

Global Market Forecast

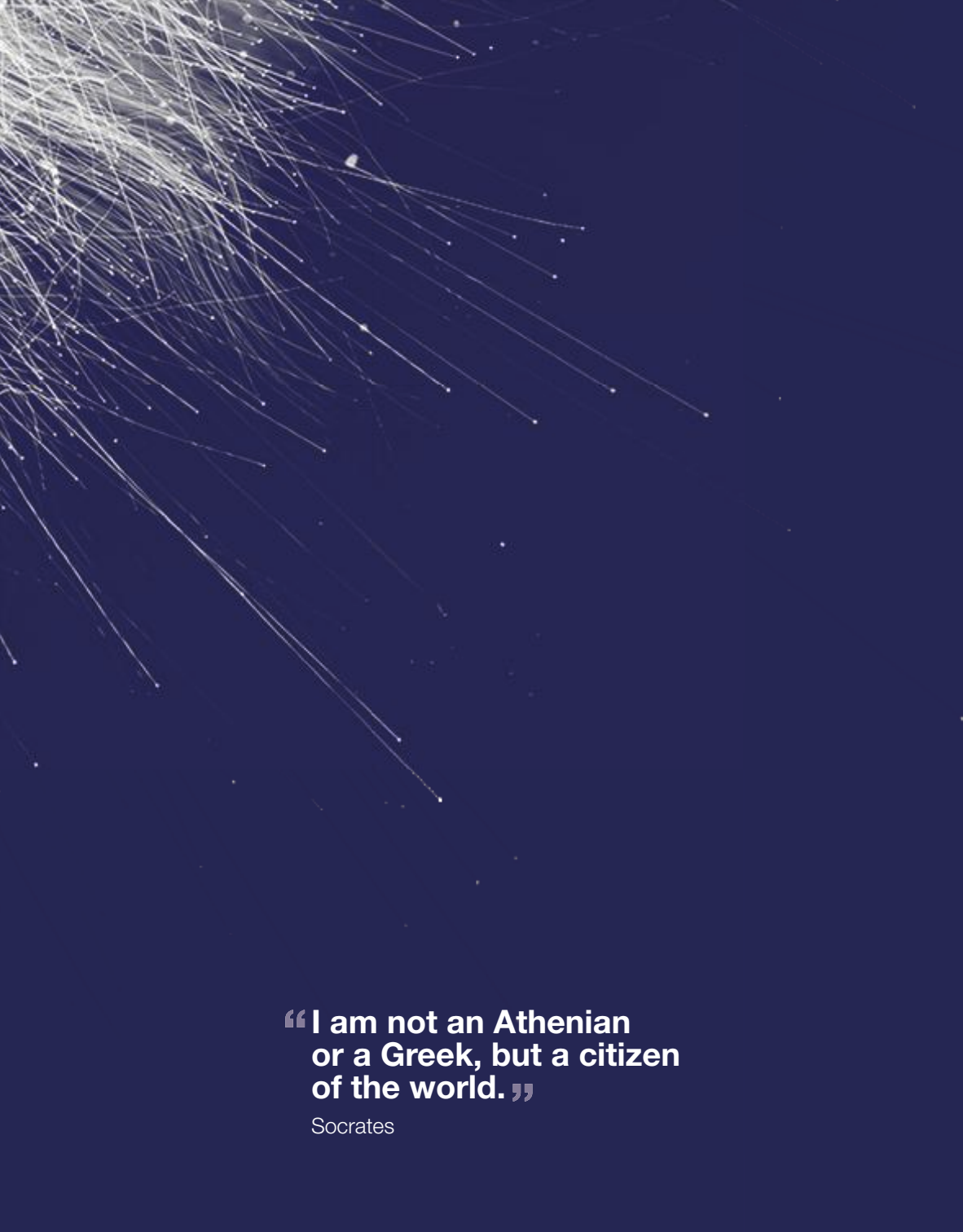
Global Networks, Global Citizens

2018-2037



AIRBUS

**Global
Networks,
Global
Citizen**



**“I am not an Athenian
or a Greek, but a citizen
of the world.”**

Socrates

Introduction

Welcome to the 2018 edition of
Airbus' Global Market Forecast (GMF).

Commercial aviation is already the most global of businesses. Official Airline Guide data shows that the global network connects all countries in the world: 3,190 cities and 3,250 airports. Connectivity between these airports, which has doubled since the early nineteen-eighties, continues to grow, and more of the world's people from both emerging and mature economies use aviation as part of their lives.

Global network travel encourages more people to see themselves as global citizens. In the same way as access to the internet and social media provoke curiosity and interest in other people and other places, physically travelling between cities and countries satisfies that curiosity in allowing people to meet and understand each other. And that understanding is one of the most powerful forces for good in the world.

One only needs to look at the “propensity to fly” section of this book and the accompanying GMF 2018 App to see how air travel can grow further. It is particularly noticeable in the emerging countries. In India for example the propensity to fly is 0.1 trips per capita today but by 2037 will rise to ~0.4, or roughly four times greater. A BBC survey* questioned 20,000 people from 18 countries and found that 56% of the people surveyed coming from emerging countries saw themselves first and foremost as global citizens. In India this figure was 67%. The BBC suggests this is partly because “...the world as a whole is becoming more prosperous and air travel is becoming more affordable to the rising middle classes.” This is one of the common themes in our Global Market Forecast when we explore the drivers for growth in aviation.

We hope that you find the 2018 Global Market Forecast informative and useful. We seek to improve our analyses continually, and your questions, challenges and suggestions help us advance towards this goal. Don't forget you can download our App to your smartphone. It complements the forecast and enables you to have facts, figures and insights at your fingertips wherever you go. If all you want are the numbers, you can download an excel sheet from www.airbus.com.

*BBC World Service Poll (reported on www.bbc.co.uk/news/world April 2016)

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Executive summary

- Long term growth potential for our industry is confirmed:

- The commercial aviation industry has been resilient to external shocks, traffic has grown x2.3 since 2000
- Traffic forecast to double in the next 15 years
- Our forecast confirms a 4.4% average traffic growth p.a. over the next 20 years

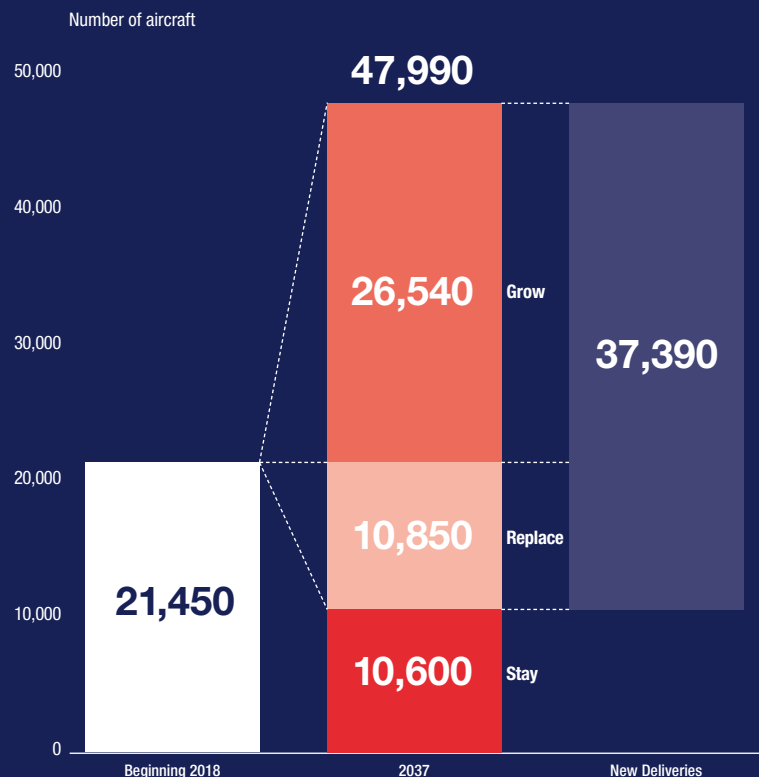
- Demand for 37,400 passenger and freight aircraft over the next 20 years:

- 30% for aircraft replacement, and 70% for growth
- ~36,560 passenger aircraft and 830 new build freighters
- The small segment will represent 76% of deliveries and 54% of the value
- The M, L, XL segments will represent 24% of demand in units, but 46% of the value
- Asia-Pacific will account for 42% of deliveries, with airlines in North America and Europe together 35% of the passenger aircraft deliveries
- The services market is forecast to deliver a cumulative US\$4.6 trillion over the next 20 years

THE WORLD FLEET WILL MORE THAN DOUBLE OVER THE NEXT 20 YEARS

Notes: Passenger aircraft (≥ 100 seats) | Jet freight aircraft (>10 tonnes). Rounded figures to the nearest 10

Source: Airbus GMF 2018



S	28,550 (76%)
M	5,480 (15%)
L	1,760 (5%)
XL	1,590 (4%)

37,400
aircraft units

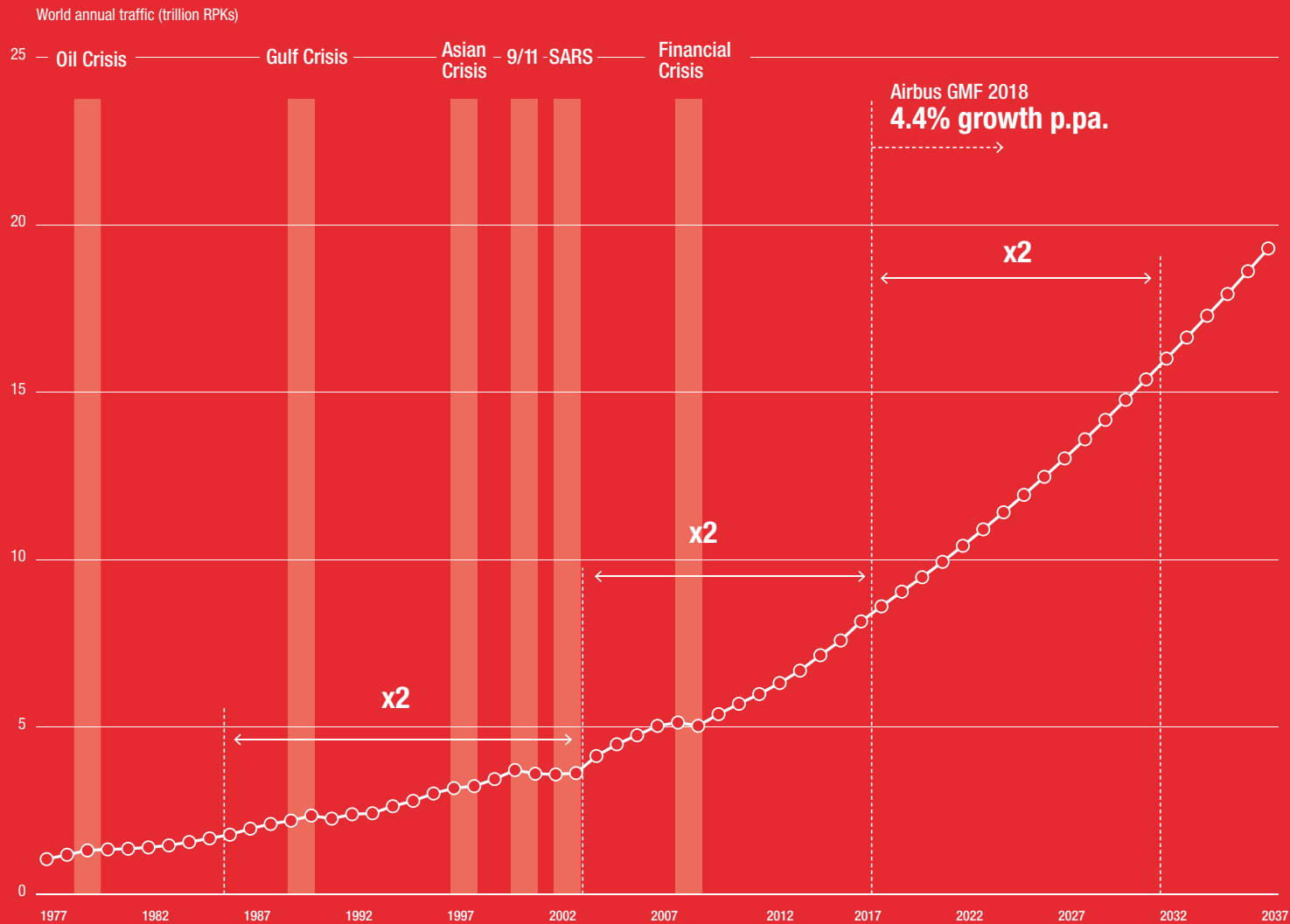
AROUND 37,400 AIRCRAFT WILL BE REQUIRED OVER THE NEXT 20 YEARS

Notes: Passenger aircraft (≥ 100 seats) | Jet freight aircraft (>10 tons)

