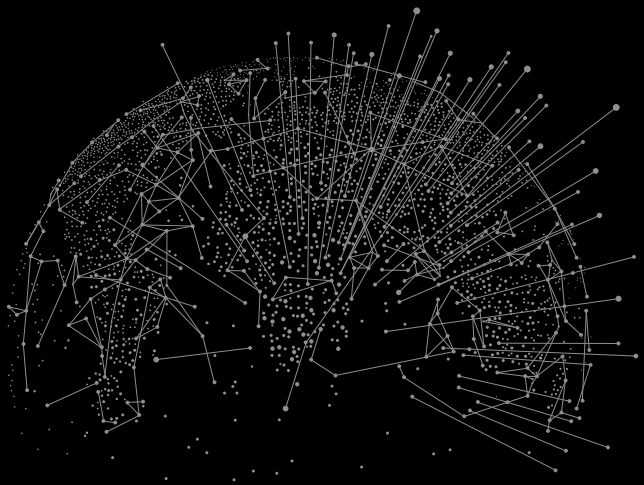
Global Market Forecast

Mapping Demand

2016 / 2035



AIRBUS

Introduction

As long as 2000 years ago, the Romans mapped their world showing towns, cities and the transportation links between them.
They understood that efficiently connecting their population centres meant that a higher level of society and wealth creation was possible. They also understood the need to communicate this graphically for people to access and use the knowledge they contained.

Today, in aviation and in the GMF we still use maps, in all their forms, to find our way and to communicate knowledge. What is also as true today as it was 2000 years ago is that major cities need and benefit from the enhanced connectivity good transportation links bring.
In those days all roads pretty much did lead to Rome. Today, it is aviation that links world's major urban centres and in particular the aviation mega-cities who benefit from the connectivity aviation delivers. It is these benefits that also make aviation resilient to the perturbations our industry sometimes faces.

We hope that you find the 2016 Global Market Forecast informative and useful.
We seek to improve our analyses continually, and your questions, challenges and suggestions help us advance towards that goal.
Don't forget you can download our App in several formats from tablet to smartphone. It complements the forecast and includes our thoughts in an interactive format.

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ROME
Port-d'Auguste
Ostie
Ardée
MER
INFÉRIEURE

01 Executive summary

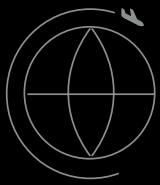

Check - In
20 to 1
Exit
TAXI
P
metro

- Strong and **resilient** passenger traffic growth
- **Air traffic** (RPK) **doubles** every **15 years**
- As air transport develops, **new drivers** become more significant
- Demand for 33,070 new aircraft by 2035: **~32,430** passenger aircraft and **650** freighters
- **40%** of passenger aircraft demand needed for **replacement**, and **60% for growth**
- Single-aisle represent 71% of units, and wide-bodies represent 54% of value
- VLA demand largely concentrated on **Aviation Mega-Cities** and network efficiencies will facilitate new VLA destinations

Passenger fleet
2015
18,020
2035
37,710
+19,690

Freighter fleet
2015
1,560
2035
2,110
+ 550

Demand for
33,070
New pax & Freight aircraft



2016-2035
Traffic
& pax fleet
x2

Passenger traffic growth next 20 years
4.5% CAGR

Freight traffic growth
4.0% CAGR

Passenger deliveries (> 100 seats)
2016 - 2035
32,425

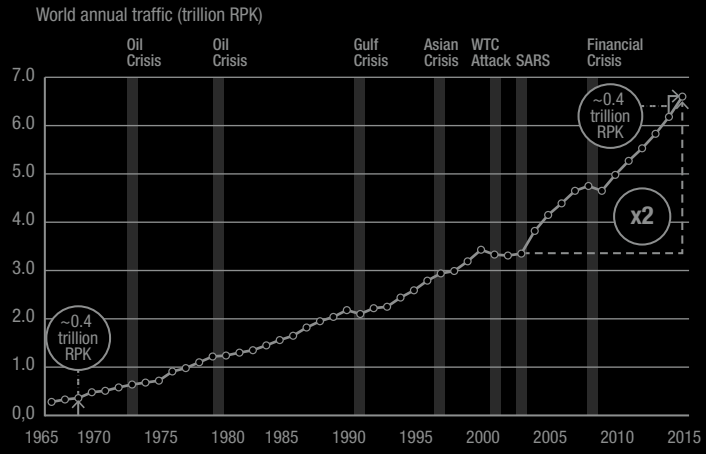
New freighters
2016 - 2035
645

Passenger & New freighter deliveries
2016 - 2035
33,070

Value of Demand
$5.2trillion
New pax & Freight aircraft

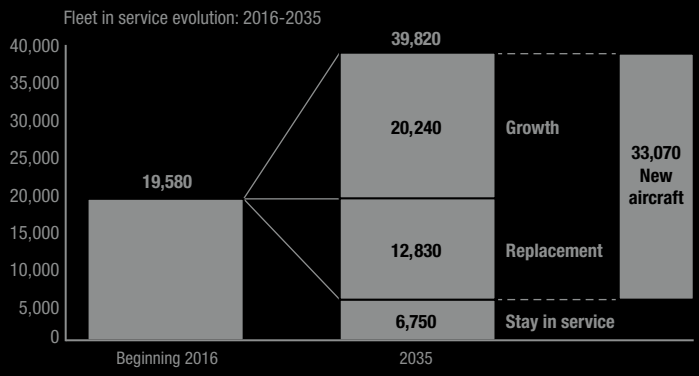
AIR TRAVEL HAS PROVED TO BE RESILIENT TO EXTERNAL SHOCKS

Source: ICAO, Airbus GMF 2016
RPK = Revenue Passenger Kilometer



DEMAND FOR SOME 33,000 NEW PASSENGER AND FREIGHTER AIRCRAFT

Source: Airbus GMF 2016
Note: Passenger aircraft ≥100 seats, Freighter aircraft ≥10 tonnes

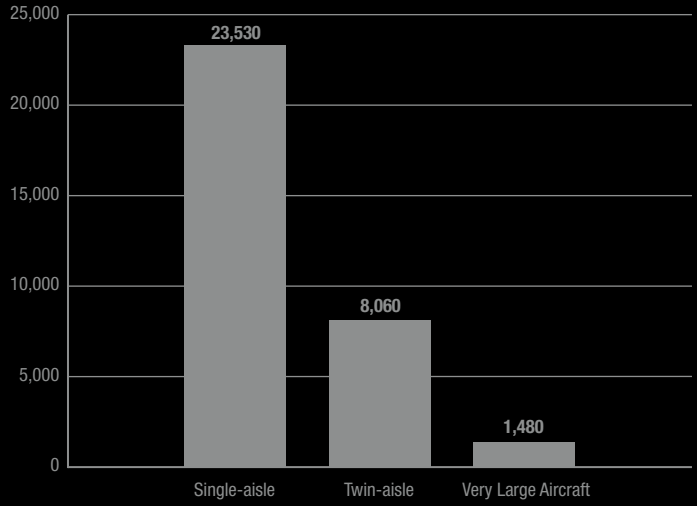


New Deliveries

33,070

GMF
2016-2035

20-year new deliveries of passenger and freighter aircraft



% units	71%	24%	5%
% value	46%	43%	11%

SINGLE-AISLE: 71% OF UNIT; WIDE-BODIES: 54% OF VALUE

Passenger aircraft (≥ 100 seats) and jet freight aircraft (≥10 tonnes)
Source: Airbus GMF 2016

	2016 2025	2026 2035	2016 2035	SHARE OF 2016-2035 NEW DELIVERIES
AFRICA	447	544	991	3%
ASIA-PACIFIC	5,157	8,082	13,239	40%
CIS	448	753	1,201	3%
EUROPE	3,108	3,400	6,508	20%
LATIN AMERICA	1,319	1,226	2,545	8%
MIDDLE EAST	1,170	1,195	2,365	7%
NORTH AMERICA	2,381	3,198	5,579	17%
FREIGHTERS	364	282	646	2%
WORLD	14,394	18,680	33,074	100%

NEW AIRCRAFT DEMAND PASSENGER AND FREIGHTERS

DEMAND FOR MORE THAN 33,000 NEW AICRAFT

Passenger aircraft (≥ 100 seats) and jet freight aircraft (≥10 tonnes)

02

Demand for air travel

DRIVERS FOR AIR TRANSPORTATION GO BEYOND GDP

- Whilst **GDP remains an important driver** for air transport, its relationship to aviation's growth has evolved over time. This is apparent at a global level, but is driven by activity at a regional or country level, for example we have seen a strong move away from GDP in the US domestic market in the last year where **yield has played a more significant role.** It is clear that GDP is not the only factor that drives air traffic growth, in fact in our traffic forecasting, **Airbus uses as many as 15 different explanatory variables.**
- From the the word cloud in this chapter you can see many of these different variables, with their size representing the number of times they have been used across the more than 100 traffic flows modelled in the Airbus traffic forecast.
- **Private consumption**, a component of GDP, **is becoming more significant**, with this variable even replacing GDP in our model for the Chinese and Indian domestic markets this year. Working age population is also becoming a more significant driver.
- Other factors include:
  - **Urbanisation**, which helps to drive wealth, including private consumption.
  - The **Growing middle classes**, particularly in developing aviation markets.
  - **Liberalisation**, either through bi-lateral agreements, agreements across trading blocks e.g. ASEAN.
  - **Immigration procedure simplification**, extension of visa waver programmes, visa simplification, for example recent agreements between China and the US and Australia.
  - **Tourism**, according to the WTTC (World Travel & Tourism Council). Recent years have seen Travel & Tourism growing at a faster rate than both the wider economy and other significant sectors such as automotive, financial services and health care. Last year was no exception. International tourist arrivals reached nearly 1.14 billion and visitor spending more than matched that growth. Visitors from emerging economies now represent a 46% share of these international arrivals (up from 38% in 2000), proving the growth and increased opportunities for travel by the people in these new markets. The World Tourism Organisation forecasts that global tourism arrivals will reach 1.6 billion by 2020.
  - **Airline business models**, with greater liberalisation and tourism, opportunity for airlines will grow, including for the Low Cost Airlines, offering low fare service quickly when new opportunities present themselves.

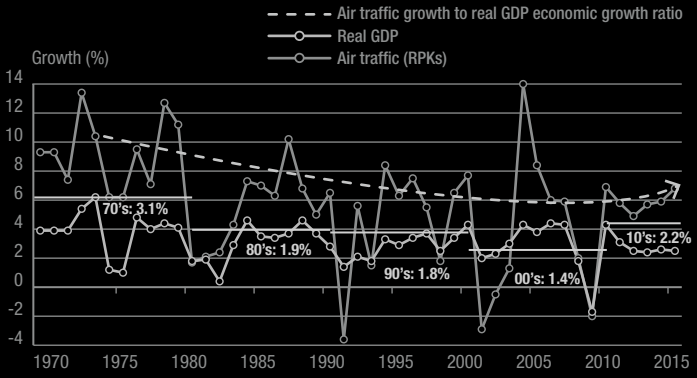
2015 results

Real GDP
+ 2.5%

Air traffic
+ 6.8%

THE RELATIONSHIP BETWEEN PASSENGER TRAFFIC AND GDP EVOLVES OVER TIME

Source: ICAO, IHS Economics, Airbus



PASSENGER TRAFFIC AND ECONOMIC GROWTH APPEAR LESS CORRELATED IN SOME MARKETS

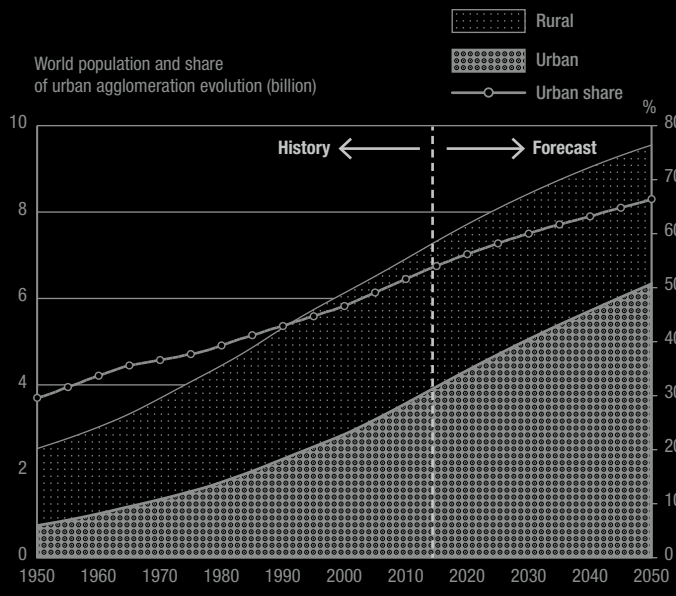
Source: IHS Economics, US Bureau of Transportation Statistics, Airbus

*Revenue Passenger Kilometers

TRAFFIC VARIABLE WORD CLOUD

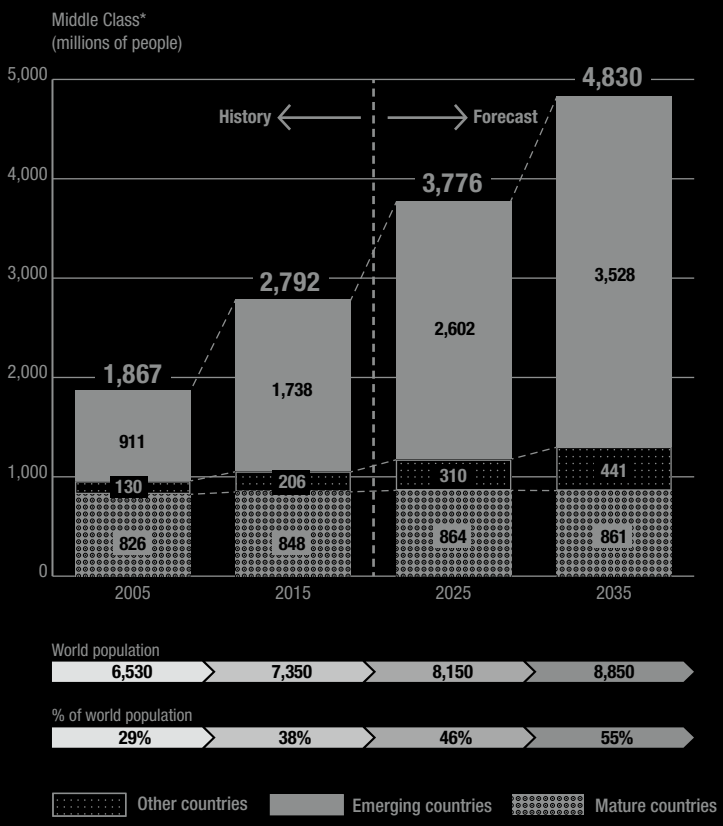
MORE THAN TWO THIRDS OF THE WORLD'S POPULATION WILL BE URBAN IN 2050

Source: UN Population Division, Airbus



MIDDLE CLASS* TO ALMOST DOUBLE OVER THE NEXT 20 YEARS

*Households with yearly income between $20,000 and $150,000 at PPP in constant 2015 prices
Sources: Oxford Economics, Airbus

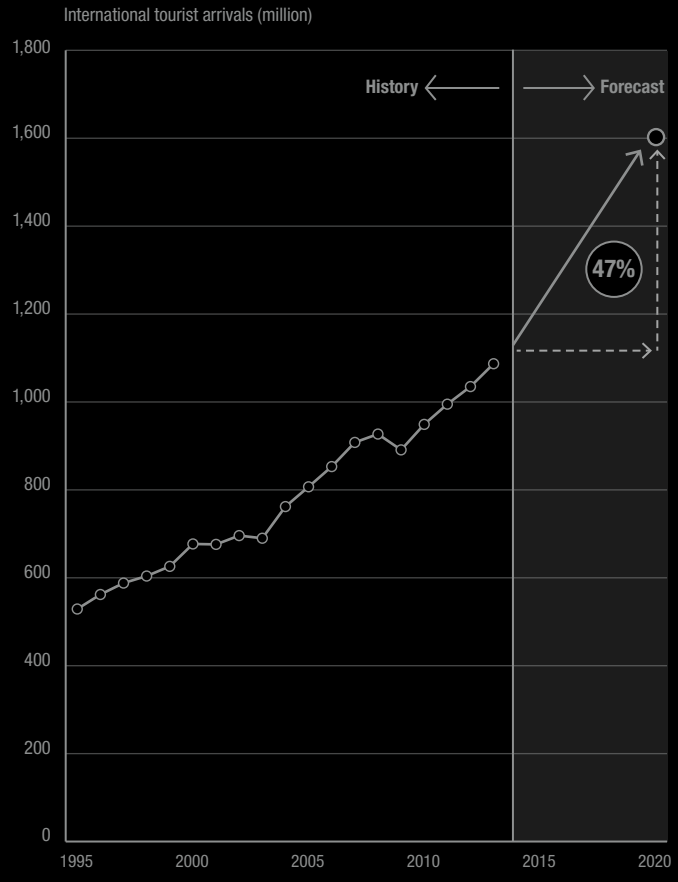


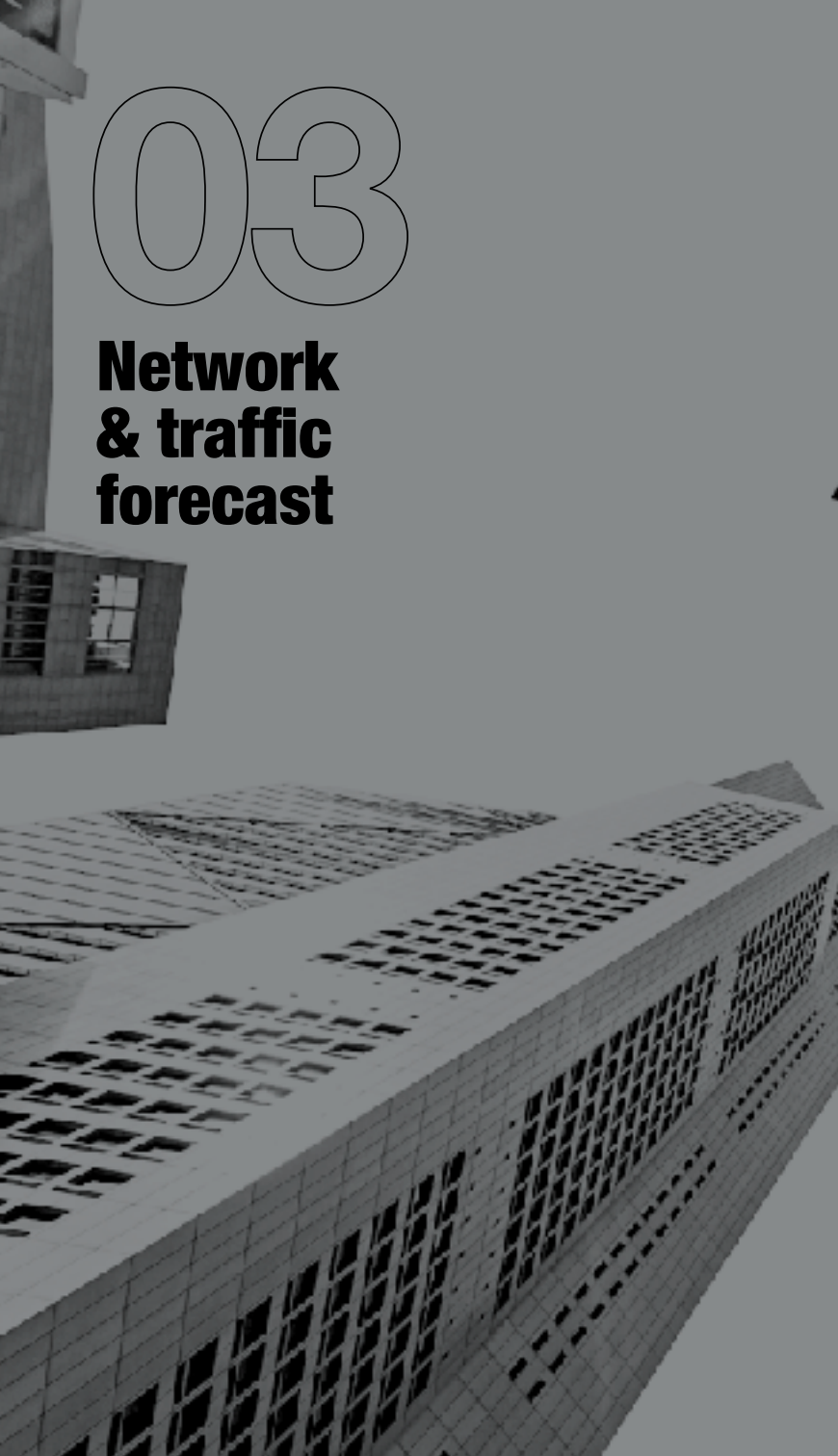
INTERNATIONAL TOURIST ARRIVALS EXPECTED TO REACH 1.6 BILLION PEOPLE BY 2020

Source: World Tourism Organisation, Airbus

1.6

billion tourists arrivals expected by 2020





03

Network & traffic forecast

PASSENGER TRAFFIC TO CONTINUE TO GROW

- Air traffic experienced its highest growth over the last five years in 2015, with a **6.8% increase in Revenue Passengers Kilometres** (RPKs) as compared to 2014, according to ICAO figures, which were preliminary at the time of writing.
- This represents **an impressive 3.5 billion passengers carried by air in 2015.**
- **Air passengers have benefited from lower oil prices** recently, with airlines able to choose between stimulating the market through lower yields and therefore ticket prices and increasing margins.
- **Air traffic continues to prove its resilience** to slow economic growth by outperforming global GDP, demonstrating the world's appreciation of the benefits aviation brings.
- This resilience can also be seen through our long-term traffic forecast models, where **we see some positive evolution in traffic drivers,** as explained previously.
- For the next 20 years, the **Airbus GMF forecasts a 4.5% global annual air traffic growth.** In our forecast the first decade will enjoy a 5.0% increase per year, with 4.1% average annual growth for the last decade, a lower figure but growth in those years based, on absolute traffic numbers, higher than today.
- Our GMF 2000 forecast continues to track the long term trend, and our latest forecast, despite significant market perturbations in the years following its production.

