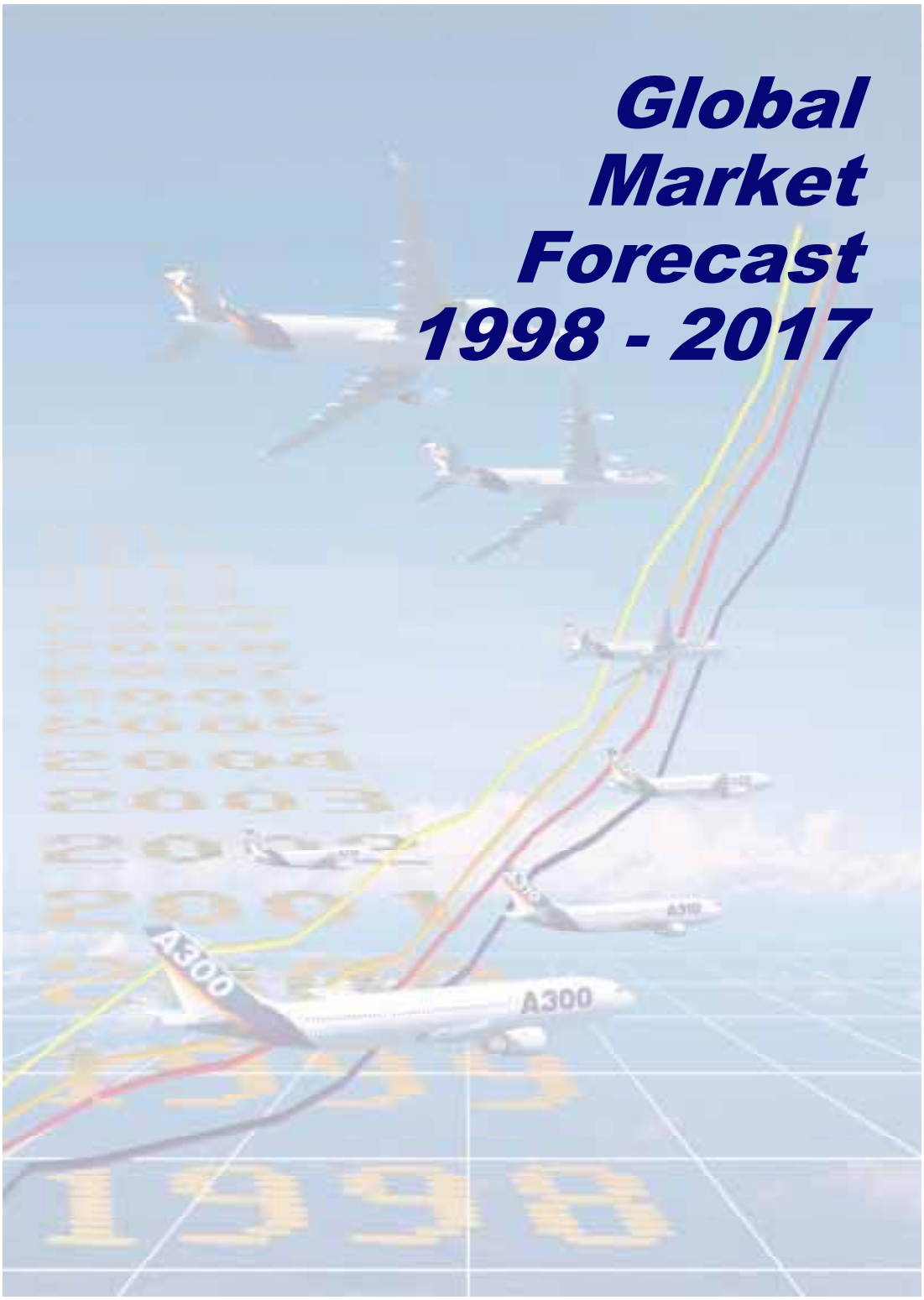
Global Market Forecast 1998 - 2017



April 1998

AIRBUS

The Airbus Global Market Forecast
can also be found on the Internet at
http://www.airbus.com

AIRBUS INDUSTRIE

31707 Blagnac Cedex
France
Telephone 05 61 93 33 33

AI/CP 390.0043/98

Printed in France

Contents

Appendices

1. Forecast highlights

Airbus Industrie's latest Global Market Forecast shows that over the next twenty years civil aircraft manufacturing is set to remain one of the world's major industries, helping the airlines to make quiet and clean air transport affordable by more and more of the world's peoples.

Although some markets are approaching maturity, and others are suffering the effects of short-term financial turmoil, tremendous potential still exists for an increase in demand for air travel as the world's economy continues to grow and the most populous, but less developed, nations climb up the economic development curve.

While growth will continue to follow its historical cyclical pattern, the underlying trend will remain strong. Average annual revenue passenger-kilometre growth of 5.0 per cent means that in twenty years' time there will be nearly three times as many air travellers as today.

The world's airport and air traffic management systems, already close to saturation, will not allow a corresponding increase in flight frequencies. As a result airlines will need a new type of aircraft larger and more economical than anything flying today if they are to meet growing demand for low-cost air travel between major population centres.

At the same time, as historical regulatory constraints on air transport are progressively removed, airlines will also need a new generation of ultra-long-range four-engined aircraft to open new non-stop premium services involving very long flights over the ocean and other inhospitable terrain.

In response to growing demand, the fleet of jetliners with at least 70 seats operated by the world's major airlines will increase to 17,900 aircraft from its current level of 9,700; an increase of 8,200 aircraft. At the same time these airlines will replace 8,500 of their older, noisier and less economic aircraft. Consequently, during the period 1998 through 2017, the opportunity will develop to sell or place a total of 16,700 aircraft.

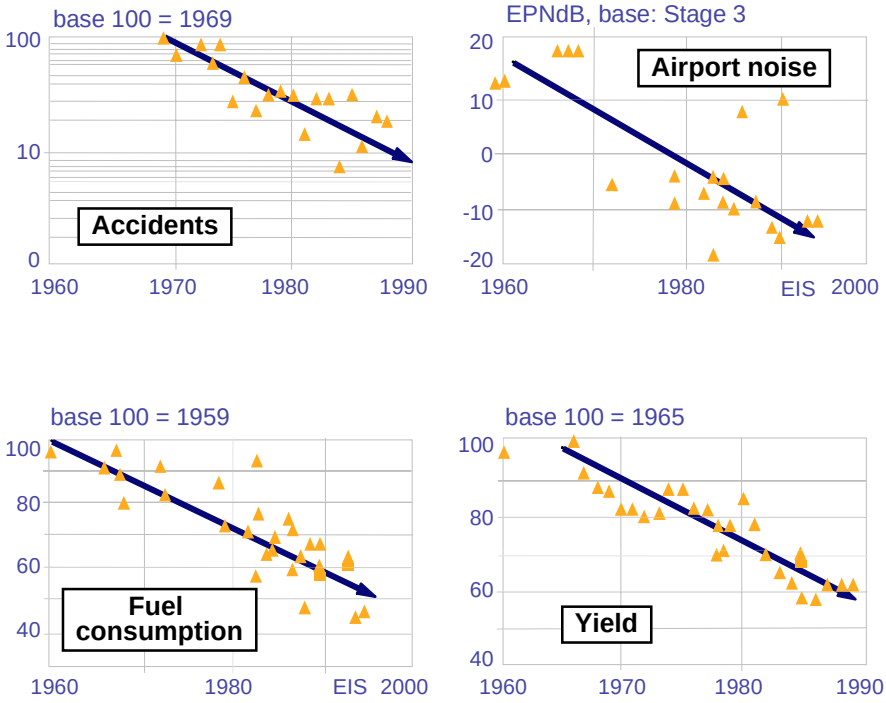
Some 3,100 of these opportunities will be met by used aircraft being recycled back into the world's passenger fleet after they have come off operating lease or been replaced by their previous operator. This means that during the next twenty years the world's two remaining manufacturers of large civil aircraft can expect to deliver a total of some 13,600 new jetliners; a market worth approximately $1.2 trillion* at present prices.

*) Terminology used throughout this report: billion = 10^9, trillion = 10^{12}.

2. The world air transport industry today

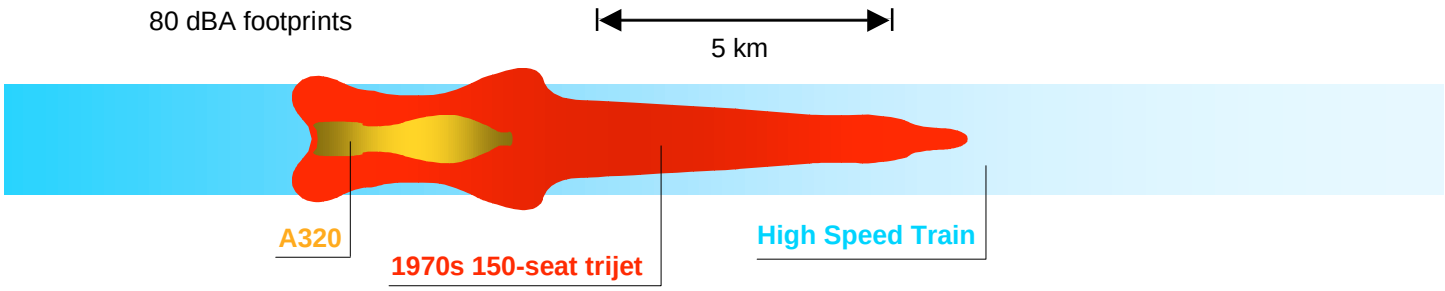
During the past thirty years, the introduction of successive generations of more advanced and efficient jetliners has resulted in a ten-fold reduction in the accident rate, a halving of fuel consumption and of revenue yields (in real terms), and a ten-fold reduction in aircraft noise energy output.

Technology has had a beneficial impact



The zone exposed to an annoying level of noise (> 80 dBA) by a modern aircraft taking off and landing is much less than that of a high-speed train. And of course the noise footprint created by the high-speed train stretches all the way from its origin to its destination. As a result the number of people exposed to aircraft noise has substantially reduced, while many more people are exposed to noise from roads and railways.

Modern aircraft are good "neighbours"...

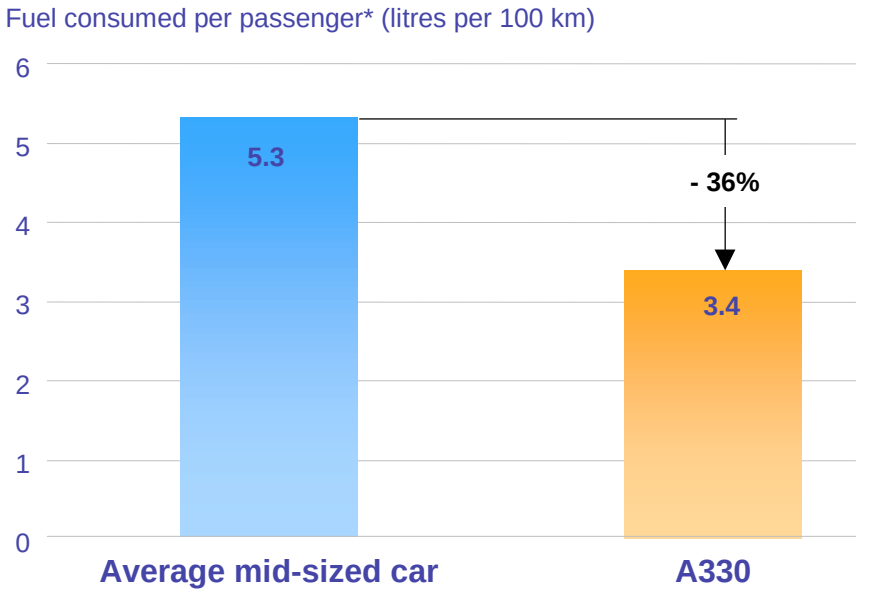


Source: Lufthansa, AECMA

In fact, the huge physical barriers needed to contain the noise from high-speed trains could one day become as serious an environmental threat as the noise itself. Moreover, per passenger transported, airports use land about five times more efficiently than rail, and six times more efficiently than road.

Despite their much higher speed, the latest aircraft consume substantially less energy per passenger than the average mid-sized car (based on typical occupancy).

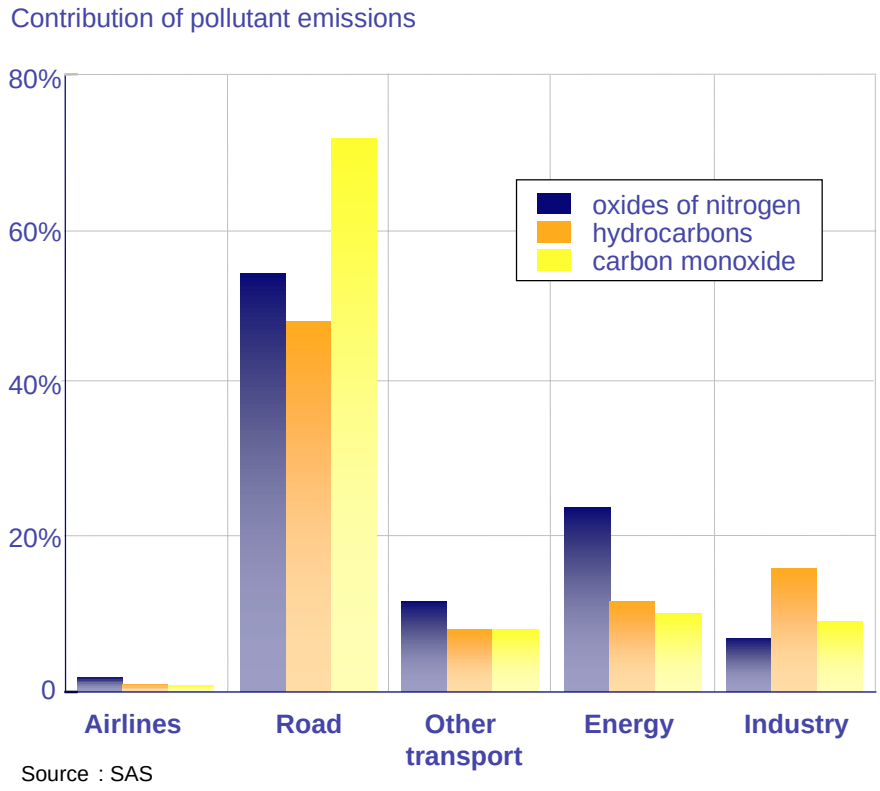
... and energy-efficient



* typical load factors

Emissions by aircraft of unburnt hydrocarbons and carbon monoxide have been dramatically reduced, and Airbus A320s were the first aircraft in the world to enter service with engines modified to reduce still further emissions of nitrous oxides. Much more pollution around airports is now caused by the ground vehicles than by the aircraft themselves.

The airlines are very clean

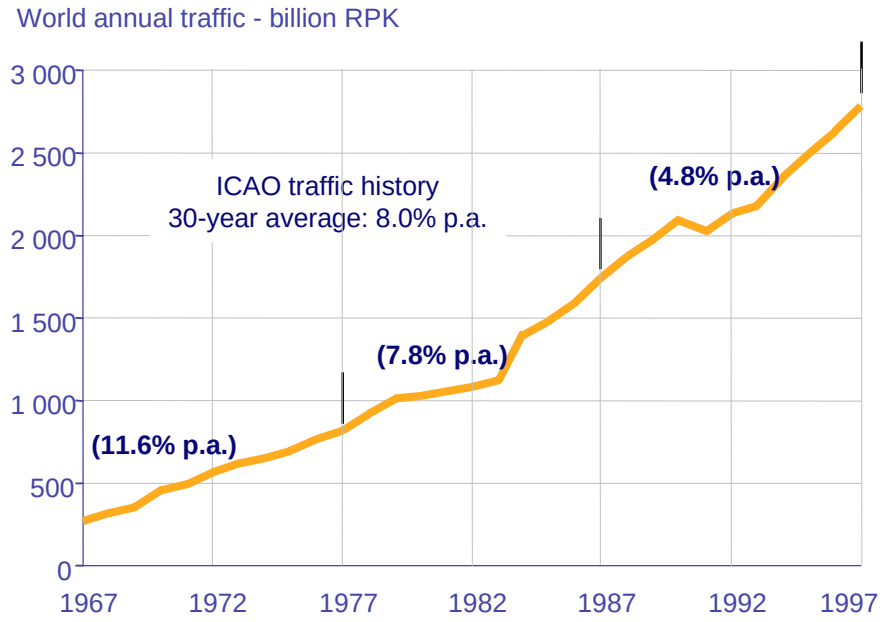


Source : SAS

Overall, therefore, despite some public perceptions to the contrary, modern aircraft have not merely transformed intercontinental jet travel from a luxury for the privileged few to a commodity within the reach of many ordinary people; they are also among the safest and most efficient, clean and quiet means of transport available.