Source: Airbus GMF 2018

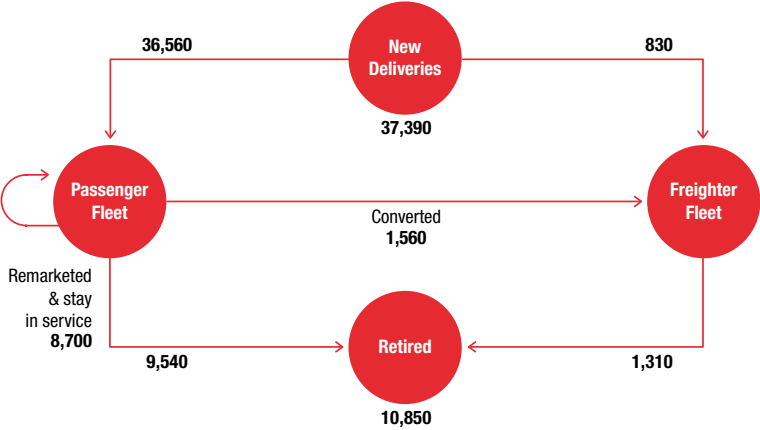
S	\$3.2 tn (54%)
M	\$1.4 tn (25%)
L	\$0.6 tn (10%)
XL	\$0.6 tn (11%)

\$5.8 trillion
aircraft value



**TRAFFIC HAS PROVEN TO
BE RESILIENT TO EXTERNAL
SHOCKS AND DOUBLES
EVERY 15 YEARS**

Source: ICAO, Airbus GMF 2018
RPK = Revenue Passenger
Kilometre



**PASSENGER AIRCRAFT
ABOVE 100 SEATS
AND FREIGHTER AIRCRAFT
ABOVE 10 TONS**

Source: Airbus GMF 2018
Rounded figures to the nearest 10

	2018 2027	2028 2037	2018 2037	SHARE OF 2018-2037 NEW DELIVERIES
AFRICA	450	680	1,130	3%
ASIA-PACIFIC	6,480	9,160	15,640	42%
CIS	580	640	1,220	3%
EUROPE	3,650	3,420	7,070	19%
LATIN AMERICA	1,330	1,380	2,710	7%
MIDDLE EAST	1,340	1,490	2,830	8%
NORTH AMERICA	2,970	2,990	5,960	16%
FREIGHTERS	450	380	830	2%
WORLD TOTAL	17,250	20,140	37,390	100%





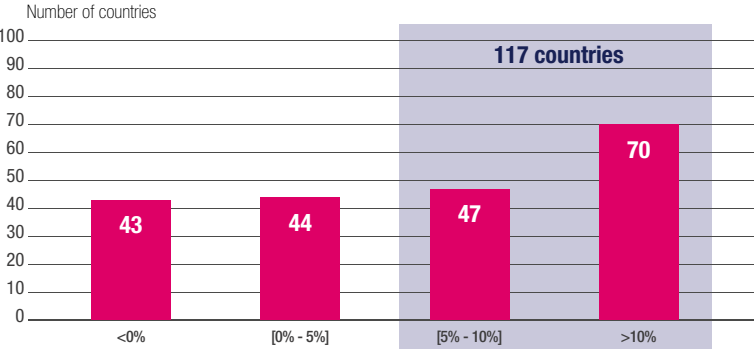
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**Demand
for air travel**

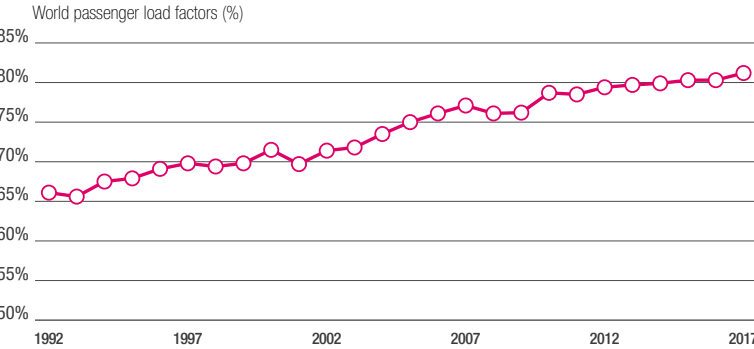
THE SHORT TERM

- It was another good year for aviation in 2017, with traffic growth measured in Revenue Passenger Kilometres up 7.5% year on year, and capacity, Available Seat Kilometers (ASKs) up 6.5%. As in 2016, this additional capacity was added carefully indicated by the fact that an already record global load factor improved further by almost a percentage point.
- This additional capacity was distributed globally, with 117 countries growing more than 5% in the year, with 70 of these growing more than 10%.

2017 ADDED CAPACITY (ASKs)



LOAD FACTORS

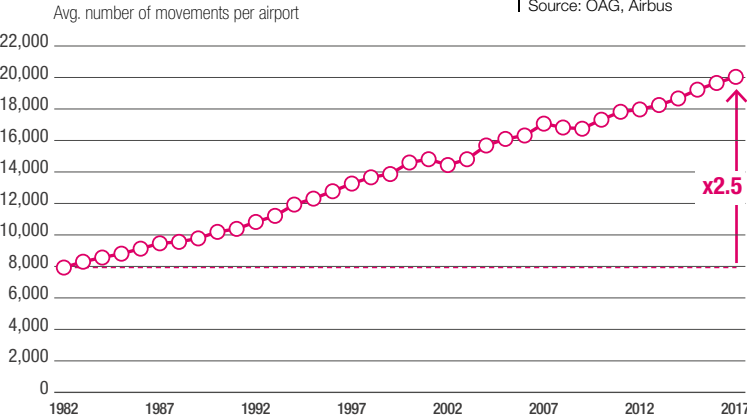


IMPRESSIVE AIR TRANSPORT RESULT IN 2017 WITH MORE THAN 100 COUNTRIES ADDING 5% OR MORE CAPACITY AND LOAD FACTOR AT RECORD HIGH

Source: OAG, ICAO, Airbus

- The network also continued to evolve with more movements and more connectivity, both positive for the world's passengers and for the businesses at their points of origin and destination. Since 1990, both aircraft movements and the number of destinations have doubled.

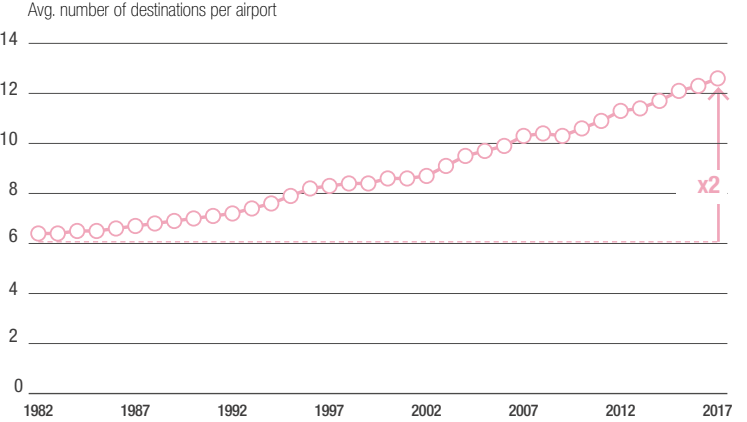
AIRPORT MOVEMENTS



MORE MOVEMENTS, MORE CONNECTIVITY...

Source: OAG, Airbus

AIRPORT CONNECTIVITY



THE CYCLE

- The civil aviation market is well known for its “cyclicality”, this usually associated with passenger and freight traffic. But in fact, there are several different cycles which all have slightly different timing one reliant on the other. For example, more traffic, more airline profitability, more aircraft orders and then the need to deliver them. Today, with manufacturers increasing their rates, deliveries are a focus.

AIR TRANSPORT LEADING INDICATORS REMAIN GREEN SUMMER OF 2018

INDICATOR	STATUS	TREND	COMMENT
Economy	<div><div></div><div></div><div></div></div>	→	• Despite some uncertainties, global economic growth is expected to pick up from +3.1% in 2017 to +3.2% in 2018 and +3.3% in 2019 led by the United States, the Eurozone and emerging markets
Passenger traffic	<div><div></div><div></div><div></div></div>	→	• Strong passenger traffic growth in the 1 st quarter of 2018, especially for airlines from emerging markets • Rising load factors, up 1 percentage point since the beginning of 2018
Freight traffic	<div><div></div><div></div><div></div></div>	→	• Freight traffic expected to continue to grow throughout 2018
Finance	<div><div></div><div></div><div></div></div>	→	• Low level of tension in finance and stock markets • Interest rates still at low levels
Aircraft	<div><div></div><div></div><div></div></div>	→	• Stored aircraft remaining at historical low levels • Passenger aircraft productivity continues to improve
Airlines	<div><div></div><div></div><div></div></div>	→	• Airline profitability expected to continue but down from record levels as a consequence of increased jet fuel and labour costs

Traffic light code: Trend indication:
● : Positive → : unchanged
● : Concerns ↗ : improving
● : Negative ↘ : moderating

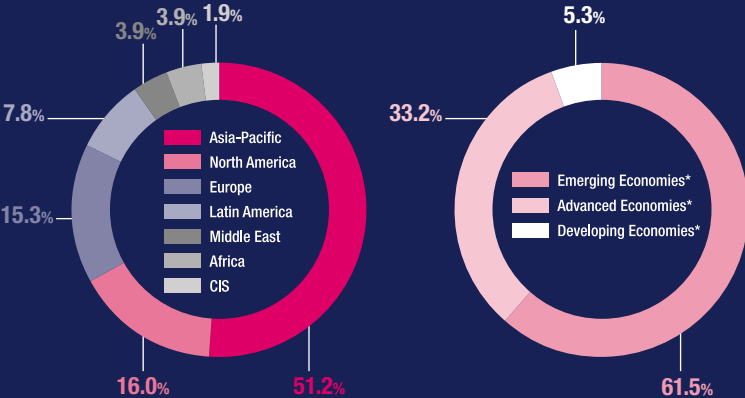
- A short-term outlook would not be complete without a view on where we are in the overall cycle. At Airbus, we monitor leading indicators to highlight any trends that may indicate an industry issue; some of these are shown in this year's GMF. As can be seen, positive market conditions, which have been in place for several years, remain at the time of writing in the summer of 2018. However, the movement of oil prices and geo-political stability are both areas which will need to be monitored.