Air transport is a growth market

Almost
60%
growth over the last ten years

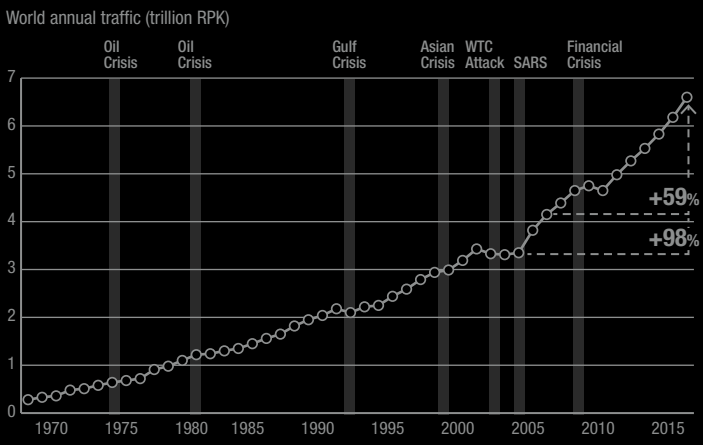
Almost double since 2001

GMF long term validity

GMF 2000
long term forecast is still in line with our latest forecast

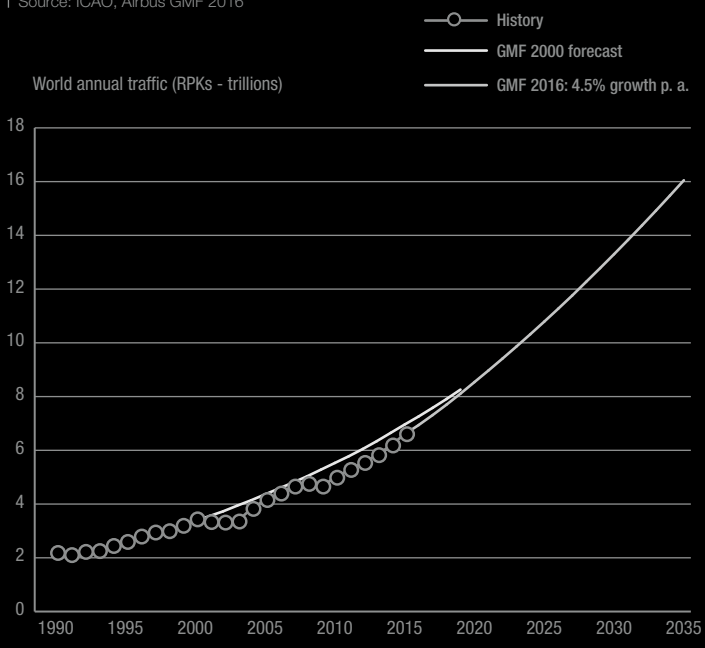
AIR TRAVEL HAS PROVED TO BE RESILIENT TO EXTERNAL SHOCKS

Source: ICAO, Airbus GMF 2016
RPK = Revenue Passenger Kilometer



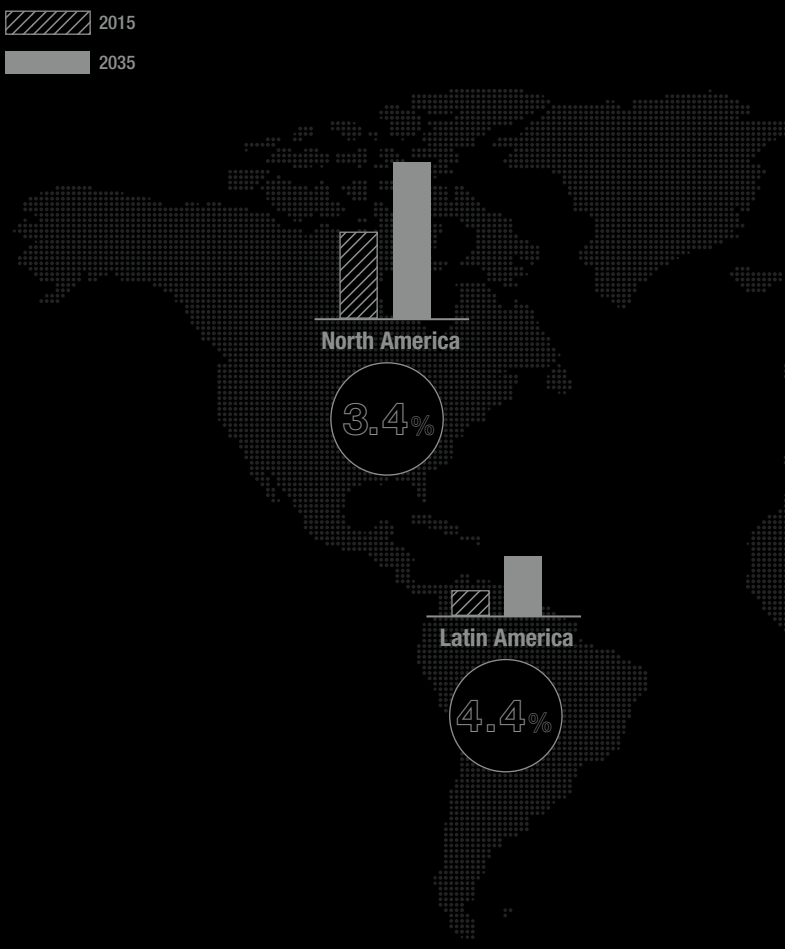
AIRBUS GMF PREDICTING LONG TERM DEMAND

Source: ICAO, Airbus GMF 2016



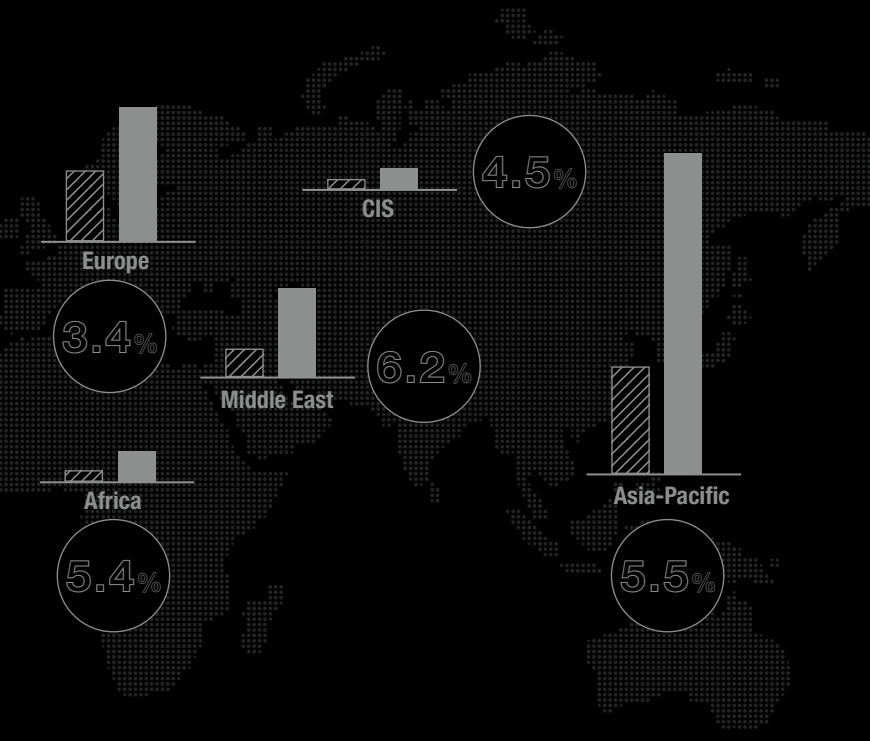
ASIAN TRAFFIC SET TO GROW STRONGLY

Billion RPK (legs)
RPK = Revenue Passenger Kilometer

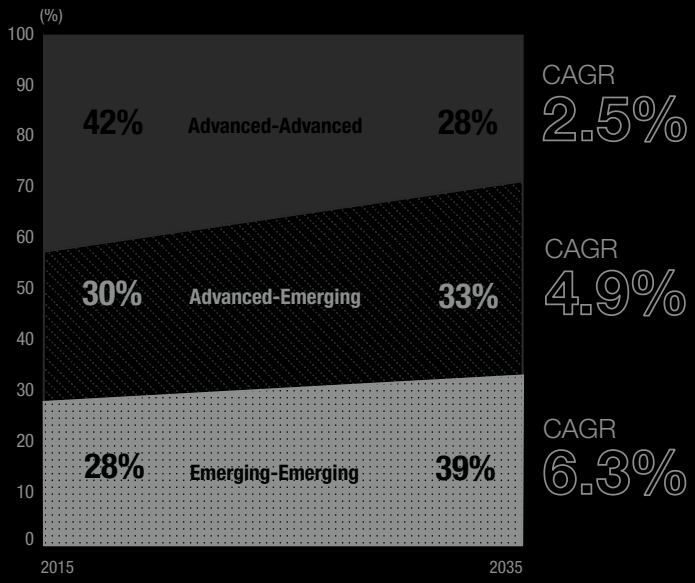


TRAFFIC FORECAST

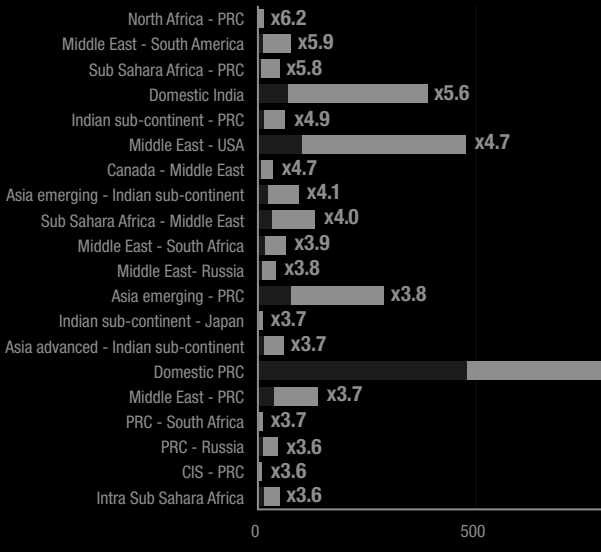
- **Asia-Pacific will lead world traffic by 2035,** with a three fold increase in the traffic serving this region by the end of the forecast period.
- Traffic between emerging countries is forecast to grow at 6.3% per annum, and will represent a growing share of air traffic, from 28% of world traffic in 2015 up to 39% by 2035.
- **Domestic China will become the largest traffic flow** before the end of the forecast period, supplanting Domestic USA. By the end of our forecast period, Domestic Chinese traffic is forecast to almost quadruple. Domestic USA traffic will increase by 50% from its already high base.
- **The three major flows connecting Western Europe are all expected to develop:** Western-Europe – USA, Intra-Western Europe and Western-Europe – Middle East forecast to grow 1.7, 1.7 and 2.6 times respectively.
- **Amongst the Top 20 traffic flows, 50% will involve Asia-Pacific and 25% will involve the Middle East.**



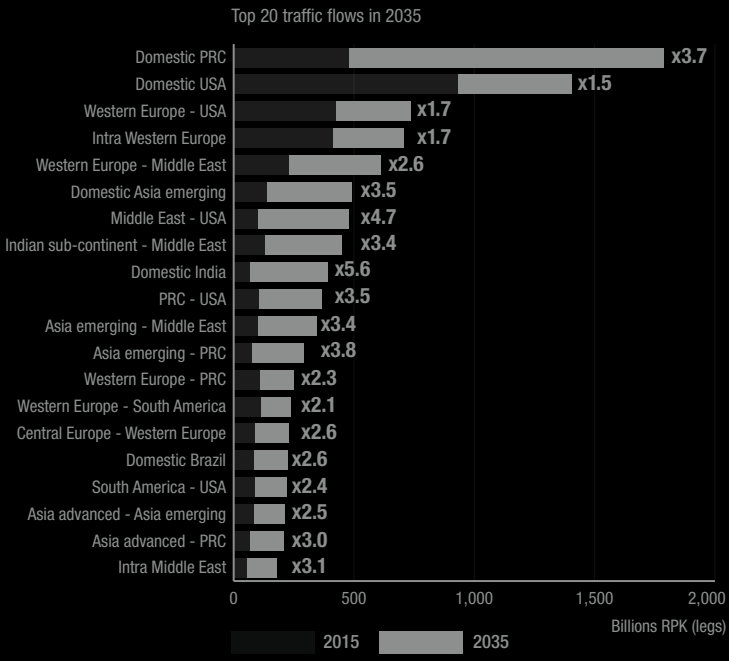
TRAFFIC BETWEEN EMERGING MARKETS TO REPRESENT A HIGHER SHARE OF WORLD TRAFFIC

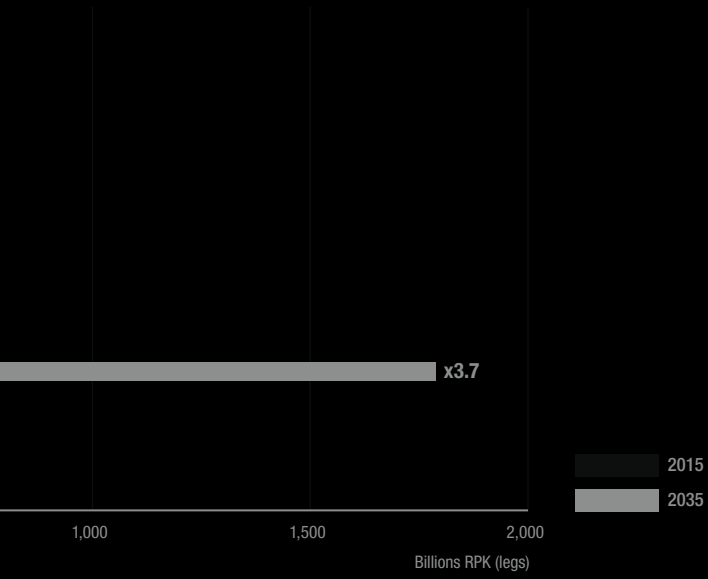


TOP 20 FASTEST GROWING FLOWS OVER THE NEXT 20 YEARS

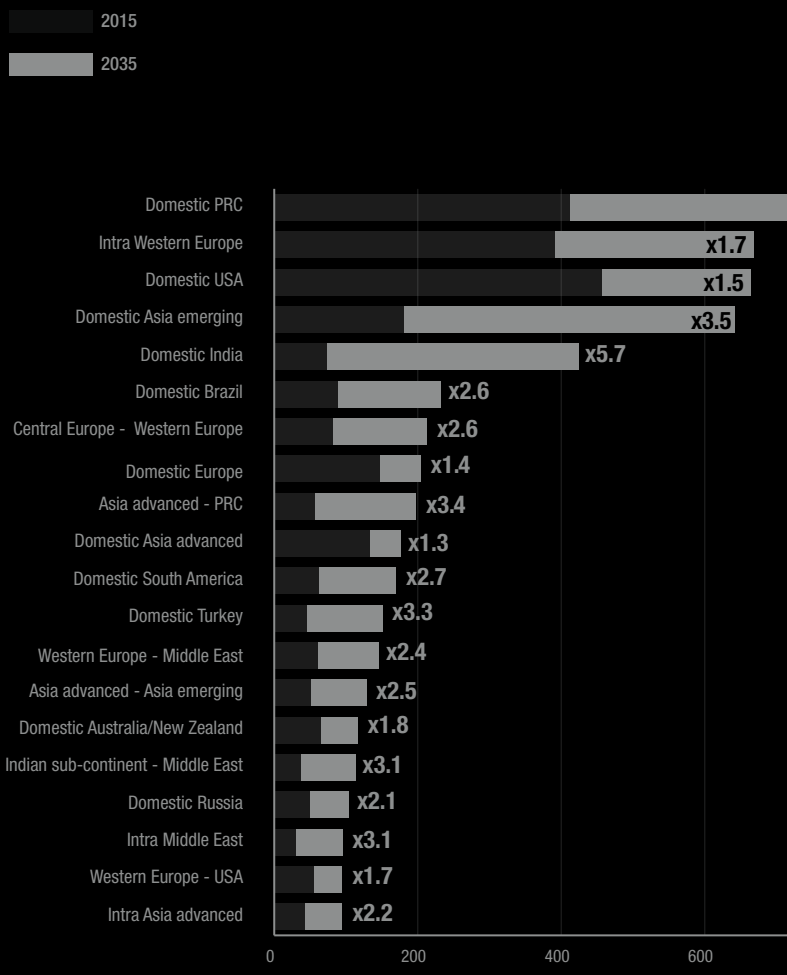


DOMESTIC CHINESE TRAFFIC FLOW TO BE NUMBER ONE



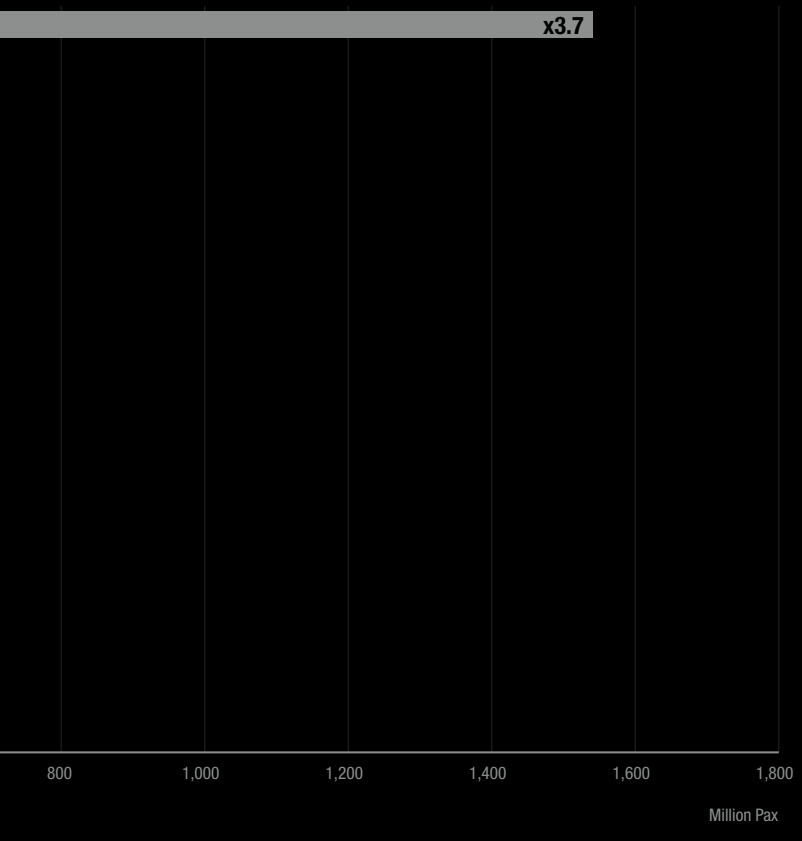


TOP 20 PASSENGER FLOWS IN 2035 (ORIGIN-DESTINATION)
Source: annualised Sept. 2015 data from Sabre



ORIGIN-DESTINATION PASSENGER FORECAST FIGURES

- Taking Origin and destination passengers (O&D pax) gives a better feel for the future volume of passengers by flow.
- In terms of Origin and Destination passengers, some remarkable evolutions can be highlighted from our forecast.
- 1.5 billion passengers are expected to travel within China in 2035, almost four times the number of passengers that travelled by air in 2015.
- The number of passengers in Domestic India is expected to multiply by almost six in the next 20 years, and to reach at that time the same level as Domestic China today.



04

Demand for passenger aircraft


ROLLS

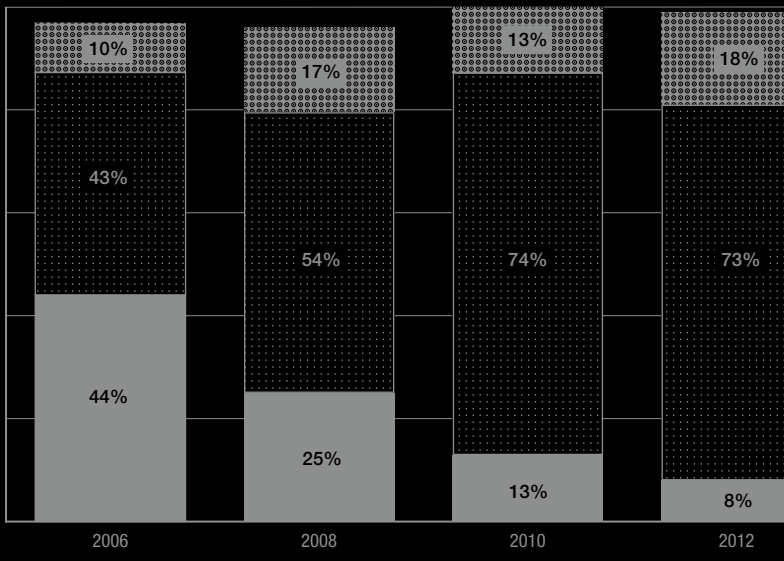
MORE AIRCRAFT, MORE PRODUCTIVITY, MORE SEATS

- The trends in passenger traffic, network and infrastructure developments, airline requirements and technology will all help define the demand and class of aircraft to be delivered in the coming years.
- At Airbus we have long seen a trend towards larger aircraft, both in single-aisle and wide-body sectors. Taking the A320 family as an example, increases in economics and range of the latest versions of the A321 have made it a clear best seller with its family share of deliveries up four fold in the last ten years.
- The trend to larger aircraft is also seen at the world's major airports where the average number of passengers per departure continues to rise. This is perhaps not a surprise since most of these airports are capacity constrained at peak times both in the air and on the ground.
- In translating a traffic growth forecast (Revenue Passenger Kilometres, RPKs) into an aircraft demand forecast the productivity of aircraft is as important as understanding trends in aircraft size. Two factors are key drivers of this productivity; load factor, or the proportion of the available seats on each flight that are filled, and utilisation, the number of hours a day that the aircraft flies and generates revenue. In recent years both of these parameters have risen to levels which would have been considered impossible 20 years ago.
- Typical load factors for a well-run airline in the 1990s were in the mid 70% range. However, developments in airline reservation systems, the advent of internet booking tools and the desire to minimise seasonality negative effects means that today many major network carriers report levels above 80% and with some LCCs even reporting load factors regularly in above 90%.
- Utilisation has similarly risen dramatically, for example from our own data from Airbus single-aisle and twin aisle products, we have seen an increase in utilisation up 30% relative to 25 years ago.
- However, having already reached these very high levels, how much more can they improve? In our forecast we allow for some small improvements, but clearly the opportunity to increase load factors is limited, however as well as more seats, technology on and off the aircraft could provide scope for improved productivity in the form of aircraft utilisation.

- Every traffic flow, every airline and every route has a different optimum and they are all evolving differently. One size doesn't fit all even within a single airline. Over time the picture is even more varied. This is why it is necessary to offer a family of aircraft to cover the breadth of different ideal aircraft. Over a 20 year period even LCCs with their single type business model and more dynamic network management are likely to migrate across model boundaries as their markets evolve. Our forecast shows that the highest proportion of demand is focused on airlines with demand across multiple single-aisle size categories for example.
- The top end of the single-aisle and the bottom end of the wide-body sectors is an area of particular challenge to the forecaster. Looking at aircraft capacity and range there is a clear cross-over with 13% of single-aisle capacity operating over 2,000nm and 14% of twin-aisle capacity operating on routes shorter than this distance. New large single-aisles are most fuel efficient but larger, commercial proposition. All of this pivots on the cost of fuel, the cost of maintenance and the passenger demands and preferences perceptually and at a route level. However, by adopting a demand model methodology with its neutral seat categories helps us to model some of these dynamics.
- Fuel remains the largest single contributor to operating cost even in a low fuel environment. At $50 per barrel it is still ~17% for an average airline rising to ~30% at $100 per barrel. Being an average hides the fact that airline business models that have focussed on minimising costs like the LCCs (Low Cost Airlines) can have fuel as a significantly higher proportion of their costs.
- New, fuel efficient aircraft provide a natural hedge against this most unpredictable of cost drivers and at the same time provide a better passenger experience and enhance the Green credentials of the airline.

THE SINGLE-AISLE MARKET IS ALREADY MOVING TO BIGGER AIRCRAFT

A320 Family deliveries (% units)

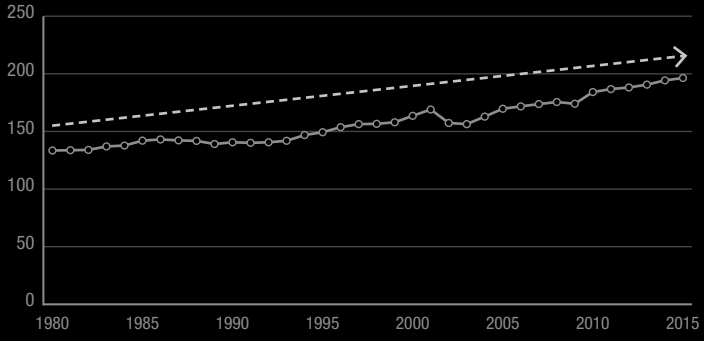


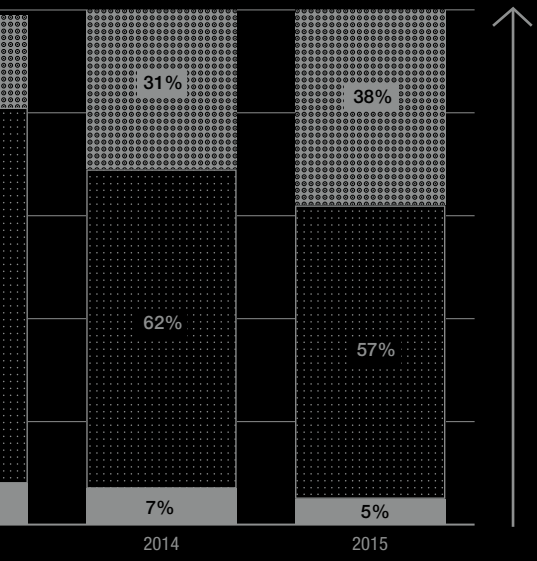
MORE SEATS, MORE SEATS FILLED

Source: OAG, Ascend, Airbus

Offered seats per aircraft

Avg. number of offered seats per aircraft (000)