Economic growth, coupled with a proliferation of convenient schedules and a progressive reduction in fare levels in real terms, has led to a ten-fold increase in air revenue passenger-kilometres during the past thirty years, representing an average annual growth rate of 8.0 per cent. Worldwide air travel now amounts to some 2.8 trillion RPKs per year; roughly equivalent to every man, woman and child in a nation the size of France or the United Kingdom making a round-the-world air trip each year.

Air travel has grown strongly during the past thirty years



The world air transport system is highly concentrated. The September 1997 edition of the Official Airline Guide shows that half the world's jetliner fleet is operated by just the 17 largest airlines, and that half of all available seat-kilometres flown by the scheduled airlines in the GMF are flown on just the top 6 per cent of routes linking no more than 33 airports.

And this concentration is likely to increase. Following World War II a system was set in place of strict bilateral regulation of international air services, and major domestic air travel markets were similarly regulated.

World air transport is highly concentrated

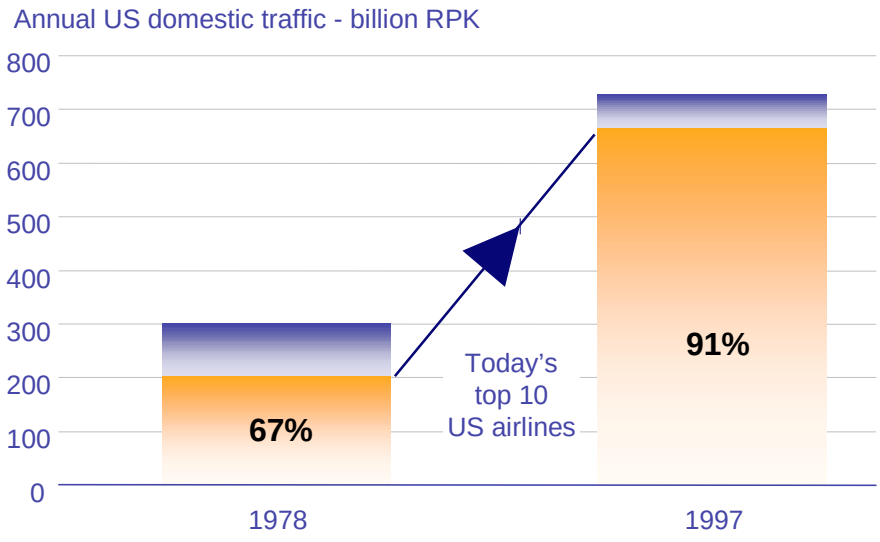
September 1997 OAG shows that:

- Half the world's jetliner fleet is operated by the 17 largest airlines
- Out of 9,067 sectors linking 1,600 airports flown by the GMF scheduled airlines, half of all ASKs are provided on:
  - the top 579 routes (6.3%)
  - flights to/from the top 33 airports (2.1%)

In 1978 the United States deregulated its domestic air transport system, and a wave of liberalisation is now sweeping worldwide.

Contrary to expectations, the result of US domestic deregulation was to increase concentration, as a handful of major airlines built dominant positions at strategically located "hub" airports. By 1997, today's top ten airlines had increased their share of domestic RPKs to 91 per cent compared with just 67 per cent prior to deregulation.

Airline concentration is increasing

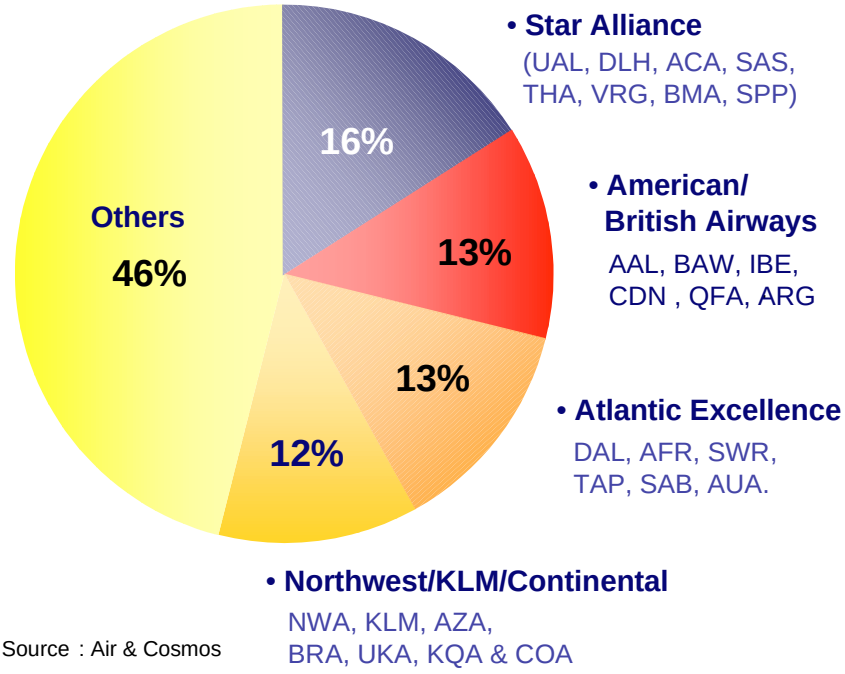


Source: Back Information Services

As the US domestic air travel market has matured, the major US airlines have increasingly looked to international markets as a source of continuing growth. While their domestic market remains inaccessible to foreign carriers, the US airlines have expanded internationally. At the same time they have sought to repeat their domestic hub strategy on a global basis by entering into strategic alliances with foreign airlines seeking to bolster their own positions.

Airline consolidation will reflect concentration on the supply side

Four groups will carry over half of all passengers ….



Source : Air & Cosmos

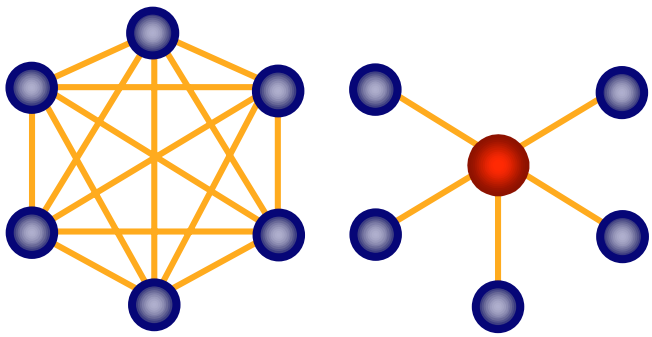
… and this concentration will increase

At the time of writing, the point is being rapidly approached where just four major global alliances will carry 60 per cent of all world passengers. As well as consolidating joint services and building dominant positions at key global hub airports, the alliance partners will also seek to exploit their combined buying power by

rationalising their purchases of goods and services - and ultimately of aircraft. The result will be a concentration on the civil aircraft buying side similar to that which has occurred on the supply side, where only two significant competitors still exist.

While air travellers may dream of a choice of frequent, non-stop flights from their local airport to their destination a continent away, the truth is that provision of such services tends to be very costly. Such a system may be viable for high-economic-value government or business travellers willing to pay the high fares required, but the great bulk of travellers will seek reasonable connections at the lowest possible fare. As the US airlines discovered, this can best be achieved by nominating one centrally-located city as a hub, providing short connecting times between flights arriving from, and those departing to, all the other cities.

"Hubbing" can drastically rationalise route network development



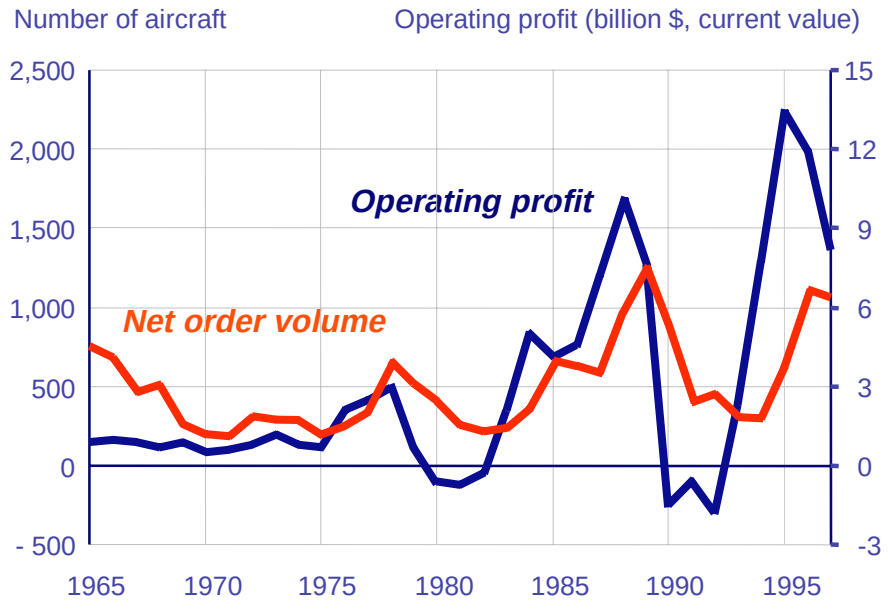
Network type:	**Fragmented**	**Hubbed**
No. of cities:	n	n
No. of flights to connect all Os & Ds:	n (n-1)	2 (n-1)

By consolidating passenger loads to and from many origins and destinations, this hub strategy dramatically improves the quality of service that can be economically provided to smaller communities, and by increasing the

size of aircraft flown it allows a reduction in fares as a result of economies of scale. The substantial reduction in numbers of flights also allows more passengers to be transported in a congested airport and air traffic environment.

This has been a key to allowing an increase in US domestic air travel despite lagging investment in airport and air traffic management infrastructure. The extension of hub strategies by airline alliances on a global basis is likely to be vital to preventing growing demand for air travel worldwide being strangled by infrastructure capacity limitations. It will also reinforce the need for a new type of very large aircraft, able to increase the number of passengers carried despite airport and air traffic slot limitations, and offering a significant reduction in operating cost.

Airliner orders follow airline profits (ICAO scheduled airlines)

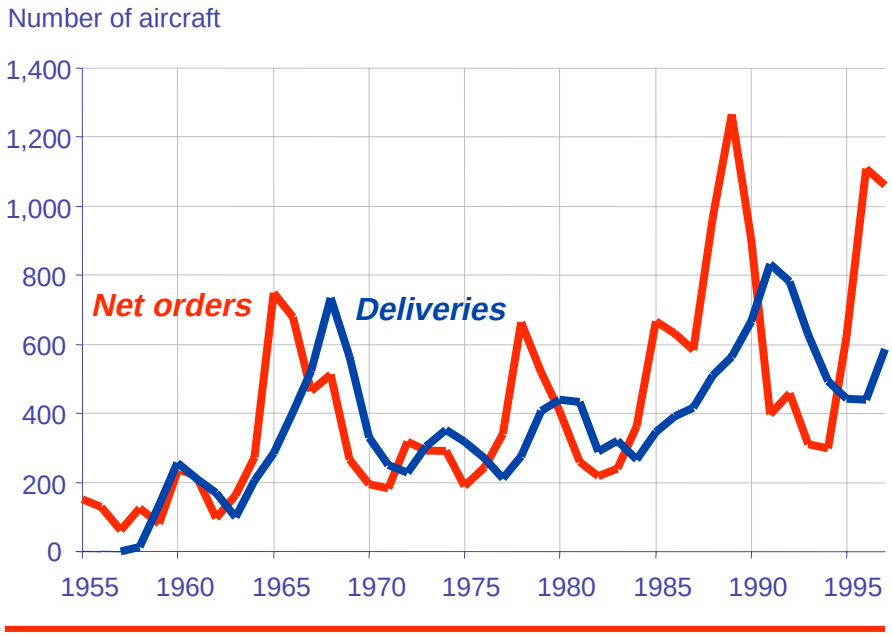


Booming traffic demand, coupled with reductions in the price of aviation fuel, has resulted in record profits for many airlines in North America and Europe. The resulting need for additional capacity has come at the same time as

new, more stringent noise rules which will render many noisy aircraft inoperable within, to or from the United States from end 1999 and other parts of the world from end 2002. This in turn has led to a surge in aircraft orders, which has driven the manufacturers to increase production to record levels.

This has put the world air transport system firmly on the positive phase of its classic business cycle. When the newly-ordered aircraft are delivered, the additional capacity invariably causes load factors to drop and airline profits to decline, triggering a reduction in orders and subsequent deliveries until capacity once more comes into balance with demand, causing profits to rise and the cycle to repeat. The system is currently in its fourth mega cycle since the start of the jet age.

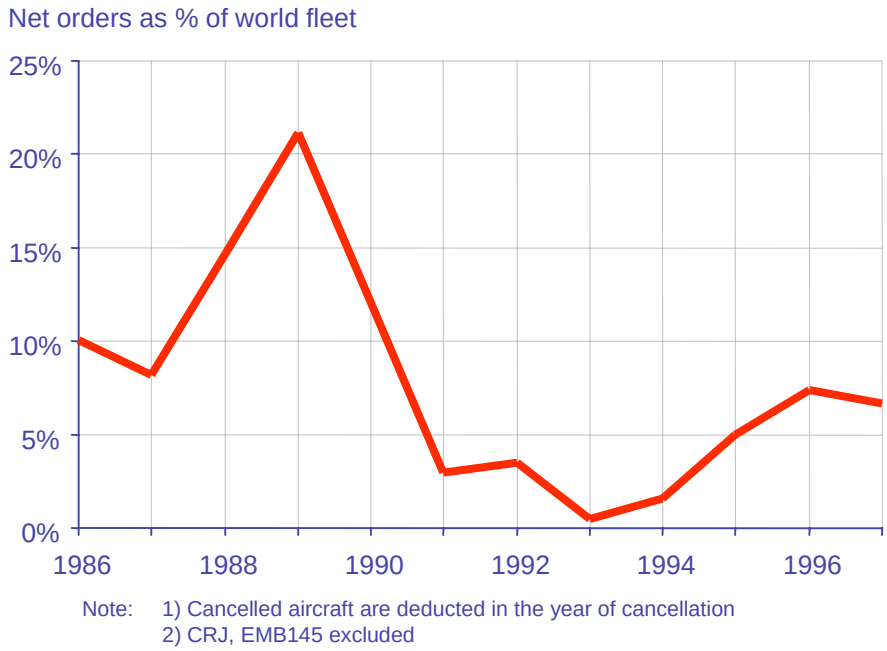
Airliner orders and deliveries are highly cyclical



Last time around, overoptimistic growth projections by the airlines coupled with huge speculative orders by leasing companies led to a collapse of orders after the cycle had passed its peak. This time, however, the airlines and the remaining leasing companies have been more prudent in their orders for growth.

During the past two years annual orders have amounted to only about 7 per cent of the world fleet, compared to a level of more than 20 per cent at the peak of the last order cycle. Moreover a significant proportion of recent orders has been to replace older, less efficient aircraft which have become uneconomic or too noisy to continue in operation beyond the implementation of the more stringent FAA Stage 3 and ICAO Chapter 3 noise rules at end 1999 / end 2002 respectively.

Current order levels are more prudent than during the last cycle



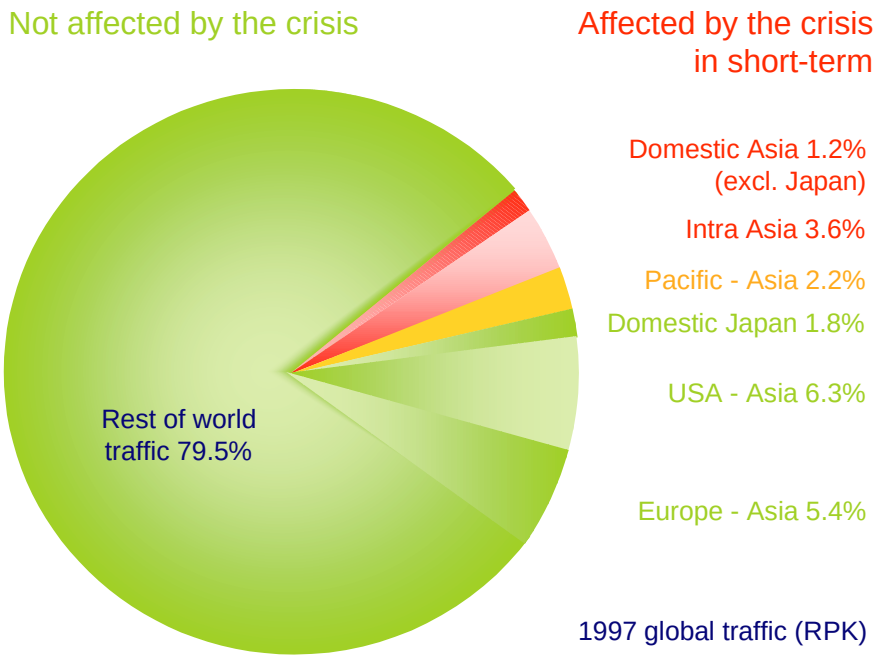
Note: 1) Cancelled aircraft are deducted in the year of cancellation
2) CRJ, EMB145 excluded

In addition, the manufacturers have succeeded in reducing their manufacturing lead-times, and are therefore able to respond more nimbly to changes in demand. Consequently, although aircraft ordering will continue to follow a cyclical pattern, there are good reasons to believe that the amplitude of the cycle will be less extreme than in the past.