DRIVERS FOR GROWTH

- GDP (Gross Domestic Product) is still an important variable in explaining the growth of aviation into the future. If the source of future GDP growth is examined over the next 20 years it gives a strong indication as to where future air traffic growth will originate. Countries in the Asia-Pacific for example will be responsible for over 50% of this growth, with the US and Europe combined over 30%.
- Segmenting the data differently shows another key dynamic, in this case the importance of the emerging economies, 54 nations who together will be responsible for over 60% of the world's economic growth over the next 20 years.
- The importance of these “emerging economies” is underlined when private consumption forecasts are examined, with this set to grow two and a half times by 2037, this compared to one and half times growth for the 32 “advanced economies”. Private consumption, which is a component of GDP, is becoming increasingly more important when modelling future traffic growth.

EMERGING REGIONS AND ECONOMIES EXPECTED TO ACCOUNT FOR A LARGE SHARE OF NEXT 20 YEARS WORLD ECONOMIC GROWTH
Source: IHS Economics, Airbus

2017-2037 share of World economic growth (%)



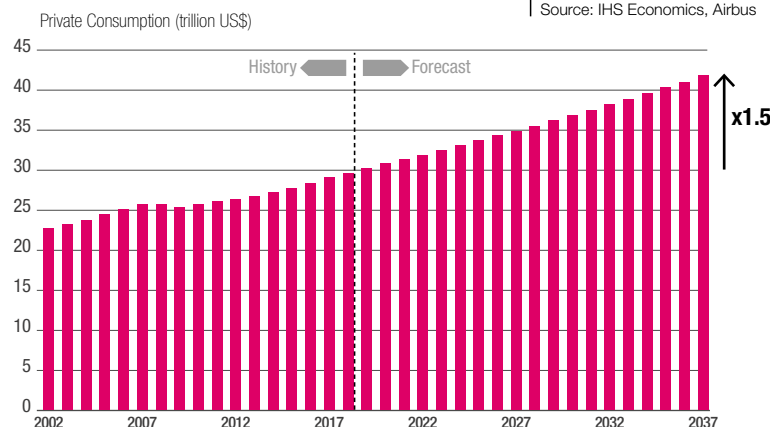
* 54 Emerging Economies; 32 Advanced Economies; 120 Developing Economies

- A driver for private consumption is the “wealth effect”, with wealth, and an increase in disposable income also important elements of people’s desire and ability to fly.
- The evolution of the middle classes is an excellent proxy for this relationship. In 2002, about a quarter of the world’s population could be described as “middle class”, today it’s around 40% and by 2037, is forecast to be well over 50% or some five billion people, all in the pool of regular or potential new flyers in the future.

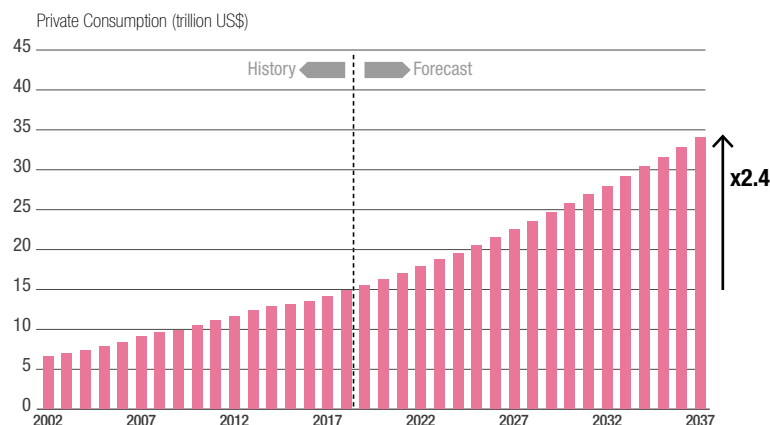
**PRIVATE CONSUMPTION
EXPECTED TO BECOME
INCREASINGLY IMPORTANT
TO EXPLAIN AIR
TRANSPORT GROWTH**

Source: IHS Economics, Airbus

ADVANCED ECONOMIES



EMERGING ECONOMIES



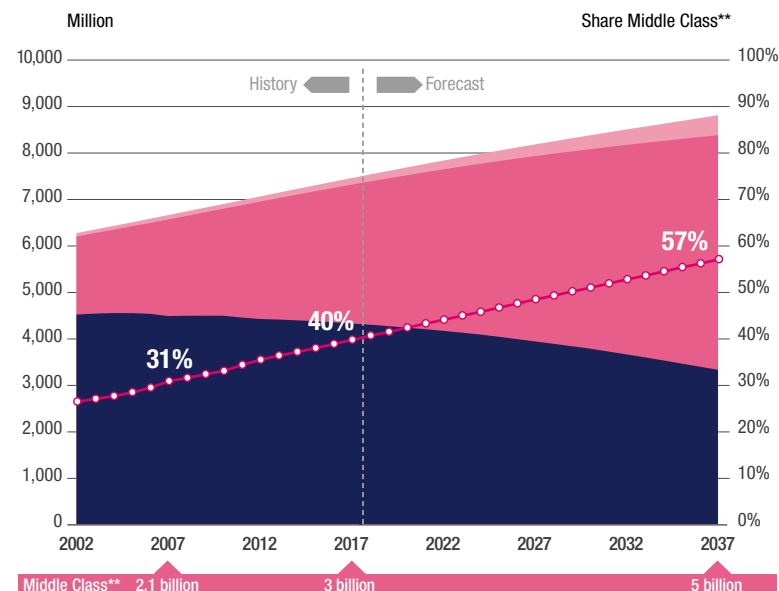
Middle Class

expected to represent

57%
of total population by
2037

**MIDDLE CLASS TO ALMOST
DOUBLE OVER THE NEXT
20 YEARS**

Source: Oxford Economics, Airbus



- Airline business models also evolve over time to meet the needs of customers, to take advantage of opportunity and to respond to their competition.
- There is no doubt that whilst not new, the low-cost model has helped to deliver additional growth, through the provision of low fares and new city pairs largely, but not exclusively, to the leisure market. Businesses are also benefiting from the new routings and additional connectivity the model delivers.
- In recent years, the low-cost model itself has evolved with ultra-low cost and long-haul low-cost variants growing the number of seats they offer.

Upper Class***
Middle Class**
Lower Class*
Share Middle Class

*Households with yearly income between \$0 and \$20,000 at PPP in constant 2017 prices

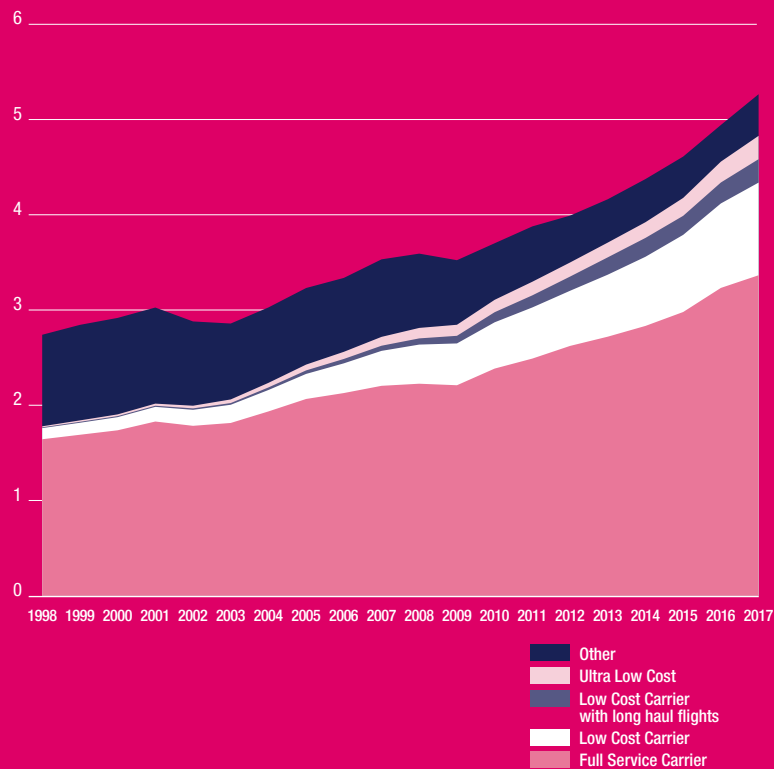
**Households with yearly income between \$20,000 and \$150,000 at PPP in constant 2017 prices

***Households with yearly income above \$150,000 at PPP in constant 2017 prices

**AS OTHER BUSINESS MODELS,
'TRADITIONAL' LOW COST
CARRIERS HAVE BEEN
DIVERSIFYING OVER
THE LAST YEARS**

Source: OAG, Airbus
Business models defined
based on 2017 operations

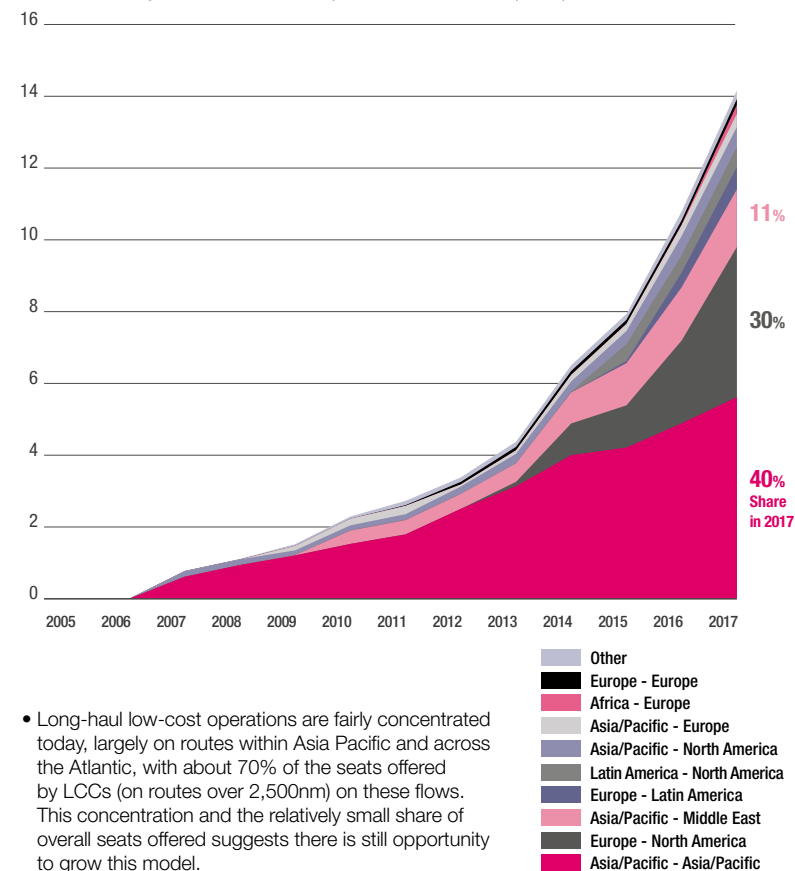
Seats offered evolution by business model (Billion, All distances considered)



**STRONG ACCELERATION
OF LONG-HAUL OPERATIONS
BY LOW COST CARRIERS
OVER THE LAST 5 YEARS**

Source: OAG, Airbus GMF,
Business models defined
based on 2017 operations

Seats offered by Low-Cost Carriers with operations above 2,500nm (Million)



- Long-haul low-cost operations are fairly concentrated today, largely on routes within Asia Pacific and across the Atlantic, with about 70% of the seats offered by LCCs (on routes over 2,500nm) on these flows. This concentration and the relatively small share of overall seats offered suggests there is still opportunity to grow this model.