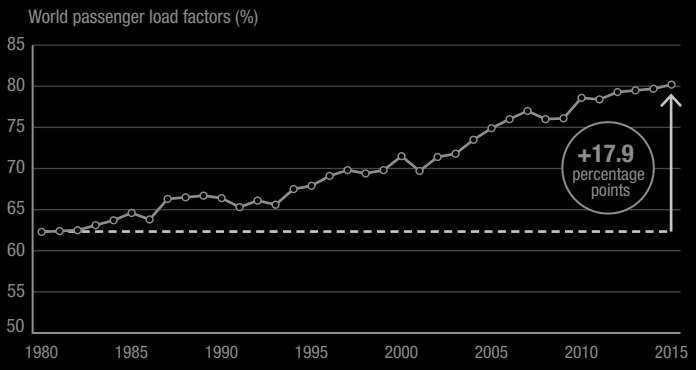


Market trend

Clear demand for larger and more efficient aircraft

A321
A320
A319

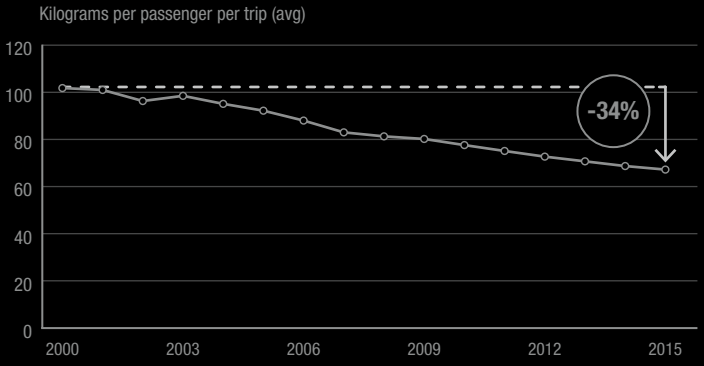
Load factors



LESS FUEL BURN, THEREFORE LESS EMISSIONS

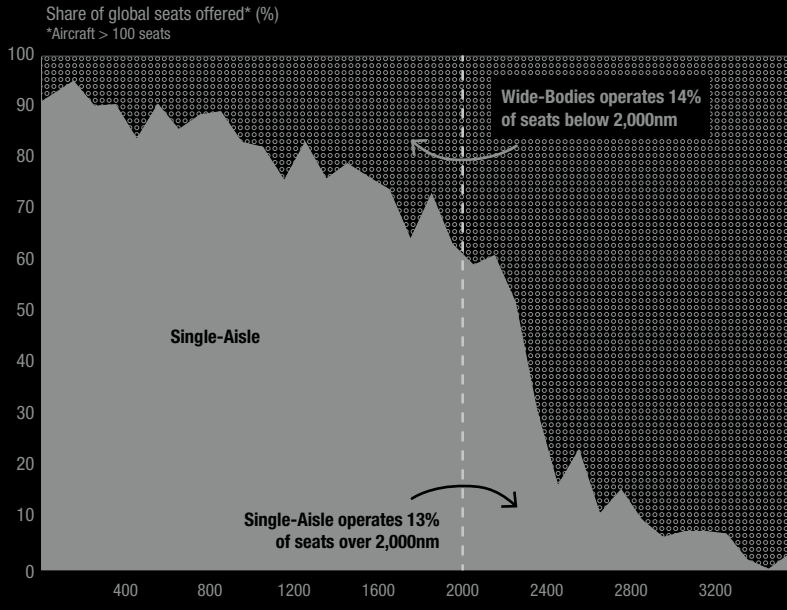
Source: ICAO, IATA, Airbus

Fuel consumption

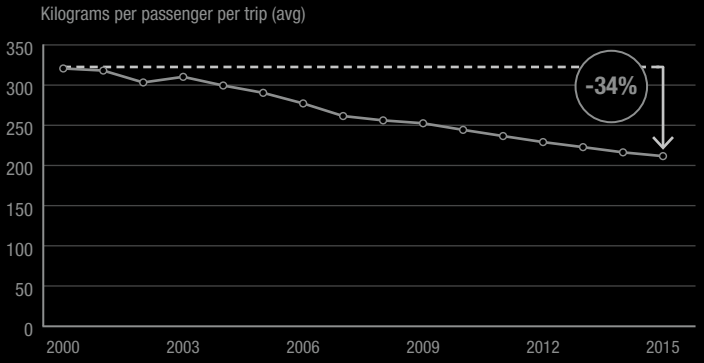


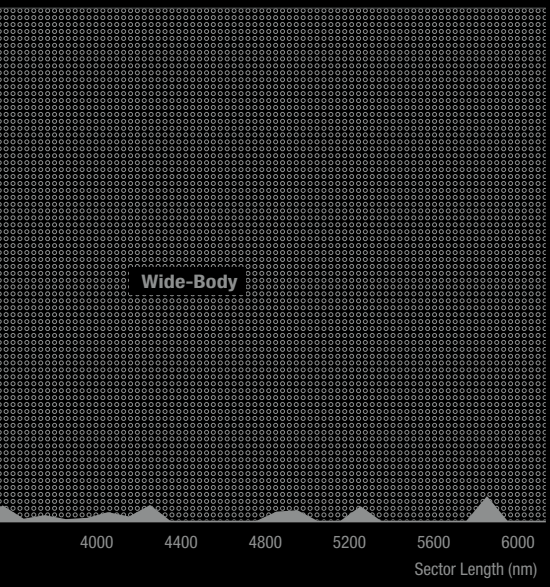
SIGNIFICANT OVERLAP TODAY BETWEEN SA & WB MARKETS

Source: OAG (Sept.2015), Airbus



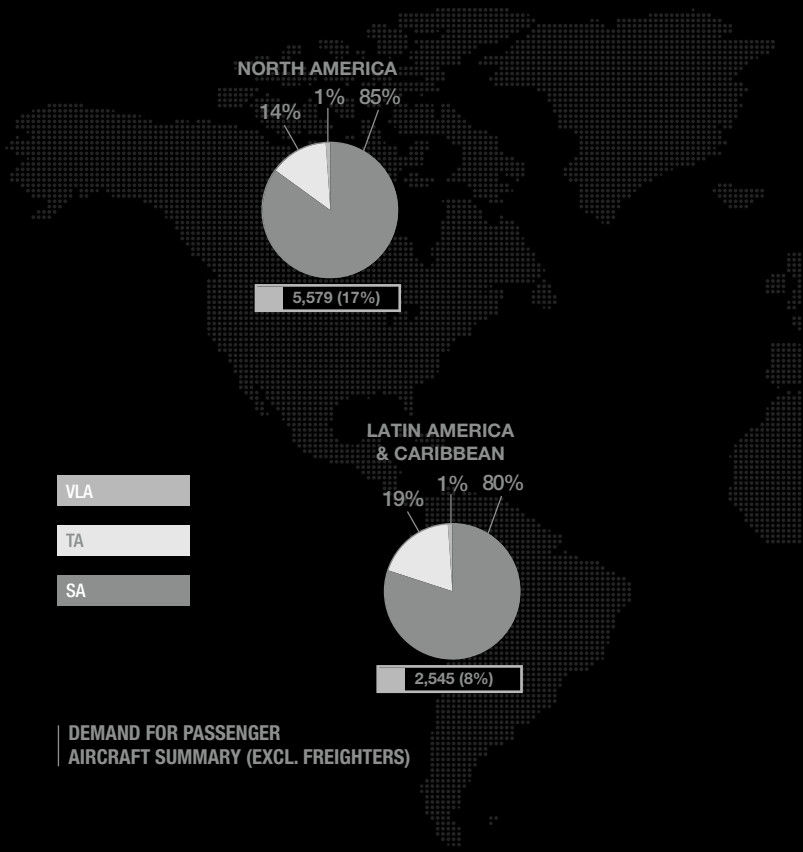
CO_2 emissions





A Mixed Market

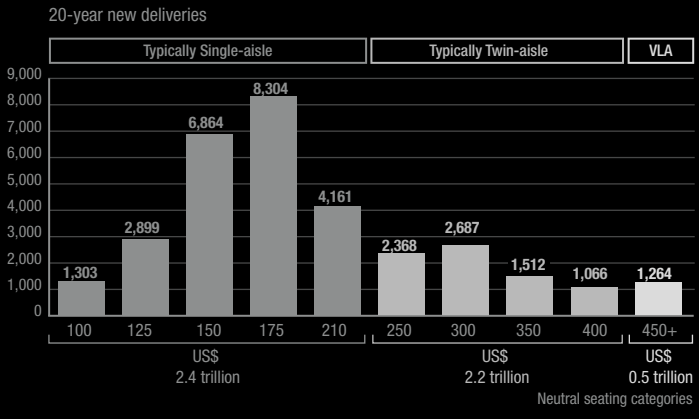
SA 13% > 2,000nm
WB 14% < 2,000nm

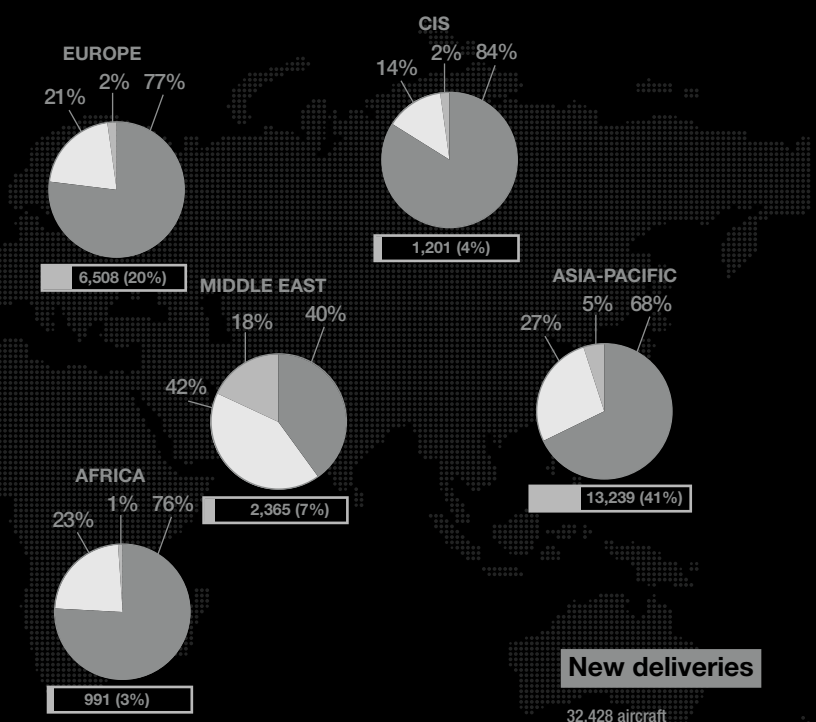


DEMAND FOR PASSENGER AIRCRAFT SUMMARY (EXCL. FREIGHTERS)

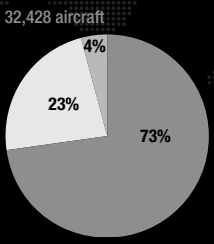
NEW PASSENGER A/C DELIVERIES BY NEUTRAL SEATING CATEGORY

Source: Airbus GMF 2016



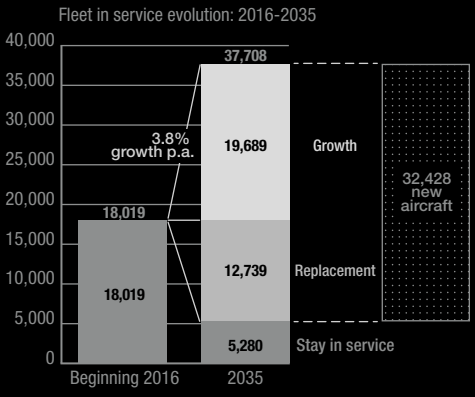


New deliveries

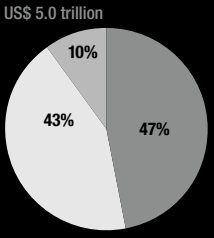


DEMAND FOR SOME 32,430 NEW PASSENGER AIRCRAFT

Source: Airbus GMF 2016
Note: Passenger aircraft ≥ 100 seats



Market value



05
Demand by region

Asia-Pacific

30% WORLD'S SURFACE, 60% WORLD'S POPULATION, 40% OF AIRCRAFT DEMAND

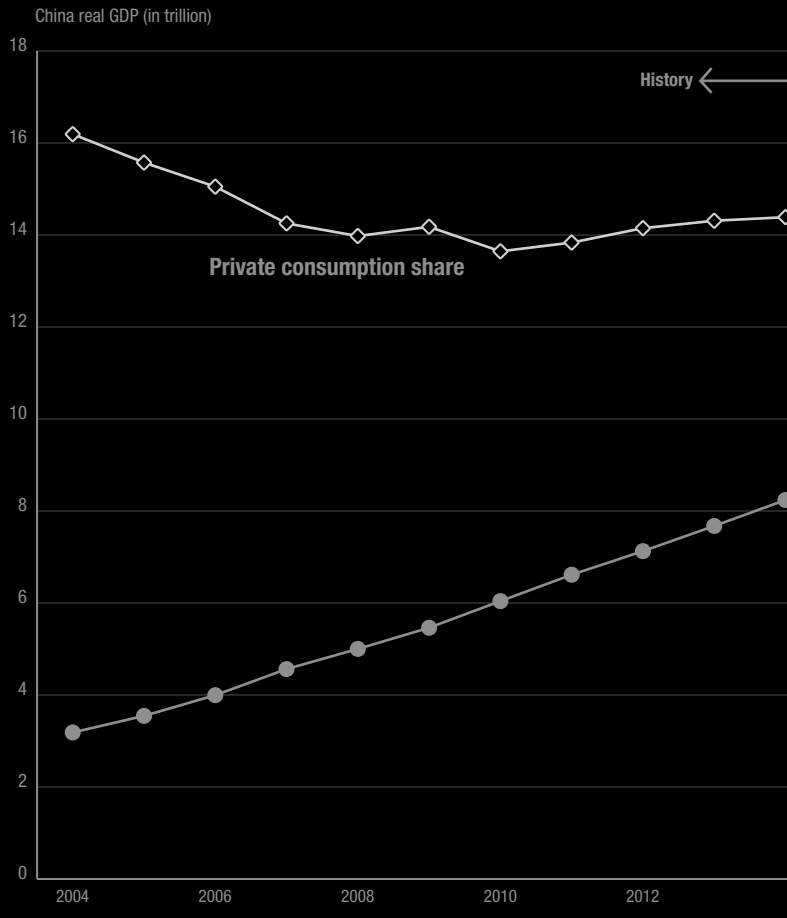
- Despite occasional concerns at a country level, Asia-Pacific will continue to lead world economic growth according to forecast, with an average real GDP growth of 4.1% per year over the next 20 years as forecast by IHS Economics.
- Domestic sources of growth-particularly private consumption-will play a larger role in coming years.
- In China for example, **private consumption will grow** to contribute just over 40% of China's total GDP.
- With the **middle classes** in the region expected **to double to over 2.5 billion people** over the next 20 years, also contributing to air traffic growth.
- **Chinese middle class households already exceed the number in the US**, and will be more than double by 2024 according to Oxford Economics.
- **Deregulation will continue to play a role** in driving growth in the region. The number of routes between China and ASEAN states has more than doubled since 2009 for example.
- Low cost carriers whilst present and playing a role in increasing the accessibility of aviation in the region have opportunity to grow inter-regionally. Some 25% of Asian inter-region seats are flown by these airlines, in Europe it is over 40%. China and Japan in particular have a lower share than other Asian countries like Malaysia and the Philippines.
- With its growing middle classes, population likely to exceed China's in the next decade, and economic growth already above China, India has all the drivers in place for continued growth in air traffic and to play a greater role in the region's aviation development.

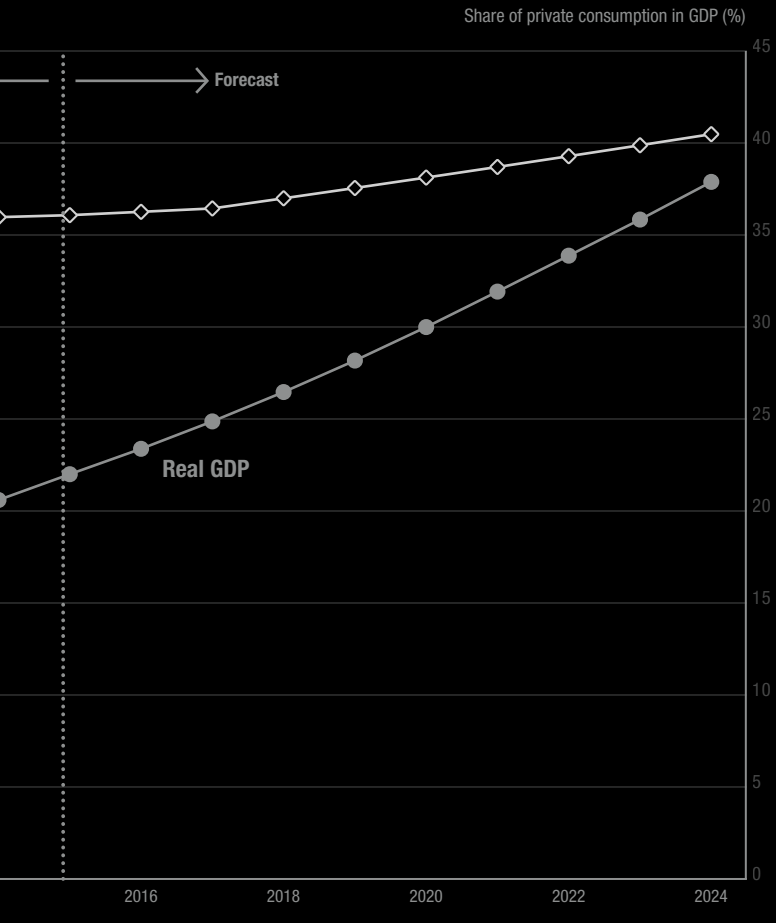
Real GDP growth is forecast to grow

4.1%

per year between 2015-2035 period

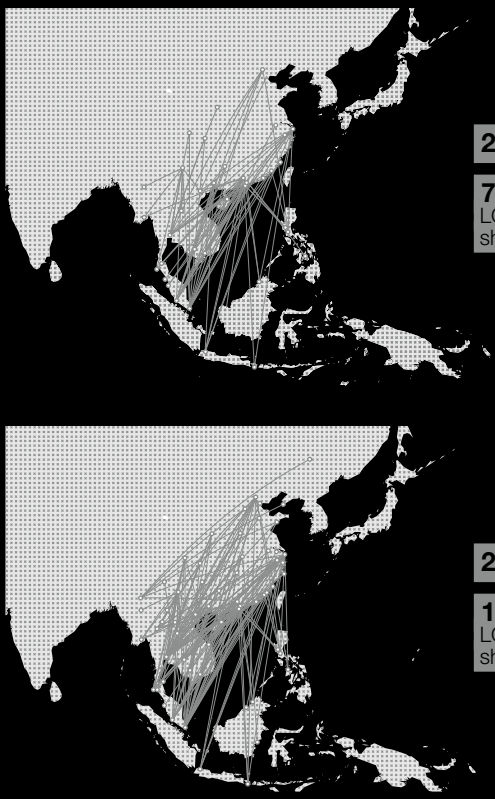
PRIVATE CONSUMPTION WILL DRIVE CHINESE ECONOMIC GROWTH
Source: IHS Economics, Airbus




Share of private consumption in GDP (%)
Forecast
Real GDP
45
40
35
30
25
20
15
10
5
0
2016
2018
2020
2022
2024

SIGNIFICANT IMPACT OF THE CHINA-ASEAN AIR TRANSPORT AGREEMENT ON THE NUMBER OF SERVICES

LCC: AirAsia, Cebu Pacific, Citilink, Jetstar, PAL Express, Scoot, Spring Airlines, TigerAir
Source: OAG (September data), Airbus



2009

78 Airport-pairs
LCC market share (ASK): **18%**

2014

156 airport-pairs
LCC market share (ASK): **29%**

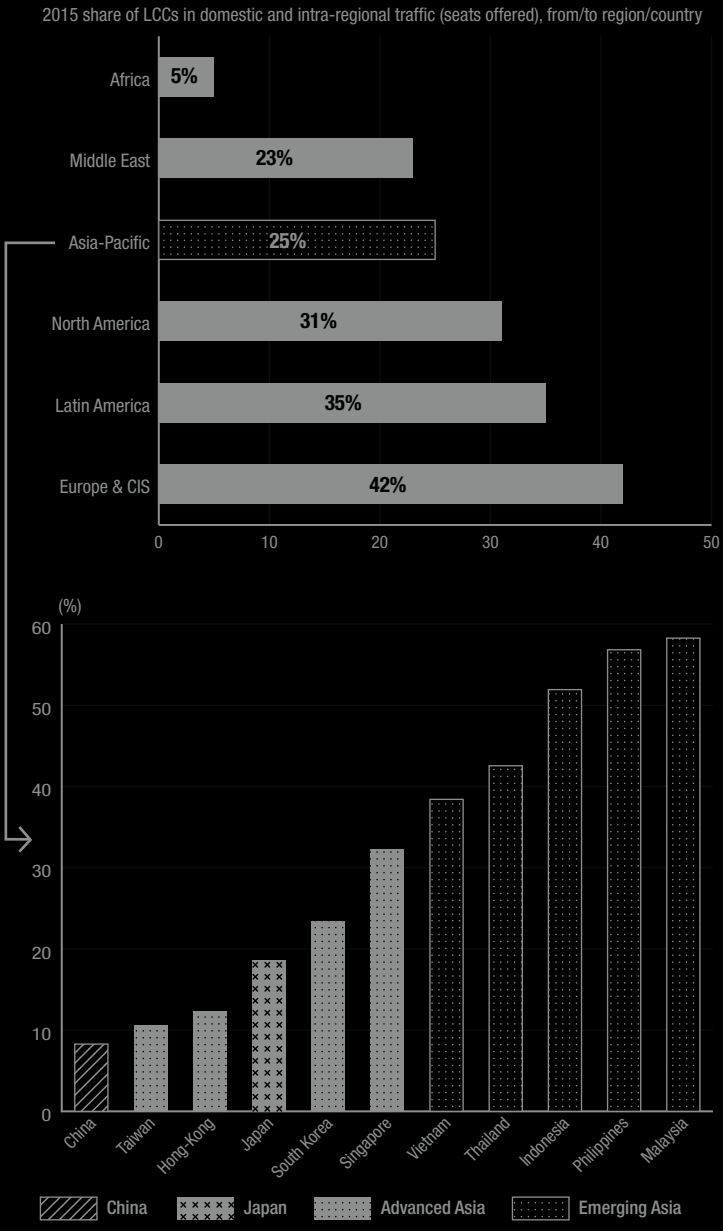
Number of airport-pairs

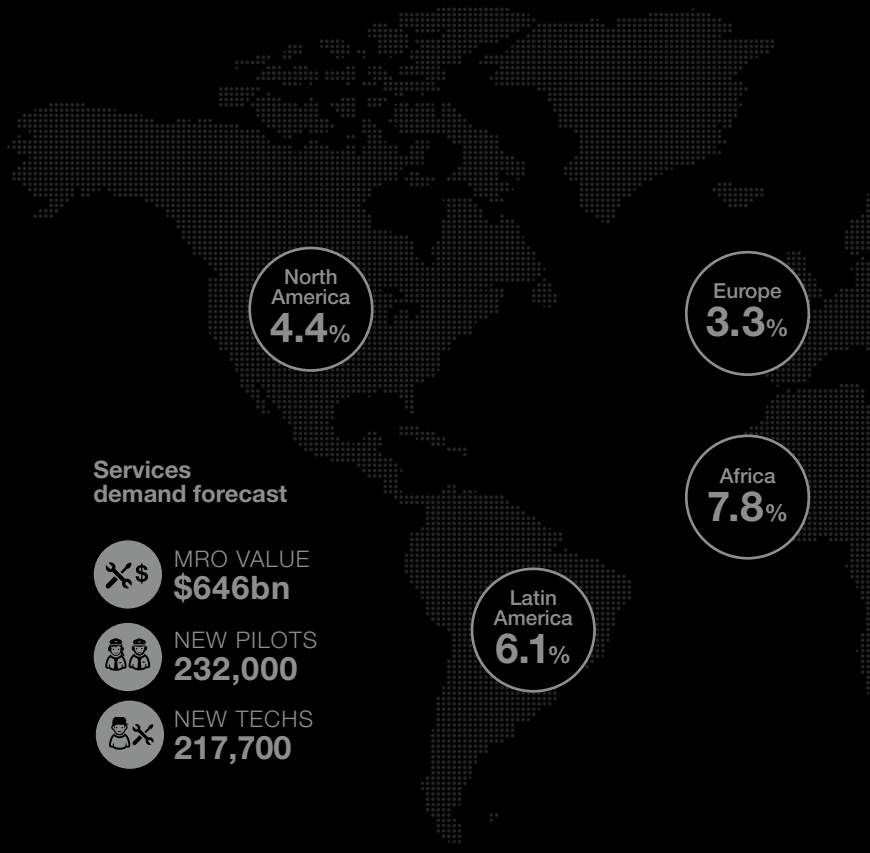
2009-2014
Between China and ASEAN

x 2

POTENTIAL FOR DEVELOPMENT OF LOW COST CARRIERS IN ASIA-PACIFIC AND CHINA

LCC definition from Airbus GMF
Source: OAG (September data), Airbus





Services demand forecast

MRO VALUE **$646bn**

NEW PILOTS **232,000**

NEW TECHS **217,700**

Results

Economy**

Real Trade 4.3%

Real GDP **4.1%**

Traffic**

Intra-regional & domestic 6.0%

Inter-regional 4.8%

Total traffic **5.5%**

Fleet*

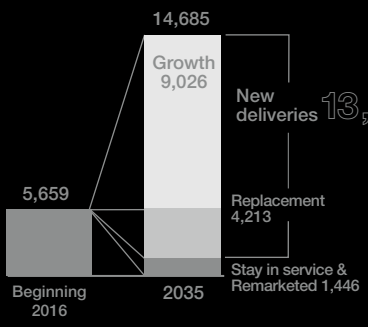
Fleet in service 2015 5,659 2035 14,685

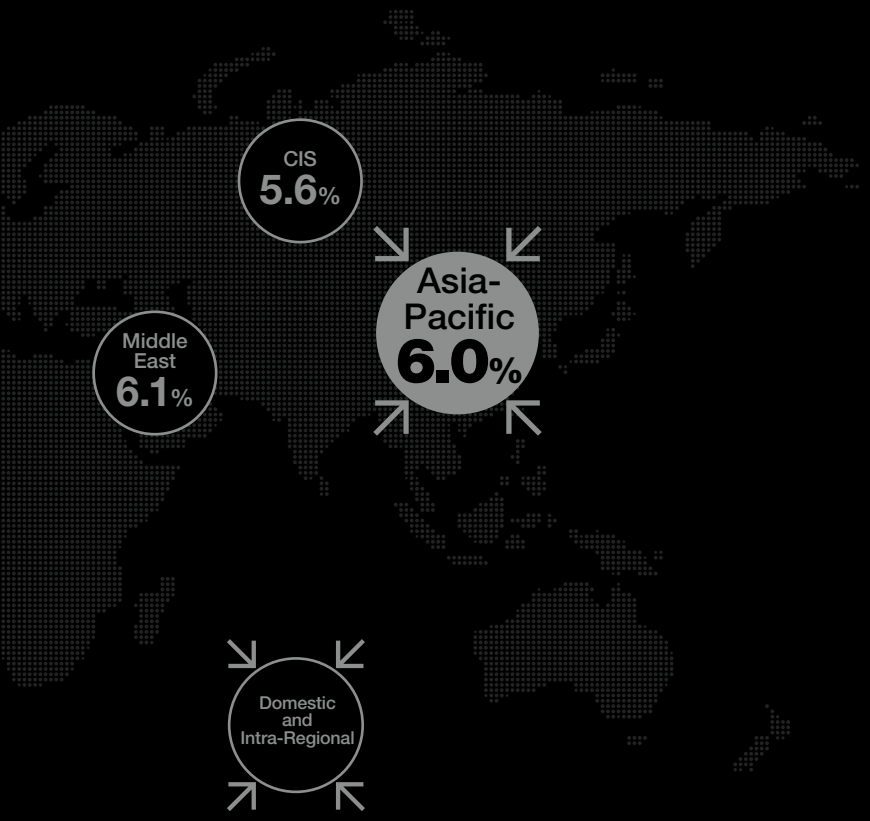
20 year new deliveries **13,239**

* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

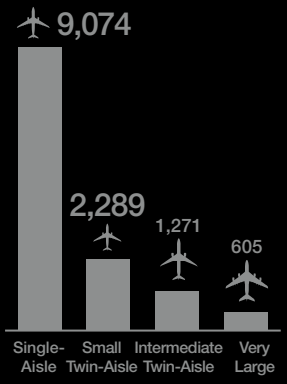
Fleet in service evolution

Fleet size*

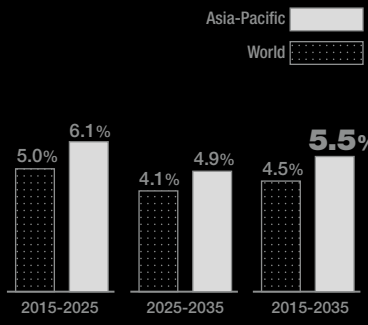




New deliveries by segment
Number of new aircraft



Total RPK traffic growth



Europe

ECONOMIC HEADWINDS NOT ENOUGH TO BLOW AVIATION OF COURSE

- In the near term, economic growth has been edging upwards in Europe, supported by easing credit conditions, a competitive euro, lower oil prices, and reduced fiscal headwinds.
- Whilst long term challenges remain, real GDP growth is forecast to grow ~1.8% per year between 2015-2035 period, largely reflecting changing demographics.
- Despite hesitant economic growth in the region as a whole, and localised fiscal and economic challenges within a number of European countries, air transport has continued to grow impressively. In fact, the ratio of air traffic growth to GDP in Europe is typically higher than the world average.
- Origin and destination traffic to/from/within Europe has grown 59% since 2005, hardly missing a step during the financial crisis in 2008/2009.
- Consumer confidence, European enlargement, and the growth in low cost carriers all helped simulate these developments.
- Today, low cost carriers (LCCs) represent ~40% of the Available Seat Kilometers flown between European countries or domestically.
- To meet this demand LCCs have added seats faster than flights, meaning that the aircraft they are using are getting bigger either through larger equipment or by adding more seats to existing cabins. A trend we expect to continue especially as the routes they are expected to operate range further afield.