The recent collapse of several Asian currencies against the US dollar has caused a sharp decline in air travel in a number of the markets to, from and within the Asia-Pacific region. But the impact on world air traffic should be kept in perspective.

Firstly, not all Asian traffic flows have been affected in the same way. Regional markets, and domestic markets outside Japan and Taiwan, have suffered significantly. Asia - Pacific traffic has been moderately affected. But traffic between the US and Asia remains solid, with a surge in US tourist traffic expected to offset a decline in Asia-originated passengers. And traffic to and from Europe has great scope for future long-term growth, with many opportunities for additional city-pairs to gain daily service.

The Asian crisis is affecting only a small proportion of the total world air travel market



So the affected markets represent only 7 per cent of 1997 world RPKs, and the impact of the crisis on global traffic has been quite small. Actually, if air travel in all the affected markets were to come to a complete standstill for a year, total world air traffic would show hardly any decline at all.

Also, despite the severe short-term problems facing the Asian airlines, the fundamentals underlying the region's great potential for sustained long-term economic growth remain unchanged. The Asian nations have large populations which characteristically work hard, save a high proportion of their earnings, and look to their families rather than the state when times are hard.

Moreover, many of Asia's airlines are healthier than the Asian economies. One major Asian airline, severely affected by the crisis and having its worst year ever, has still managed to report a profit margin on 1997 operations that would arouse envy from most airlines in other parts of the world.

Airbus Industrie analysts have developed forecasting models based on similar crises in the past; for example the Mexican peso crisis which caused a collapse in Mexican domestic air travel in 1995. These models, adjusted to reflect the particular Asian situation, suggest that regional air travel markets must expect a rather severe short-term impact, but no significant change in the long-term growth outlook. Similarly, domestic Asian air travel markets are expected to resume their normal growth pattern by 2001, with some countries rebounding faster.

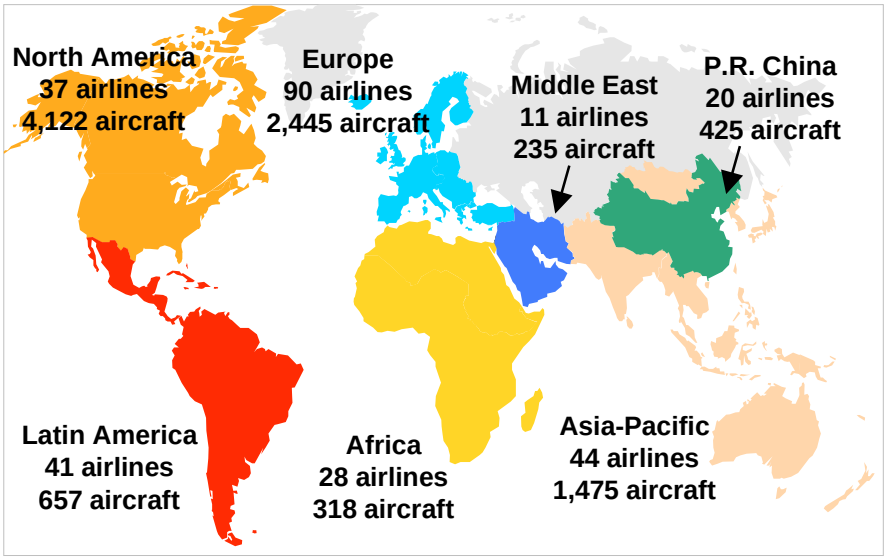
Overall, the indications are that, provided the Asian governments move swiftly to implement the necessary reforms, the current crisis will have no significant impact on long-term demand for air travel worldwide.

3. What is the GMF?

Airbus Industrie's Global Market Forecast is probably the most detailed and comprehensive forecast of the long-term development of the world air transport system produced anywhere in the world.

This latest edition projects passenger traffic growth, aircraft productivity changes and flight frequency / aircraft size relationships over the next twenty years on a total of 9,067 city-pair route sectors in 81 domestic and international air service sub-markets.

The GMF provides comprehensive coverage - but excludes airlines in the CIS



These route-by-route forecasts are then consolidated so as to project the evolution from end 1997 to end 2017 of the fleets of the world's largest 271 airlines, domiciled in seven geographical regions and accounting for 98 per cent of the current global active fleet of passenger aircraft with 70 seats or more. Evidently, the overall traffic growth forecast for each airline is made up of the growth predicted in each of the sub-markets it serves. The airlines studied, and the geographical regions to which they are assigned, are listed in Appendix A.

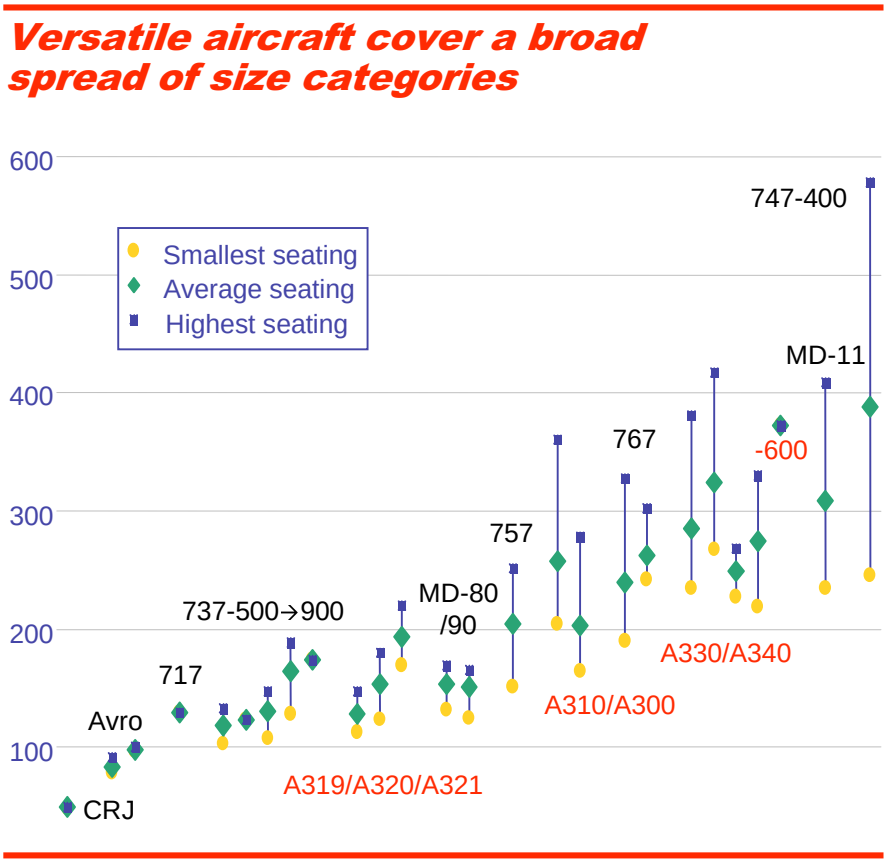
The forecasts are further consolidated into region-by-region and total world forecasts, as well as forecasts of the evolution of the world jetliner fleet in a number of individual aircraft size categories. To facilitate comparison with other aircraft demand forecasts, these results are consolidated into five generic groups:

- 70, 85 & 100-seaters*
- 125, 150 & 175-seaters
- 210 & 250-seaters
- 300, 350 & 400-seaters
- Larger than 400-seaters

These size categories have been chosen to correspond roughly to the average mixed-class seating capacity of the major aircraft types available or anticipated. But unlike many other forecasts the GMF takes into account the precise seating capacity of each individual aircraft, so that a particular type of aircraft will contribute capacity to a range of generic seating categories. For example A330-300s, in service with interior configurations ranging from a high-density single-class 412-seat layout to regional three-class layouts with just 267 seats, will provide capacity in seating categories from 250 to 500 seats.

The method used to allocate the seating capacity of an individual aircraft into the different categories is described in Appendix E. It ensures that despite differences in seating standards the correct number of seats is maintained in each airline fleet.

*) Demand predicted in the smallest aircraft size category does not measure total demand for jetliners in this class, because many more will be needed by smaller airlines and those currently equipped with an all-propeller-driven fleet, which are not covered by the GMF.



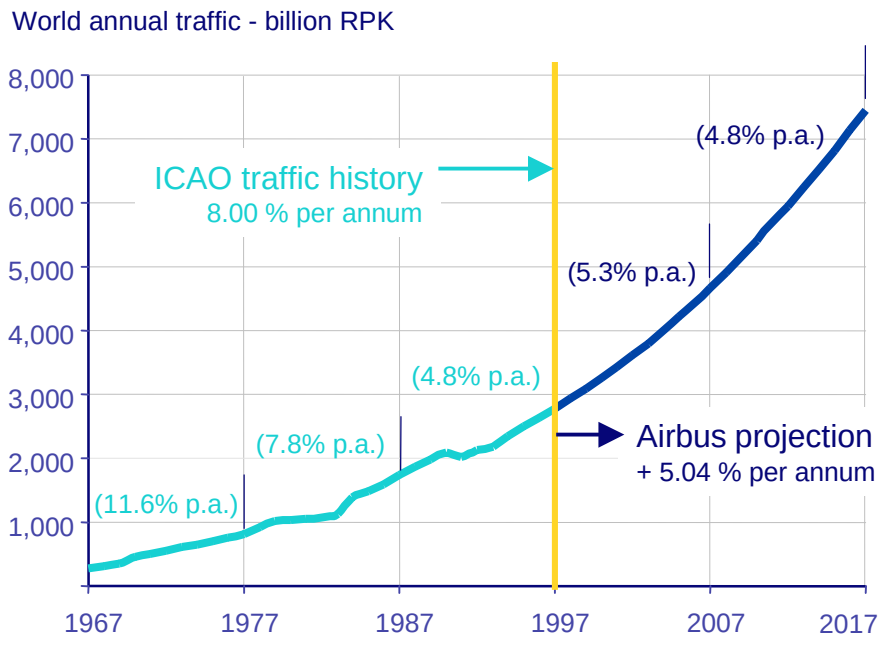
Note that the GMF is a forecast of demand. The extent to which any individual aircraft type will fill this demand will depend on its performance, economic and environmental characteristics relative to those of competing types.

4. Demand for air travel

Demand for air travel is driven primarily by economic (GDP) growth, reductions in real fare levels, and demographic (population) growth. The relative importance of these different drivers changes as air travel markets mature. The methodology used in the GMF to develop long-term projections of growth in passenger air traffic (measured in revenue passenger-kilometres) is described in Appendix B.

In reality, air traffic growth will exhibit some cyclical variation in line with business and economic cycles. This is not reflected here; the traffic forecasts in the GMF are aimed at projecting the underlying secular trends.

Demand for air travel will continue to grow strongly

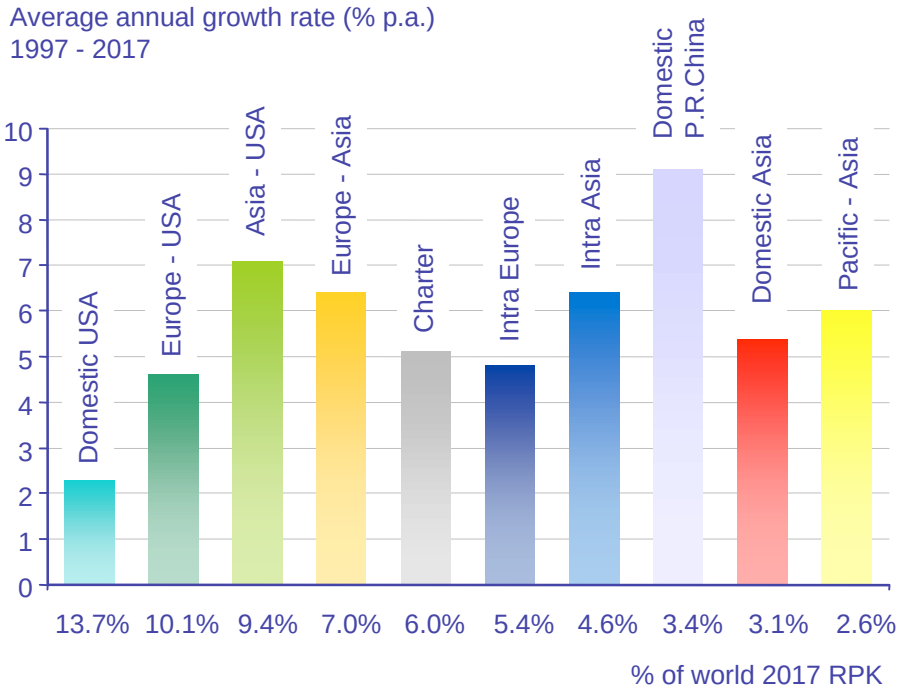


On this basis, Airbus Industrie predicts that during the ten years to 2007 passenger traffic (RPKs) carried by the 271 airlines covered by the GMF will grow at an average annual rate of 5.3 per cent, and that during the next ten years average annual growth will decline to 4.8 per cent as markets mature.

The overall result will be an average annual RPK growth rate of 5.0 per cent during the twenty-year period of the forecast, meaning that during this time traffic will increase by 168 per cent. In other words, in twenty years' time the airlines will be carrying nearly three times as much traffic as today.

During the past thirty years the average level of world air traffic has been approximately 1.3 trillion RPKs per year. The forecast for the next twenty years shows an average of almost 5 trillion RPKs per year; nearly four times higher.

Traffic growth in different markets will vary widely



These markets will represent 65% of world 2017 RPK

The global average is made up of substantially different growth forecasts in the different sub-markets, ranging from 2.3% per year in the mature North American markets to 9.1% per year in the emergent PRC domestic market.

The relatively low traffic growth projected on US domestic routes means that during the next twenty years the proportion of total world RPKs generated by this market will shrink to less than 14 per cent from its current level of 23 per cent. At the same time the importance of the rapidly growing domestic PRC routes will more than double, growing to 3.4 per cent from just 1.6 per cent today.

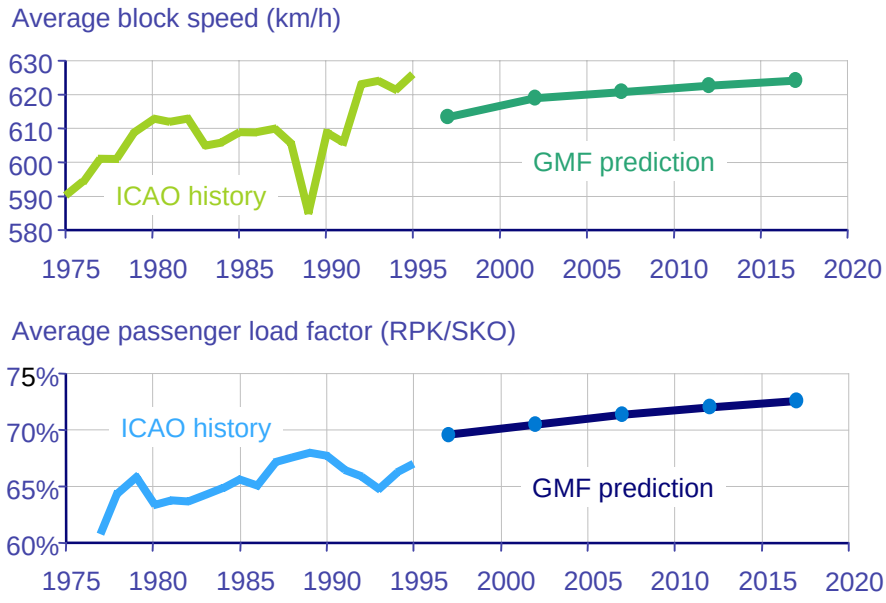
The annual average RPK growth rates projected over the two ten-year periods covered by the forecast for each of the 81 sub-markets studied are listed in Appendix B. This also shows the extent to which world air traffic is concentrated. Half of all 1997 RPKs were generated in just the Top Five sub-markets, and two-thirds in the Top Twelve. Airbus nevertheless studies all 81 sub-markets in order to understand better the traffic growth potential for each of the 271 airlines covered by the GMF.

5. Aircraft productivity

The forecast growth in passenger traffic will be accommodated largely by an increase in the number of seats in the airline fleet. But at the same time part of this growth will be absorbed by increases in aircraft productivity.