- Governments policies around open skies, visa and immigration have long influenced demand for aviation. Understanding the benefits aviation can bring in terms of business and tourism has meant that these policies have relaxed over time stimulating demand.
- Two recent government driven initiatives also look set to help stimulate air travel both in their own countries but also to others.
- In India, the Ude Desh Ka Aam Nagrik Regional Connectivity scheme or UDAN-RCS is a government initiative designed to make domestic flying more accessible to the Indian population, by making it more affordable and convenient, whilst at the same time stimulating economic growth. In the first round, RCS-1, a total of 128 routes were awarded to 5 players.
- The Government awarded more than 300 routes to airlines and helicopter operators under RCS-2 on January 24th, 2018. Whilst being largely regional in focus greater connectivity will also feed additional passengers to the larger aviation centres creating a need for larger aircraft types. With a number of these new routes also expected to grow and in time needing for example single-aisle types.
- Already today, Letters of Award from the Airport Authority of India detail a number of routes, many with a capacity requirement for 180 seats.
- In China, the much discussed Belt and Road initiative seems to have started to stimulate higher air traffic growth to and from China for some of the countries connected to the initiative. For example, Kenya and Vietnam both have higher traffic growth to and from China for the period 2013-2017 than the previous five years. Some estimates list the Belt and Road Initiative as one of the largest infrastructure and investment projects in history, covering more than 68 countries, including 65% of the world's population and 30% of the global GDP as of 2017, with this scale it is likely the initiative will stimulate further aviation growth.



RECENT GOVERNMENT INITIATIVES STIMULATING AIR TRAVEL

India's UDAN-RCS initiative designed to make domestic flying affordable and convenient.

China's Belt and Road Initiative aims to connect Asia, Europe, the Middle East and Europe with a vast logistics and transport network

**RECENT GOVERNMENT
INITIATIVES STIMULATING
AIR TRAVEL**





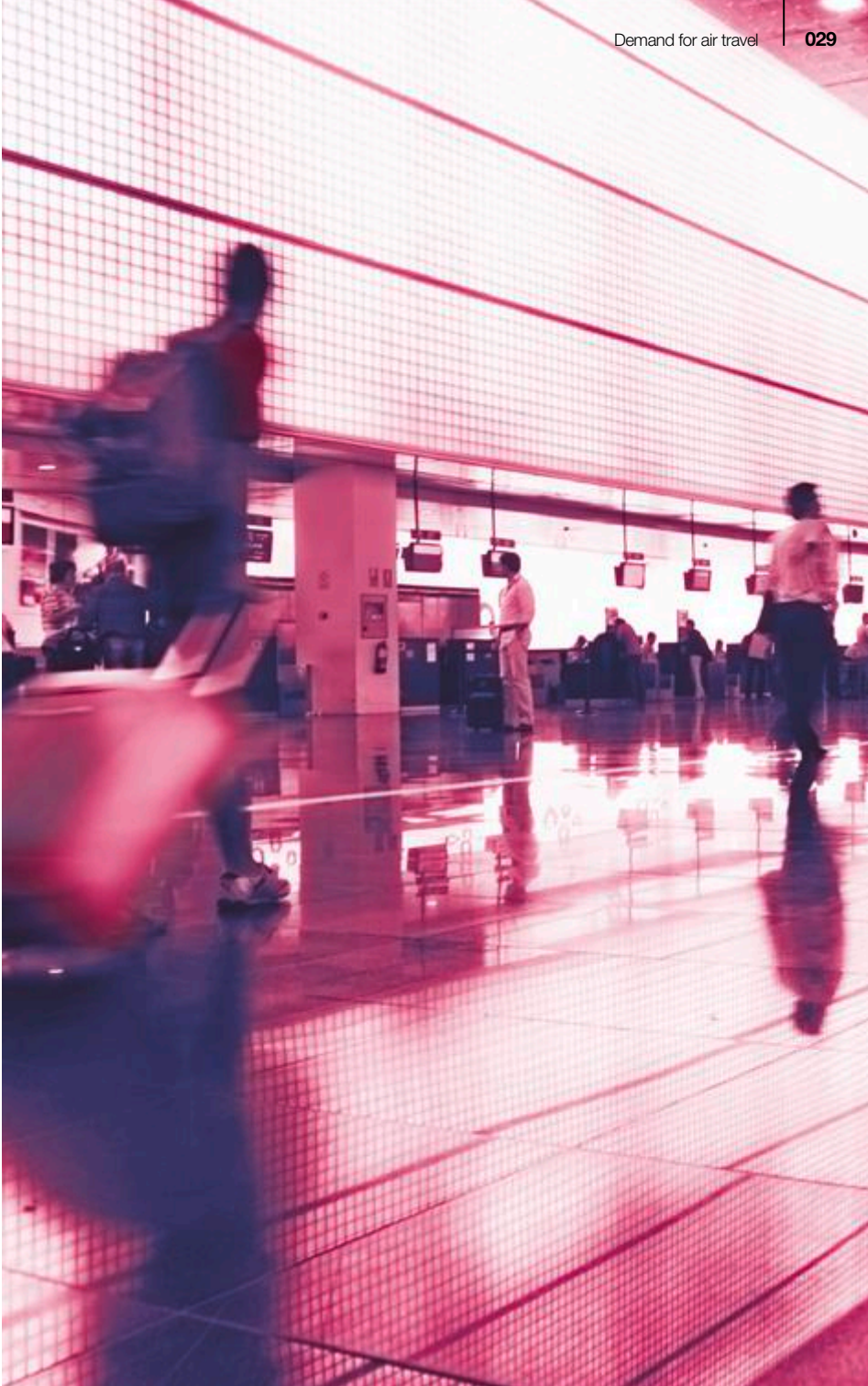
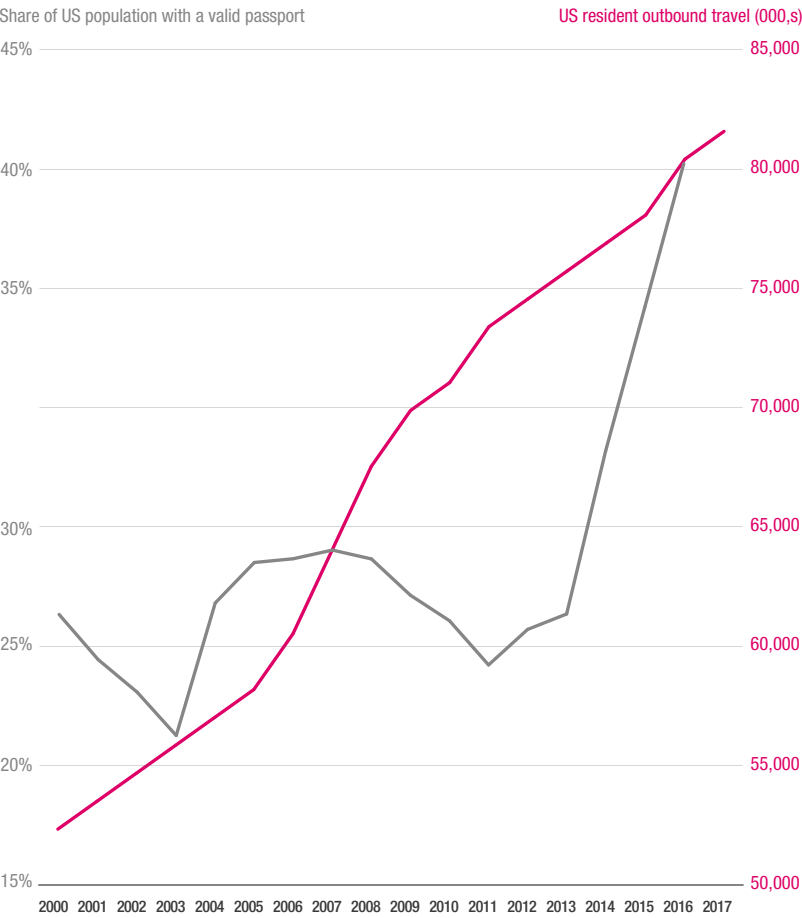
- As well as economic, demographic, airline business model evolution and governmental drivers for aviation traffic growth, tourism has proven to be another source of growth for air travel markets. Of course, these drivers are also often linked to tourism growth, with governments for example seeking to use tourist spending to increase the share of tourism in their GDP.

- Another trend that is helping drive tourism is the growth in social media, and sights like Instagram, with more than 500 million active users popularising many sites through the power of the image. Between 2009 and 2014 for example, visitors to Trolltunga, site of a picturesque cliff extending precariously from a Norwegian mountainside increased from 500 to 40,000 in what many consider social media-fuelled tourism. One well followed Instagram user has been quoted as saying “Now you’re less than 10 clicks away from seeing an image on Instagram to purchasing a ticket to go there”.

• Evidence that these drivers are having an effect in the US for example is the number of passport holders that has increased dramatically together with US outbound travel. In 1990 just 4% of US citizens had a passport, today its 42% with more than 20 million issued in 2017, the highest number ever recorded.

**MORE US PASSPORTS,
MORE FOREIGN TRAVEL**

Source: US Department of State,
US Census bureau, Airbus



03

Network & traffic forecast

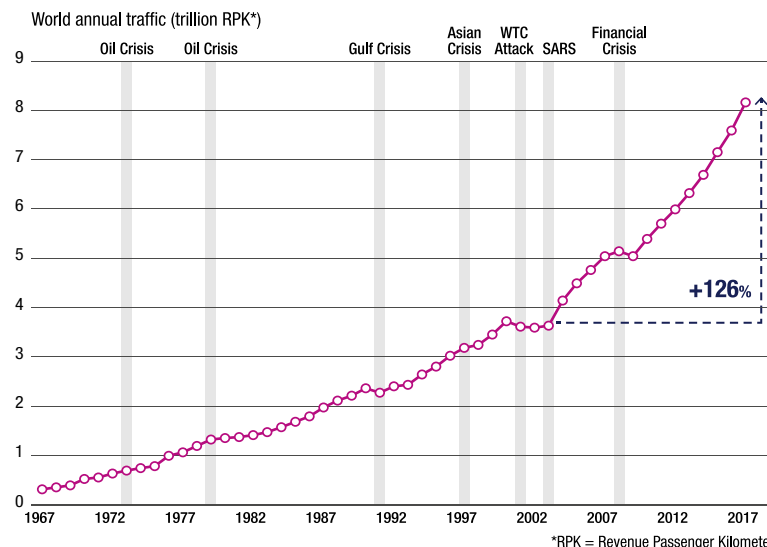
Air transport is a growth market

More than
60%
growth over
the last ten years

- Compared to 2016, Revenue Passengers Kilometres (RPKs) grew impressively at 7.5% in 2017, according to ICAO figures which were preliminary at the time of writing.
- This represents an impressive 4.1 billion passengers carried by air in 2017.
- Over half of the world's tourists who travel across international borders each year were transported by air.
- Air passengers benefited from oil prices which remained relatively low, with airlines able to choose between stimulating the market through lower yields, and therefore ticket prices, or their margins.
- Air traffic continues to prove its resilience as it continues to outperform global GDP growth, demonstrating passengers' appreciation of the benefits that aviation brings.
- For the next 20 years, the Airbus GMF forecasts a 4.4% global annual air traffic growth. In our forecast the first decade will enjoy a 4.8% increase per year, with 4.0% average annual growth for the last decade, a lower figure but growth in those years based on absolute traffic numbers higher than today.
- We continue to monitor the reliability and validity of the Airbus GMF forecast. As an example, 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.