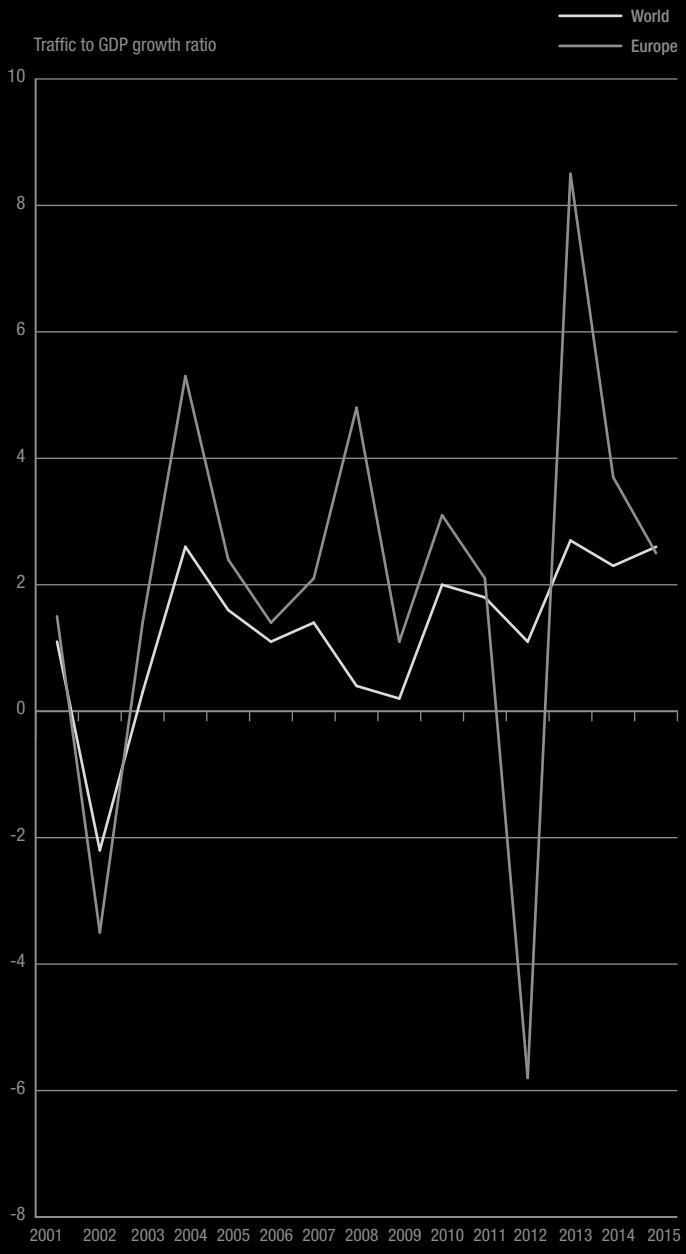
Real GDP growth is forecast to grow

≈1.8%

per year between 2015-2035 period

RATIO TRAFFIC TO GDP GROWTH IN EUROPE IS ALMOST ALWAYS ABOVE WORLD AVERAGE

Source: OAG (September data of each year), IHS Economics, Airbus



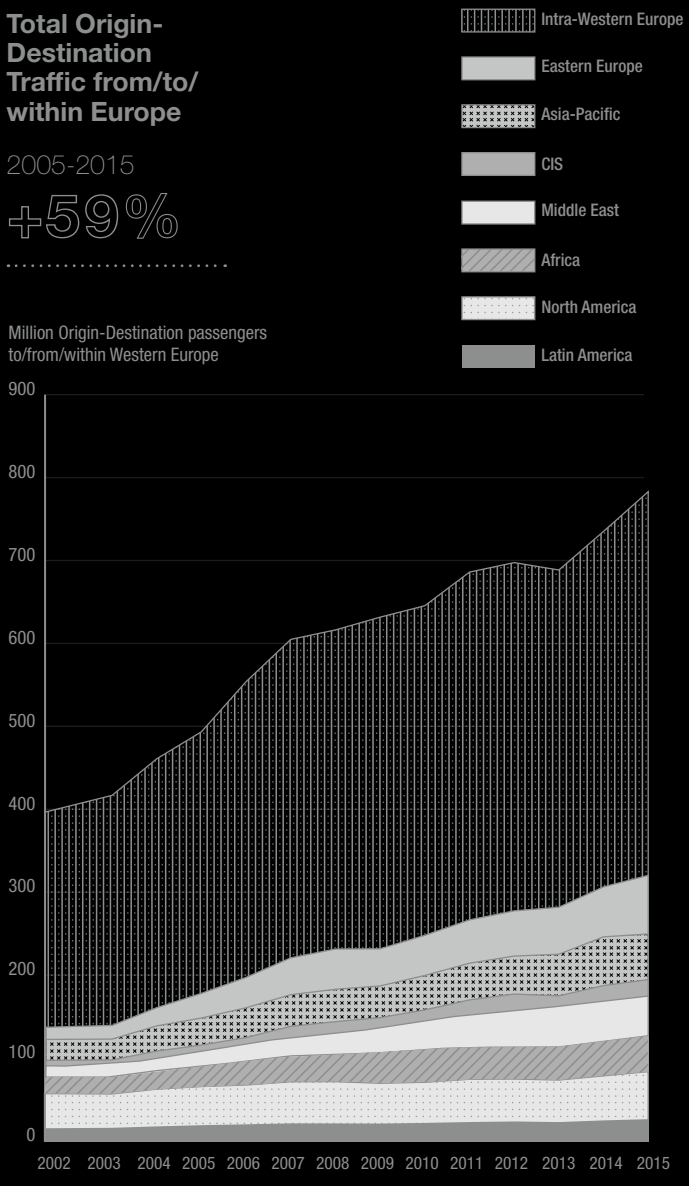
INTRA-REGIONAL TRAFFIC IN EUROPE HAS INCREASED BY 47% IN THE LAST TEN YEARS

Source: Sabre GDD, Airbus GMF

Total Origin-Destination Traffic from/to/within Europe

2005-2015

+59%

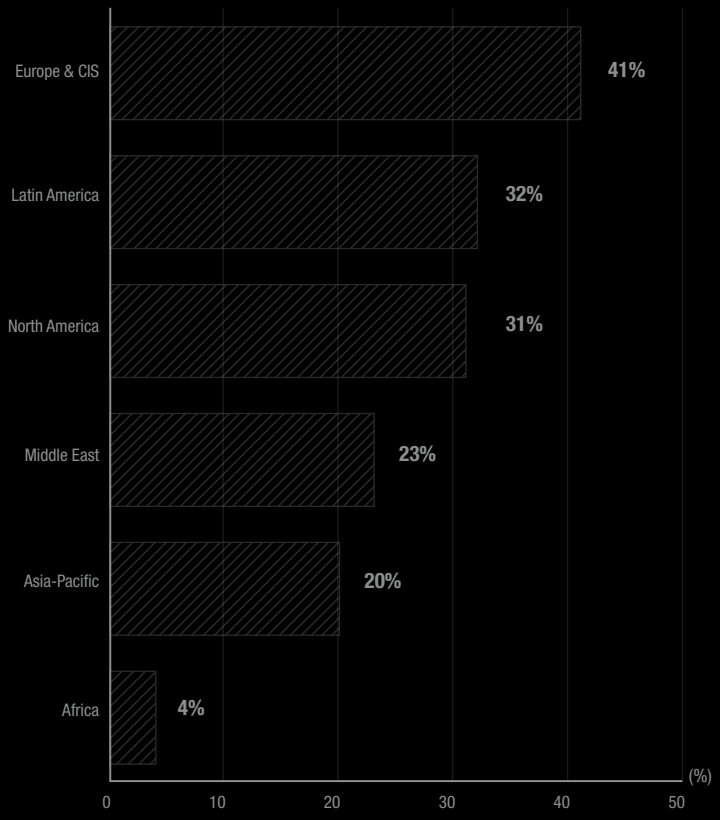


Market share of LCCs

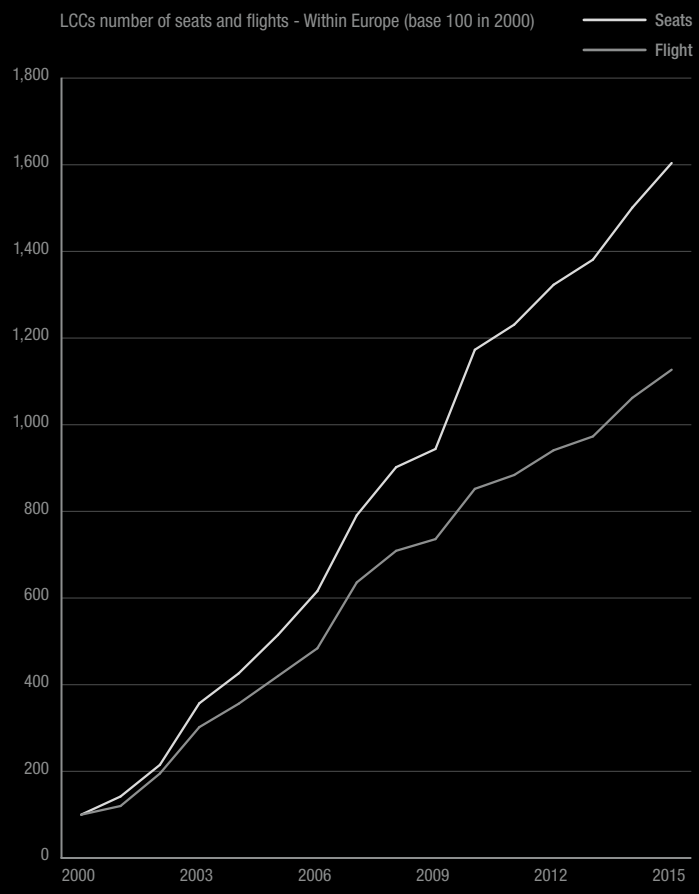
41%
in Europe and CIS

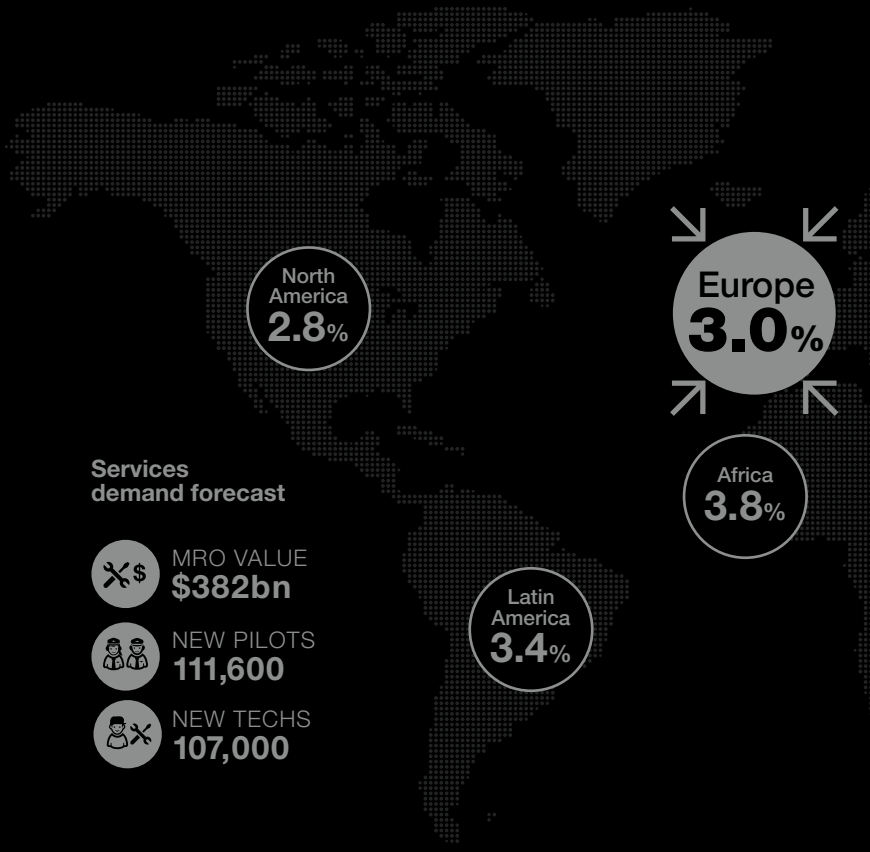
EUROPE IS THE MOST DEVELOPED MARKET FOR LOW-COST CARRIERS (LCC)
Source: September traffic from OAG, Airbus

Share of LCCs in domestic and intra-regional ASK traffic, by region (in 2015)



LOW-COST CARRIERS HAVE GROWN 40% FASTER IN CAPACITY THAN FREQUENCY
Source: OAG (Sept. data), Airbus





Services demand forecast

MRO VALUE **$382bn**

NEW PILOTS **111,600**

NEW TECHS **107,000**

Results

Economy**

Real Trade	Real GDP
3.0%	**1.8%**

Traffic**

Intra-regional & domestic 3.0%	Total traffic **3.4%**
Inter-regional 3.6%	

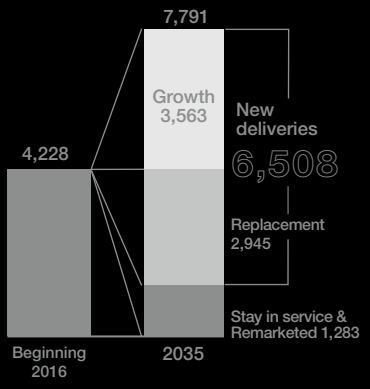
Fleet*

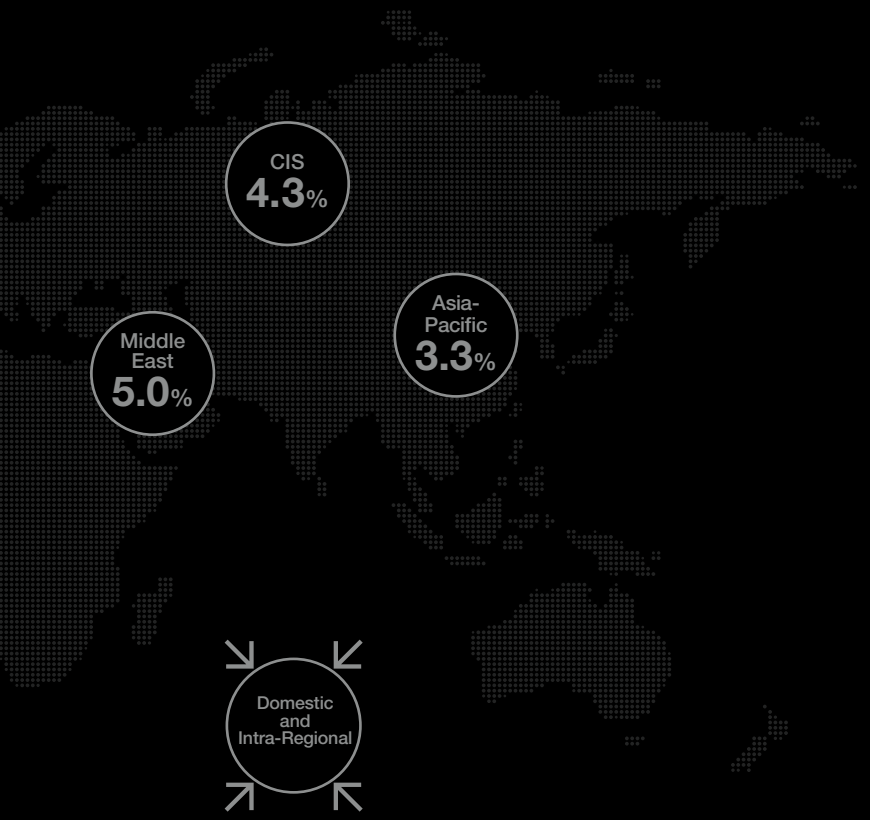
Fleet in service		20 year new deliveries
2015	2035	**6,508**
4,228	7,791	

* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

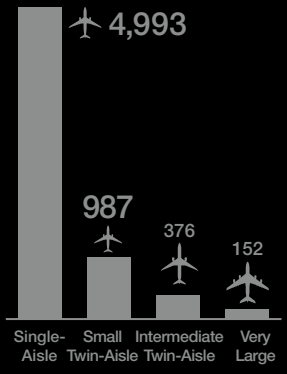
Fleet in service evolution

Fleet size*

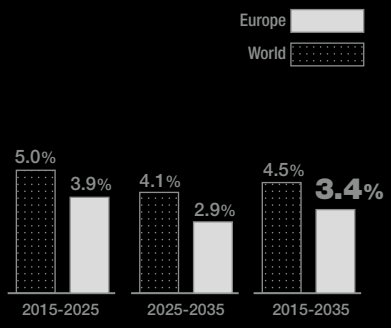




New deliveries by segment
Number of new aircraft



Total RPK traffic growth



North America

MARKETS: MASSIVE DOMESTIC, GROWING INTERNATIONAL

- Real GDP growth in North America is expected to grow at an average of 2.3% per year to 2035, with greater business fixed investment and 2035 R&D spending offsetting the slowdown in labor force growth.
- Airlines in North America had another successful year in 2015. They made about 60% of the whole industries net profit. 2015's result matched the all time high set in 2014.
- Record profits driven by lower fuel costs are allowing airlines to invest in the in-flight experience, resulting in higher passenger satisfaction according to the American Customer Satisfaction Index's (ACSI) Travel Report 2016.
- Disciplined capacity growth on both domestic and international markets. For example, in 2015 load factors in these markets were at 85% and 81% respectively.
- Capacity increase on the international market driven by steady growth on the mature markets and above average growth on flows with the emerging economies.
- Tourism is another North American driver, with inbound tourism outpacing outbound.
- By 2025, the direct contribution of travel and tourism to US GDP is expected to be close to US$700bn according to the World Travel & Tourism Council (WTTC).
  The total contribution (direct, indirect and induced) is expected to be around US$2 trillion.

Real GDP growth

2.3%

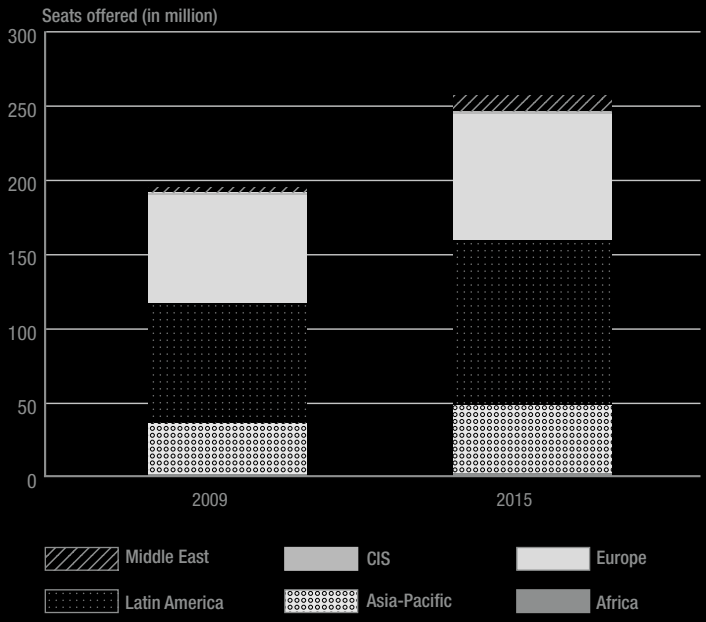
per year

60%

of Global net profit in 2015

WHILST MAINTAINING LOAD FACTORS ABOVE 80% INTERNATIONAL TRAFFIC TO/ FROM NORTH AMERICA HAS INCREASED BY ABOUT A THIRD SINCE 2009

Source: OAG, Airbus



US carriers load factors

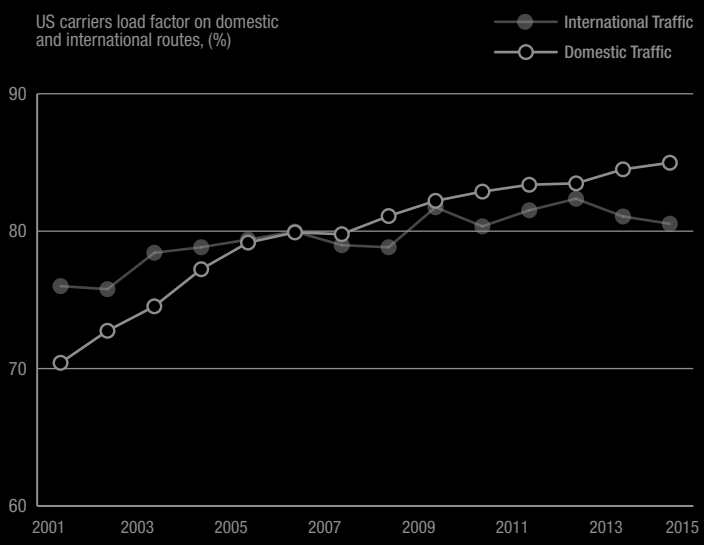
2002-2015
Domestic
+15pp
International
+5pp

In 2014

75
million inbound vs.
63
million outbound tourists

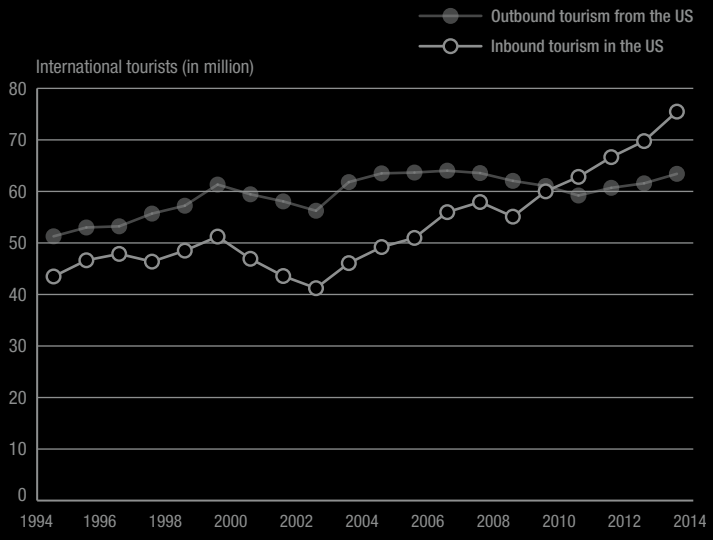
AVERAGE LOAD FACTORS HAVE IMPROVED OVER THE LAST DECADE

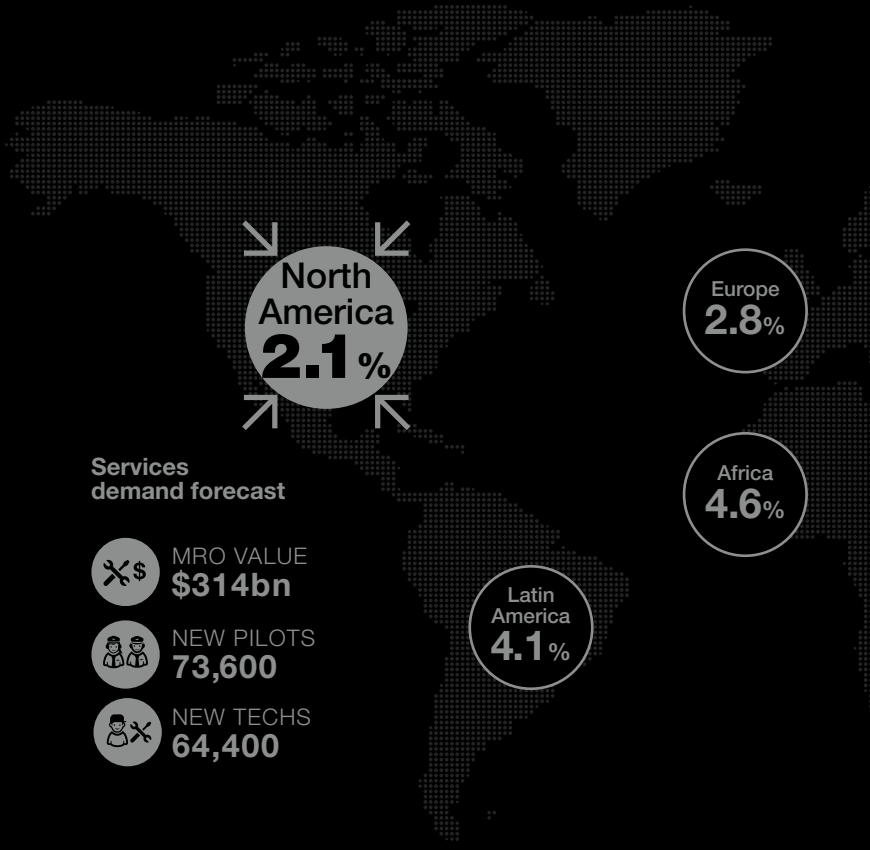
Source: US Bureau of Transportation Statistics, Airbus



INBOUND TOURISM TO US HAS SURPASSED OUTBOUND

Source: World Tourism Organization, Airbus





Services demand forecast

MRO VALUE **$314bn**

NEW PILOTS **73,600**

NEW TECHS **64,400**

Results

Economy**

Real Trade	Real GDP
3.7%	**2.3%**

Traffic**

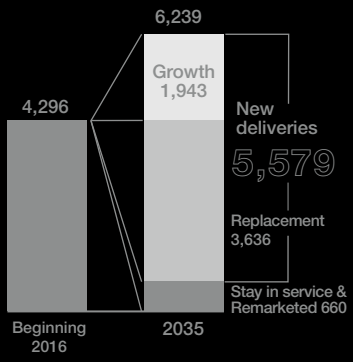
Intra-regional & domestic 2.1%	Total traffic
Inter-regional 4.2%	**3.4%**

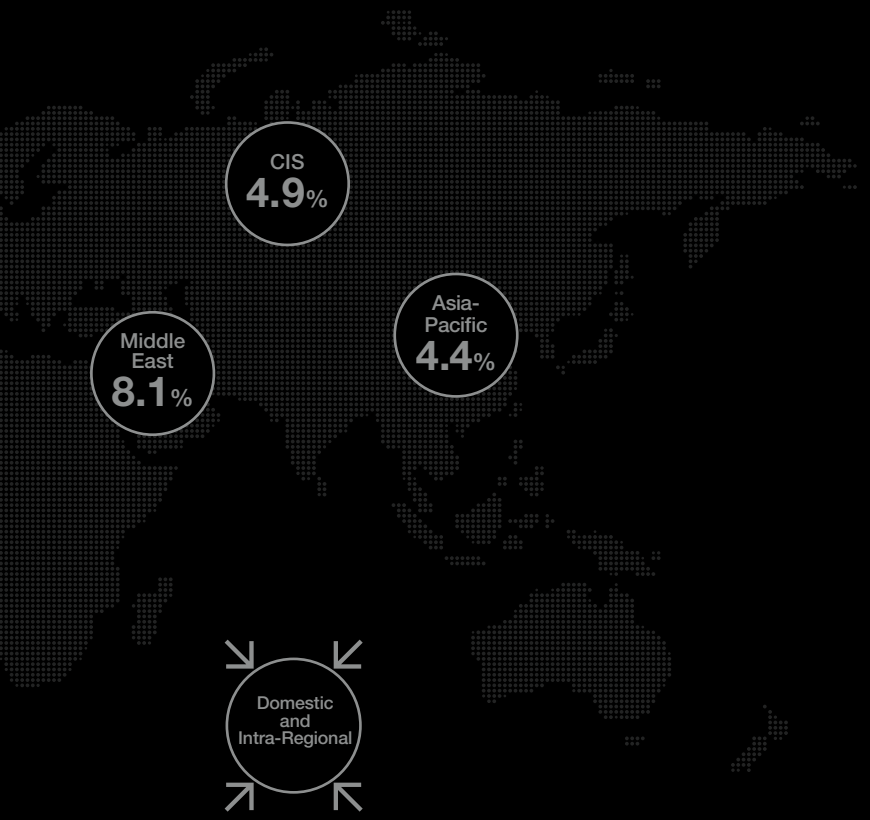
Fleet*

Fleet in service		20 year new deliveries
2015	2035	**5,579**
4,296	6,239	

* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

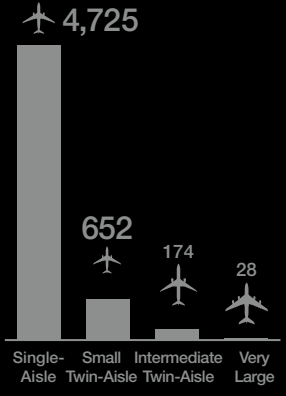
Fleet in service evolution
Fleet size*



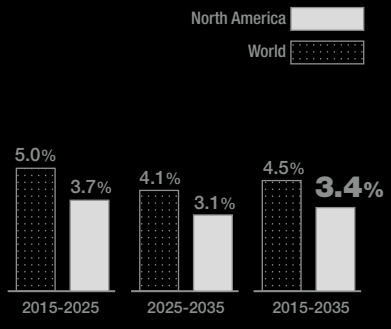


New deliveries by segment

Number of new aircraft



Total RPK traffic growth



Middle East

REALISING ITS POTENTIAL

- Middle East economic outlook remains supported by its substantial petroleum resources, its proximity to energy intensive Asian economies, a growing tourism potential, and its often sited strategically important geopolitical location. The Middle East region's real GDP growth is forecast to average **3.6%** per year over the next 20 years.
- In the short to medium term, GDP and growth in private consumption put the region well above the world average on these metrics and close to Asia Pacific.
- Today, just three of the **Middle Eastern airlines account for ~30% of Europe to Asia origin and destination traffic.** This compares to Asian and European airline's where fifteen airlines in each region also command about 30%.
- As positive political moves have developed over recent years, so to has the economists' view of Iran's economic outlook, which has shown annual GDP growth potential grow nearly a percentage point to 4.0% in the space of a year.
- This improved outlook is shared for aviation with Iran's propensity to fly also below its potential today.
- Combine this with a large and growing population, which is estimated will be 90 million people by the end of our forecast period, Iran will definitely be well placed on the aviation map in the future.
- Simply fly in and out of the region's airports today and witness the wealth of airport development from the UAE to Oman, from Jeddah to Bahrain to get a glimpse of the future.