The forecast increase of nearly 6 per cent in average flight distance during the twenty-year period, together with the progressive implementation of satellite-based navigation and air traffic management systems, will allow an increase in average aircraft speed. But at the same time the almost doubling in numbers of flights will inevitably increase congestion in the air and on the ground. The net result is expected to be an increase of just 1.7 per cent in average speed during the forecast period, reaching 624 km/h in 2017 compared with the current average of 613.5 km/h.

Airlines will continue to improve aircraft productivity



Potential exists for further improvements in aircraft utilisation, which is projected to increase to an average of 3,571 block hours per year from its current 3,379 block hours, and in passenger load factors (the percentage of seats occupied on each flight), which are expected to rise to 72.6 per cent from 69.6 per cent during the next twenty years, boosted by the increasing sophistication of computer reservations systems.

The overall result will be a global average increase of 0.7 per cent per year in aircraft productivity.

Higher-than-average aircraft productivity gains (1.0 per cent per year) are projected for the airlines of the Asia-Pacific region, where potential exists for further significant increases in average passenger load factors. However further improvements in productivity by the airlines of the PRC will be limited to 0.2 per cent per year as their domestic load factors decline from their currently high levels.

The forecast average annual aircraft productivity growth of 0.7 per cent will leave a requirement for an average annual increase of 4.4 per cent in fleet capacity (the number of seats in service).

6. Fleet renewal

Until quite recently, the great majority of jetliners have been purchased to accommodate traffic growth. But now the need to replace older aircraft has become a much more important consideration for the airlines; whether as part of a competitive strategy to maintain a youthful and up-to-date fleet; to meet new, more stringent noise rules; or simply because existing aircraft have reached an age at which they are becoming no longer economic to operate.

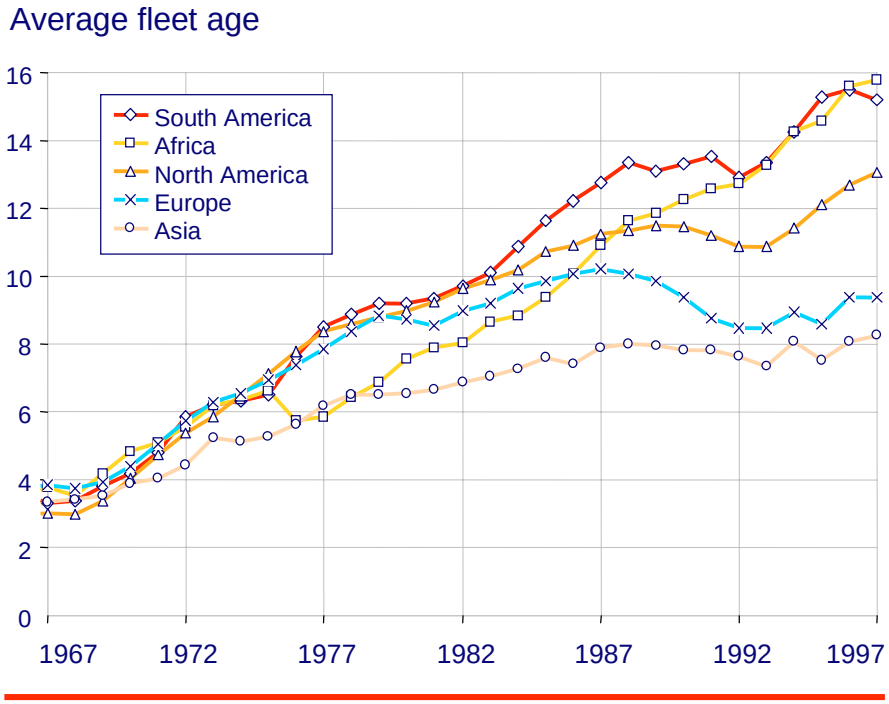
Airbus Industrie has analysed the aircraft replacement / fleet renewal process in considerable detail, and developed a methodology (described in Appendix D) which reflects real airline practices.

Almost all jetliners are withdrawn from passenger service before they reach 30 years of age

The statistics show that the great majority of jetliners are definitively retired from passenger service before they reach thirty years of age. So far, the earlier generation of widebodied aircraft have tended to be retired earlier than single-aisle types.

But many airlines choose to replace their aircraft much earlier. This creates opportunities to place new aircraft, which the GMF - unlike many other forecasts - aims to identify. Where an airline is known to have adopted a policy - for strategic, tax or any other reasons - to maintain a young fleet, the early replacement of its aircraft, long before they are retired from passenger service, is reflected in the forecast. A similar opportunity arises whenever an operating lease expires. So the GMF does not simply assume that aircraft remain in service until retirement; it recognises that many airlines will be looking to replace their aircraft much earlier, and that these prematurely replaced aircraft will then compete with new aircraft for the business of airlines which are prepared to acquire them.

Airlines in Europe and Asia maintain young fleets

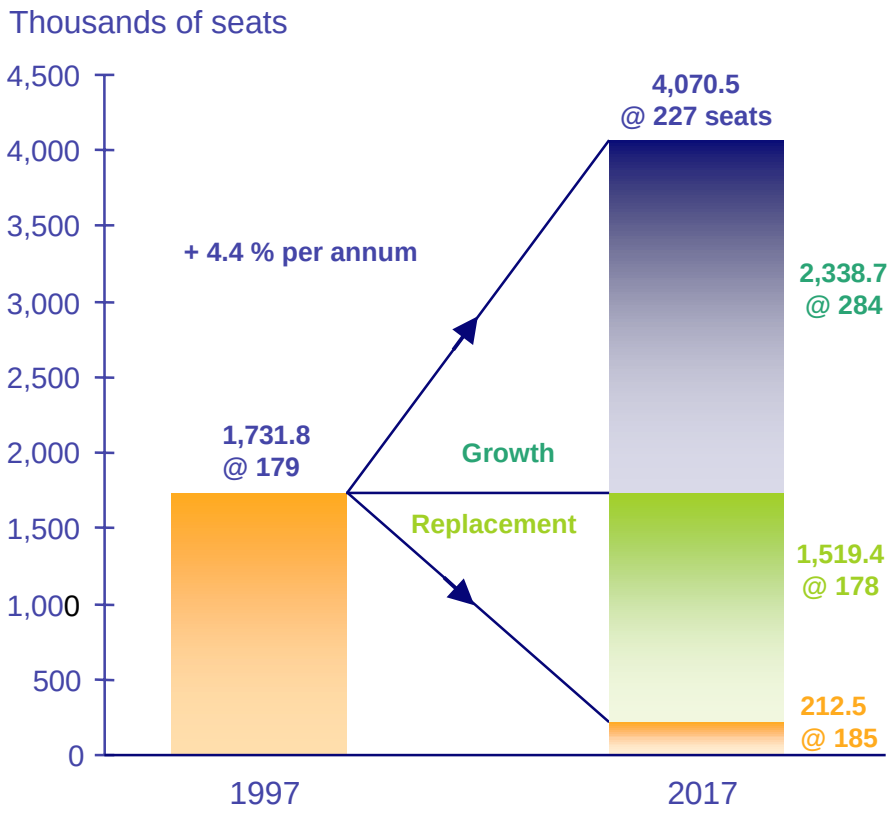


The overall prediction is that by end 2017 almost 90 per cent of the 9,677 aircraft in service with the airlines in the GMF at end 1997 will have been replaced. These aircraft provide a total of 1,519,400 seats.

7. Demand for seats

The projected average annual increase of 4.4 per cent in fleet capacity (the number of seats in service) means that the total capacity of the world passenger fleet covered by the GMF will grow to 4,070,500 seats at end 2017 from 1,731,800 at end 1997; an increase of 135 per cent. In other words, during the next twenty years, the major airlines will more than double the numbers of seats in their passenger fleets.

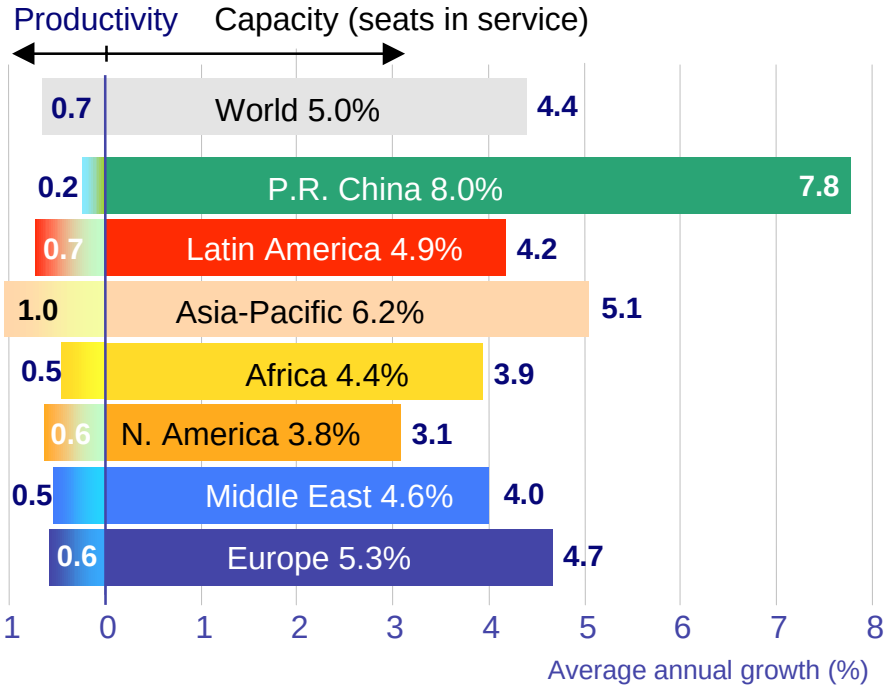
The number of seats will more than double



Once again, this average figure covers a considerable variation between different sub-markets and different geographical regions. To keep pace with rapidly growing traffic the airlines domiciled in the PRC, for example, will increase their fleet capacity more than four-fold, to 387,000 seats by end 2017 from just 87,000 at end 1997; an average annual growth of 7.8 per cent per year.

The airlines of North America, serving more mature markets, will increase capacity during the next twenty years by only about 80 per cent, growing at an average 3.1 per cent per year to almost 1,200,000 seats from their current 650,000.

Aircraft productivity and seat growth will vary between geographical regions



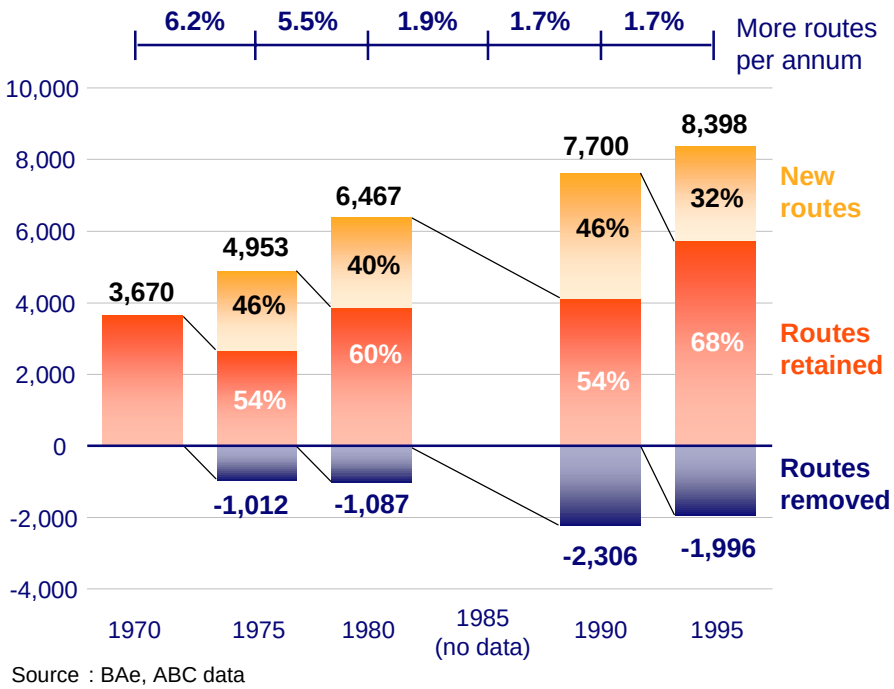
The capacity growth rates shown are the averages for the airlines domiciled in each geographical region, representing the additional seats they will need to accommodate projected traffic growth in all the sub-markets they serve. The figures do not show the growth in seats needed on routes to, from and within the various regions.

To the 2,338,700 additional seats needed to accommodate traffic growth must be added the 1,519,400 seats needed for fleet renewal. In total the airlines in the GMF will need to acquire a total of 3,858,100 seats during the next twenty years, approximately 60% to meet traffic growth and 40% for fleet renewal.

8. Route development, service frequency & aircraft size evolution

During the 1970s airlines worldwide opened almost 5,000 new routes in response to passenger demand for more frequent and convenient services. At the same time they stopped serving just over 2,000. So on balance through the decade the number of routes flown grew at an average 5.8 per cent per year. But since then the pace of new route development has slowed sharply. Increased freedom to serve new routes has been balanced by a freedom to abandon them if they prove unprofitable. So while some 2,700 new routes were opened between 1990 and 1995, almost 2,000 were dropped. The net result was an increase averaging just 1.7 per cent per year.

New route development is slowing



Source : BAe, ABC data

Most significantly, during this five-year period the number of routes flown between Europe and North America increased by just six, and between Asia and North America by just ten - out of a world total of some 8,400 routes.

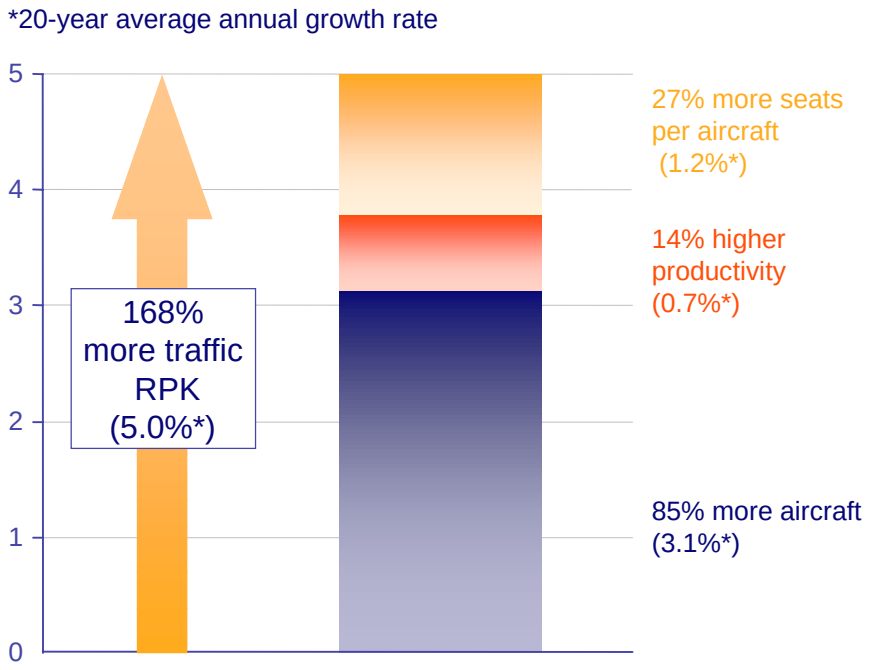
A relatively small number of passengers will continue to drive the opening of new, direct, frequent non-stop services between pairs of cities where adequate demand exists. This is reflected in the GMF by setting artificially high levels of acceptable and maximum frequency on existing routes. Thus service between individual airport-pairs is allowed to grow to as many as 60 flights per day in short-haul markets, up to 18 flights per day on routes equivalent to London - New York, and up to nine flights per day on very long intercontinental routes. The overall result is a projected twenty-year growth of 88 per cent in number of flights, an average annual increase of 3.2 per cent.

Even if concerns about vulnerability are overcome, and progressive implementation of the satellite-based Future Air Navigation System helps ease en-route congestion, the growing number of flights will present a major challenge. It will require a major expansion of airports and air traffic management capacity worldwide. Several new airport and airport expansion projects are already planned or under construction; others will be needed.

Some potential does exist during the forecast period for aircraft to make more flights per year as a result of increased airline efficiency and reduced turnaround times, but this will be largely counterbalanced by the forecast 6 per cent increase in average flight distance. On average, each aircraft will make 1,575 flights in 2017, compared with the current average of 1,550; an increase of just 1.6 per cent. As a result, in order to achieve the 88 per cent increase in flights projected for 2017, the airlines covered by the GMF will need a total of 85 per cent more aircraft. This represents a twenty-year average increase of 3.1 per cent per year.

