-Paris	992	293,652	296	217%	245%	9%
Kuala Lumpur-Adelaide	209	61,864	296	809%	854%	5%
Osaka-Cairns	362	92,187	255	448%	510%	11%
Tokyo-Saigon	830	233,147	281	313%	233%	-19%
Shanghai-Vienna	277	72,647	262	2,978%	2,674%	-10%
Beijing-Munich	493	141,469	287	383%	380%	-1%
Shanghai-London LHR	864	238,919	277	427%	376%	-10%
Shanghai-Moscow	254	56,783	224	167%	206%	14%
Lima-New York	365	80,665	221	1,360%	1,360%	0%
Porto-Sao Paolo	102	26,622	261	685%	631%	-7%
Warsaw-Toronto	236	49,845	211	661%	626%	-5%
Madrid-Cancun	278	60,916	219	613%	620%	1%
London LHR-Nassau	261	49,329	189	587%	587%	0%
Casablanca-Montreal	349	82,015	235	1,026%	492%	-47%
London LHR-Baltimore	364	69,636	191	460%	467%	1%
London LGW-Vancouver	110	32,416	295	547%	425%	-19%
Amsterdam-Bonaire	622	174,684	281	455%	417%	-7%
Rome-Caracas	99	22,473	227	313%	346%	8%
Birmingham UK-Toronto	273	74,549	273	269%	311%	12%
Lisbon-Salvador	368	95,876	261	141%	208%	28%
Sao Paolo-Johannesburg	365	97,226	226	181%	144%	-13%
Los Angeles-Shanghai	364	118,664	326	367%	350%	-4%

Pakistan International Airlines has opened new routes from Islamabad, Karachi and Lahore to Toronto and New York.

which KLM will start to operate in 2007 with a 757. Limited slot numbers are one physical limit to the number of new routes that can be opened, and restricted bilateral agreements are another.

Other airlines expect substantial development. "I expect the long-haul market to grow with an increased number of city-pairs being started by airlines as traffic rights become more liberalised and new generation aircraft with lower trip costs become available," says Kostermaa. "There is certainly potential for us to open more routes to the Asia Pacific, which will connect to Europe via our base at Helsinki. Of the 44 European cities that we serve, only 10 have daily flights to major cities in the Asia Pacific. Moreover, there are fewer cities served from Copenhagen than Helsinki, and there is only one route from Stockholm."

KLM has opened a smaller number of new routes over the past five or six years, but closed two. Unlike Finnair, it is physically close to Europe's three largest hubs: Paris, London and Frankfurt. This partially explains KLM's partnership with Air France. Weak traffic volumes mean that KLM has stopped flying some long-haul routes from Amsterdam, and off-loaded them to Air France to be served from Paris. Similarly, Air France has stopped flying to some Asia Pacific destinations, which are now operated solely by KLM from Amsterdam.

New routes can draw traffic from existing routes, thereby undermining the revenue generated on trunk sectors. KLM likes to open intercontinental routes with a minimum frequency of one per week, and increase this to seven per week when traffic volumes permit.

Finnair also focuses on frequency. "We used to start new routes with at least three flights per week, but have increased this to five, since it is better for business passengers," says Kostermaa. "We then aim to increase this to a daily service, and then to a twice-daily service at some point in the future. We are in a fortunate position at Helsinki, because not only are there a limited number of alternative services, but our distance from many Asia Pacific cities allows us to make a return flight in less than 24 hours, leaving enough time for aircraft maintenance while permitting high rates of aircraft utilisation. We can also make connections with European flights in a short time. We have found that the traffic volumes on existing routes change little when we open new ones. For example the number of passengers on our route to Hong Kong did not fall when we started flying to Guangzhou."

However, KLM, which has also considered flying to Guangzhou, is concerned that it will adversely affect its traffic volumes to Hong Kong, so it has chosen to consolidate traffic on this route instead.

Forecasts

The 767, 787 models, A310, A330-200 and A350-800 are regarded as small widebodies. The A350-800 is the largest at 270 seats. The 777 family, A330-300, A340 family and A350-900/-1000 are classed as medium widebodies, with seat capacities up to 375. These two groups are forecast to each have global fleets of 3,000 aircraft in 20 years. The 787 and A350 will be required to replace 767s and A300s, and even early built A330s, but most expected airline orders will be to satisfy strategic growth. Similarly, a minority of 777-200/-300s and A350-800/-900s ordered will replace aircraft in the same size category. Overall, some forecast that the size of these two fleets will grow from a total of 2,500 aircraft to 6,500 in 20 years: a net increase of 4,000.

This demand for such a large number of aircraft will come from high traffic growth rates. The North America-Southwest Asia (Indian sub-continent) market is expected to grow by an average of 13% per year, spurred by aircraft with sufficient range now being available. The Middle East-Australasia market is expected to grow by 8% per year, mainly due to connecting traffic, and the Africa-North America market by 7% per year over the period. The growth in these and other markets is expected to lead to a burgeoning of new routes.

Many unserved routes are in the ultra-long-range category, and so will not be opened until new types like the 787 and A350 are operating in substantial numbers. There are already more than 410 firm orders for the 787-8/-9, which will be in service for six years before the A350. The number of city-pairs longer than 3,000nm is expected to increase by 70% from 1,200 to nearly 2,100 over the next 20 years. This is based on airlines catering for passengers' requirements for more frequencies and routes. Frequencies are forecast to increase by 160% over the same period for new and current routes. While there are a few long-haul routes with frequencies of two or more flights per day, the global average for long-haul is 1.1 flights. There is clearly potential to increase the number of daily flights, since this average frequency of 1.1 per day is shared by all carriers on a route. Most airlines will aim to get to two or even three services per day before considering using larger aircraft, since frequency is a driver of business traffic. Airport congestion and slot constraints mean, however, that this may not be achievable.

The analysis of current developments in new and fast growing routes suggests there will be strong demand for small and medium widebodies over the next 20 years, although capacity and congestion issues will gradually have an increasing influence. The effects of the development of new and fast growing routes on capacity requirements on the busiest long-haul routes, and the requirement for the 747-8 and A380, is less clear. AC