The Middle East region's real GDP growth is forecast to average

3.6%

per year over the next 20 years

Big 3 Gulf airlines
~30%
for 3 airlines

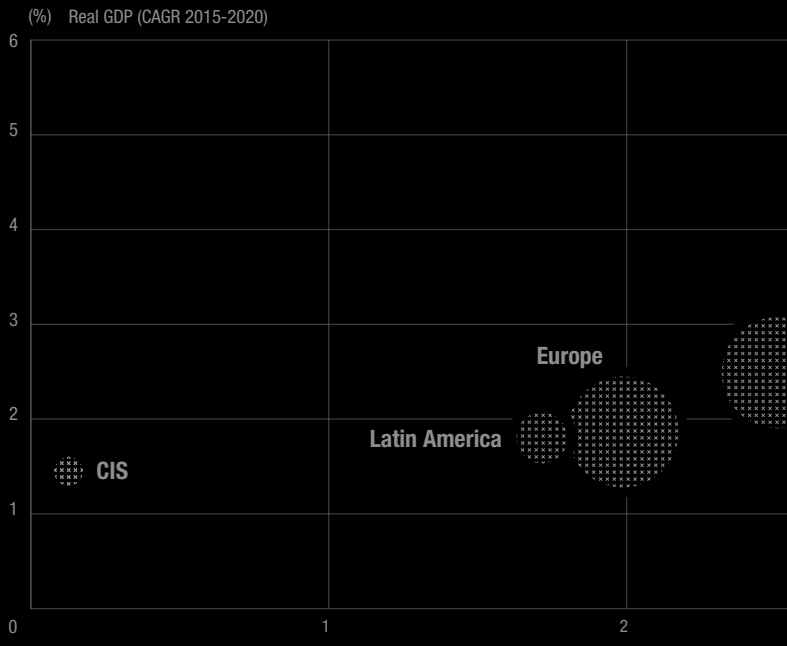
Top 15 European airlines
~30%
for 15 airlines

Top 15 Asia-Pacific airlines
~30%
for 15 airlines

MIDDLE EAST'S ECONOMY EXPECTED TO PERFORM BETTER THAN THE WORLD AVERAGE

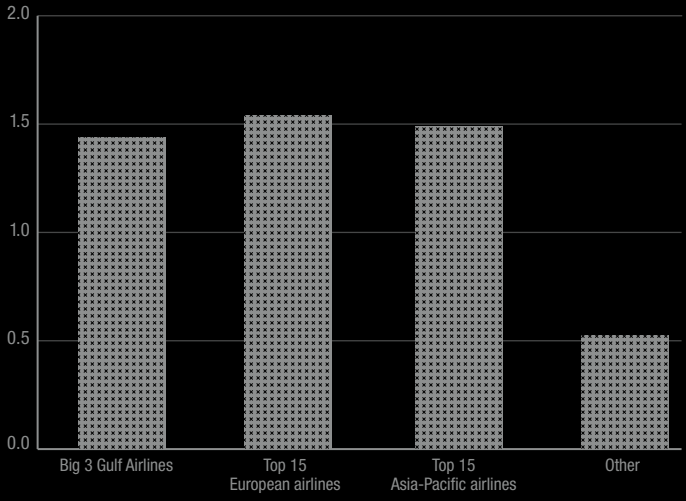
Source: IHS Economics, Airbus
Bubble diameter proportional to real GDP in 2020

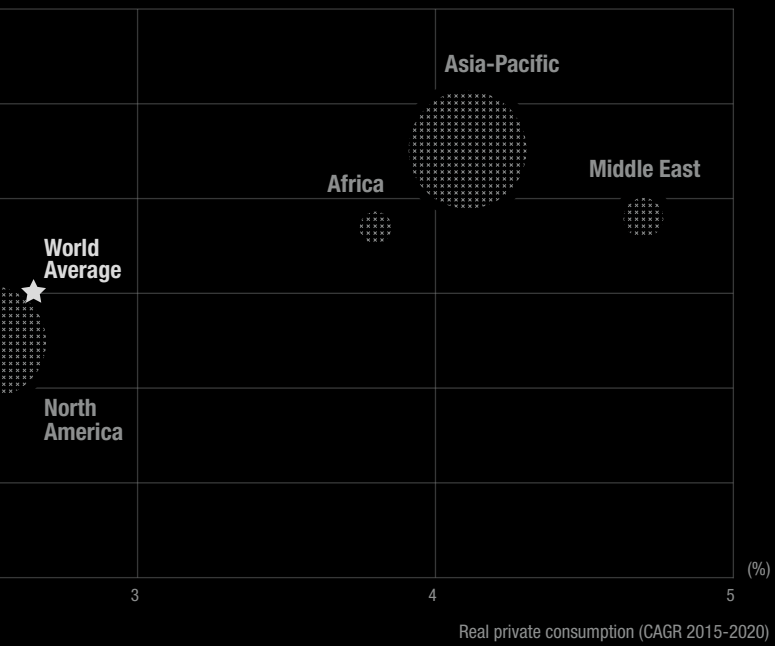
Evolution of real GDP and real private consumption (2015-2020)



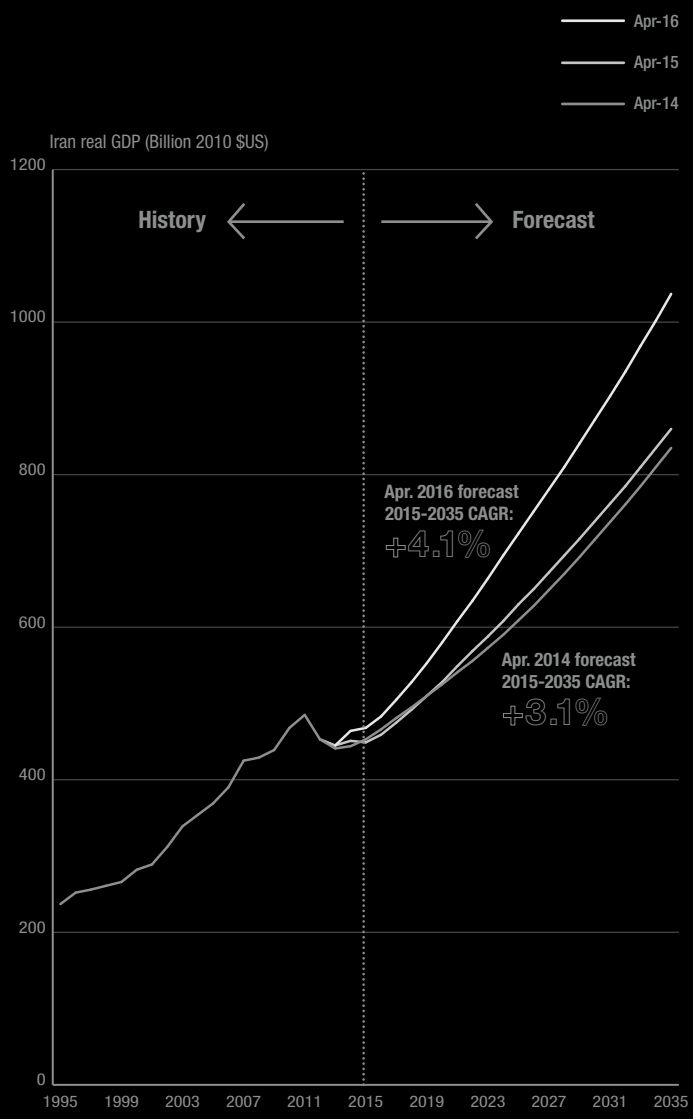
THE BIG 3 GULF AIRLINES ARE LEADING THE ASIA/PACIFIC – EUROPE MARKET
Source: Sabre GDD (2016/01), Airbus

Origin-destination passenger traffic between Europe and Asia-Pacific, in 2016/01 (million)

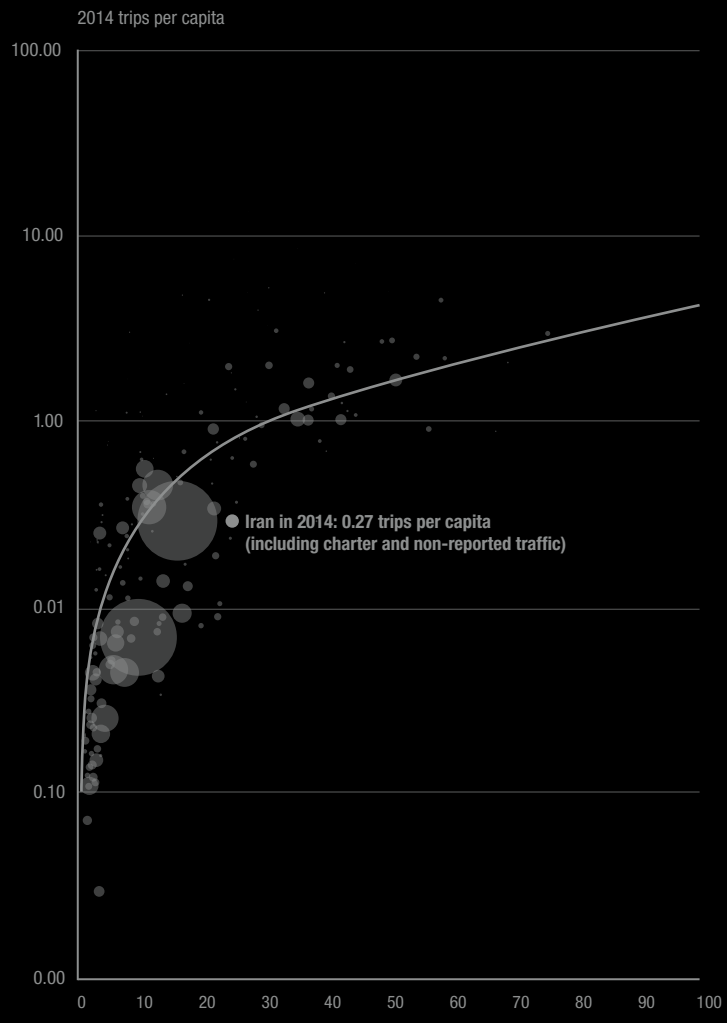


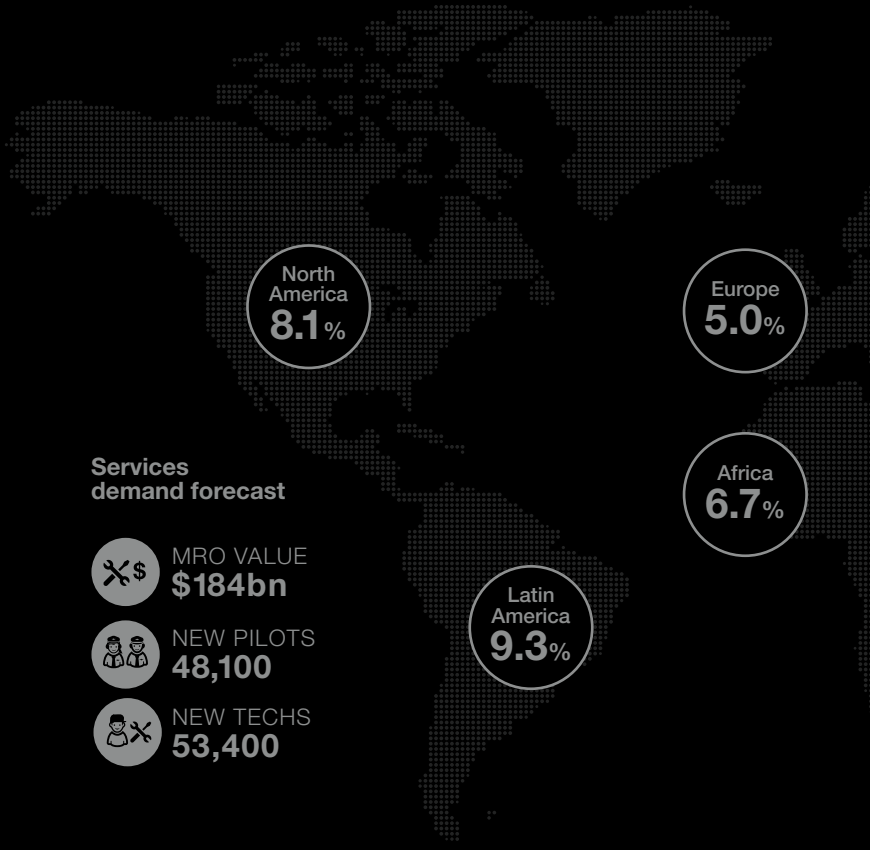


LONG-TERM ECONOMIC FORECASTS HAVE BEEN REVISED UPWARDS FOR IRAN
Source: IHS Economics, Airbus



PROPENSITY TO TRAVEL IN IRAN IS BELOW ITS POTENTIAL
Source: Sabre, IHS Economics, Airbus GMF 2015





Services demand forecast

MRO VALUE
$184bn

NEW PILOTS
48,100

NEW TECHS
53,400

Results

Economy**

Real Trade
4.0%

Real GDP
3.6%

Traffic**

Intra-regional & domestic
5.5%

Inter-regional
6.2%

Total traffic
6.2%

Fleet*

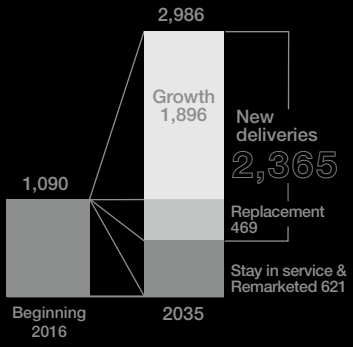
Fleet in service
2015 1,090
2035 2,986

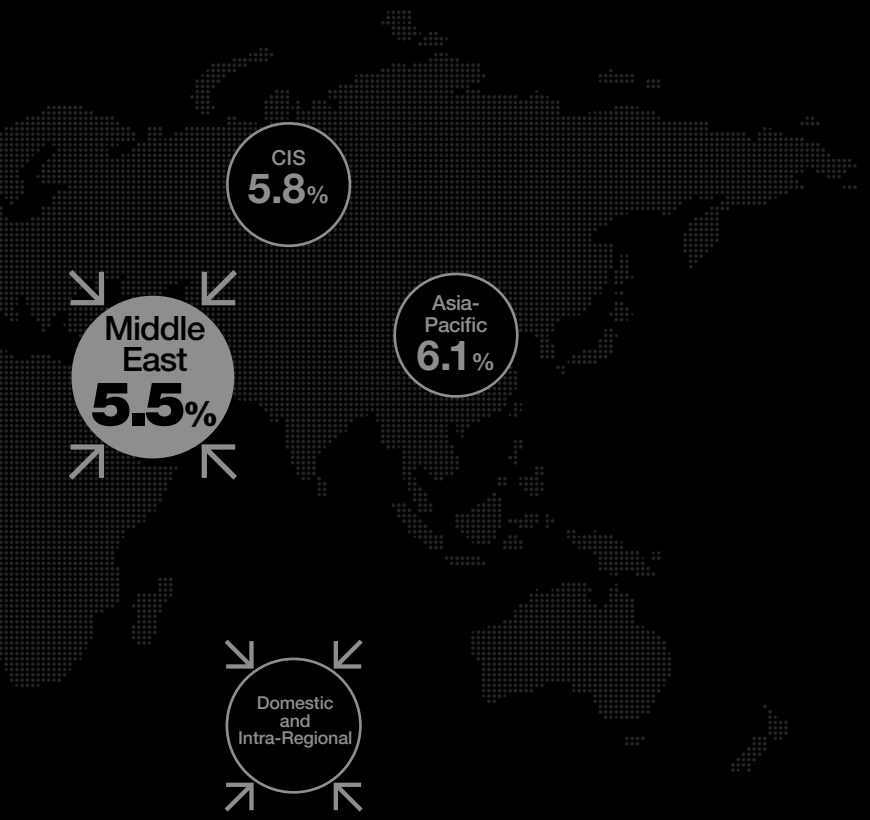
20 year new deliveries
2,365

* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

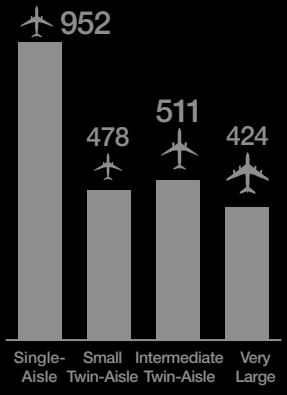
Fleet in service evolution

Fleet size*

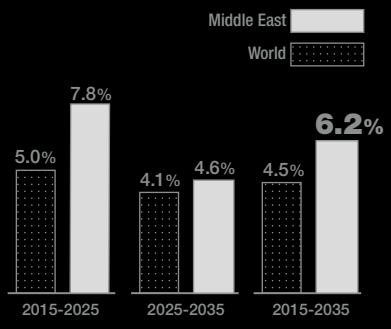




New deliveries by segment
Number of new aircraft



Total RPK traffic growth



Latin America & Caribbean

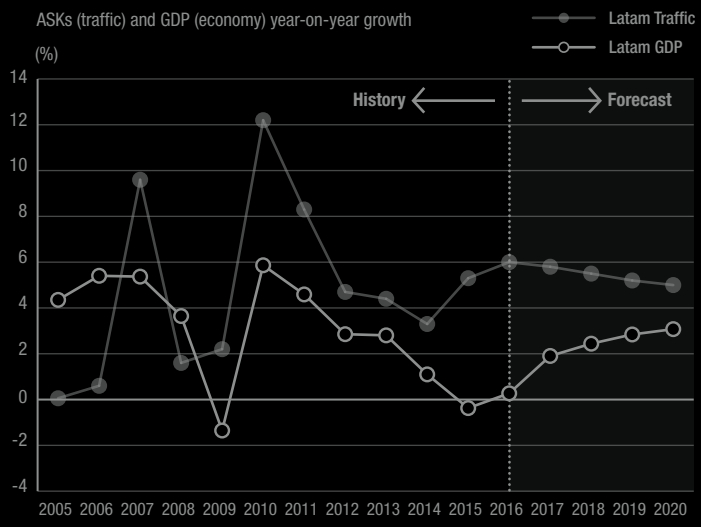
LATIN AMERICA - CITIES AND PEOPLE DEFINING DEMAND

- Despite economic perturbations like those in Brazil at the time of writing, and longer term challenges like income equality and general infrastructure, the Latin America economic outlook remains positive with Real GDP growth forecast to average +2.9% per year over our forecast period.
- Latin America has the second highest level of urbanisation, at 80%, when compared to other regions.
- The region's middle-class will more than double to reach half a billion people by 2035, helping to drive aviation growth.
- Traffic growth remained relatively strong during the region's economic slowdown.
- At 9% of origin and destination passengers, intra-regional traffic is still under developed and there is potential for continued growth in air travel between its + 40 countries. In fact, intra-regional demand is higher in every other region except North America (two countries, the US and Canada).
- Connecting traffic is growing, especially in Brazil where passengers connecting through the country has grown nearly a third in three years.
- As in other parts of the world, aircraft are getting bigger in Latin America. Since 1994, average seats per aircraft has grown nearly 1% per year.

Real GDP growth
+2.9%
per year over our forecast period

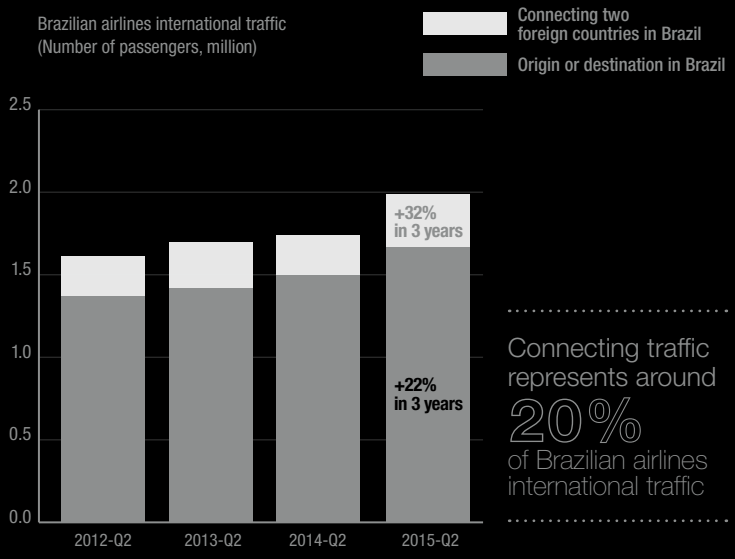
LATIN AMERICAN TRAFFIC GROWTH REMAINED STRONG DESPITE ECONOMIC DOWNTURN

Source: IHS Economics, OAG (Sept. data), Airbus GMF



CONNECTING TRAFFIC IN BRAZIL INCREASING FASTER THAN ORIGIN-DESTINATION TRAFFIC

Connecting passengers counted once
Source: ANAC, Sabre GDD, Airbus



Connecting traffic represents around **20%** of Brazilian airlines international traffic

LATIN AMERICA HAS A STRONG POTENTIAL FOR INTRA-REGIONAL TRAFFIC

Source: UNPD Department of economic and social affairs, IHS Economics, Airbus Market Research & Forecasts

Number of daily intra-regional flights to/from/within cities >3m people

18 cities with a population **>3 million in 2014**

~700 intra-regional flights/day

137m people in 18 cities

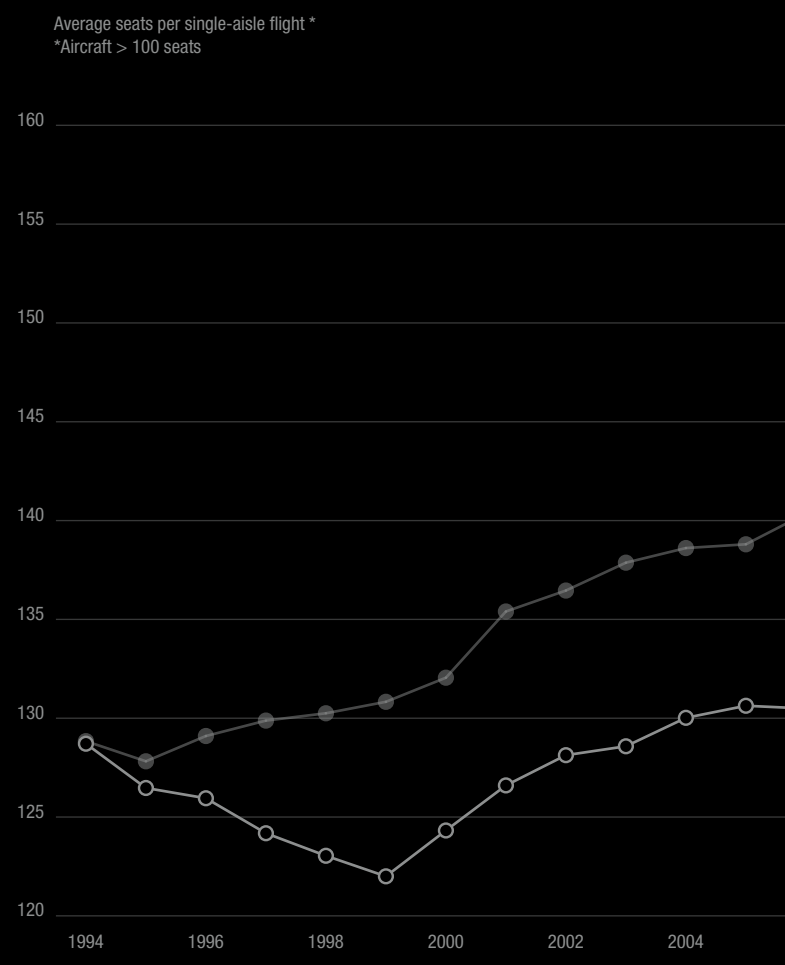
14 cities with a population **>3 million in 2014**