Consequently, of the 168 per cent increase in annual RPKs projected by the GMF through 2017, part will be provided by this increase in the number of aircraft, and part by the projected 14 per cent increase in aircraft productivity. This leaves the need for a 27 per cent increase in the average seating capacity of the world's jetliner fleet, which will have to grow at an average annual rate of 1.2 per cent to 227 seats at end 2017 from 179 seats at end 1997.

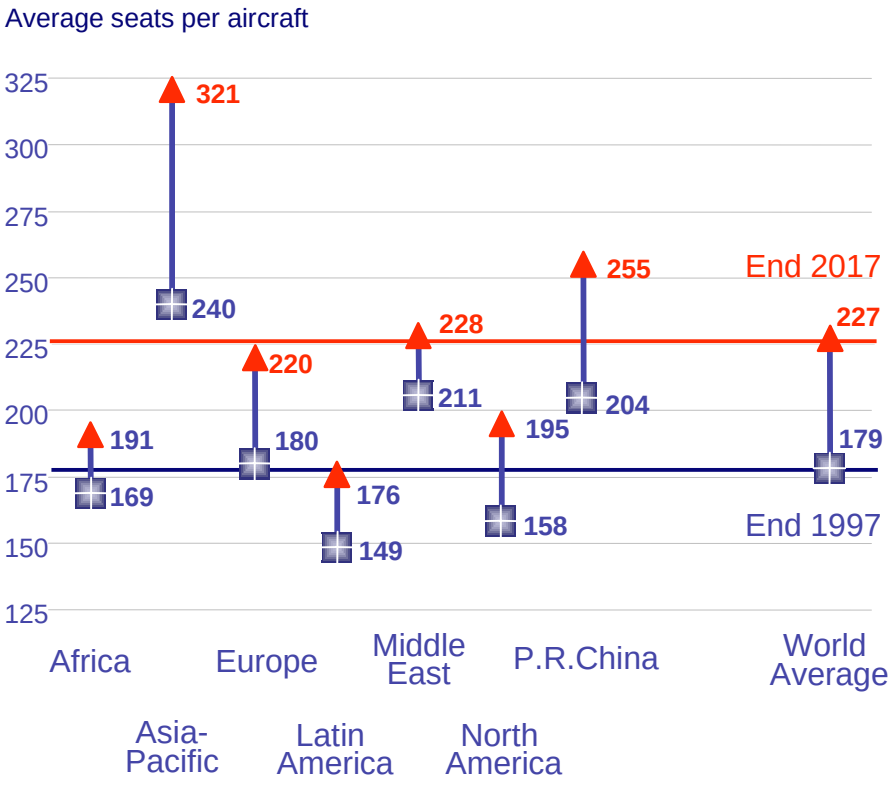
Average aircraft size will increase



Yet again, this global average embraces a wide range of regional variations. The average size of aircraft operated by the frequency-driven airlines of North America, as well as those of Africa and Latin America, are and will remain below the world average. Relatively low growth will bring the average size of aircraft operated by airlines in the Middle East, currently well above the world average, onto the average line.

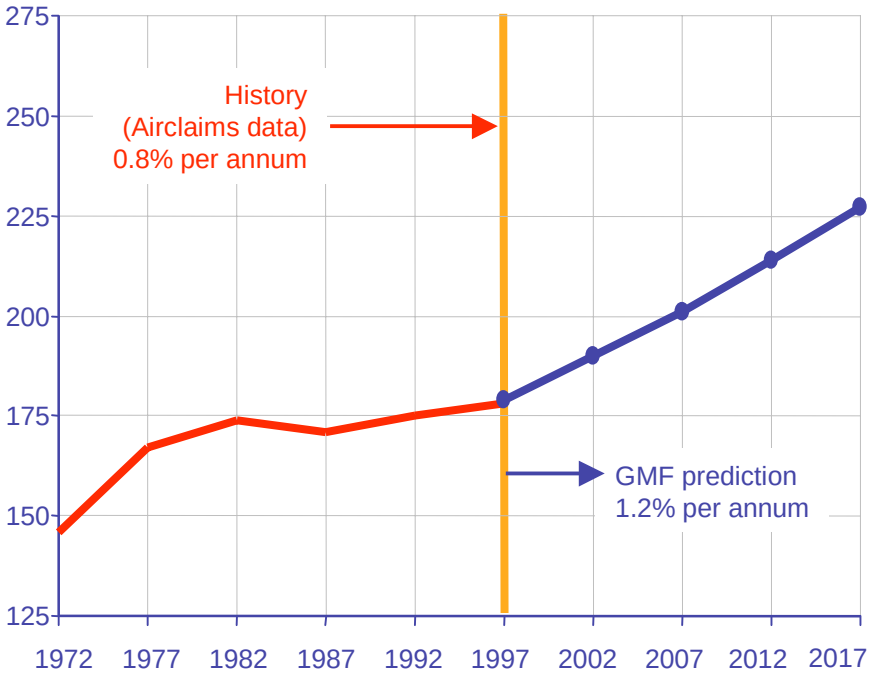
But the Asia-Pacific airlines stand out. Their heavy traffic and congested infrastructure means that, at 240 seats, their average aircraft size is already above the level projected for the world fleet in twenty years' time. And to meet anticipated traffic growth this will have to grow by more than 80 seats, at an average annual rate of 1.5 per cent. This will evidently oblige them to acquire substantial numbers of aircraft larger than anything flying today.

Asia-Pacific will lead the way in aircraft size growth



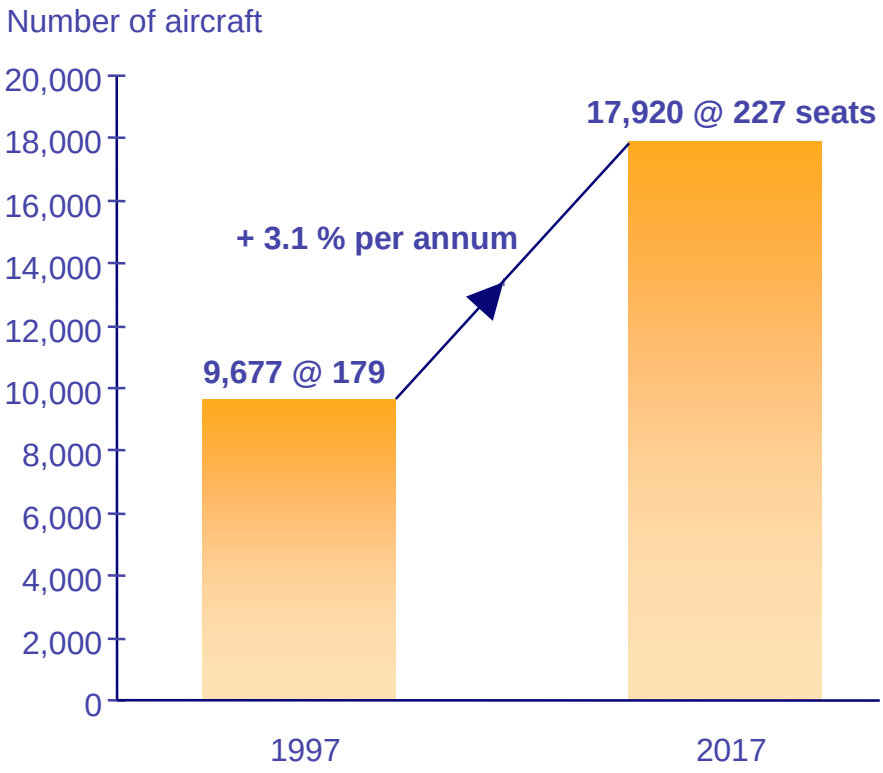
During the past 25 years, although the size of the largest available aircraft has scarcely changed, the average size of jetliner in the world fleet has grown at an average rate of 0.8 per cent per year, increasing to 179 seats from 146 in 1972. In comparison the GMF prediction that average aircraft size will grow at an average 1.2 per cent per year during the next twenty years, when congestion will increase and significantly larger aircraft become available, appears prudent.

The GMF predicts a prudent increase in average aircraft size



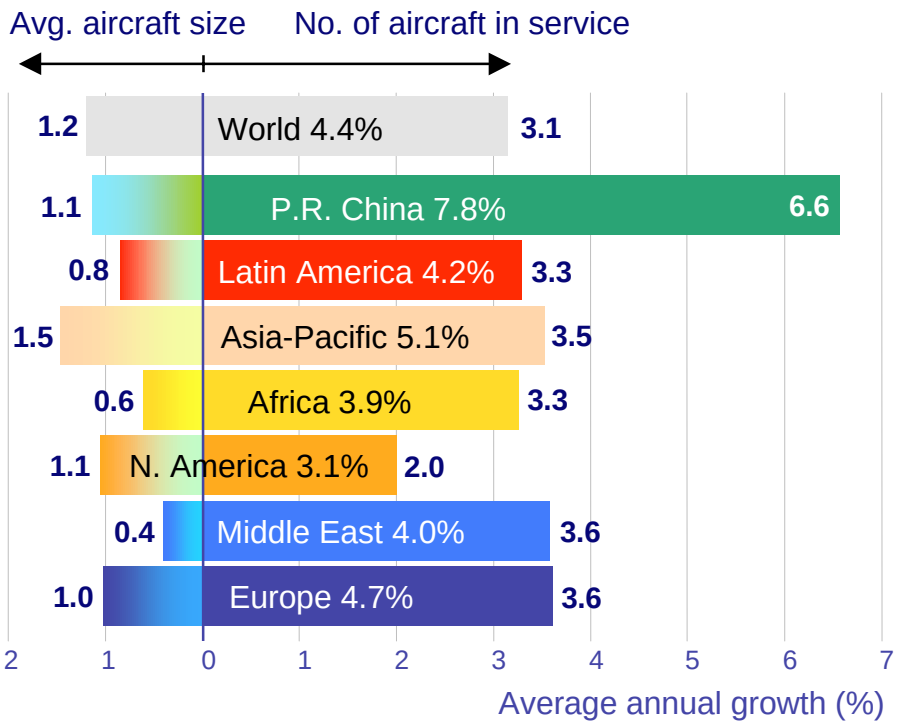
The number of passenger aircraft with 70 seats or more operated by the airlines covered by the GMF will increase to 17,920 at end 2017 from 9,677 at end 1997. This represents an average annual growth in fleet size of 3.1 per cent.

The world's fleet of jetliners will grow by 85 per cent



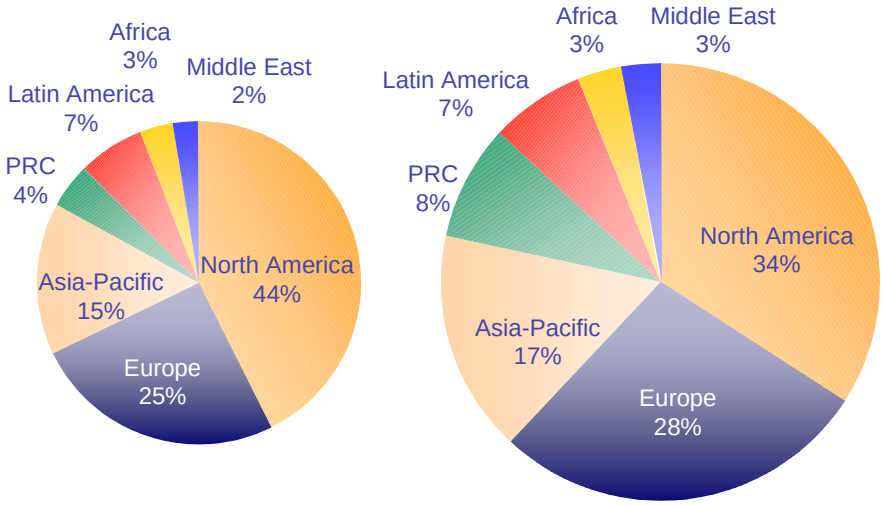
The highest rate of fleet growth is foreseen for the airlines of the PRC. Their total fleet will grow three-&-a-half times to 1,518 aircraft by end 2017 from its current level of 425. At the other extreme, the airlines of North America will grow their fleet by just under 50 per cent during the next twenty years to reach a total of 6,139 aircraft from 4,122 today. The fleets of the other regional airline groups will all roughly double during the forecast period, growing at average annual rates in the range from 3.3 to 3.6 per cent.

Fleet growth varies between regions



As a consequence, the share of the world jetliner fleet operated by the airlines of North America will decline to 34 per cent in 2017 from its current 44 per cent, while the combined fleet of the Asia-Pacific region plus the PRC will increase its share to 25 per cent from its current 19 per cent.

US and Canadian airlines' share of the world fleet will decline

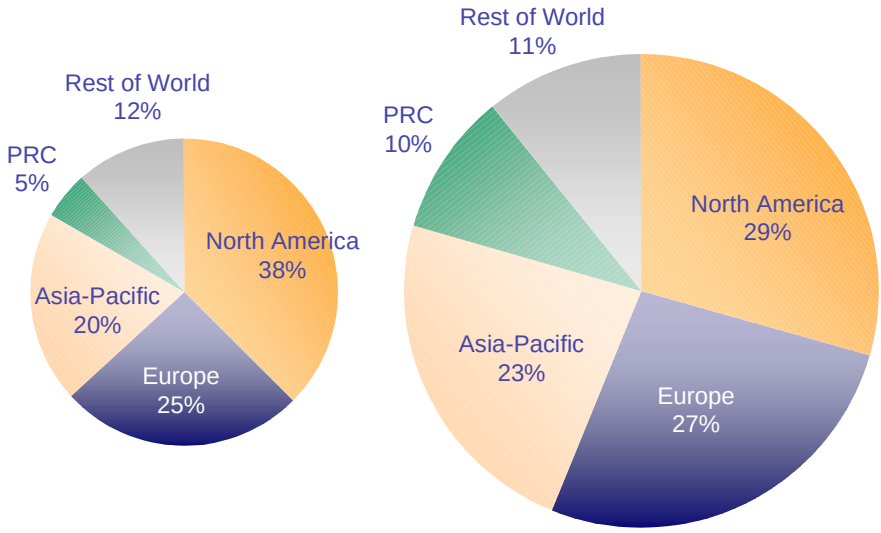


World total at end 1997
9,677 aircraft

World total at end 2017
17,920 aircraft

In fact, the relative decline in importance of the North American fleet during the next twenty years will be even greater because of the higher-than-average growth in the average size of aircraft operated by the Asia-Pacific airlines. In terms of seats, the Asian airlines (including those in the PRC) will overtake the airlines of Europe in 2000 and the airlines of North America in 2012 to become the world's largest regional group. Their share of total world seats will increase to 33 per cent from their current 25 per cent. At the same time the share of the North American airlines will drop to 29 per cent from 38 per cent today, and the share of the European airlines will grow slightly to 27 per cent from their current 25 per cent.

The airlines of Asia-Pacific and the PRC will become the world's largest group in terms of capacity



World total at end 1997
1.73 million seats

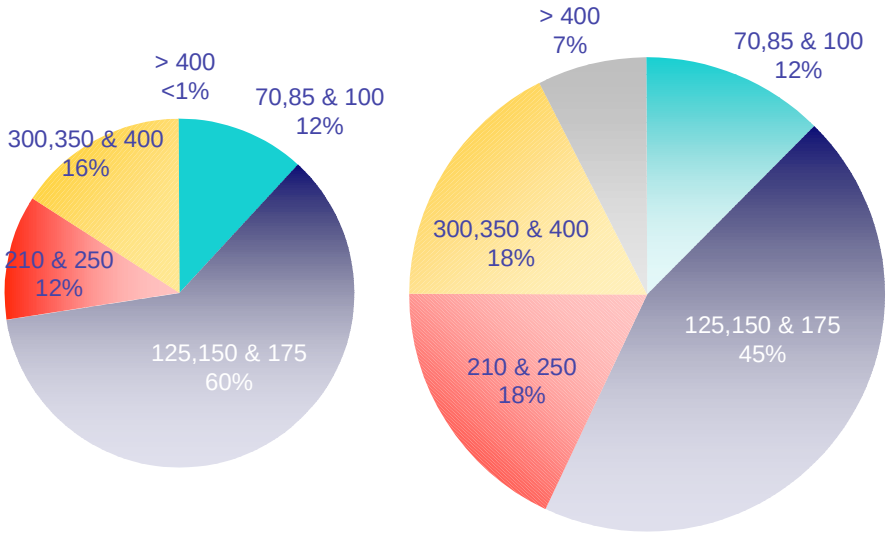
World total at end 2017
4.07 million seats

The increase in average aircraft size needed to accommodate traffic growth within an increasingly congested airport and air traffic system will result from a significant change in the composition of the world jetliner fleet. At end 1997, 72 per cent of the aircraft were single-aisle types (basically, aircraft in size categories below 210 seats) and 28 per cent were widebodies.