GMF long term validity

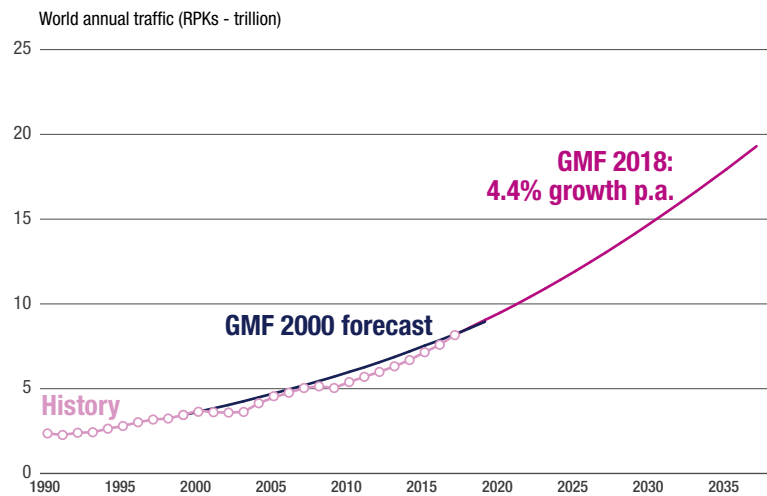
GMF
2000
long term forecast
is still in line with
our latest forecast



AIR TRAVEL HAS PROVED TO BE RESILIENT TO EXTERNAL SHOCKS

Source: ICAO, Airbus GMF 2018

* RPK = Revenue Passenger Kilometer



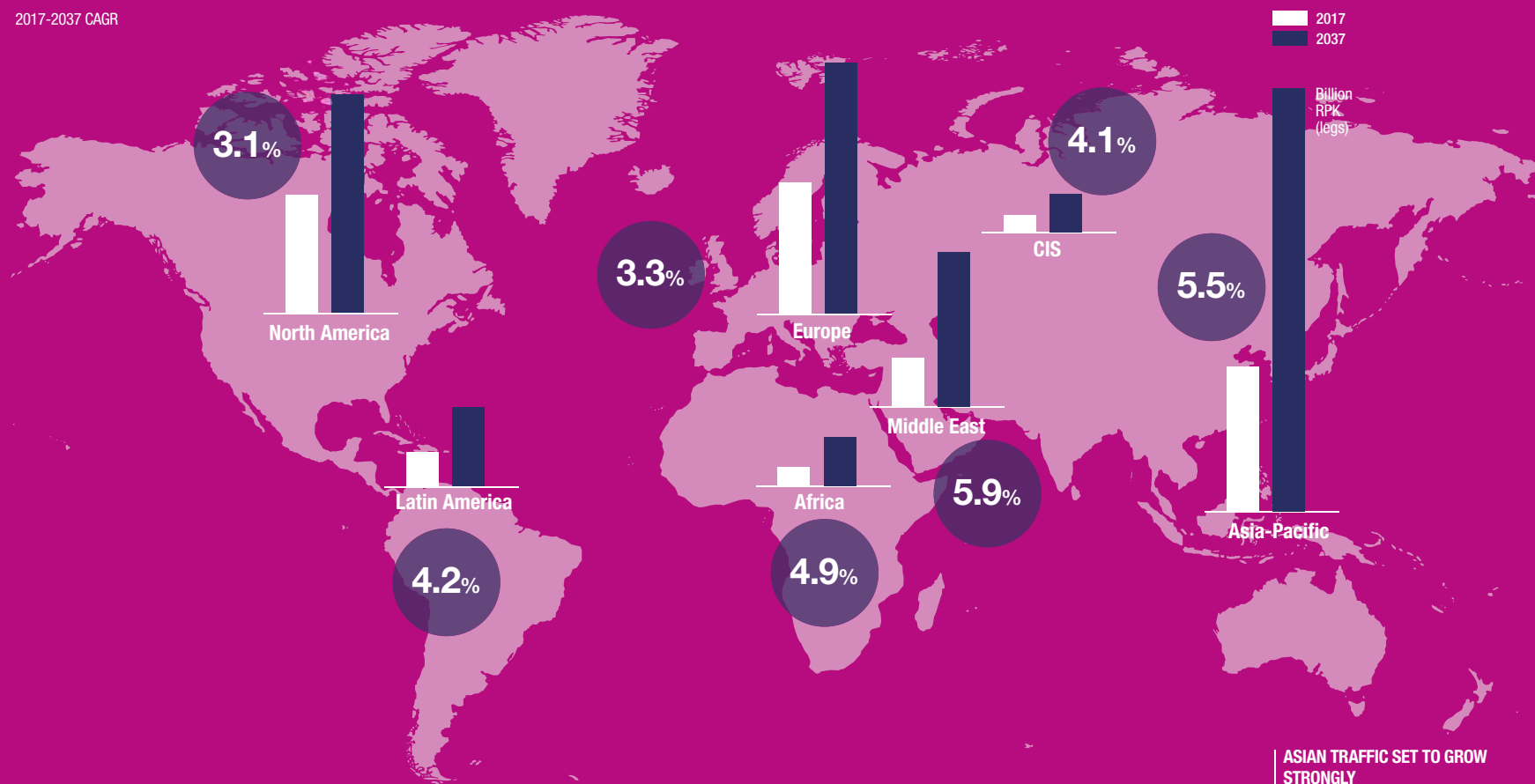
AIRBUS GMF PREDICTING LONG TERM DEMAND

Source: ICAO, Airbus GMF 2018

- Asia-Pacific will lead world traffic by 2037, 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 6.2% per annum, and will represent a growing share of air traffic, from 29% of world traffic in 2017 up to 40% by 2037.

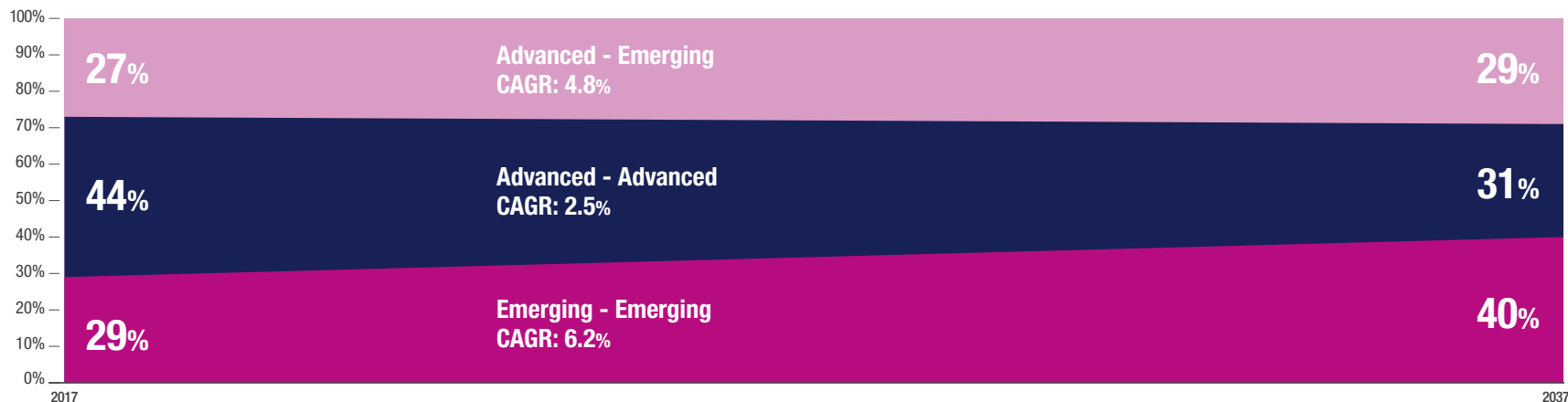
- Domestic China will become the largest traffic flow before the end of the forecast period. Domestic Chinese traffic is forecast to increase 3.5 times, with Domestic USA increasing by half from an already high base.
- The three major flows connecting Western Europe are all expected to develop: Western-Europe – USA, Intra-Western Europe to grow 1.7 times and Western-Europe – Middle East 2.6 times respectively.
- Amongst the Top 20 traffic flows, 60% will involve Asia-Pacific and 25% the Middle East.