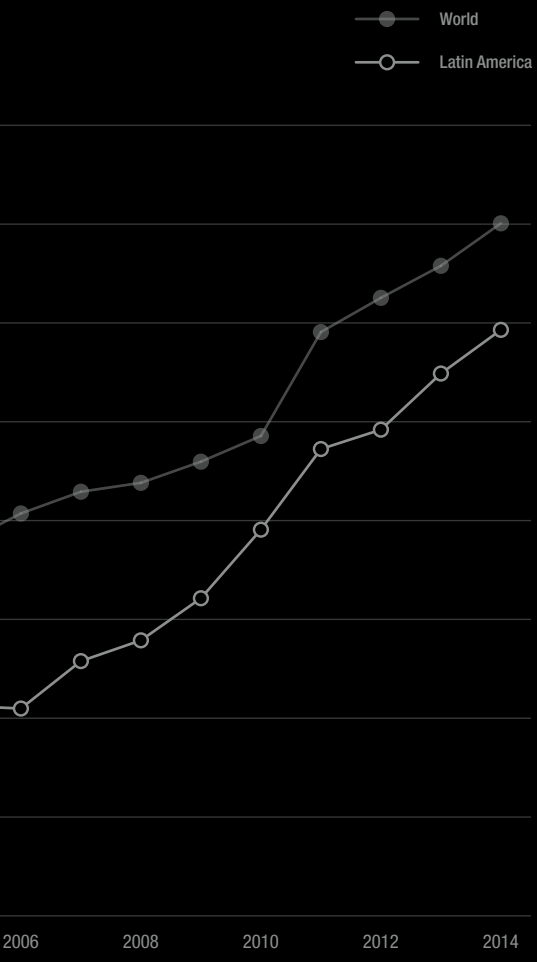
~6,600 intra-regional flights/day

77m people in 14 cities

AIRCRAFT IN THE REGION ARE GETTING BIGGER

Source: OAG, Airbus Market Research and Forecasts

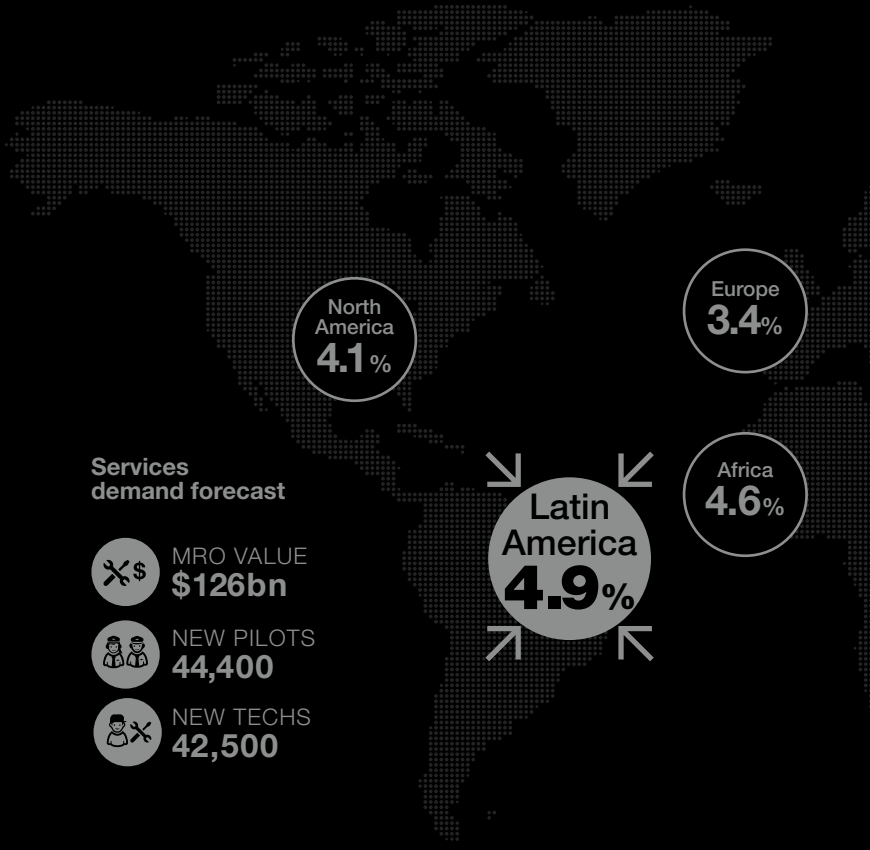




Latin America

1994-2014 annual growth on average single-aisle seats

0.8%



Services demand forecast

MRO VALUE **$126bn**

NEW PILOTS **44,400**

NEW TECHS **42,500**

Results

Economy**

Real Trade	Real GDP
3.2%	**2.9%**

Traffic**

Intra-regional & domestic 4.9%

Inter-regional 4.1%

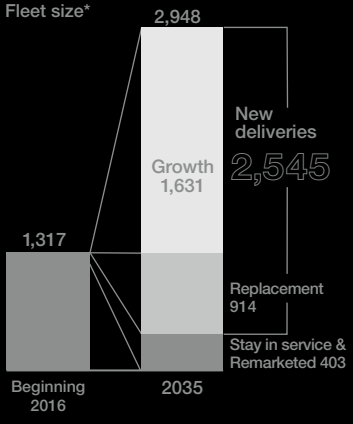
Total traffic **4.4%**

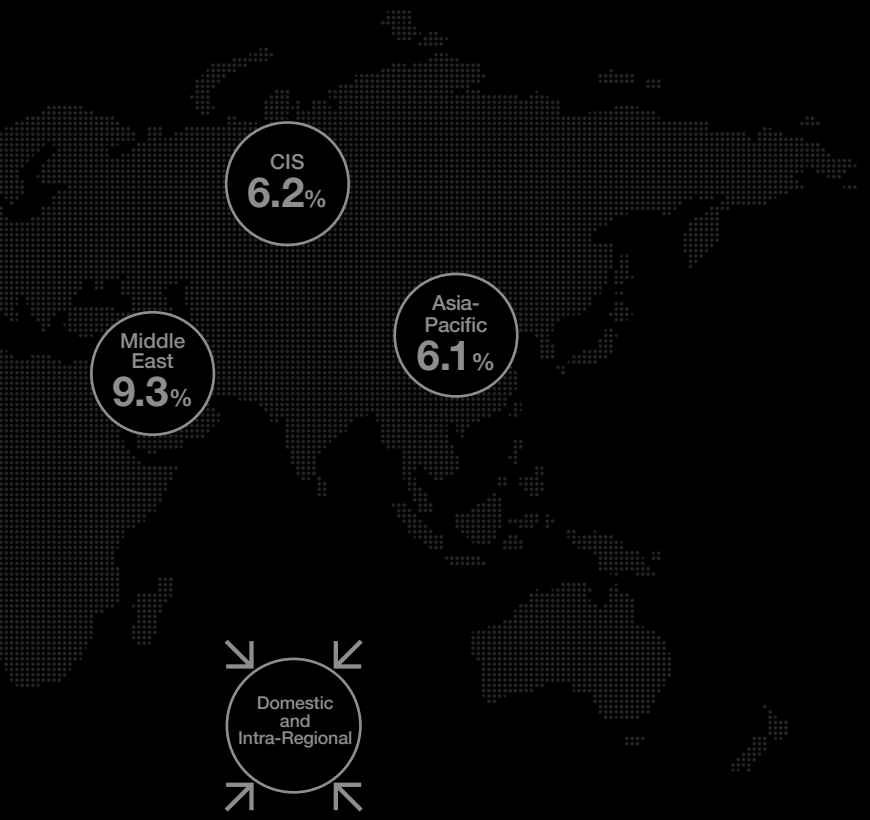
Fleet*

Fleet in service		20 year new deliveries
2015	2035	**2,545**
1,317	2,948	

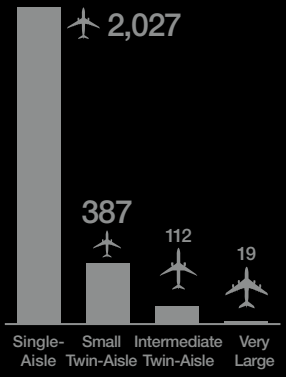
* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

Fleet in service evolution

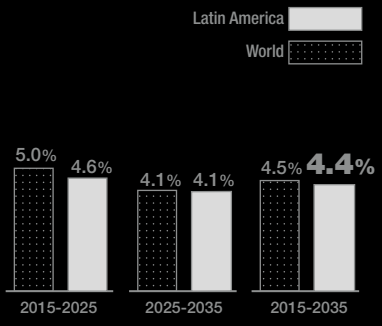


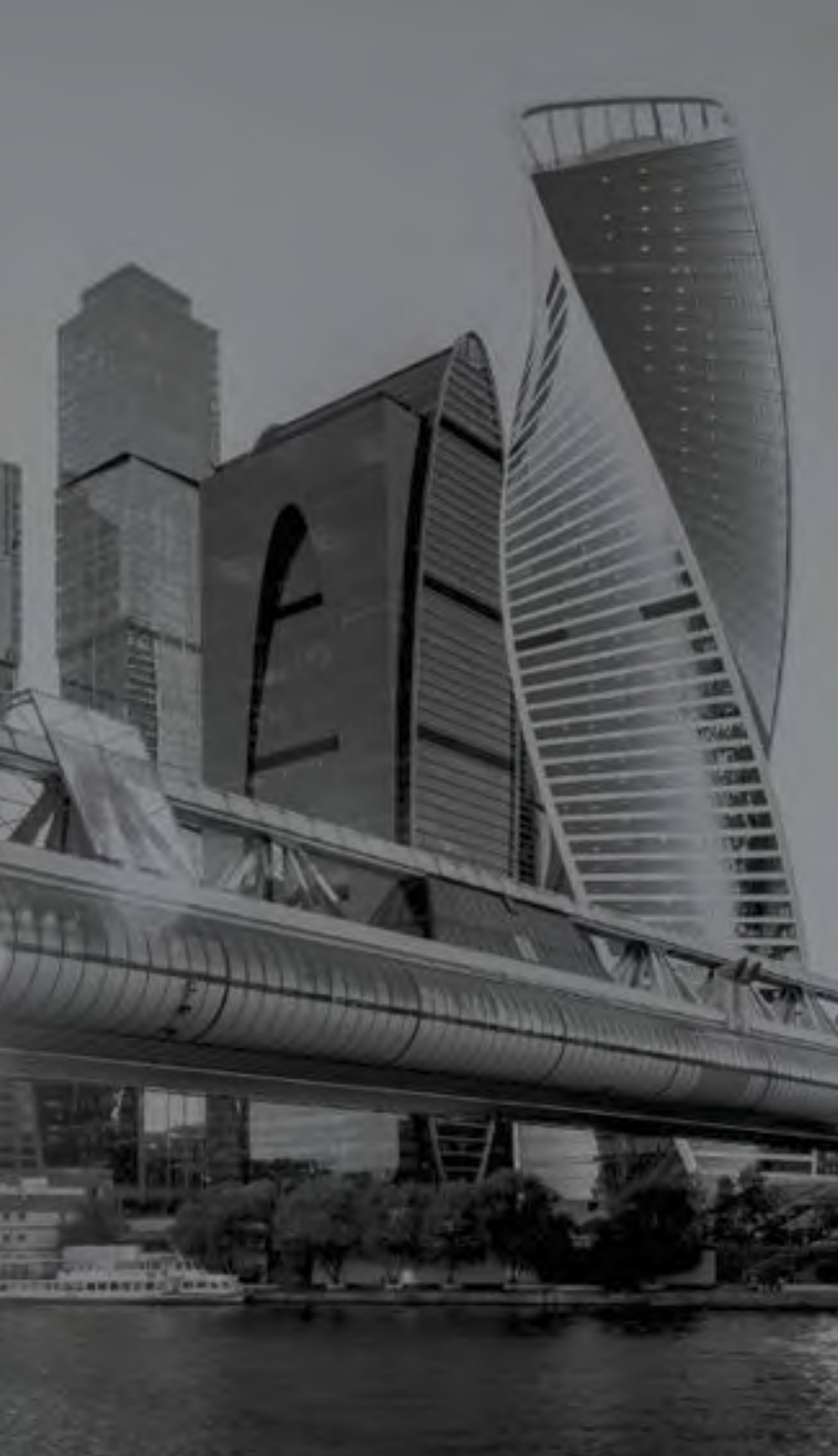


New deliveries by segment
Number of new aircraft



Total RPK traffic growth





Commonwealth of Independent States

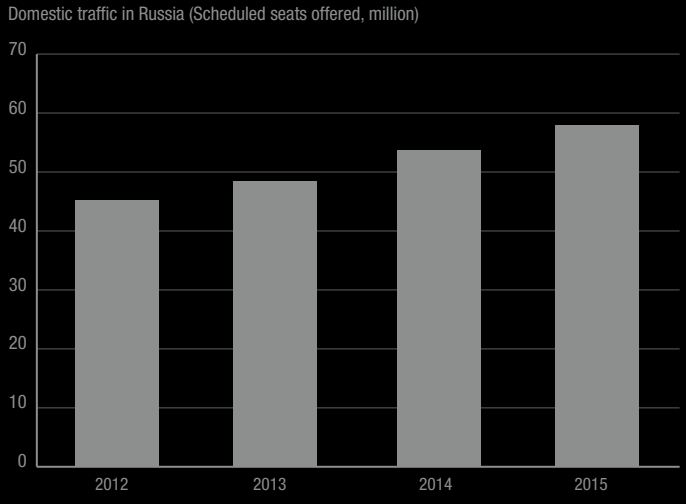
TAKING OFF AGAINST THE WIND

- The drop in oil prices, economic and financial sanctions, and capital flight have impacted the Russian economy and the collective performance of the CIS.
- A decrease in Russia's currency value has had a negative effect on outbound tourism, but **domestic traffic growth remained positive.**
- **Connecting traffic** operated by Russian airlines has **grown 90% in three years,** being less dependent on the local economy. Today, connecting traffic represents around 15% of international traffic of the Russian airlines and is likely to grow.
- The economic downturn witnessed today has an impact in the short-term, but the **longer-term economic potential remains.** The CIS' real GDP growth is forecast to average **2.4%** per year over the next 20 years.
- Whilst GDP growth will help to drive aviation's development in the region, so to will a forecast growth in wealth. Russian middle classes are still expected to develop with some 70% of the population forecast to be in this grouping at Purchasing Power Parity by 2035.
- Passenger traffic in the long-term will grow to the point that trips per capita will reach current European levels.
- The other countries in the CIS will also continue to develop beyond their links to Russia, with one indicator for this potential the **growing share of imports and exports to other countries and regions** beyond Russia.

Real GDP growth is forecast to average **2.4%** per year over the next 20 years

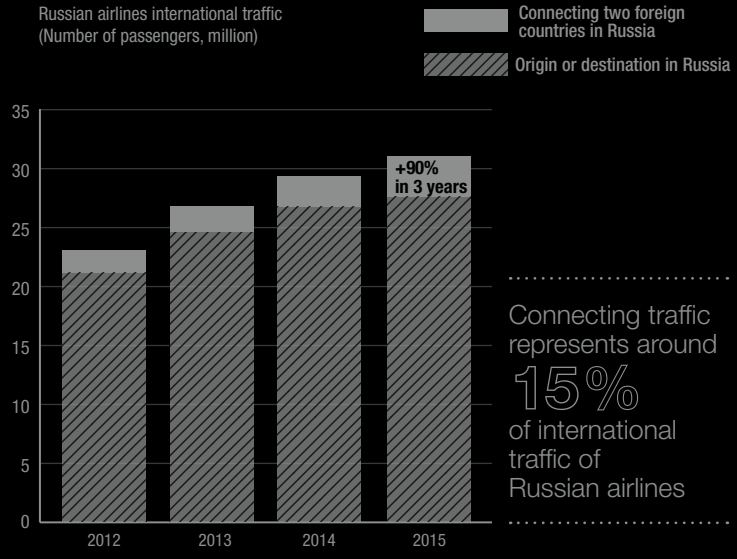
DESPITE ECONOMIC DOWNTURN, POSITIVE GROWTH FOR THE DOMESTIC RUSSIAN MARKET

Source: OAG, Airbus



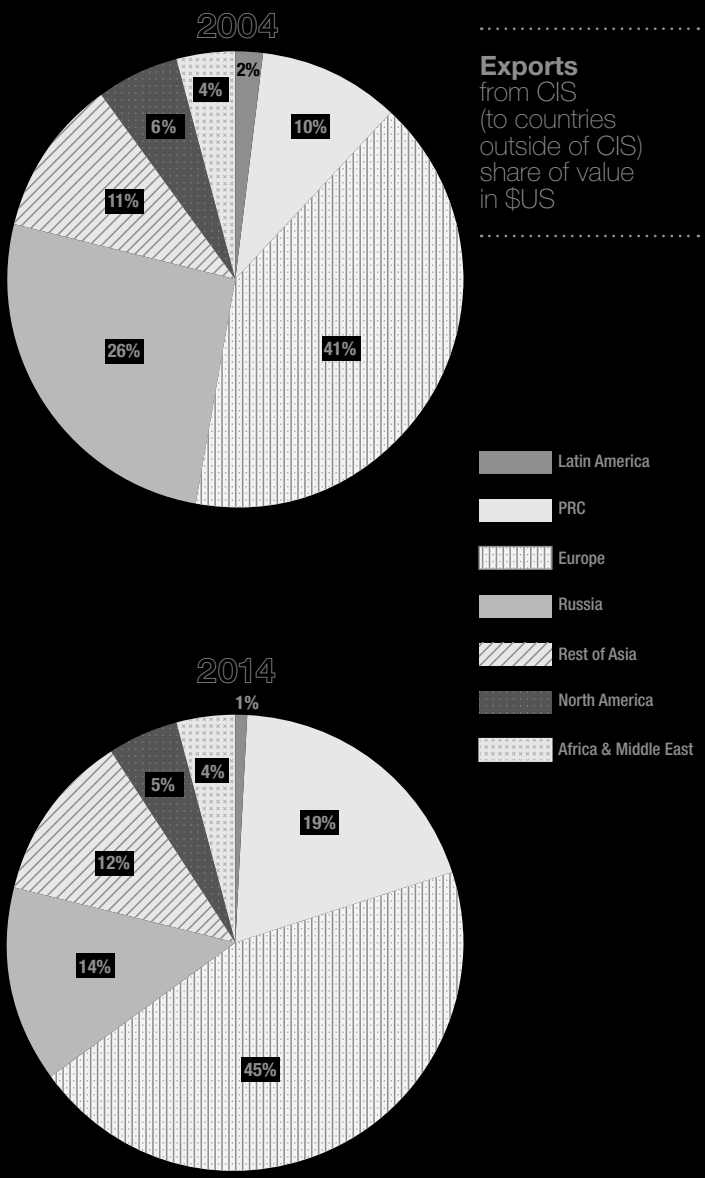
CONNECTING TRAFFIC HELPING DURING DIFFICULT TIMES

Connecting passengers counted once
Source; Sabre GDD, Airbus



Connecting traffic represents around **15%** of international traffic of Russian airlines

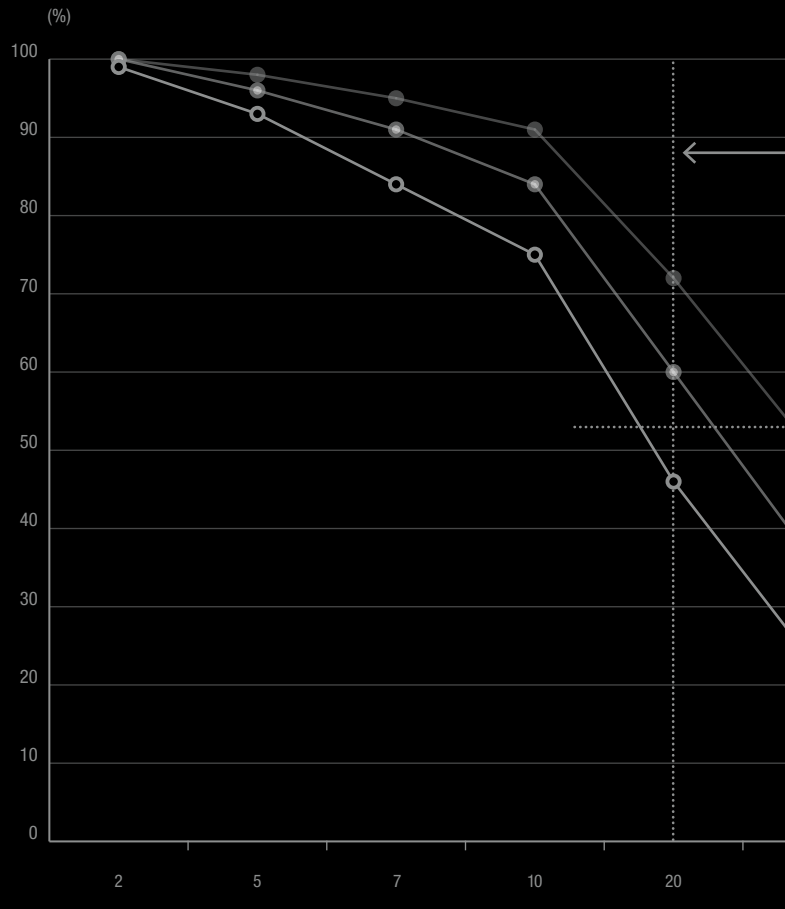
CIS COUNTRIES FORGING LINKS BEYOND ITS BOUNDARIES
Source: Seabury, Airbus

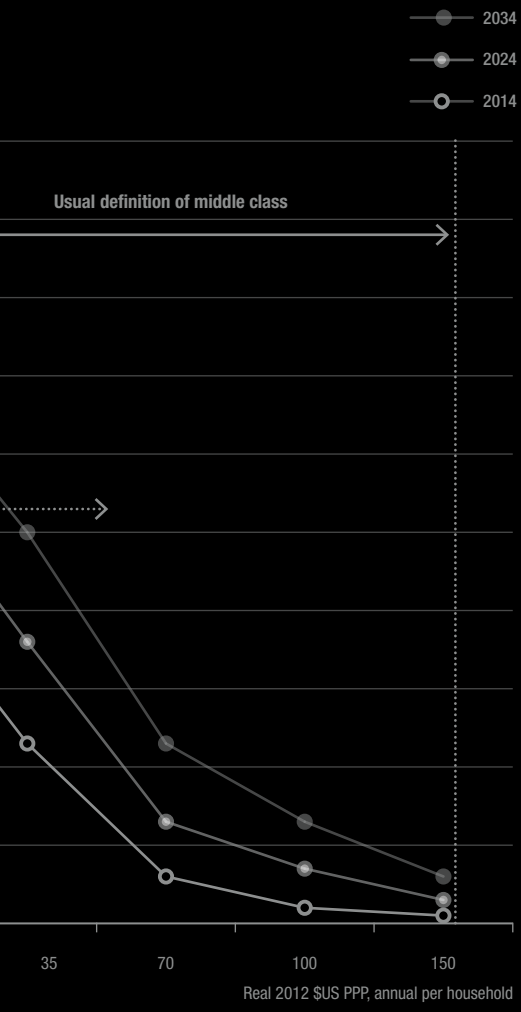


RUSSIAN MIDDLE CLASS WILL CONTINUE TO DEVELOP

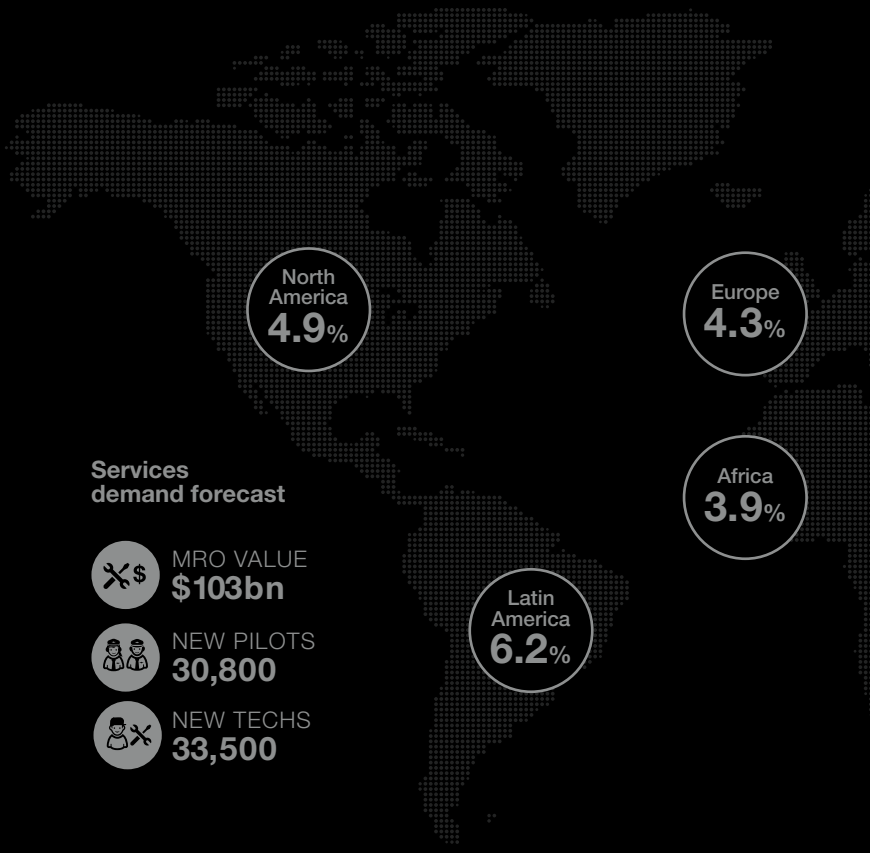
2012 PPP exchange rate with US$: 18.3 rubble per US$
Average household size: 2.6
Source: Oxford Economics, Airbus

Income distribution in Russia





Share of households earning more than each income threshold



Services demand forecast

MRO VALUE **$103bn**

NEW PILOTS **30,800**

NEW TECHS **33,500**

Results

Economy**

Real Trade 2.7%

Real GDP **2.4%**

Traffic**

Intra-regional & domestic 3.9%

Inter-regional 5.0%

Total traffic **4.5%**

Fleet*

Fleet in service

2015 824

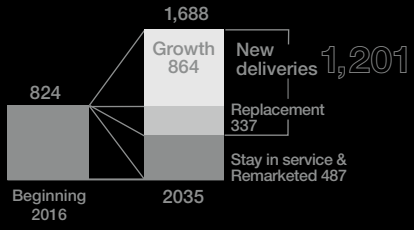
2035 1,688

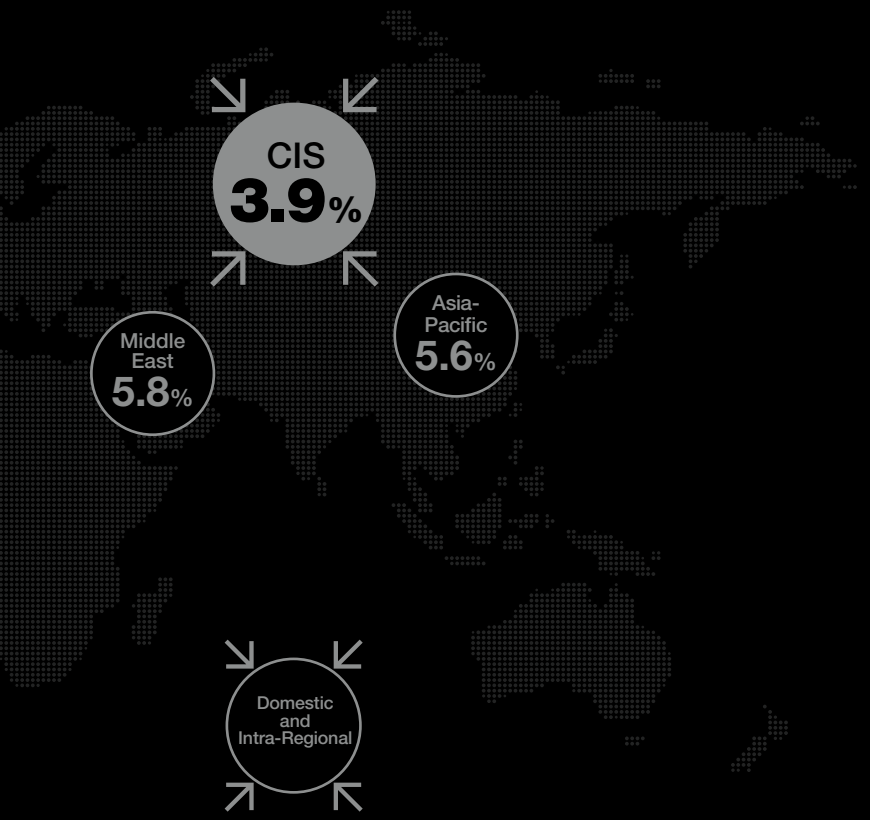
20 year new deliveries **1,201**

* Passenger aircraft ≥100 seats
** 2015-2035 CAGR

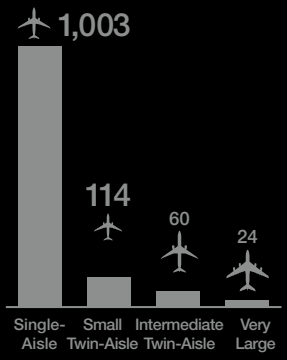
Fleet in service evolution

Fleet size*

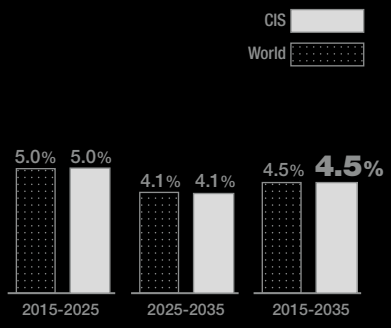




New deliveries by segment
Number of new aircraft



Total RPK traffic growth



Africa

AVIATION DEMAND ACROSS THE MAP

- Beyond developments in global commodity markets, which can fluctuate depending on demand from large economies including China, expanding domestic markets, growing middle-class populations, and regional integration will help to support long term economic growth. The African region's real GDP growth is forecast to average **3.6%** per year over the next 20 years.
- Urbanisation across Africa is growing strongly. In 2015, there were 56 African cities with more than a million people. This compares to 58 in India and 38 in Europe for example. By 2025, there will be 19 cities with over 4 million people, cities that will increasingly need the benefits brought by connectivity including wealth and commerce.
- Today, countries in the region are growing their aviation inventories, with some of the largest in terms of their populations, also the highest in terms of aircraft to population size ratio. It also shows how aviation is developing around the compass, not just north and south but increasingly west and east.
- Since 2005 inter/intra-regional African traffic has grown dramatically. But many industry stakeholders believe that greater liberalisation in the region remains possible and in fact essential for its countries and people.
- IATA commissioned a study which examined the potential benefits from the greater liberalisation of air services for 12 of the 44 signatories of the Yamoussoukro Decision in 1999. Their study showed that increased liberalisation would lead to stimulation factors such as lower fares and greater connectivity, which themselves would lead to more traffic, more jobs, an estimated 155 thousand jobs in aviation, tourism, and the wider economy, and could contribute US$1.3 billion to annual GDP.