By 2017, the single-aisle proportion will have reduced to 57 per cent and the wide-body share will be up to 43 per cent.

In twenty years' time, aircraft in size categories above 400 seats will account for 7 per cent of the world fleet. By way of comparison, during the past ten years the proportion of the world fleet made up of 747s (with in-service seating capacities ranging up to 578 in high-density domestic and charter configurations) has stayed at a constant 8 per cent.

Widebodies will take a much larger share of the world fleet



World total at end 1997
9,677 aircraft

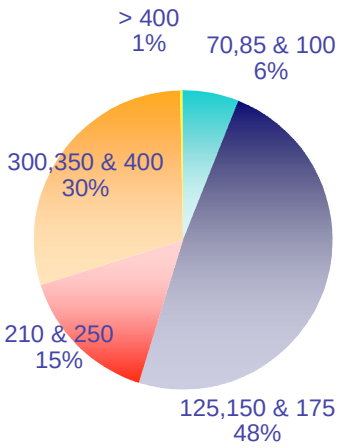
World total at end 2017
17,920 aircraft

The change in composition of the world fleet is even more striking when presented in terms of numbers of seats. At end 1997, 53 per cent of the seats operated by the airlines in the GMF were provided by single aisle aircraft, and 47 per cent by widebody types. By end 2017 the single-aisle capacity share will be down to 35 per cent, with widebodies providing 65 per cent of the seats.

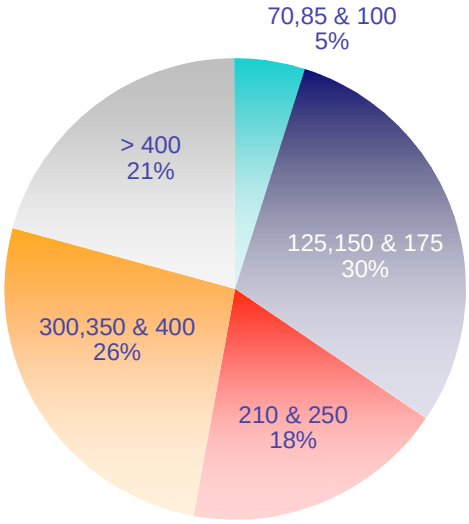
Among the aircraft size categories of the GMF, the most significant changes will be:

- The share of total fleet capacity provided by 125,150 & 175-seaters will drop to just 30 per cent from its current 48 per cent;
- The proportion of world fleet capacity provided by aircraft with more than 400 seats will increase to 21 per cent from just 1 per cent today.

By 2017 very large aircraft will provide more than 20 per cent of world fleet capacity



World total at end 1997
1.73 million seats



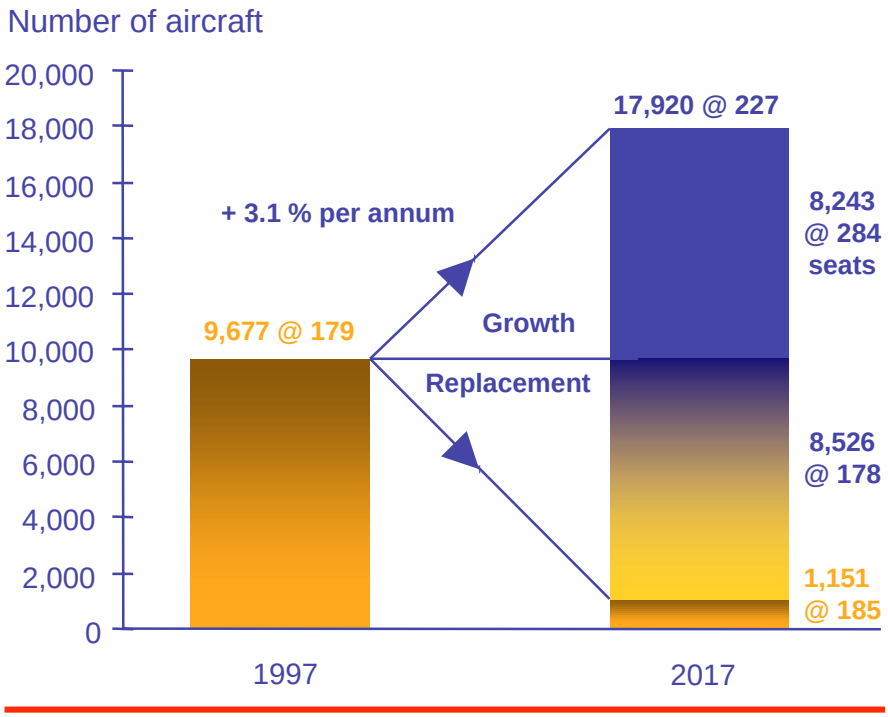
World total at end 2017
4.07 million seats

10. Demand for aircraft deliveries

The 8,243 aircraft acquired to accommodate traffic growth from end 1997 to end 2017 will have an average capacity of 284 seats. At the same time, 8,526 aircraft (88 per cent) of the currently active fleet will be either retired from passenger service or replaced with more modern aircraft, leaving 1,151 aircraft in service with the same operator at end 2016.

This means that during the next twenty years opportunities will develop to sell or place a total of 16,769 passenger aircraft with the GMF airlines. To provide the required 3,858,100 seats, these aircraft will have an average capacity of 230 seats.

Opportunities will arise to sell or place nearly 17,000 aircraft

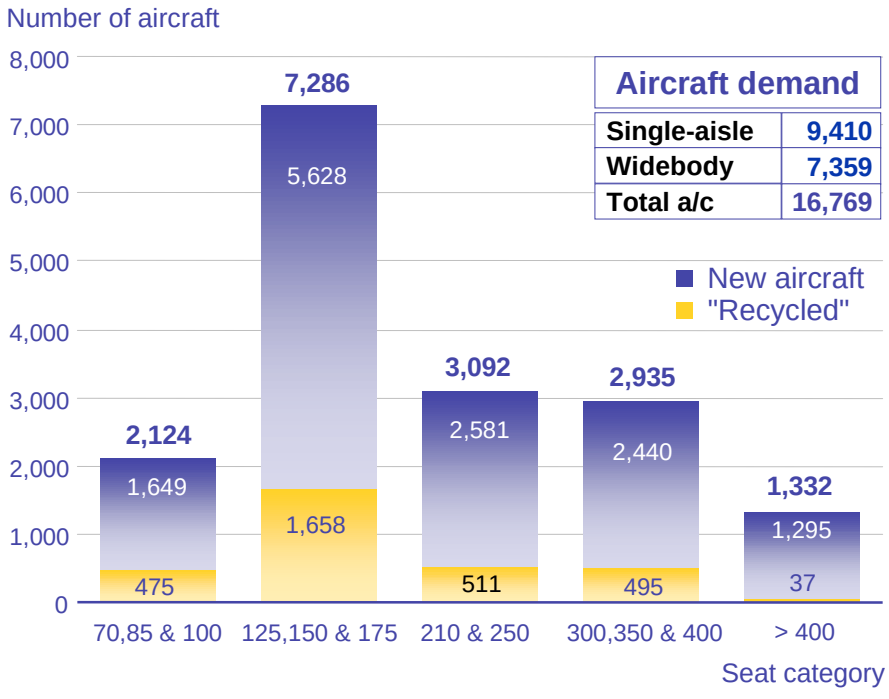


Of the new aircraft with at least 70 seats delivered to the airlines covered by the GMF from 1998 to 2017, 9,410 will be basically single-aisle aircraft in size categories below 210 seats (56 per cent) and 7,359 wide-bodies (44 per cent).

The forecast demand for 2,124 70, 85 & 100-seaters does not represent the total demand for aircraft in these size categories, because more will be needed by smaller airlines and current turboprop operators whose needs are not included in the GMF. In addition 7,286 aircraft will be needed in the 125, 150 & 175-seater categories, where the A320 family is currently the best seller.

The GMF predicts demand for 3,092 aircraft in the 210 & 250-seater categories, where the A300 and A310 have done so well and where Airbus is now beginning to sell the A321 and the A330-200, and for 2,935 aircraft in the 300, 350 & 400-seater categories of the A330-300 and A340.

Peak demand will be for aircraft in the category of the A320 family



As historical regulatory constraints on air transport are progressively removed, a relatively small number of high-yield passengers will drive the opening of new, premium non-stop services between distant cities, often involving very long flights over the ocean or other inhospitable terrain, which do not generate sufficient traffic to sustain an aircraft as large and costly as the 747.

To meet this need, airlines will acquire significant numbers of a new type of mid-sized aircraft able to fly substantially further than any aircraft in service today while offering the economy, integrity, autonomy and freedom from operational constraints conferred by four engines. In response, Airbus has launched the new A340-500/-600.

At the top end of the market, despite the very liberal assumptions made in the GMF regarding frequency development, Airbus continues to predict a substantial need for very large aircraft. The GMF predicts delivery through end 2017 of 1,332 aircraft in size categories above 400 seats, approximately the average size of the current 747-400.

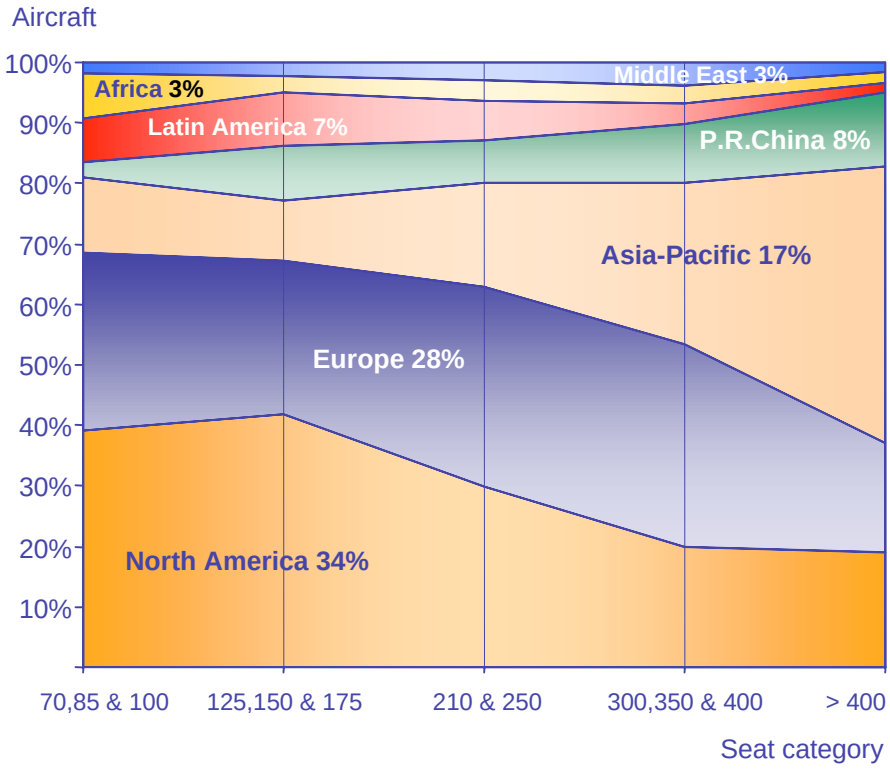
This is the market targeted by Airbus' all-new A3XX project. Technology has advanced significantly during the past thirty years. The 150-seater A320, for example, burns half as much fuel as the 1960s-vintage 150-seater trijet it has superseded. It is now possible to create an aircraft, compatible with the design of current airports, able to carry substantially more people than any aircraft now flying over greater distances and at significantly lower cost. Such an aircraft will be a vital element in the continuing development of the global air transport system during the next twenty years, when the average level of world RPKs will be nearly four times as high as during the period when the airlines have acquired nearly 1,300 of the world's current largest aircraft.

The airlines in North America will take 34 per cent of all aircraft of 70 seats or more delivered during the next twenty years. The airlines of Europe will take 28 per cent, and the airlines of Asia-Pacific and the PRC 25 per cent. This leaves just 13 per cent for airlines in Latin America, Africa and the Middle East.

The market for small aircraft will be largely in North America and Europe, where the airlines will take almost 70 per cent of 70,85 & 100-seater deliveries, compared with only 15 per cent for the airlines of Asia-Pacific and the PRC.

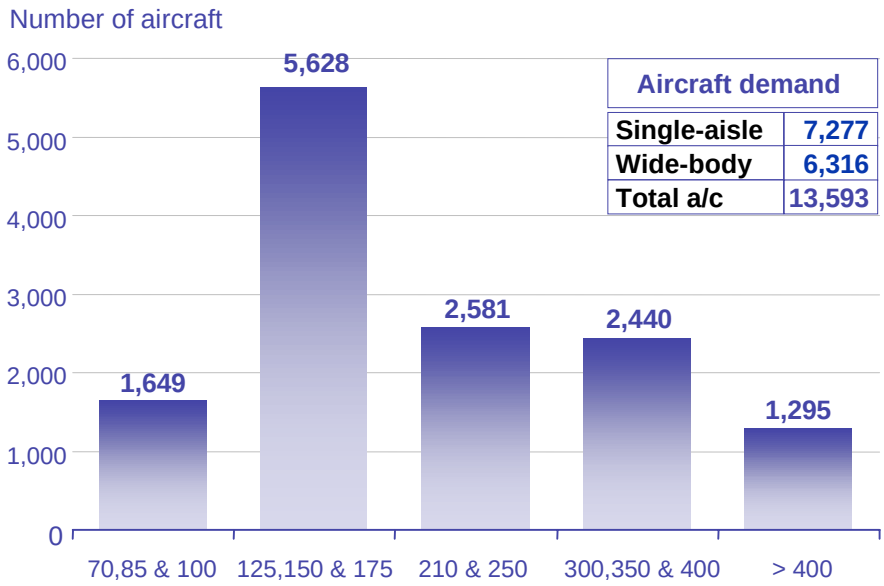
However the market for very large aircraft is largely driven by this latter group, which will alone take nearly 60 per cent of aircraft in size categories above 400 seats.

Most small aircraft will be needed in North America and Europe; most very large aircraft in Asia-Pacific and the PRC



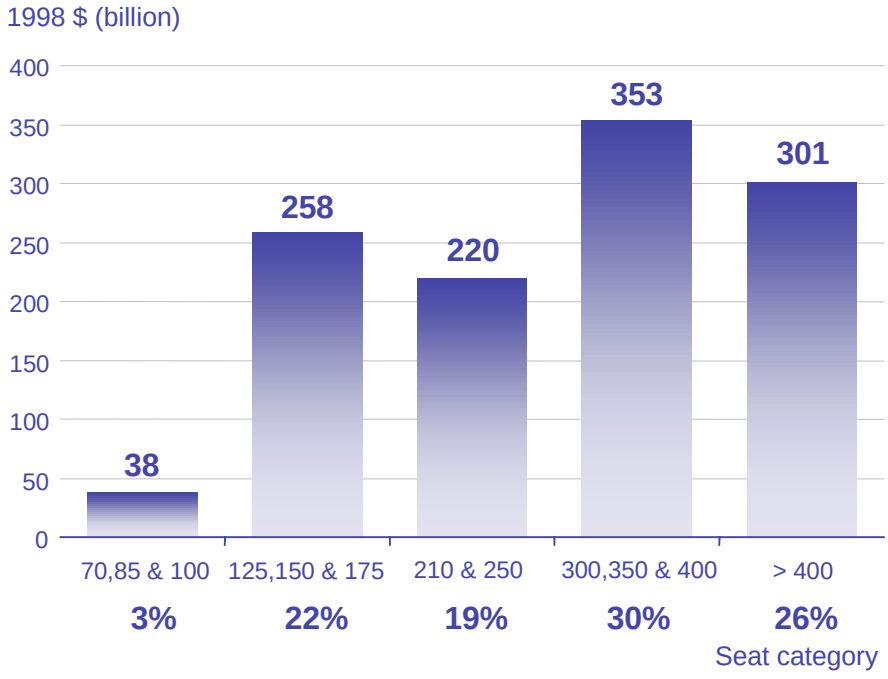
Airbus' analysis suggests that 3,176 of the forecast delivery opportunities will be satisfied by used aircraft being recycled back into the world passenger fleet after they have come off operating lease or been replaced by their previous operator. This leads to a forecast that during the period 1998 to 2017 the manufacturers can expect to deliver to the airlines covered by the GMF a total of 13,593 new aircraft with 70 seats or more.

New aircraft deliveries will average 680 per year



Based on the catalogue flyaway prices (1998 $) of current aircraft types, this business is worth a total of $1.17 trillion.

$1.2 trillion worth of new jetliners will be delivered



The greatest business volume is foreseen in the 300, 350 & 400-seater category of the A330-300 and A340, which will account for 30 per cent of the total. The 125, 150 & 175-seater categories will account for 22 per cent, and the 210 & 250-seater categories 19 per cent. At the bottom end, purchases of 70, 85 & 100-seaters by the airlines in the GMF will represent just three per cent of the total business volume; as stated elsewhere, this understates the total business potential of this segment.