2017-2037 CAGR



ASIAN TRAFFIC SET TO GROW STRONGLY

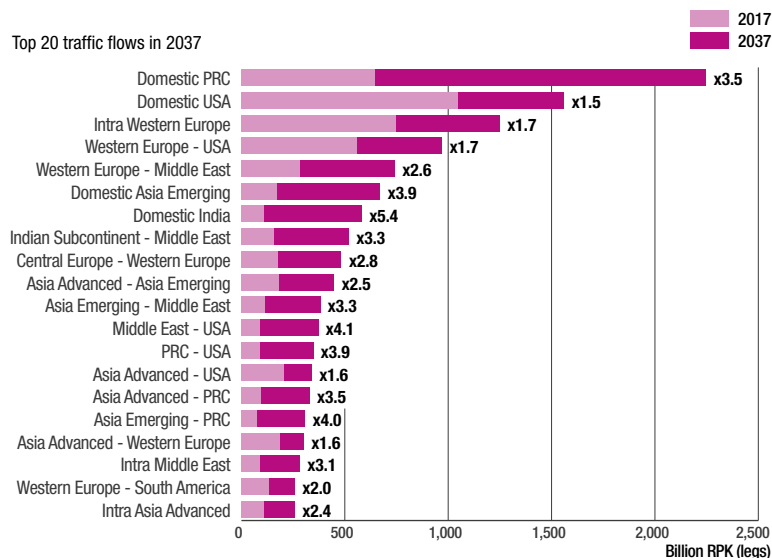
Source: Airbus GMF 2018



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

Source: Airbus GMF 2018

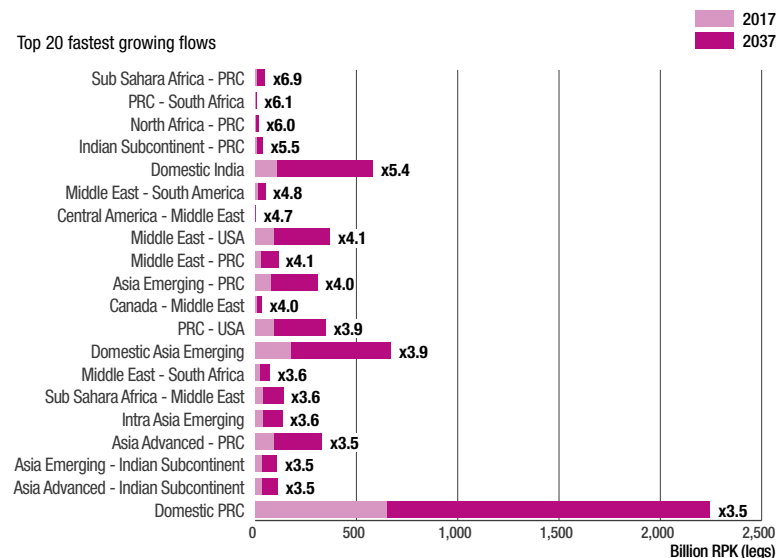
Top 20 traffic flows in 2037



**DOMESTIC CHINESE TRAFFIC
FLOW TO BE NUMBER ONE**

Source: Airbus GMF 2018

Top 20 fastest growing flows



**TOP 20 FASTEST GROWING
FLOWS OVER THE NEXT
20 YEARS**

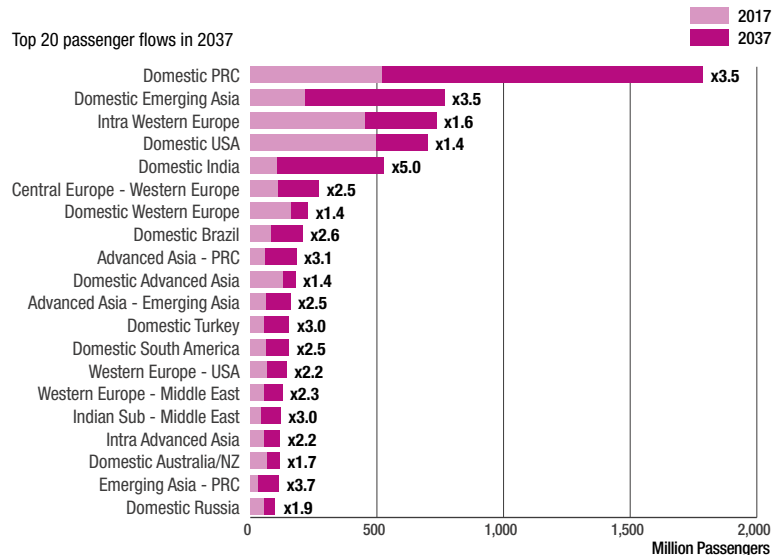
Source: Airbus GMF 2018

- Most traffic results shown in the book are by leg, that is the traffic between two points and measured in Revenue Passenger Kilometres (RPKs). We also forecast at a passenger origin and destination level (O&D pax). This gives a better feel for the future volume of passengers by flow as the distance component included in RPKs or RPMs is removed. As an example, we can see that almost 1.8 billion passengers are expected to travel within China in 2037, almost four times the number of passengers that travelled by air in 2017. Both approaches have their benefits, therefore both measures of traffic growth are modelled for the GMF.

TOP 20 PASSENGER FLOWS IN 2037 (ORIGIN & DESTINATION)

Source: annualised Sept. 2017
data from Sabre, Airbus GMF 2018

Top 20 passenger flows in 2037



BALANCING THE NEEDS OF PASSENGERS AND THE ENVIRONMENT

Whilst the benefits aviation brings to people are clear, its growth and environmental impact have also been recognised. Today, aviation represents around 2% of global man-made CO₂ emissions. However, the traffic growth rates and resulting growth in the world's fleet of aircraft we discuss in our Global Market forecast are placing increasing demands on all aviation stakeholders to continually reduce the sectors' impact on health, environment and climate change.

In the last 50 years, the aviation industry has cut fuel burn and CO₂ emissions per seat / kilometre by more than 80%, NO_x emissions by 90% and noise by 75% of our products in operation. Airbus has helped by delivering ever more efficient types such as the A350 XWB, 25% more efficient than the previous generation aircraft and the A320neo with -15 to -20% fuel burn compared to A320ceo. The average increase in global fleet fuel efficiency has been over 2% per annum over the last 20 years. Adding other productivity elements like improving load factors this number is closer to 3% per annum.

Airbus is working together with suppliers, industry, universities as well as government and non-government stakeholders in our aim to find sustainable solutions to reduce the environmental impact of aviation as well as to deliver our ambitious sectorial emission reduction goals. For example, Airbus, together with the rest of the aviation industry, has supported the ICAO agreements in 2016, on the CO₂ standard and Carbon Offsetting & Reduction Scheme for Aviation (CORSIA), the new international carbon offsetting scheme for aviation (MBM).

Airbus is also engaging with other stakeholders to focus on measures that can provide improvements in environmental performance including sustainable fuels, operational improvements including air traffic management and in the longer term disruptive technologies in the areas of electrification and hybridisation which can bring significant benefits in addressing CO₂, noise and NO_x emissions.



04

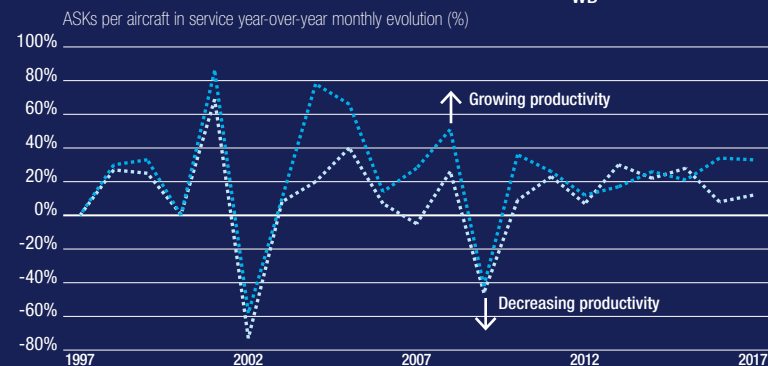
Demand for passenger aircraft

- As the latest generation aircraft are delivered either to grow the fleet or to replace aging types, the fleets productivity, based on the ASK's per aircraft, has continued to grow with the single-aisle fleet improving faster than the wide-body. This is due to a number of reasons, for example a general increase in operations, and the fact that these types are growing in size with longer routings being operated.

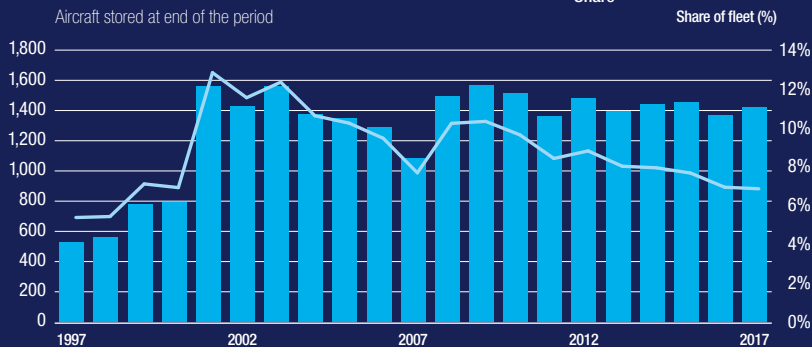
AIRCRAFT PRODUCTIVITY GROWING STEADILY SINCE 2011

Source: Flight Global Ascend, OAG, Airbus
Note: Western built aircraft only

PASSENGER AIRCRAFT PRODUCTIVITY



STORED PASSENGER AIRCRAFT

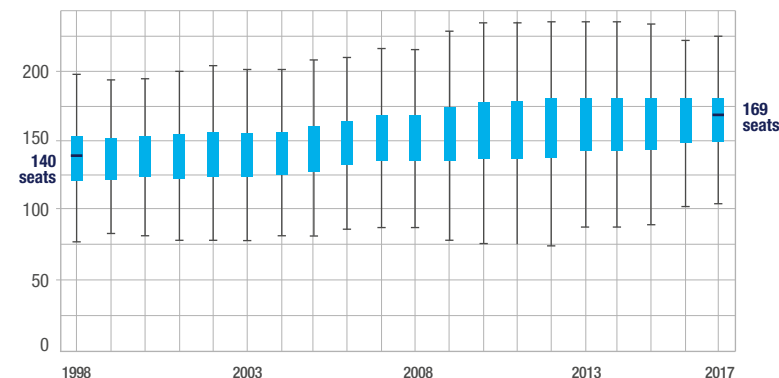


DISTRIBUTION OF SEATS OFFERED BY SINGLE-AISLE AIRCRAFT OVER THE YEARS

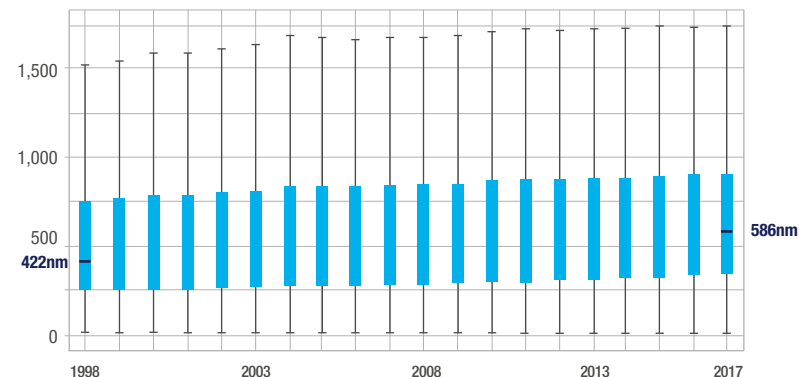
SINGLE-AISLE AIRCRAFT GETTING BIGGER AND FLYING LONGER DISTANCES

Source: OAG Sept; Airbus GMF 2018

Aircraft seating flown



Distance flown (nm)



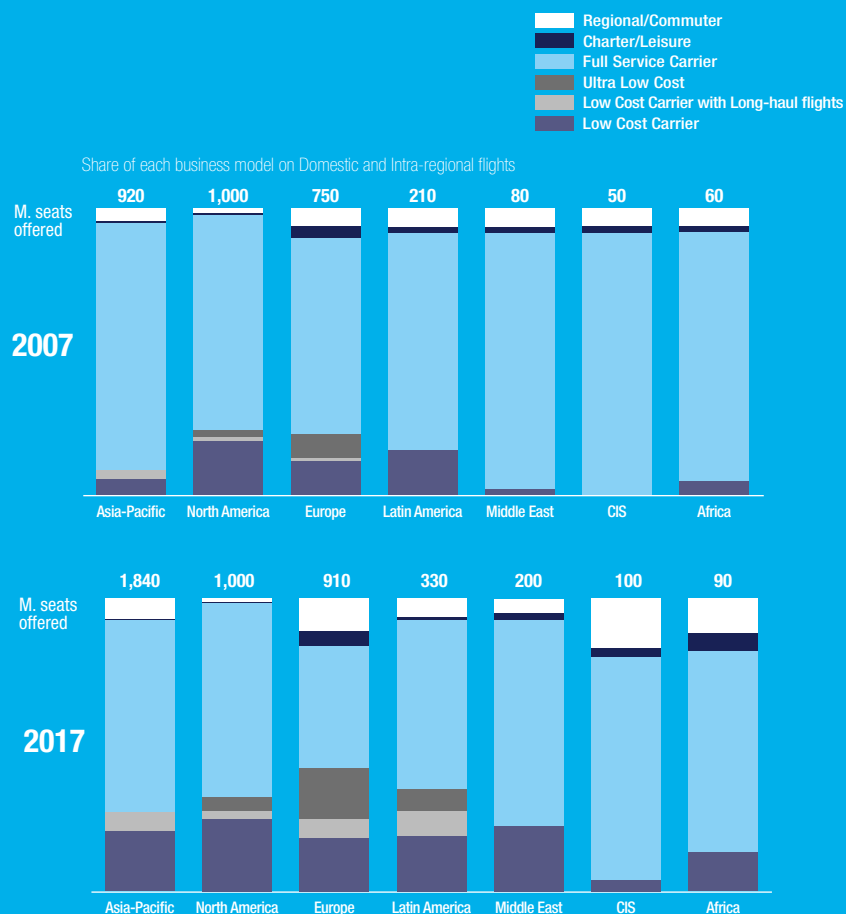
- Taking the single-aisle fleet, both average seats and range have increased. Seats average 169 seats today, with average range ~590 nm. From the data, it can also be seen that there is significant variation around the mean for aircraft size and particularly for range. As well as showing the wide spectrum of operations for which the airlines use these aircraft, it also demonstrates why the range capability of aircraft products is an important consideration for airlines and manufacturers alike; a capability which also equates to flexibility.