3.6%
real GDP growth per year

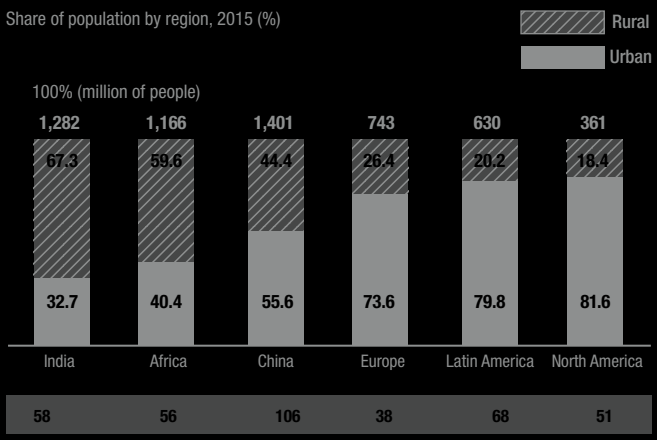
THERE WILL BE 22 AFRICAN CITIES WITH OVER 4 MILLION PEOPLE IN 2025

Source: UN Population Division, Airbus Market Research & Forecasts

Most populated African cities in 2025, (population > 4 million)

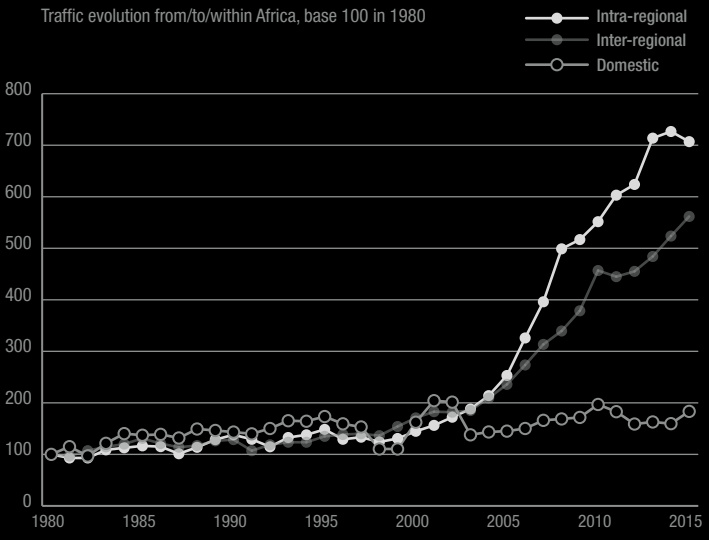
AFRICA'S URBANISATION CATCHING CHINA

Source: UNDP, Airbus Market Research & Forecasts



INTRA-REGIONAL TRAFFIC HAS SURGED IN THE LAST TEN YEARS

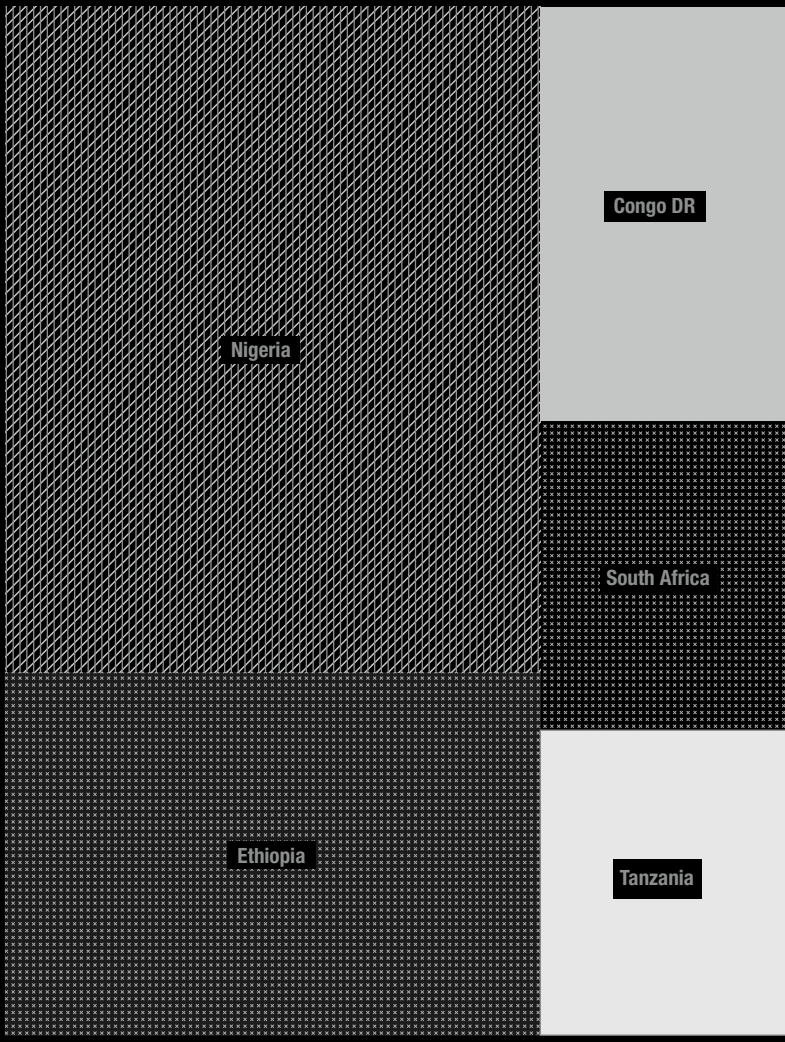
Source: OAG, Airbus Market Research & Forecasts



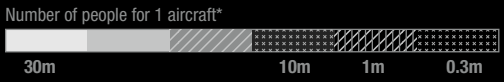
MORE AIRCRAFT PER CAPITA IN SUB SAHARAN COUNTRIES

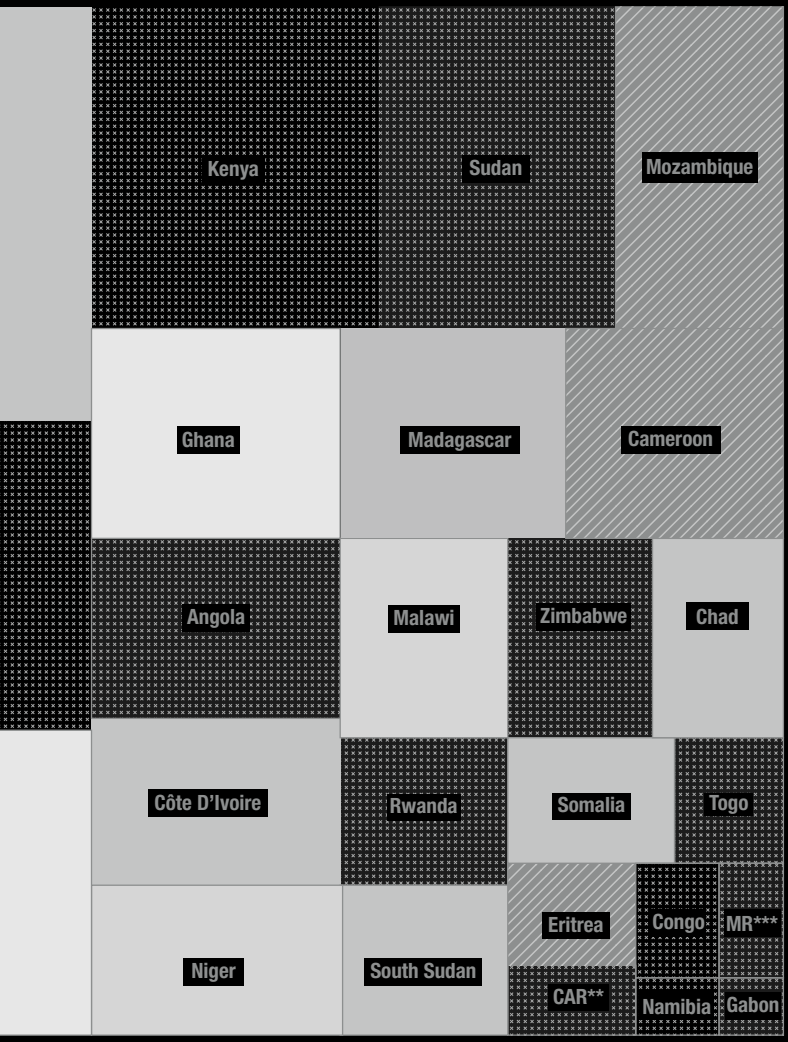
Source: Ascend, IHS Economics, Airbus Market Research & Forecasts

Capita per domiciled aircraft in Sub Saharan countries in 2015



Square size proportional to respective country population size, countries with population > 1.5m people
* All passenger aircraft >100 seats





** Central African Republic

*** Mauritania

North America 4.6%

Europe 3.8%

Africa 6.0%

Latin America 4.6%

Services demand forecast

MRO VALUE **$76bn**

NEW PILOTS **21,700**

NEW TECHS **22,200**

Results

Economy**

Real Trade 4.8%

Real GDP **3.6%**

Traffic**

Intra-regional & domestic 6.0%

Inter-regional 5.3%

Total traffic **5.4%**

Fleet*

Fleet in service

2015 605

2035 1,370

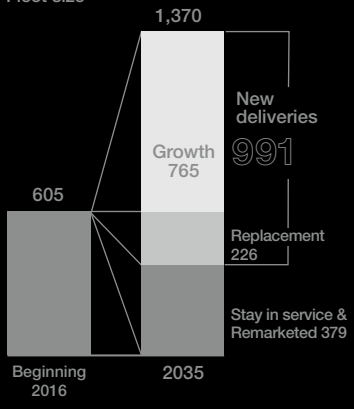
20 year new deliveries **991**

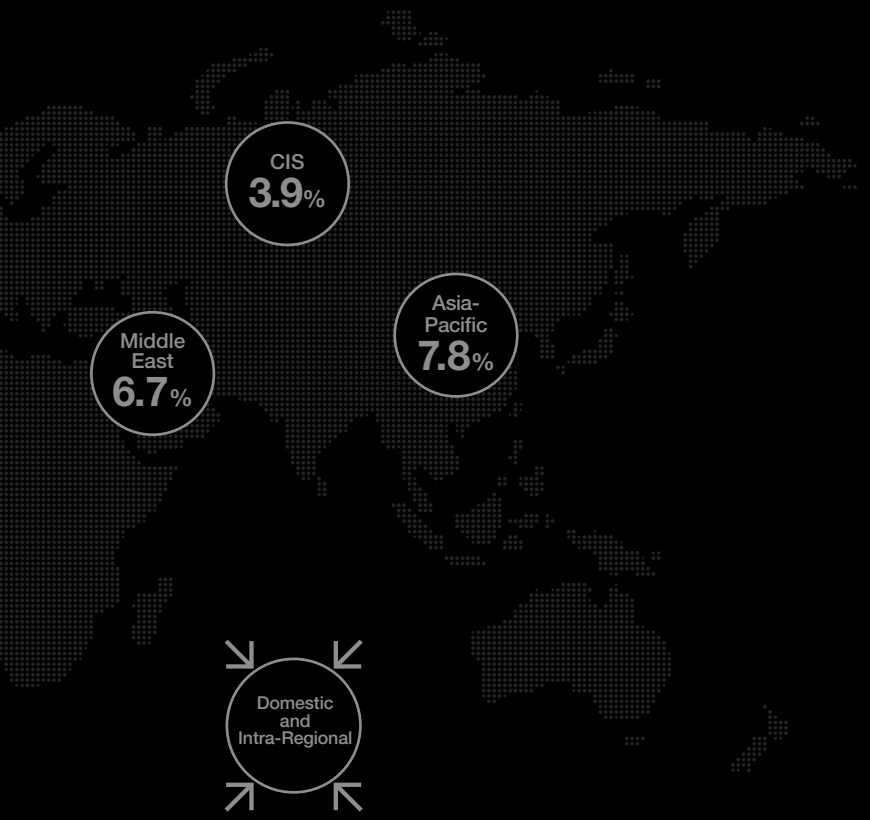
* Passenger aircraft ≥100 seats

** 2015-2035 CAGR

Fleet in service evolution

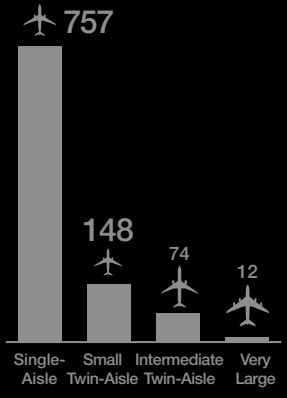
Fleet size*



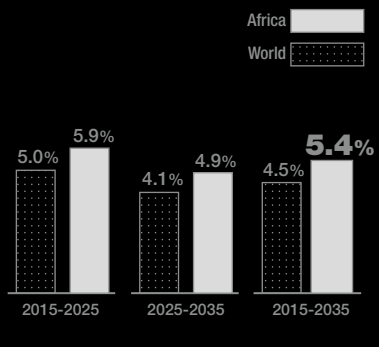


New deliveries by segment

Number of new aircraft



Total RPK traffic growth



06

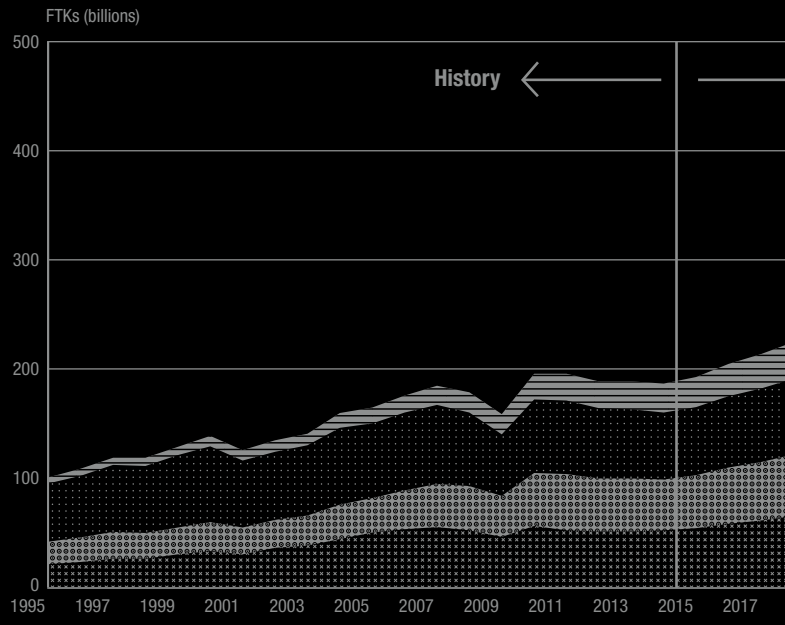
Freighter forecast

- Even though air cargo has faced some challenging times in recent years, e.g. yields declining, slow growth, overcapacity, there are however potential niche **growth areas** including:
  - **Express carriers**, who have continuously reported positive growth figures (with the exception of 2009).
  - **E-commerce** represents a strong growth opportunity, particularly in emerging economies. For example express in China is booming, and with just 50-70 aircraft flying today, compared with ~400 aircraft flying for express carriers on domestic operations in the US.

- **Middle Eastern carriers are successfully replicating their passenger hub and spoke strategy for the cargo** market with the use of various aircraft types and capabilities (777F, A330F and the use of belly hold capacity).

- **Belly capacity is a complementary to dedicated freighters:**
  - Belly capacity is increasing faster than cargo traffic due to healthy passenger traffic growth, and the underfloor freight capacity this can yield.
  - However, cargo intensive flows and belly capacity availability are not necessarily in sync e.g. on the trans-Pacific, thus stimulating dedicated freighter operations.

- There has been much discussion on “modal shift”, i.e. the transition of air freight to sea freight. Containerised sea freight has been growing faster than air freight, but looking at the commodity level shows that this growth has largely been the result of containerised sea freight taking share from bulk sea freight rather than air freight.



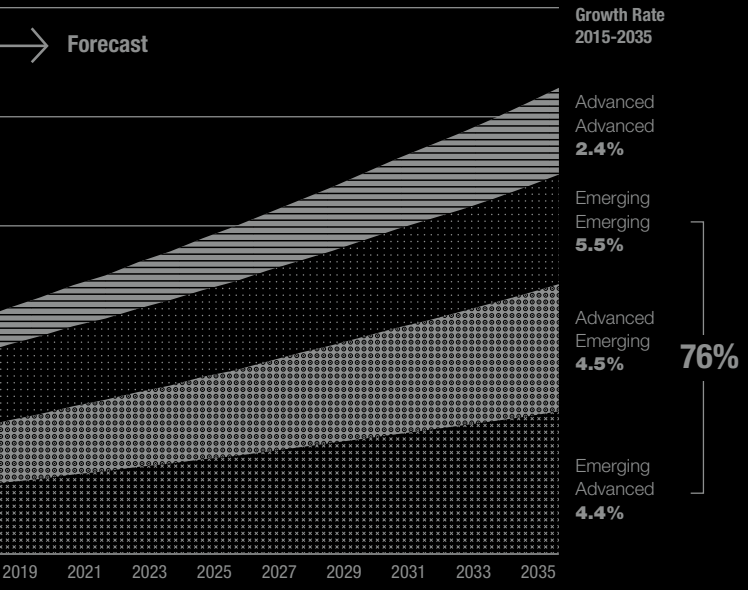
20 year world annual FTK growth

4.0%

Total traffic growth includes main deck and belly capacity

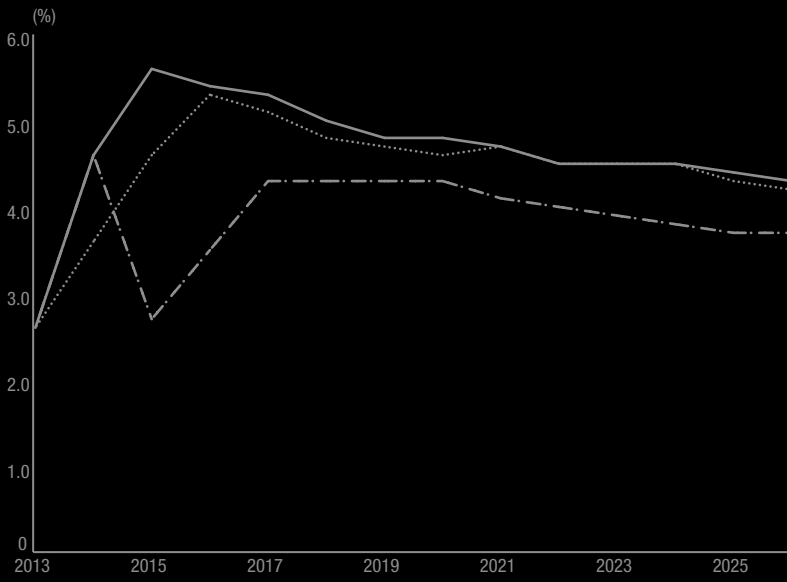
FREIGHT TRAFFIC GROWTH, DOMESTIC + INTERNATIONAL

Source: Airbus GMF 2016



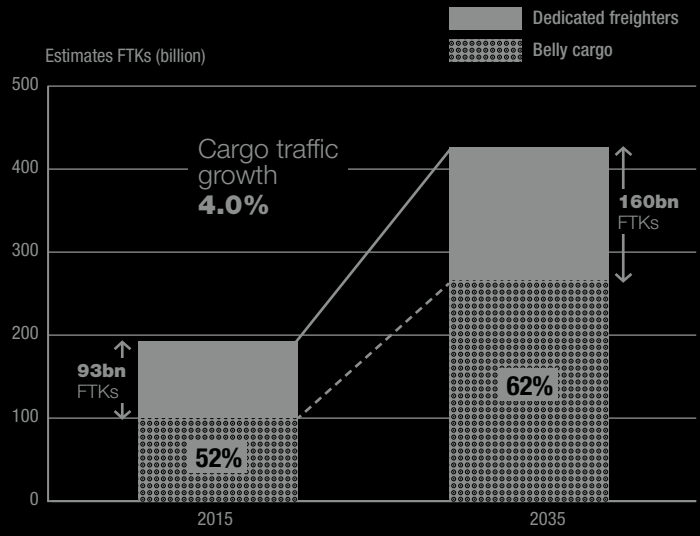
WORLD TRADE FORECASTS

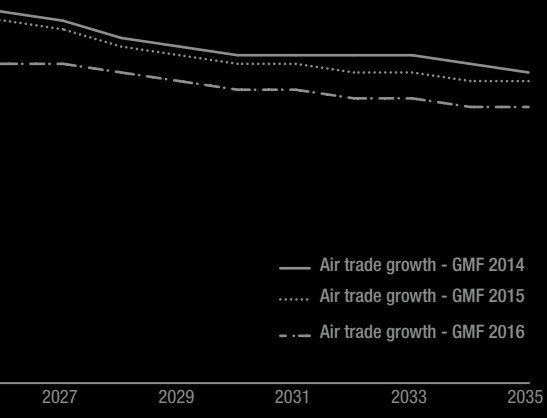
Source: Airbus GMF 2016



WORLDWIDE SHARE OF BELLY VS DEDICATED CARGO TRAFFIC

Source: Airbus GMF 2016





GMF 2014 trade CAGR
2015 - 2035
4.3%

GMF 2015 trade CAGR
2015 - 2035
4.1%

GMF 2016 trade CAGR
2015 - 2035
3.7%

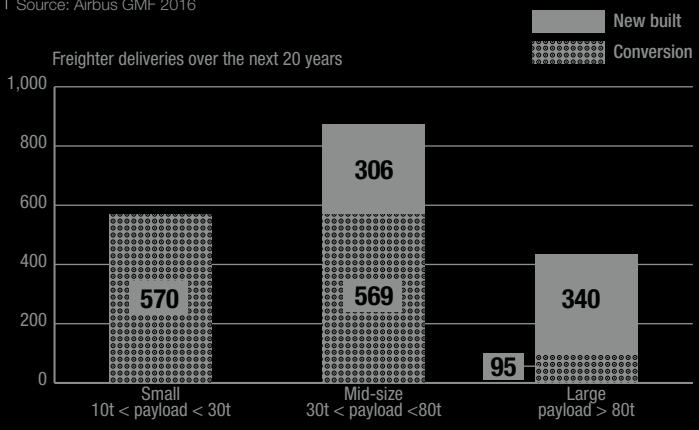
Belly capacity will capture market share