Perhaps the outstanding aspect is the prediction that the very large aircraft category, currently subject to a supply monopoly, will account for 26 per cent of all dollars spent by the airlines on new aircraft during the next twenty years. This emphasises Airbus' determination to ensure that from early in the next decade the airlines have a choice of equipment in this important category.

The detailed results of the GMF by individual aircraft type (for aircraft already in service or on firm order) and generic size category (for additional deliveries) are shown in Appendix F.


Appendices
A300
A300

A. Geographical regions & airlines analysed

The GMF is the product of a "bottom-up" micro analysis that comprises 271 airlines with 28 subsidiaries (airlines for which either operations and/or fleets cannot be separated from their mother companies) in 7 geographical regions (see map in chapter 3).

Airlines that are selected for the GMF fulfill the following criteria (these criteria are evaluated for each region and for all airlines domiciled in that region):

- to cover 98% of the scheduled passenger operations;
- to operate (including announced orders) more than 5 jets above 50 seats;
- and to cover at least 95% of all jets operated.

90 European airlines with 13 subsidiaries *

ADR	Adria Airways	
AEA	Air Europa	
AEF	Aero Lloyd	
AEL	Air Europe SPA	
AFR	Air France	
AIH	Airtours	
AIZ	Arkia Israeli Airlines	
AMC	Air Malta	
AMM	Air 2000	
AOM	AOM French Airlines	
AON	Air One	
ARP	*L'Aeropostale*	*AFR*
AUA	Austrian Airlines	
AYC	*AVIACO*	*IBE*
AZA	Alitalia	
AZZ	Azure Air	
BAG	*Deutsche BA*	*BAW*
BAL	Britannia Airlines	
BAW	British Airways	
BCY	Cityjet	
BER	Air Berlin	
BMA	British Midland	
BRA	Braathens S.A.F.E.	
BZH	Brit Air	
CBR	City Bird	
CFG	Condor Flugdienst	
CIM	Cimber Air	
CKT	Caledonian Airways	
CLH	*Lufthansa Cityline*	*DLH*
CRL	Corsair	
CRX	Crossair	
CSA	Czech Airlines	
CTN	Croatia Airlines	
CYP	Cyprus Airways	
D3B	Debonair	
DAT	*Delta Air Transport*	*SAB*
DLA	Air Dolomiti	
DLH	Lufthansa	
DMA	Maersk Air	
ECA	Eurocypria	
EEZ	Eurofly SPA	
EIN	Aer Lingus	
ELY	El Al Israel Airlines	
EWG	Eurowings	
FCL	Flying Colours	
FIN	Finnair	
FUA	Futura International	
HLF	Hapag Lloyd	
IBE	IBERIA	
ICE	lcelandair	
ISS	Meridiana Spa	
IST	Istanbul Airlines	
ITF	*Air Inter Europe*	*AFR*
JAT	JAT	
JEA	Jersey European Airways	
KLM	KLM-Royal Dutch Airlines	
KYV	Kibris Turkish Airlines	
LAJ	British Mediterranean Airways	
LAZ	Balkan	
LDA	Lauda Air	
LEI	Leisure International Airways	
LFA	Air Alfa	
LGL	Luxair	
LIB	*Air Liberte*	*BAW*
LIL	Lithuanian Airlines	
LIT	Air Littoral	
LOT	LOT-Polish Airlines	
LTE	*LTE International*	*LTU*
LTS	*LTU Süd*	*LTU*
LTU	LTU International Airways	
MAH	MALEV	
MLD	Air Moldova	
MON	Monarch Airlines	
MPH	Martinair Holland	
NOV	*Avianova*	*AZA*
OAL	Olympic Airways	
OHY	Onur Air	
OLY	*Olympic Aviation*	*OAL*
PGA	Portugalia	
PGT	Pegasus Airlines	
RGI	Regional Airlines	
ROT	TAROM	
RYR	Ryanair	
SAB	SABENA	
SAS	SAS	
SCW	Malmo Aviation	
SEU	Star Europe	
SLR	Sobelair	
SPP	Spanair	
SWR	SWISSAIR	
SXS	Sun Express	
TAP	TAP Air Portugal	
TAT	*T.A.T.*	*BAW*
THY	Turkish Airlines	
TLE	Air Toulouse	
TRA	Transavia Airlines	
TSW	TEA Switzerland	
TYR	Tyrolean Airways	
UKA	Air UK	
VEX	*Virgin Express*	*VIR*
VIR	Virgin Atlantic	
VKG	Premiair	
WIF	Wideroe's Flyveselskap	

37 North American airlines with 8 subsidiaries

AAH	Aloha Airlines	
AAL	American Airlines	
ABL	*Air BC*	*ACA*
ACA	Air Canada	
AMT	American Trans Air	
ARN	*Air Nova*	*ACA*
ASA	Alaska Airlines	
ASE	*Atlantic Southeast*	*DAL*
ATL	*Air Atlantic*	*CDN*
AWE	America West Airlines	
AWI	*Air Wisconsin*	*UAL*
CDN	Canadian Airlines	
CLI	Air Club International	
CMM	Canada 3000 Airlines	
COA	Continental Airlines	
DAL	Delta Air Lines	
FAB	First Air	
FFT	Frontier	
HAL	Hawaiian Airlines	
JEX	Midway Airlines	
KIA	Kiwi International Airlines	
LBH	Laker Airways	
MEP	Midwest Express	
MTE	AirTran Airways	
NWA	Northwest Airlines	
QXE	*Horizon Air*	*ASA*
ROA	Reno Air	
ROY	Royal Airlines	
SCX	Sun Country Airlines	
SER	Aero California	
SSV	Skyservice	
SWA	Southwest Airlines	
SWG	Spirit Airlines	
TOW	Tower Air	
TRZ	Transmeridien	
TSC	Air Transat	
TWA	TWA	
UAL	United Airlines	
USA	US Airways	
USS	USAir Shuttle	USA
VGD	Vanguard Airlines	
VLJ	Valujet	MTE
WJW	Westjet Airlines	
WOA	World Airways	
WPZ	Western Pacific Airlines	

11 Middle East airlines

GFA	Gulf Air	MEA	MEA	SVA	Saudia
IRA	Iran Air	OAS	Oman Air	SYR	Syrian Arab Airlines
IYE	Yemenia Yemen Airways	QTR	Qatar Airways	UAE	Emirates
KAC	Kuwait Airways	RJA	Royal Jordanian		

20 airlines in the People's Republic of China with 1 subsidiary

C3K	*Swan Airlines*	*CBF*	CPA	Cathay Pacific Airways	CXJ	Xinjiang Airways
CBF	China Northern Airlines		CSC	Sichuan Airlines	CXN	China Southwest
CCA	Air China		CSH	Shanghai Airlines	CYH	China Yunnan Airlines
CES	China Eastern Airlines		CSN	China Southern Airlines	CYN	Zhongyuan Airlines
CHH	Hainan Airlines		CSZ	Shenzhen Airlines	HDA	Dragonair
CJG	Zhejiang Airlines		CWU	Wuhan Airlines	MUQ	Air Macau
CNW	China Northwest Airlines		CXA	Xiamen Airlines	S3D	Shandong Airlines

28 African airlines

AGN	Air Gabon	LAM	LAM Mozambique	RAM	Royal Air Maroc
AZW	Air Zimbabwe	MAU	Air Mauritius	RKA	Air Afrique
BLV	Bellview Airlines	MDG	Air Madagascar	SAA	South African Airways
BOP	Sun Air	MRT	Air Mauritanie	SEY	Air Seychelles
CAW	Comair	MSR	Egyptair	SUD	Sudan Airways
DAH	Air Algerie	N4A	Nationwide Air	TAR	Tunis Air
DTA	TAAG Angola Airlines	NGA	Nigeria Airways	TCV	Transp.Aereos de Cabo Verde
ETH	Ethiopian Airlines	NMB	Air Namibia	UYC	Cameroon Airlines
GHA	Ghana Airways	OKJ	Okada Air		
KQA	Kenya Airways	QNK	Kabo Air		

44 Asia-Pacific airlines with 3 subsidiaries

AAA	Ansett Australia	
AAR	Asiana Airlines	
AIC	Air India	
ALK	Air Lanka	
ANA	All Nippon Airways	
ANG	Air Niugini	
ANK	*Air Nippon*	*ANA*
ANZ	Air New Zealand	
BBC	Biman Bangladesh Airlines	
BOU	Bouraq Indonesia	
C3U	Cebu Pacific Air	
CAL	China Airlines	
EVA	EVA Airways	
FEA	Far Eastern Air Transport	
FJI	Air Pacific	
G4C	Great China Airlines	
GAP	Air Philippines	
GDI	Grandair	
GIA	Garuda Indonesia	
HVN	Vietnam Airlines	
IAC	Indian Airlines	
JAA	Japan Asia Airways	
JAC	Japan Air Commuter	
JAI	Jet Airways	
JAL	Japan AirLines	
JAS	Japan Air System	
JTA	Japan Transocean Air	
KAL	Korean Air	
MAS	Malaysia Airlines	
MDL	Mandala Airlines	
MKG	UNI Airways	
MNA	Merpati Nusantara	
MND	Mandarin Airlines	CAL
PAL	Philippine Airlines	
PIA	Pakistan International	
QFA	Qantas Airways	
RBA	Royal Brunei Airlines	
RNA	Royal Nepal Airlines	
RSO	Aero Asia	
SAH	Sahara India Airlines	
SIA	Singapore Airlines	
SLK	Silk Air	SIA
SSR	Sempati Air	
T3H	Air Tahiti	
THA	Thai Airways	
TNA	Trans Asia Airways	
ULN	U Land Airlines	

41 Latin American airlines with 1 subsidiary

A3G	Aerosur	
A3K	Aerolineas lnternacionales	
ACN	Aero Continente	
AES	ACES	
AJM	Air Jamaica	
ALM	ALM	
AMX	Aeromexico	
ARG	Aerolineas Argentinas	
ARU	Air Aruba	
AUT	Austral	
AVA	AVIANCA	
AVE	AVENSA	
BWA	BWIA International	
CHP	AVIACSA	
CMP	COPA	
CUB	CUBANA	
EEA	Ecuatoriana	
GUG	AVIATECA	
LAN	LAN-Chile	
LAV	Aeropostal	
LCO	Ladeco	
LLB	LAB	
LPR	LAPA	
LRC	LACSA	
MXA	*MEXICANA*	*AMX*
NCN	National Airlines	
NES	Nordeste	
PLI	Aeroperu	
PUA	PLUNA	
RDN	Dinar Lineas Aereas	
RPB	Aerorepublica	
RSL	Rio-Sul Servicos Aereos	
SAM	SAM	
SET	SAETA	
SVV	Servivensa	
TAE	TAME	
TAI	Taca International Airlines	
TAM	TAM	
TBA	Transbrasil	
TEJ	TAESA	
VRG	VARIG	
VSP	VASP	

*) Airlines in italics are treated as subsidiaries of the airlines of which the three-letter codes are given in the 3rd column.

The twenty-year average traffic growth rate is derived from year-over-year growth projections for 81 independently studied sub-markets (see Table). Such growth projections can differ significantly depending on the relative maturity and other characteristics of each sub-market, yet these are also among the more significant inputs required for the GMF. Hence, the availability of many sub-market forecasts improves the ability of the GMF to apply an appropriate rate of growth to the corresponding sub-markets served by each airline analysed.

Airbus Industrie, in conjunction with Aerospatiale, British Aerospace Airbus, Construcciones Aeronauticas and Daimler-Benz Aerospace Airbus, prepared the traffic forecasts during the fourth quarter of 1997. A review of the forecasts was conducted during the first quarter of 1998 to reflect emerging economic developments in Asia.

Traffic sub-market definitions have been preserved in an effort to maintain the year over year consistency and comparability of the GMF. The participation of new sponsors in the global traffic forecast, however, has made available numerous new traffic models from which only those of the highest quality have been selected for inclusion in the global traffic forecast. As a result, there are a few cases where the sub-market traffic growth rates vary significantly from the 1997 GMF.

The air travel environment continues to display significant long-term growth opportunities. This is largely driven by the continued integration and growth of the world and regional economies, further deregulation and liberalisation of international and domestic air transport sectors, and improvements in productivity.

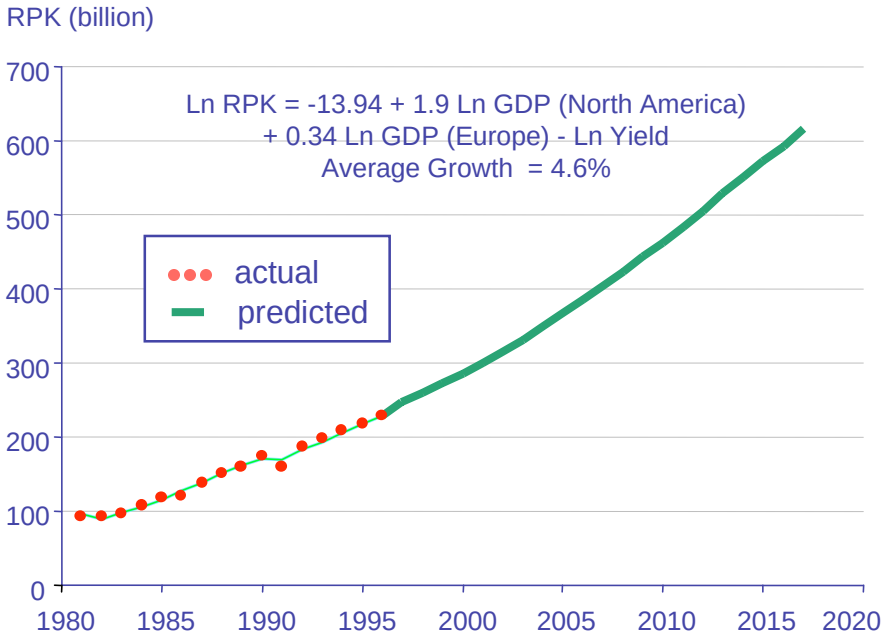
There are several causal relationships and factors that affect passenger traffic. The 1998 GMF is based on the assumption that the long-term demand for air travel is driven by economic developments, notably the growth of world and regional income levels as measured by changes

in real GDP and the cost of air travel as measured by yields. Demographic trends as measured by civilian populations have also been considered where this variable has demonstrated a statistical significance.

The traffic forecasting methodology adopted in the 1998 GMF is based on an econometric approach. The selection between linear or logarithmic functional forms, and the inclusion or omission of independent variables, follows testing and evaluation of all possible combinations. Generally, the statistical model that best fits historical traffic data is deemed to provide the best explanation of future trends unless otherwise suggested by analysis.

As an example, the following traffic model predicts average annual air traffic growth of 4.6% on transatlantic routes over the next twenty years. The model is a logarithmic function whereby the real GDP for North America and Europe as well as real yields are independent variables.

North Atlantic RPK forecast



The GMF assumes that the world political and general economic climates remain conducive to growth. No assumptions are made about possible alternative political and economic scenarios, beyond basic GDP growth as adjusted by experts to incorporate known developments such as the Asian currency crisis.

One of the challenges faced when preparing traffic forecasts for numerous sub-markets involves the limited availability of reliable and consistently prepared sources of historical traffic and yield data. The collection of data and the improvement of the traffic statistics database are a continual process at Airbus Industrie. The GMF draws on various data sources including those which are available from ICAO, IATA, the AEA, the AAPA, National Aviation Authorities, and International Tourism Agencies. While attempts are made to reconcile any material differences between the sources of data, only one source is used on any particular traffic sub-market. In a very few cases where no data are otherwise available for a particular traffic flow, data from the OAG with assumptions about load factors has been used to estimate actual traffic.

Historical and forecasted data relating to independent variables are drawn from expert and/or official sources including Standard & Poor's DRI, WEFA Group, and the IMF. Where yields have been included in forecasting models, projections have been made based on best judgements which were supported by analyses of the relative maturity of the particular sub-market as well as regulatory and other relevant trends.