- As well as the significant spectrum of operations aircraft are called on to perform, the variety of business model's airlines operate has also grown and continues to evolve. For the low-cost, additional forms of this business model are developing with the ultra-low cost and increasingly the long-haul low-cost model, which have helped even to stimulate extra traffic growth on the relatively "mature" trans-Atlantic market. The full-service carriers are also looking to segment further, but this time with their cabins, with an increased focus on brand differentiation and ancillary revenues.

BUSINESS MODELS ARE EVOLVING...

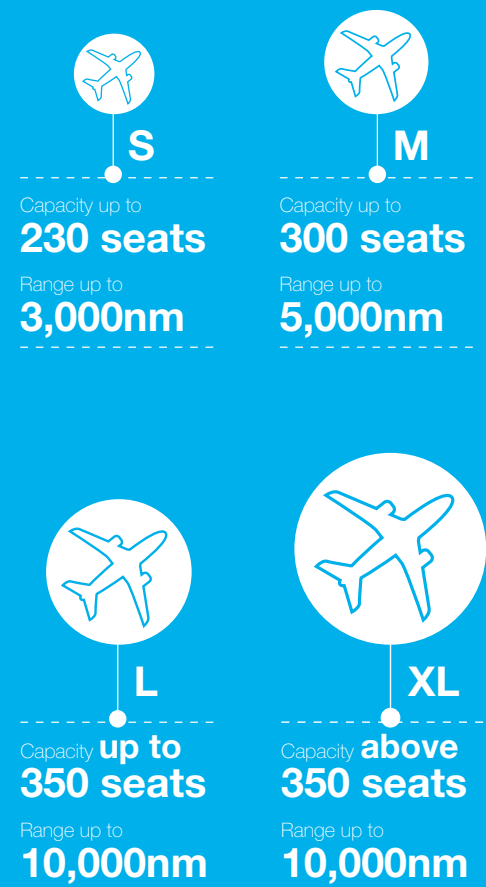
Source: OAG, Airbus GMF 2018, Business models defined based on 2017 operations

These trends are both a challenge and an opportunity for aircraft manufacturers as they strive to get the most out of their products in terms of range, costs and flexibility to meet the diverse needs of airlines due to their business model or simply from the networks they operate.

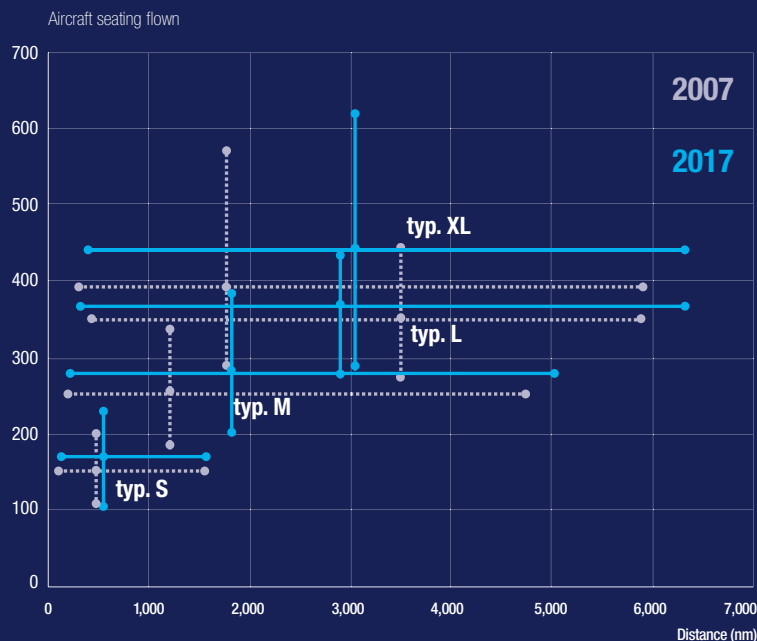


... SO ARE MARKET SEGMENTS

Source: Airbus GMF 2018



OPERATIONAL DISTRIBUTION OF 2017 A/C TYPES

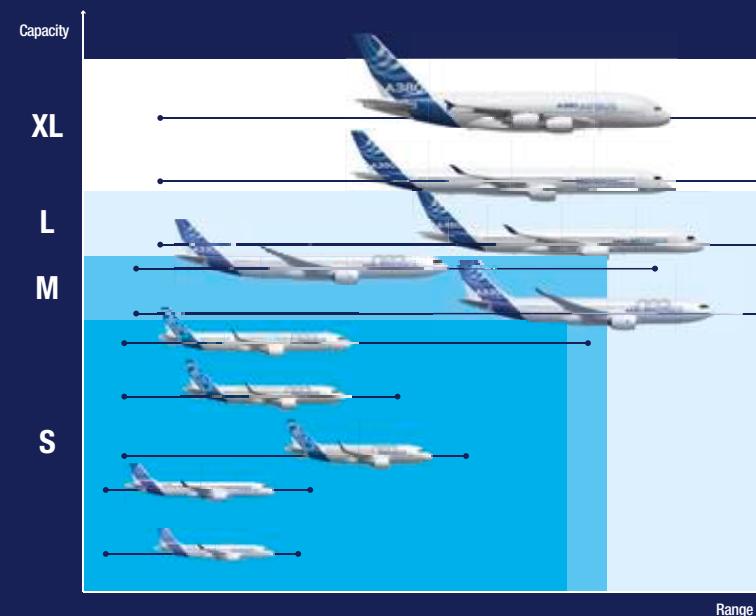


MORE CAPABLE AIRCRAFT, BLURRING THE BOUNDARIES BETWEEN SEGMENTS

Source: OAG Sept 2017;
Airbus GMF 2018

- Comparing how aircraft are operated today and in 2007, it is clear to see the evolution and scope by market segment in terms of range and number of seats. Size is increasing with a clear overlap between segments. A blurring of the boundaries between market segments which our new segmentation reflects.
- Today for example, larger single-aisle types like the A321 operate in what would have been considered a twin-aisle market space. This is not just true for the single-aisle types; larger aircraft like the A350 can operate in a number of segments depending on airline or market requirements.

AIRBUS INTRODUCES NEW FORECAST SEGMENTATION IN 2018



MEET THE AIRBUS FAMILY FROM 100 TO 600+ SEATS...

Source: Airbus GMF 2018
Note: product position
is illustrative

- To help to understand where the Airbus products can sit in the new segmentation we have overlaid them on the chart. The blurring discussed is reflected here by showing the various segments the aircraft can compete in, by the segments they touch.

- As well as developments in airline business models driving future aircraft type selection, how the network evolves will also have an impact on the mix of deliveries in terms of size and range capability. Over the last 10 years, short-haul travel has nearly doubled, driven by the low-cost airlines and developments in emerging markets for example. At the same time, both direct and connecting long-haul markets have grown, with routings involving connecting traffic growing more quickly.

10 year GROWTH

x1.8
Short-haul



x1.5
Long-haul
direct



**BOTH DIRECT AND
CONNECTING TRAFFIC ARE
ENJOYING SOLID GROWTH**

Source: Airbus GMF 2018

*Long-haul traffic, sum of legs
>=2,500nm

x1.6
Long-haul with
1 or more stops

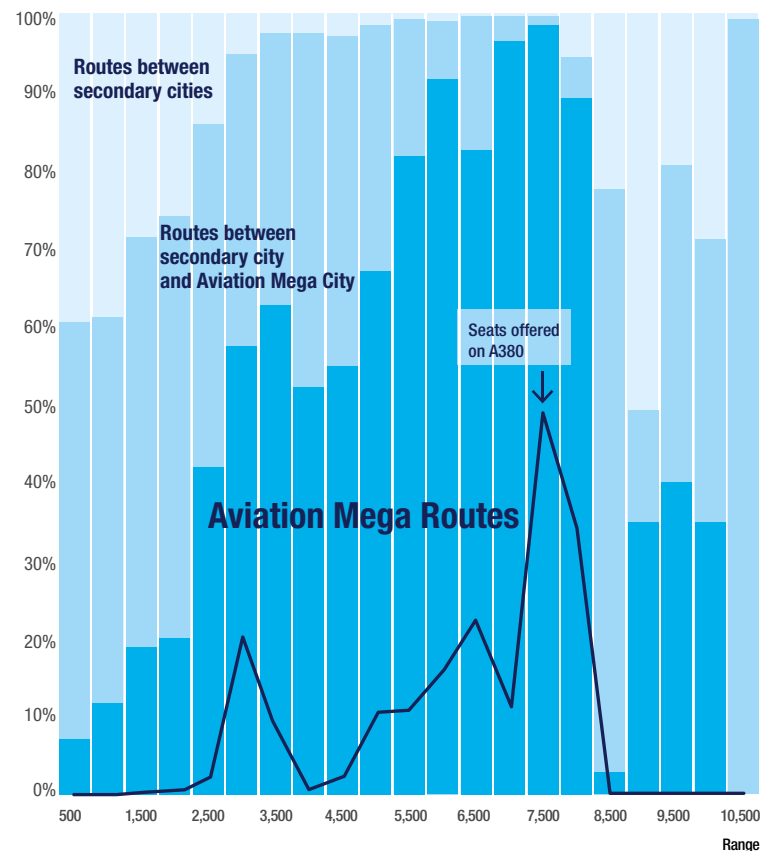


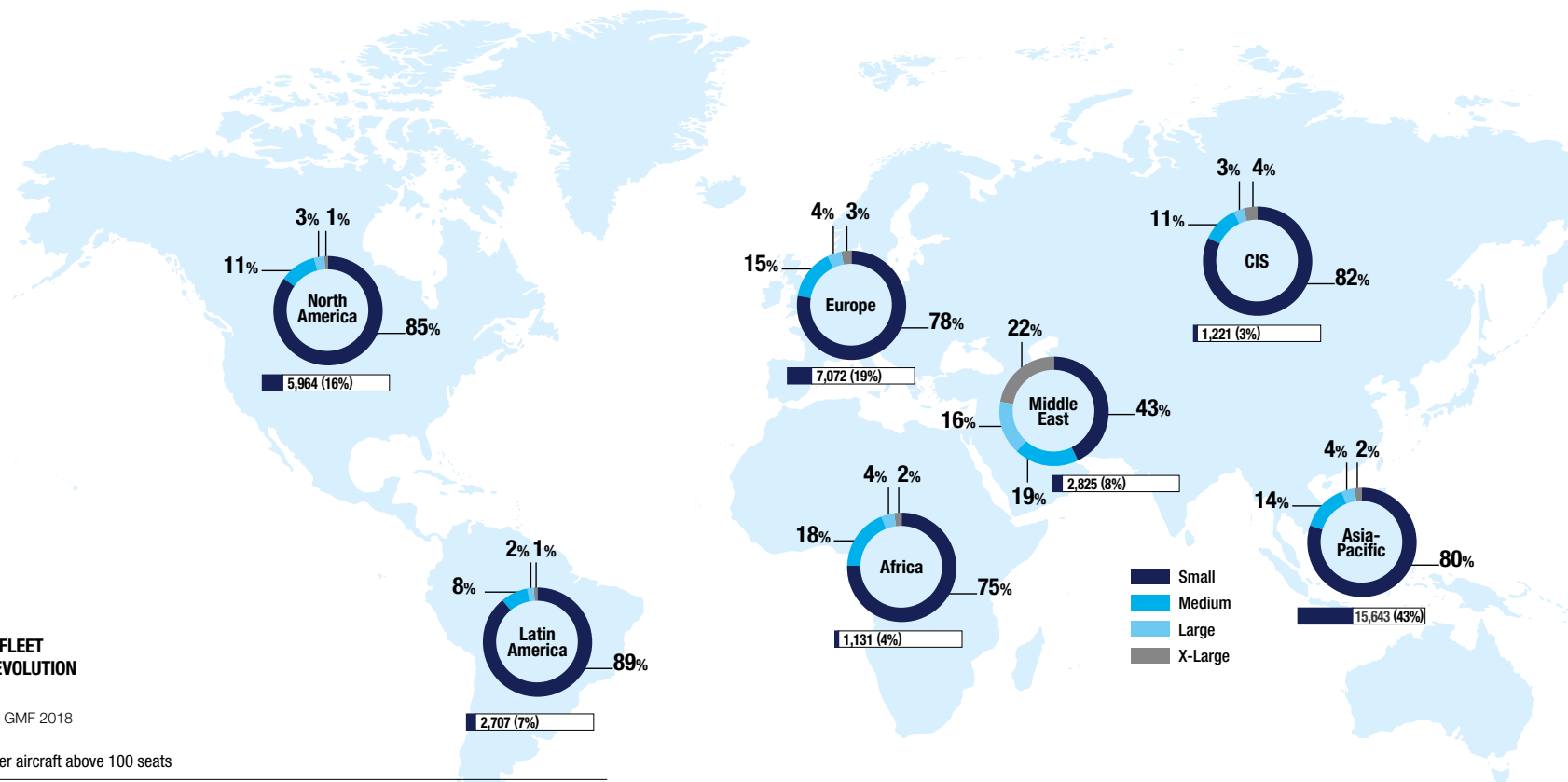
- The importance of the routings to and from aviation mega-cities remains significant particularly over longer ranges. It is also interesting to note how the seats offered on the A380 broadly follows the profile given by aviation mega-cities and the routes connecting them.