Impact is mainly on long haul flows

Main assumption being that belly load factors remain stable

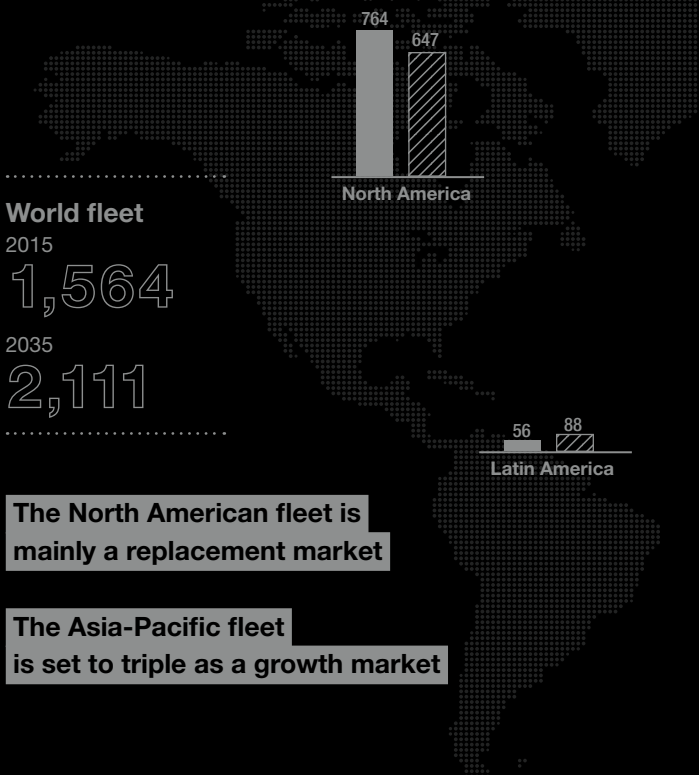
FREIGHTER DELIVERIES OVER THE NEXT 20 YEARS

Source: Airbus GMF 2016



FUTURE FREIGHTER FLEET DISTRIBUTION WILL REFLECT THE GROWING INFLUENCE OF EMERGING MARKETS

Source: Airbus GMF 2016, ASCEND



World fleet

2015

1,564

2035

2,111

The North American fleet is mainly a replacement market

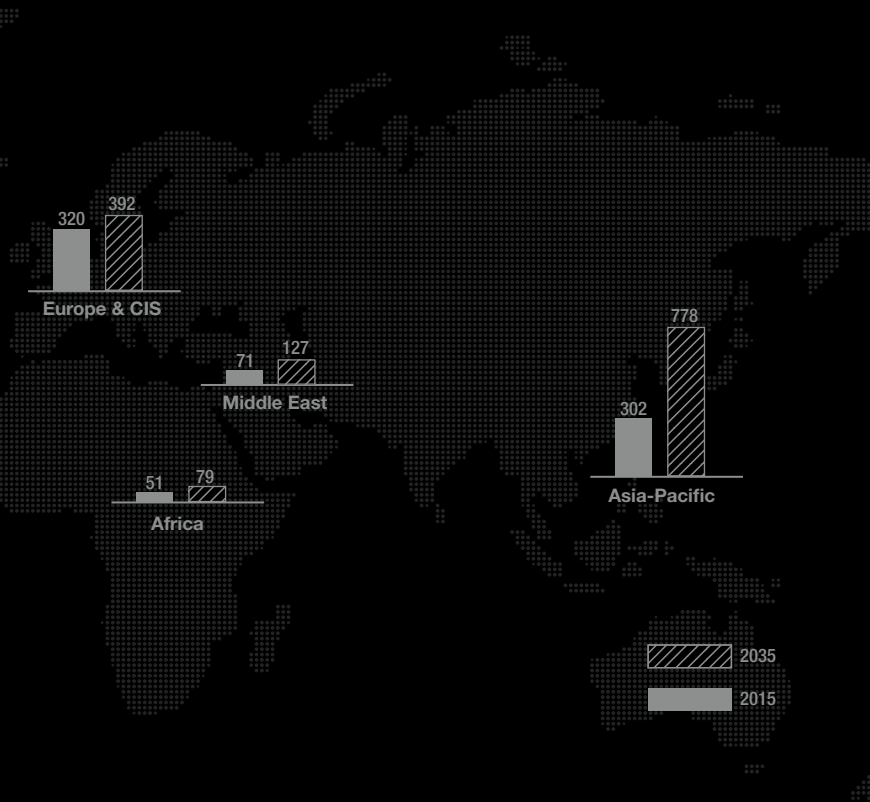
The Asia-Pacific fleet is set to triple as a growth market

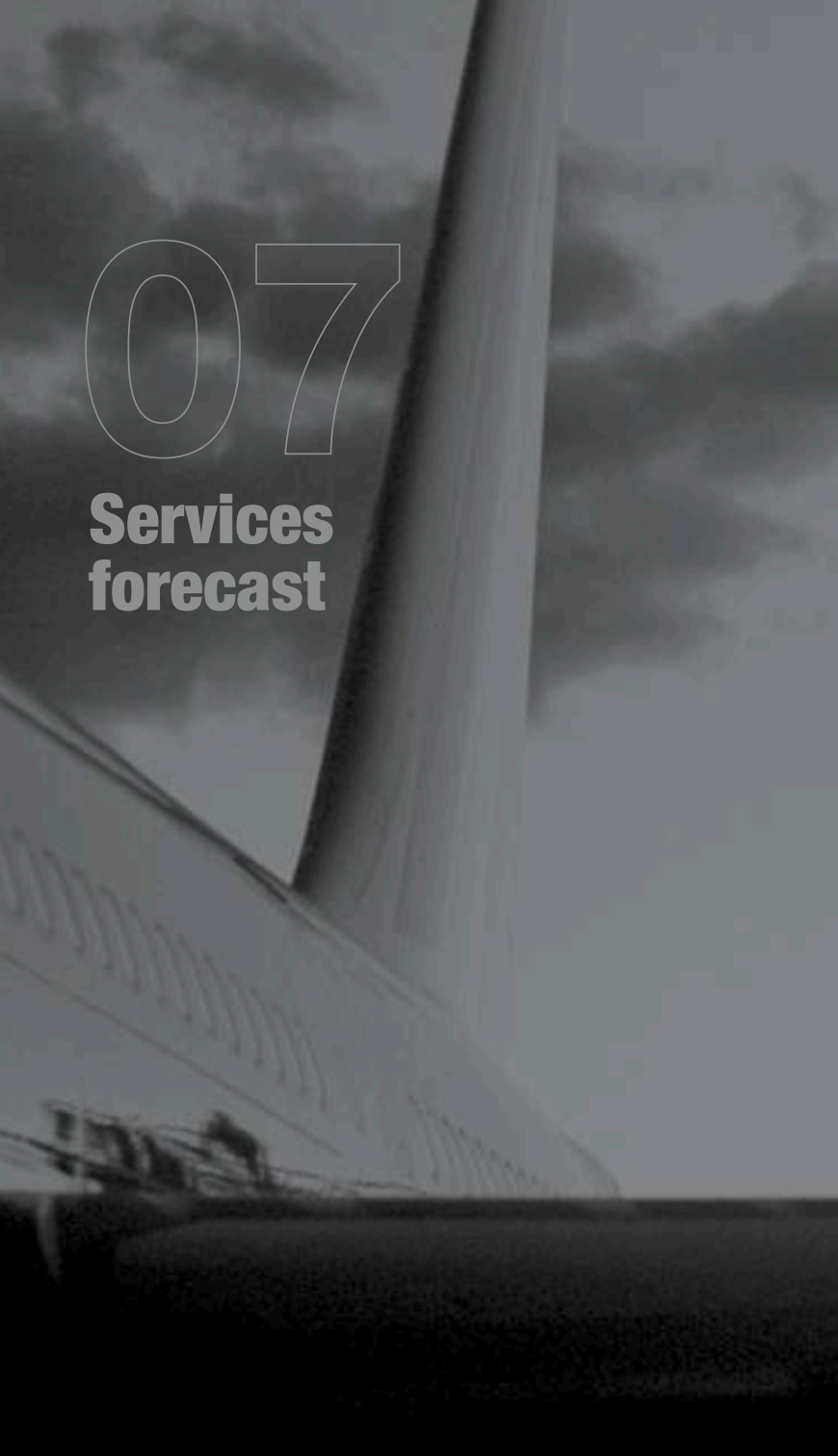
Mid-size freighter drivers

Replacement for US and Europe

Large growth in Asia-Pacific

New routes in Middle East, Latin America and Africa





07
Services forecast

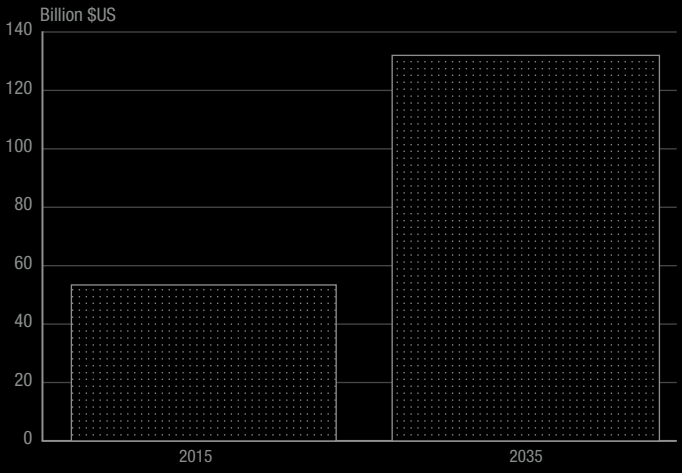
GROWING FLEET, A GROWING DEMAND FOR SERVICES

- For the first year we have added the Airbus view on the need for MRO (Maintenance, Repair and Overhaul) activities and forecast for pilot and technician training over the next 20 years.
- The services market is largely driven by evolution in the fleet of aircraft.
- At the end of 2015, the fleet of passenger aircraft over 100 seats was **18,000.** By 2035 this will more than double to **37,700,** with a corresponding increase in the need for MRO service, pilots and trained technicians.
- Today, there is already pressure building to meet these needs, particularly for pilots.
- Over the next 20 years the Maintenance, Repair and Overhaul business will grow from **$53 billion USD** to over **$132 billion USD** per year. This represents an average yearly growth of **4.6%** over the next 20 years. The total value of MRO activity, excluding upgrade services, over this period is expected to be **$1.8 trillion USD.**
- Today, there are an estimated **200,000 active pilots** in the passenger aircraft fleet over 100 seats. This is to grow to some **450,000 by 2035.**
- In order to meet this need and allowing for retirements etc. Airbus forecast the need for a total **560,000 new pilots** that will need to be trained to fly the world's fleet of passenger aircraft in 20 year's time.
- Large numbers of technicians will also be needed to meet the MRO needs of the growing passenger fleet. In its Services forecast, Airbus estimate a need to train **540,000 new technicians.** They will perform various activities across airframe, engines, and components for example.
- With the growing demand for aviation and its burgeoning airline fleets, Asia Pacific will represent the biggest market for both MRO activity and the need for pilots and technicians.
- Europe and North America combined will need about a third of the new pilots and technicians, as well as representing about a third of total MRO value.

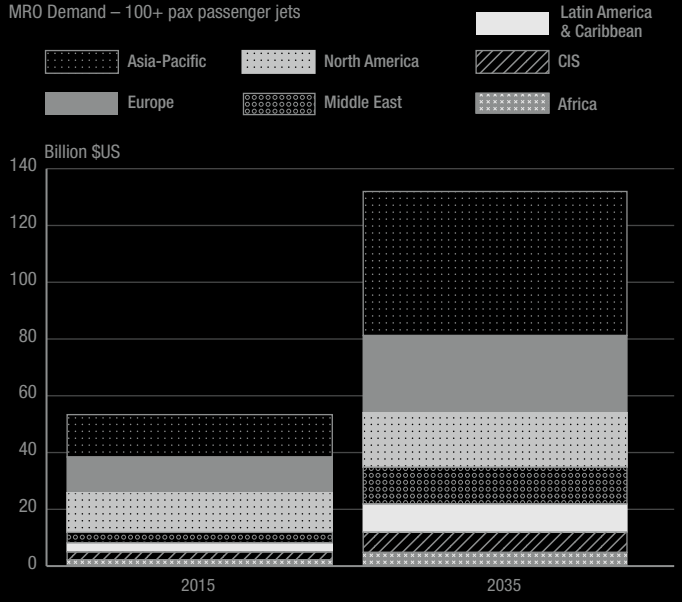
20 YEAR MRO DEMAND

Note: MRO Demand including Line / Airframe Component / Engine and excluding Upgrades

MRO Demand – 100+ pax passenger jets

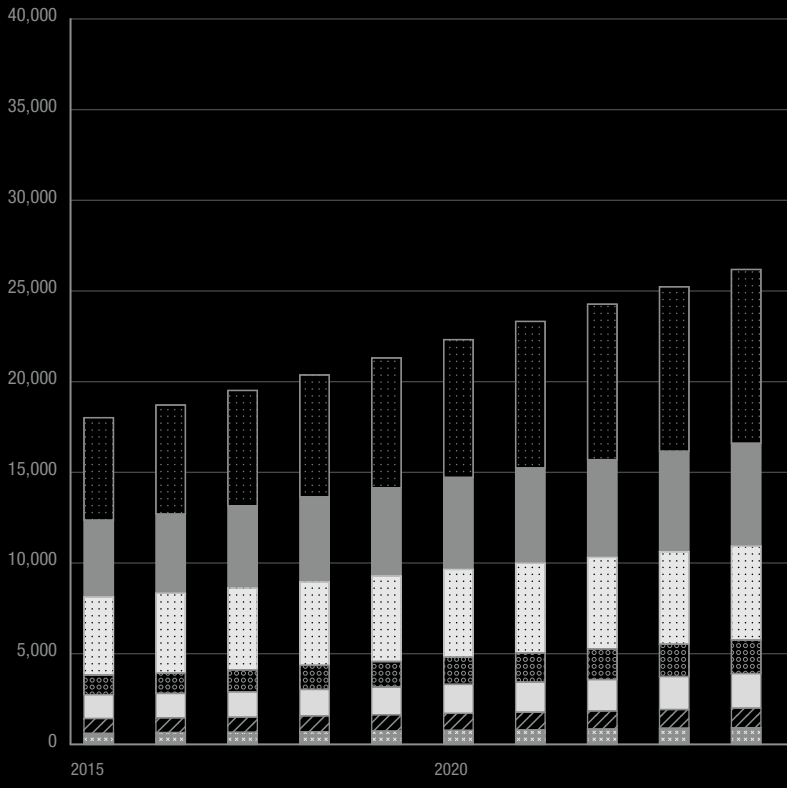


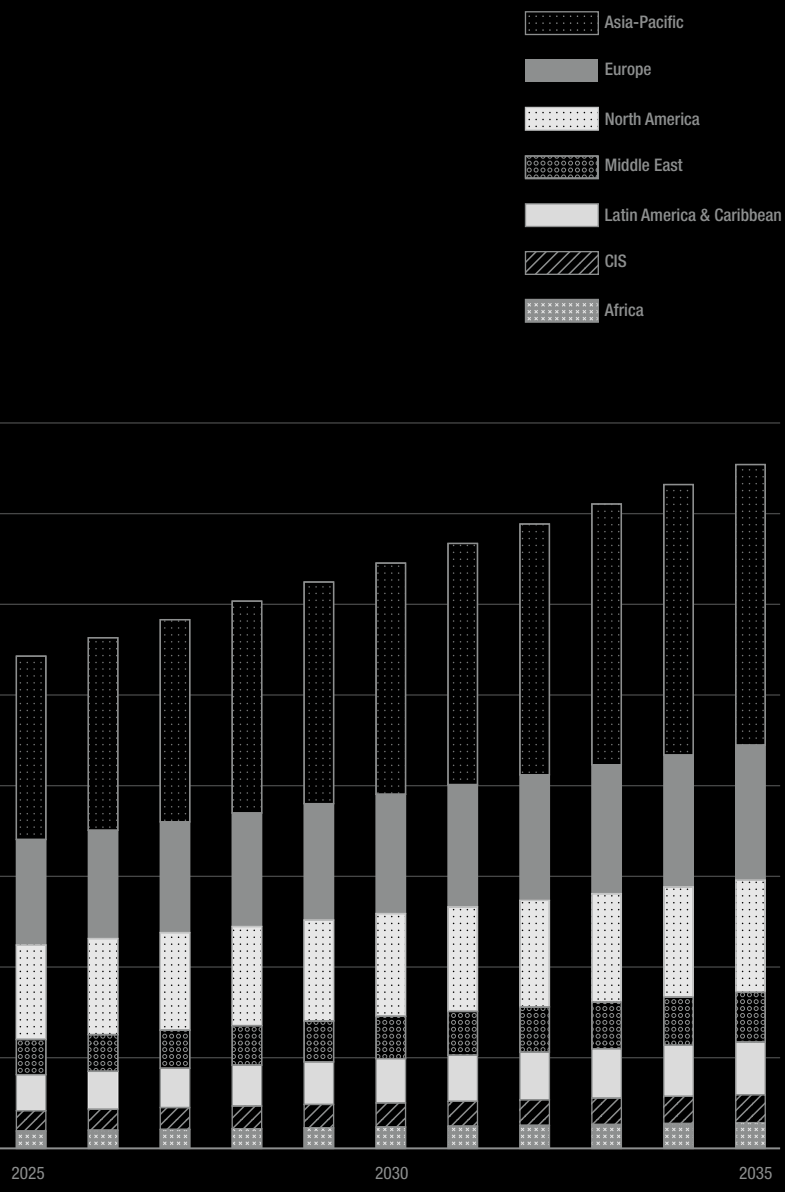
MRO Demand – 100+ pax passenger jets



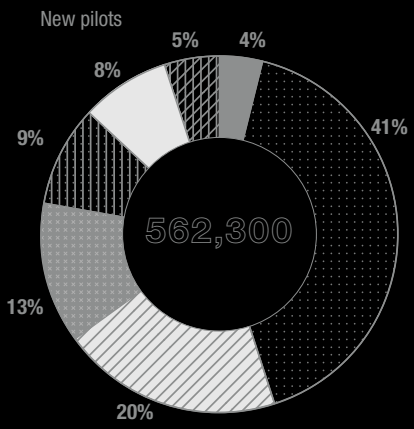
PASSENGER JET FLEET FORECAST

Fleet evolution by Region

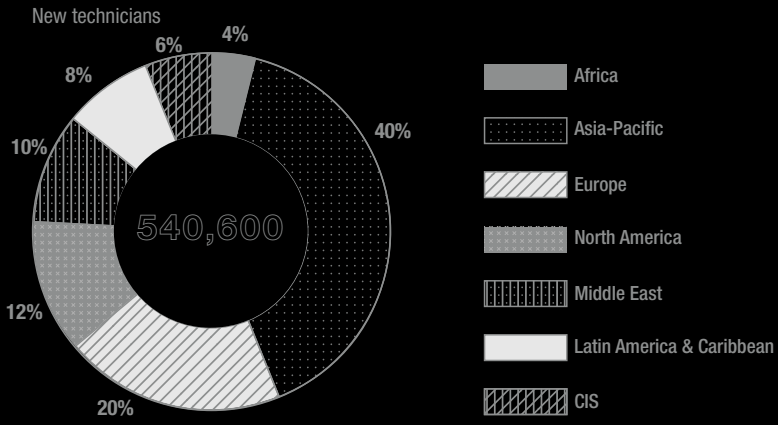



Asia-Pacific
Europe
North America
Middle East
Latin America & Caribbean
CIS
Africa
2025
2030
2035

20 YEAR PILOT / TECHNICIAN DEMAND FORECAST



2016-2035 New pilots / technicians demand



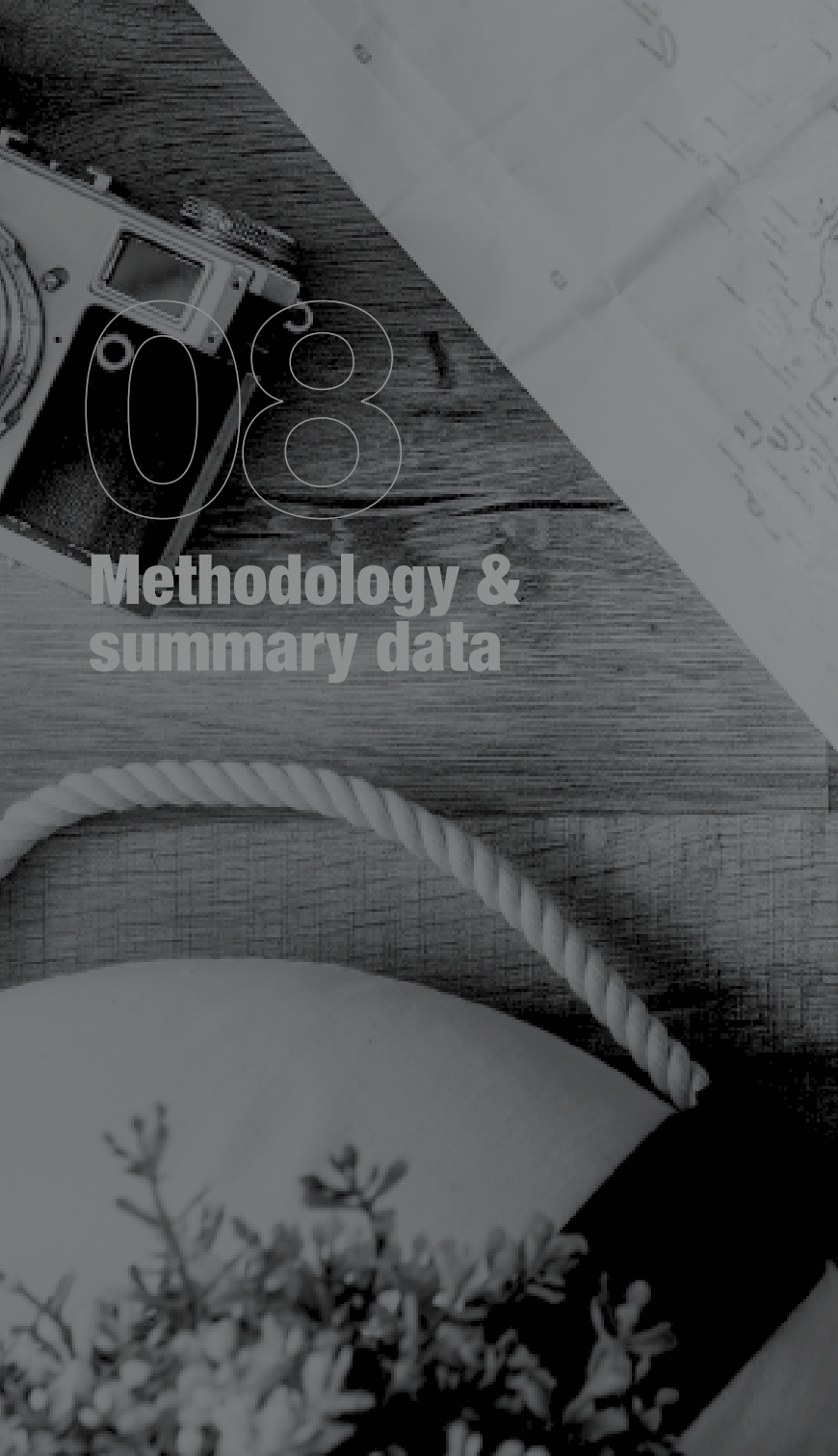
Europe
111,553
106,935

CIS
30,804
33,509

Middle East
48,132
53,390

Asia-Pacific
232,082
217,690

Africa
21,655
22,195

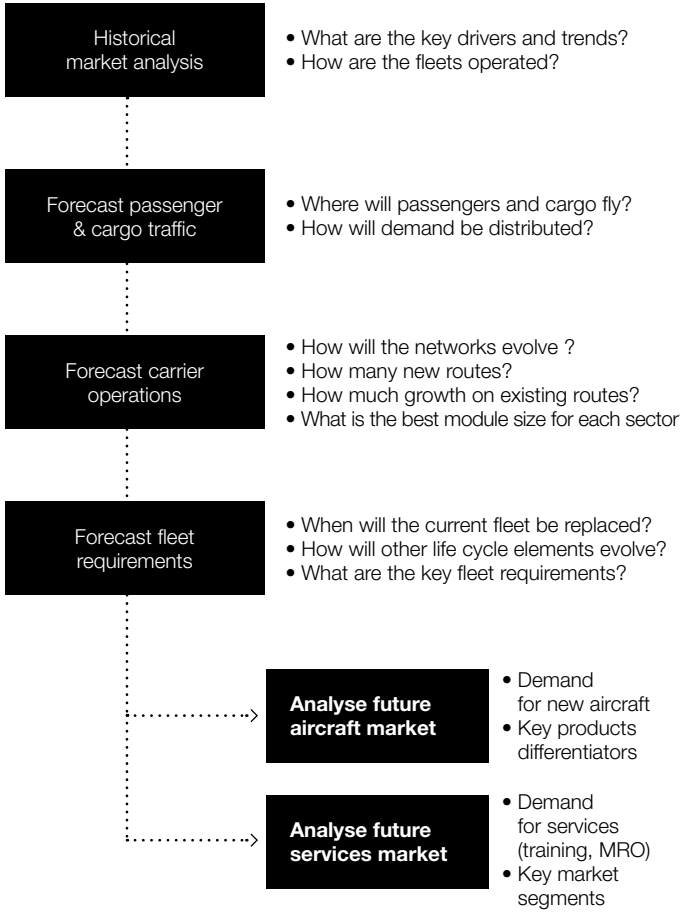


08 Methodology & summary data

OUR METHODOLOGY AT A GLANCE

FORECASTING - ASKING THE RIGHT QUESTIONS

Our main data sources: OAG, Ascend, ACAS, Sabre, Seabury, IHS Economics, IHS Economics, Oxford Economics, DoT, Eurocontrol, IATA, ICAO



NEW DELIVERIES 2016-2035

NEW PASSENGER AIRCRAFT DELIVERIES BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SINGLE-AISLE	757	9,074	1,003	4,993	2,027	952	4,725	23,531
SMALL TWIN-AISLE	148	2,289	114	987	387	478	652	5,055
INTERMEDIATE TWIN-AISLE	74	1,271	60	376	112	511	174	2,578
VERY LARGE AIRCRAFT	12	605	24	152	19	424	28	1,264
TOTAL	**991**	**13,239**	**1,201**	**6,508**	**2,545**	**2,365**	**5,579**	**32,428**

NEW FREIGHT AIRCRAFT DELIVERIES BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SMALL	-	-	-	-	-	-	-	-
MID-SIZE	6	77	12	32	22	18	139	306
LARGE	3	142	13	47	-	46	89	340
TOTAL	**9**	**219**	**25**	**79**	**22**	**64**	**228**	**646**

Source: Ascend, Airbus
100+ seats (passenger aircraft) and 10t+ (freighters)

CONVERTED FREIGHT AIRCRAFT BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SMALL	43	348	8	71	32	8	61	571
MID-SIZE	22	119	18	112	23	20	255	569
LARGE	3	35	10	13	-	5	29	95
TOTAL	**68**	**502**	**36**	**196**	**55**	**33**	**345**	**1,235**

NEW PASSENGER AND FREIGHT AIRCRAFT DELIVERIES BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SINGLE-AISLE	757	9,074	1,003	4,993	2,027	952	4,725	23,531
TWIN-AISLE	230	3,689	191	1,412	521	1,024	997	8,064
VERY LARGE AIRCRAFT	13	695	32	182	19	453	85	1,479
TOTAL	**1,000**	**13,458**	**1,226**	**6,587**	**2,567**	**2,429**	**5,807**	**33,074**

SAFE HARBOUR STATEMENT

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This presentation includes forward-looking statements. Words such as anticipates, believes, estimates, expects, intends, plans, projects, may, forecast and similar expressions are used to identify these forward-looking statements. Examples of forward-looking statements include statements made about strategy, ramp-up and delivery schedules, introduction of new products and services and market expectations, as well as statements regarding future performance and outlook. By their nature, forward-looking statements involve risk and uncertainty because they relate to future events and circumstances and there are many factors that could cause actual results and developments to differ materially from those expressed or implied by these forward-looking statements.

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