Growth rates for 81 sub-markets

Sub-market	% of world RPK	Avg. annual growth (%) 1997 -2007	2007 -2017	1997 -2017
Domestic USA	22.67%	2.4	2.3	2.3
Europe - USA	10.86%	4.9	4.2	4.6
Asia - USA	6.26%	7.2	7.1	7.1
Intra Europe	5.55%	5.3	4.3	4.8
Europe - Asia	5.29%	6.8	6.0	6.4
Intra Asia	3.50%	7.1	5.7	6.4
Domestic Asia	2.87%	5.0	5.8	5.4
Domestic Europe	2.21%	4.9	5.1	5.0
Pacific - Asia	2.14%	6.4	5.7	6.0
USA - Central America	2.07%	5.0	4.6	4.8
Africa - Europe	1.88%	4.5	4.0	4.3
Domestic Japan	1.82%	2.8	3.2	3.0
Domestic P.R.China	1.56%	12.4	5.8	9.1
Central America - Europe	1.50%	7.3	5.5	6.4
Canada - Europe	1.48%	5.0	4.2	4.6
Europe - Middle East	1.47%	3.2	3.1	3.1
USA - Latin America	1.47%	4.6	4.4	4.5
Latin America - Europe	1.45%	5.1	5.1	5.1
Pacific - USA	1.15%	7.4	7.4	7.4
Domestic Latin America	1.14%	4.3	4.4	4.4
Domestic Pacific	1.03%	4.0	3.2	3.6
Europe - Pacific	0.94%	6.8	6.0	6.4
USA - Canada	0.93%	2.4	2.3	2.3
Europe - Indian Subc.	0.83%	6.8	6.0	6.4
Domestic Canada	0.81%	2.4	2.3	2.3
Canada - Asia	0.79%	8.6	8.0	8.3
Intra CIS	0.79%	6.1	4.5	5.3
CIS - Europe	0.74%	6.1	4.5	5.3
P.R.China - Asia	0.66%	9.5	6.7	8.1
Middle East - Indian Subc.	0.63%	5.6	4.4	5.0
Domestic Brazil	0.61%	5.9	6.3	6.1
Middle East - Asia	0.57%	4.7	4.0	4.3
Intra Middle East	0.49%	5.5	4.7	5.1
Domestic Indian Subc.	0.46%	5.4	5.1	5.3
Domestic Central America	0.45%	3.8	2.7	3.3
Indian Subc. - Asia	0.44%	7.1	5.7	6.4
Europe - P.R.China	0.37%	7.7	7.4	7.6
P.R.China - USA	0.33%	7.5	6.9	7.2
Domestic Africa	0.27%	4.0	4.0	4.0
Intra Pacific	0.26%	5.6	5.6	5.6
Domestic Middle East	0.26%	5.5	4.7	5.1
Intra Latin America	0.25%	4.6	4.6	4.6
Latin America - Asia	0.24%	5.7	4.5	5.1
Intra Africa	0.23%	4.0	4.0	4.0
Middle East - USA	0.21%	5.7	4.5	5.1

continued ...

Sub-market	% of world RPK	Avg. annual growth (%) 1997 -2007	2007 -2017	1997 -2017
Latin America - Central Amer.	0.20%	5.7	4.5	5.1
Africa - Asia	0.16%	5.1	3.6	4.3
Africa - USA	0.16%	5.2	4.4	4.8
Domestic CIS	0.15%	6.1	4.5	5.3
CIS - USA	0.15%	6.1	4.5	5.3
Africa - Middle East	0.13%	4.5	4.7	4.6
CIS - Asia	0.12%	6.1	4.5	5.3
Domestic Colombia	0.10%	5.6	6.3	6.0
Central America - Asia	0.09%	5.7	4.5	5.1
Africa - Pacific	0.08%	7.1	5.3	6.2
Middle East - Pacific	0.07%	4.7	5.0	4.9
Intra Central America	0.07%	5.7	4.5	5.1
Pacific - P.R.China	0.06%	9.4	7.0	8.2
CIS - Indian Subc.	0.06%	6.1	4.5	5.3
Central America - Canada	0.06%	5.0	4.6	4.8
CIS - Middle East	0.06%	6.1	4.5	5.3
Intra Indian Subc.	0.06%	7.2	4.5	5.8
Africa - Indian Subc.	0.06%	4.2	4.7	4.4
Latin America - Canada	0.05%	7.0	5.6	6.3
CIS - P.R.China	0.05%	6.1	4.5	5.3
Canada - P.R.China	0.05%	8.9	7.0	8.0
Latin America - Africa	0.04%	5.7	4.5	5.1
Canada - Middle East	0.03%	5.7	4.5	5.1
Latin America - Pacific	0.03%	6.0	5.3	5.6
CIS - Latin America	0.02%	6.1	4.5	5.3
Pacific - Indian Subc.	0.02%	5.7	4.5	5.1
CIS - Africa	0.02%	6.1	4.5	5.3
Latin America - Middle East	0.01%	5.7	4.5	5.1
Middle East - P.R.China	0.01%	4.7	4.0	4.3
CIS - Central America	0.01%	6.1	4.5	5.3
Canada - CIS	<0.01%	6.1	4.5	5.3
P.R.China - Indian Subc.	<0.01%	7.1	5.7	6.4
Africa - P.R.China	<0.01%	7.1	5.3	6.2
Central America - Africa	<0.01%	5.7	4.5	5.1
Canada - Pacific	<0.01%	7.4	7.4	7.4
Charter	~6.00%	6.1	4.0	5.
Total world		**5.3**	**4.8**	**5.0**

C. Frequency vs size analysis

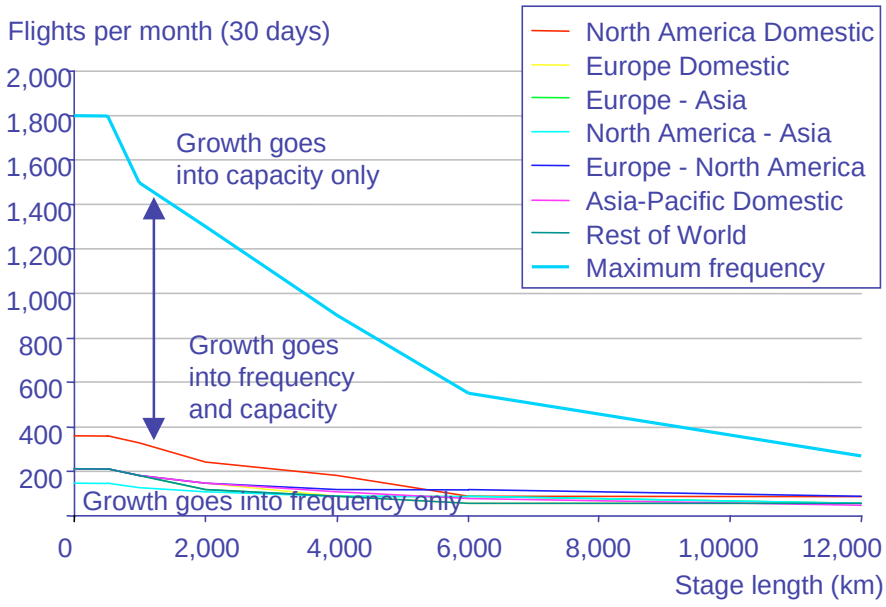
The base status of the world passenger operations is derived from the September 1997 Official Airline Guide flight schedules. For those charter airlines that do not have their flight plans in the OAG, a quasi-schedule is made up from other sources (reported operations and ASKs, average flight time and utilisation of their aircraft, etc.)

Each airline's future seat requirements are projected as a function of traffic growth and load factor development. Projections are applied to all individual sectors served by an airline in order to derive the total seat requirement as well as the ideal capacity to be offered on that sector at any point in the future.

A model for flight frequency/capacity development defines for all regional sub-markets the minimum and maximum frequency levels. These are a function of distance, reflecting journey time, departure and/or arrival time preferences, etc…To a certain extent the impact of new route development is also simulated in the model.

The entry frequency is the service level of ALL airlines operating that sector, but capacities are starting from the current equipment of the individual airline.

Frequency thresholds



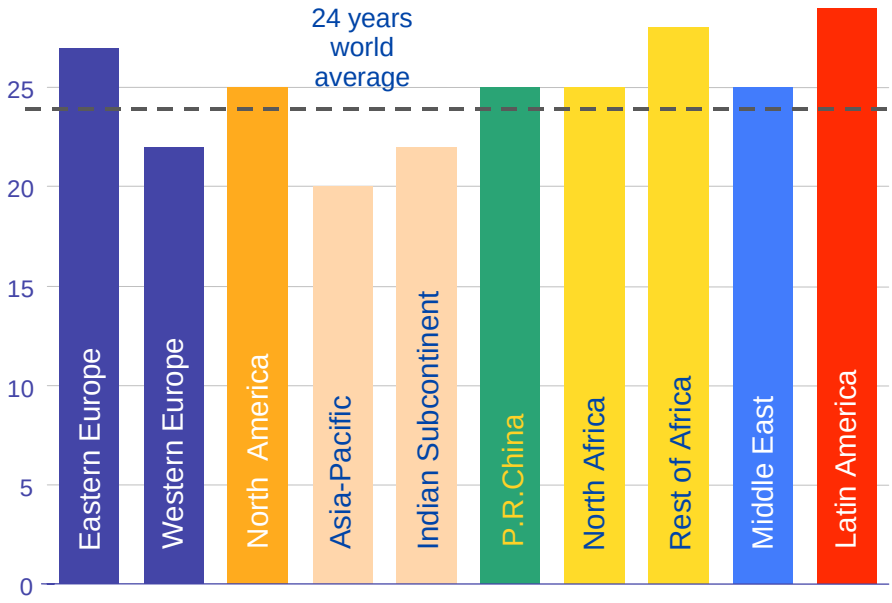
As long as the minimum frequency level is not reached only the frequency is increased, keeping the same capacity. After, both frequency and capacity will equally be increased until the maximum desirable frequency is reached. From that moment on, all the required growth in seats offered will be satisfied by an increase in capacity. In just three cases the 1997 frequency is already over maximum level. This frequency is not reduced.

Each individual airline competing on the same sector will follow the same pattern, so that market share will not change throughout the forecast period.

D. Aircraft replacement methodology

Aircraft replacements are treated on an airline-by-airline basis, starting from a regional default value that is based on historical behaviour. The base status of the airline fleets is Airclaims data, corrected as necessary and adjusted to the end 1997 fleet and order book. Aircraft over the default age, but reported as still in active service in that airline, are at least kept for the first study year (1997). Announced plans for replacement are taken into account. This includes, for the first time in a GMF, announced cancellation of lease contracts.

Default age for aircraft replacement



When the ideal future fleet is reconciled with the projected replacement pattern of the current fleet and the announced order backlog it may be necessary to introduce slight changes to the replacement in order to smooth out the fleet build-up.

All aircraft leaving service in any airline before having reached an age of 28 years are totalled in their age category. A major number of them will be retained inside the GMF airline population for release or secondhand

sales, but not necessarily in the same airline (in case of a lease contract) or not even in the same geographical region.

Summary results refer to these aircraft as “recycled” as they will satisfy part of the new delivery requirements. They are deducted from the totals in their size category to determine the requirement for newly-built aircraft only.

This analysis cannot be done for the geographical regions and even less for an individual airline.

E. Market segmentation

Aircraft requirements are calculated in predetermined market segments: “neutral” categories.

The GMF covers only passenger and combi jet aircraft of 70 seats and above, but operations with regional jets and bigger turboprops are included when necessary since they may grow into a need for a 70 seater or above aircraft at the end of the forecast period.

Individual airline fleet plans may show any of the 15 neutral size categories; final results are consolidated into five groups:

- 70, 85 & 100 seats
- 125, 150 & 175 seats
- 210 & 250 seats
- 300, 350 & 400 seats
- Larger than 400 seats
  (500, 600, 800 and 1000 seats).

The smallest group does not pretend to measure total demand for small jetliners, since many are likely to be needed by airlines not covered by the GMF.

The neutral size categories have been chosen to reflect current major size categories as well as future projects.

Today’s seats offered by an airline on a sector (i.e. the seating capacity in the actual aircraft configuration and comfort level multiplied by the frequency) define the starting point. Traffic growth results in the need for a certain number of seats to be offered at a given point in time of the forecast period and the frequency/capacity model (see Appendix C) translates these into the ideal seating capacity for that future service, usually somewhere in between two neutral size categories.

At this level both aircraft types will be employed to serve the sector, each of them with a frequency that makes the total frequency and the total seats offered equal to the ideal requirement.

Comparing the total block hours required to serve that sector with a utilisation model (a function of block time, adapted to the individual airline) allows to calculate the fractional number of aircraft required to serve that sector in the forecast year.

It should be kept in mind that whenever the need for e.g. a 350-seater appears in the fleet, this requirement may initially have been created by an ideal fit of anything between 301 and 399 seats, keeping the same configuration and comfort levels as today applied in that airline.

All sectors are totalled each year for each airline to give an ideal 20-year fleet plan that only shows neutral size categories. The ideal future fleet composition (see Appendix E) is reconciled with the actual (1997) fleet and its projected service life (taking into account retirements and replacements). This leaves the “open market” in each of the neutral size categories.

Marginal neutral categories (either the very small aircraft numbers or showing a requirement only over a short time period) may be eliminated and once a new neutral type is introduced into the future fleet, it will be kept at reasonably constant or increasing numbers throughout the forecast period.

This process enables Airbus Industrie to target future business opportunities with each airline in each aircraft size category. The total demand projected in the GMF is the sum of the individual requirements of the 271 airlines covered, including the recycled aircraft.

F. Results by aircraft size category

The ideal future fleet composition (see Appendix E) is reconciled with the actual (1997) fleet and its projected service life (taking into account retirements and replacements). This leaves the “open market” in each of the neutral size categories.

Marginal neutral categories (showing either very small numbers of aircraft or a requirement over only a short time period) may be eliminated, and once a new neutral type is introduced into the future fleet it will be kept at reasonably constant or increasing numbers throughout the forecast period.

This process enables Airbus Industrie to target future business opportunities with each airline in each aircraft size category. The total demand projected in the GMF is the sum of the individual requirements of the 271 airlines covered, including the recycled aircraft.

At end 1997, of the 16,769 aircraft to be delivered during the forecast period, 2,704 were already on firm order by GMF airlines and leasing companies.

This leaves an “open market” opportunity for delivery during the next twenty years of 14,065 yet-to-be-ordered aircraft.

The following tables give a detailed breakdown of deliveries by individual aircraft type (for those in the end 1997 firm order backlog) and generic size category (for those still to be ordered).

Single-aisle aircraft

Aircraft type	1997 in service	2017	Replacements	Deliveries
70,85 & 100		**1,911**		**1,911**
Avro 70	15		15	
Avro 85	39	49	18	28
F28	84		84	
Tu-134	21		21	
Avro 100	32	29	16	13
BAC1-11	51		51	
F70	29	4	25	
717		50		50
737-100	13		13	
737-600		122		122
BAe 146	120	4	116	
Concorde	13		13	
DC-9	63		63	
DC-9-30	419		419	
F100	247	69	178	
125,150 & 175		**5,585**		**5,585**
737-200	776		776	
737-300	953	261	782	90
737-500	327	110	246	29
A319-100	65	365	5	305
DC-9-40	25		25	
DC-9-50	92		92	
MD-80	738	4	734	
MD-80-83	210	27	193	10
Yak-42	7	3	4	
707	6		6	
727	655		655	
737-400	410	79	372	41
737-700	3	291		288
737-800		299		299
A320-100	18		18	
A320-200	572	422	447	297
MD-80-88	145	22	123	
MD-90	62	100	30	68
Tu-154	56	1	55	
737-900		10		10
757-200	667	234	543	110
757-300		14		14
A321-100	64	53	55	44
A321-200	11	107		96
IL-62	9	3	6	
Open Market				**7,496**
Backlog				1,914
Total SA	**7,017**	**10,228**	**6,199**	**9,410**

Widebody aircraft

Aircraft type	1997 in service	2017	Replacements	Deliveries
210 & 250		**2,945**		**2,945**
767-200	122		122	
767-200ER	100	10	90	
A310-200	44		44	
A310-300	122	18	111	7
767-300	92	20	82	10
767-300ER	327	136	256	65
767-400ER		56		56
A300	139		139	
A300-600	48		48	
A300-600R	123	28	103	8
A340-200	21	4	18	1
300,350 & 400		**2,292**		**2,292**
747SP	21		21	
777-200A	57	41	33	17
777-20IGW	47	223	13	189
A330-200		82		82
A340-300	99	104	63	68
DC-10	224		224	
L1011	114		114	
MD-11	123	39	87	3
747-200	221		221	
747-300	72		72	
A330-300	64	87	57	80
IL-86	2		2	
MD-11ER	5		5	
747-100	76		76	
747-400	388	213	317	142
777-300		54		54
A340-600		8		8
> 400		**1,332**		**1,332**
747SR	9		9	
Open Market				**6,569**
Backlog				790
Total WB	**2,660**	**7,692**	**2,327**	**7,359**

Total

Aircraft type	1,997 in service	2,017	Replacements	Deliveries
Open Market				**14,658**
Backlog				2,704
Aircraft	**9,677**	**17,920**	**8,526**	**16,769**