AVIATION MEGA-ROUTES ARE GETTING EVEN BUSIER

Source: Airbus GMF, Sabre

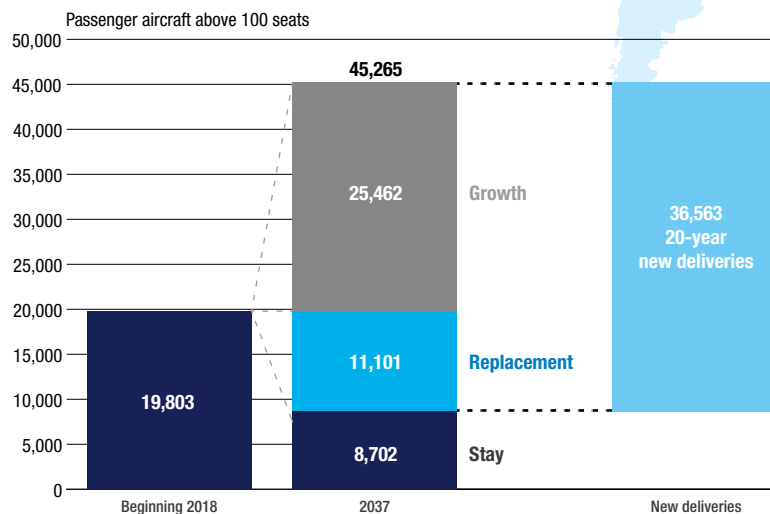
Share of passengers transported per type of routes, by step of range (100% scaled) in 2017



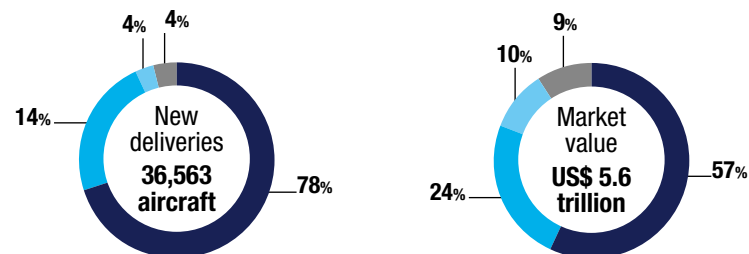


PASSENGER FLEET IN SERVICE EVOLUTION 2018-2037

Source: Airbus GMF 2018



DEMAND FOR PASSENGER AIRCRAFT SUMMARY (EXCL. FREIGHTERS)



05

**Demand
by region**



Asia-Pacific

ECONOMY

- Although India is now outpacing China in economic growth, Asia-Pacific remains firmly connected to China and its transition to a service/domestic consumption based economy.
- Recently the worst fears on slowing Chinese economic growth have eased, although this has been replaced to some extent with trade concerns.
- New manufacturing hubs such as Vietnam and Indonesia are emerging in Asia as China's cost competitiveness evolves.
- In Asia, domestic sources of growth, particularly private consumption, will play a larger role in the coming years.
- Asia-Pacific will continue to lead world economic growth with expected average real GDP growth of **+3.9%** per year over the next 20 years.



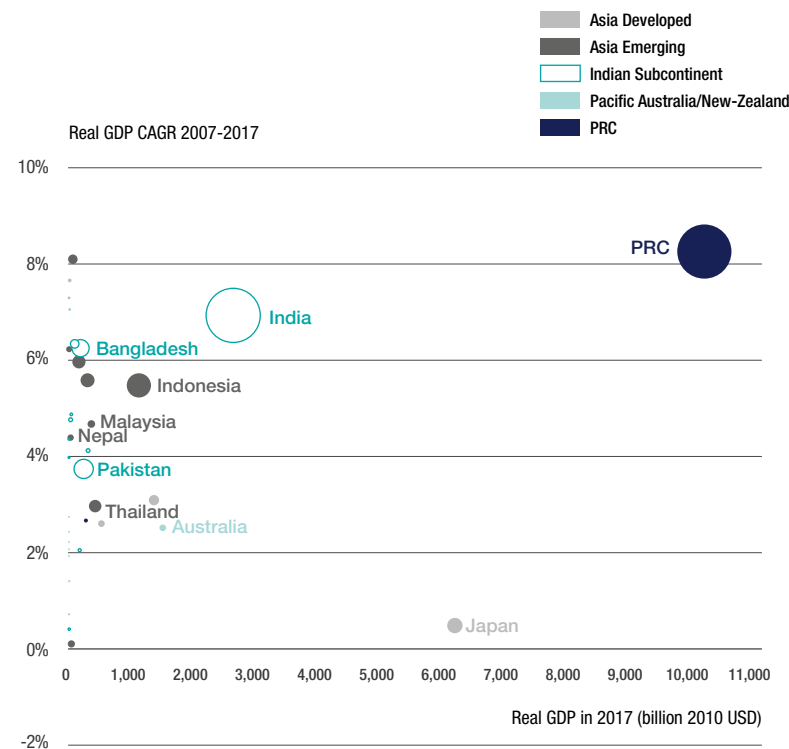
TRENDS

- The economic growth in many Asian countries is high, particularly compared to world growth in 2017, which was 3.2%, with China, India and Japan standing out in terms of the value of real GDP in 2017.
- Due to the size and diversity in the Asia-Pacific region just talking about "Asia" can mask some insights that a slightly different, more granular view, of the region could give. It is for this reason that in this year's GMF as well as looking at some individual countries like China, we have also grouped and differentiated other countries into Asia Developed, with their more mature economies, and Asia Emerging, with its more dynamic, evolving countries and economies.



DYNAMICS OF ASIA-PACIFIC'S COUNTRIES IN 2017

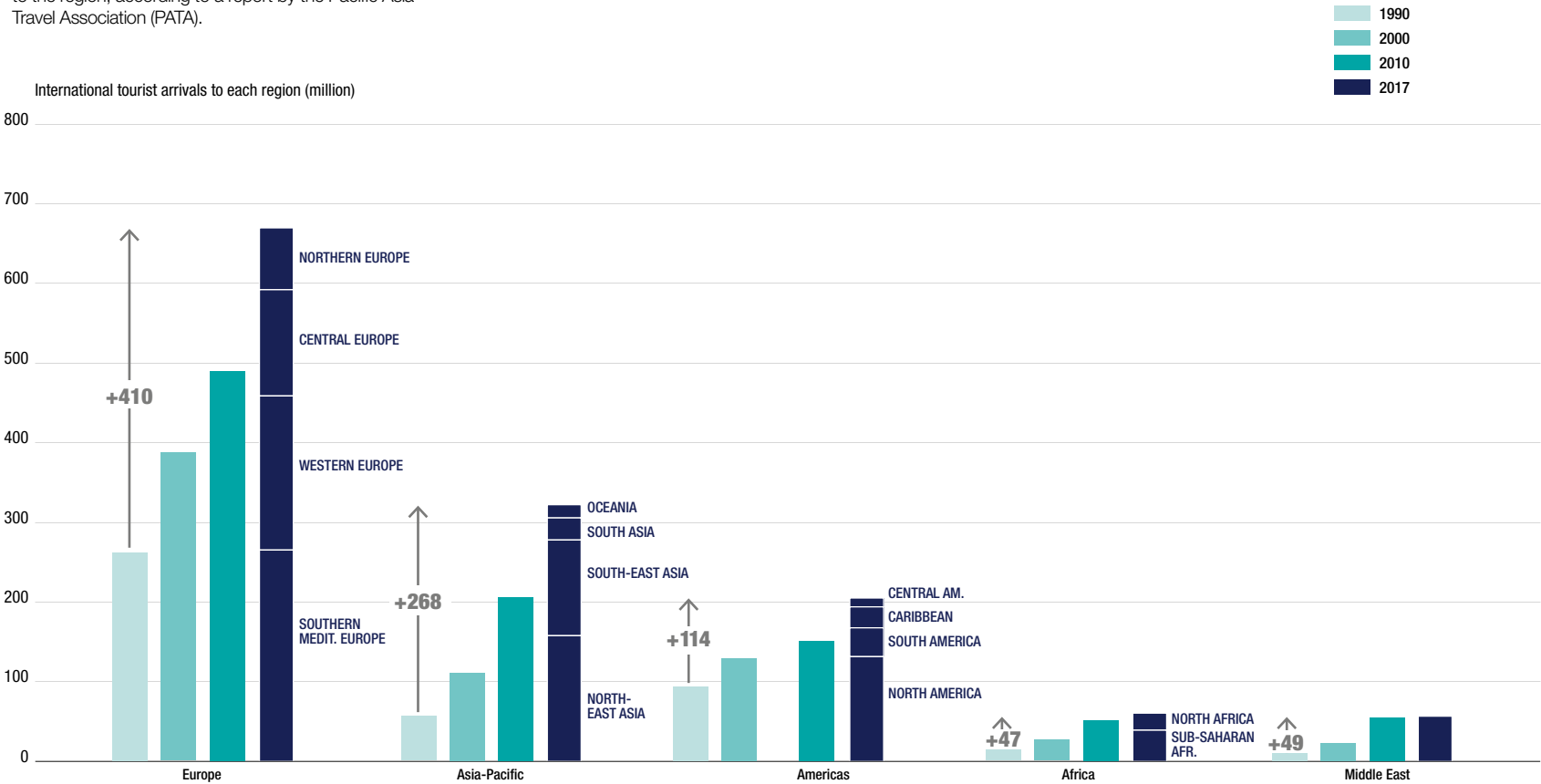
Bubble size proportional to 2017 population
Source: IHS Economics, Airbus GMF 2018



- Tourism is playing an increasing role in Asia, with the region second only to Europe in terms of International tourist arrivals, which has grown by nearly 270 million since 1990.
- It is unsurprising that with this increase the importance of tourism to Asian economies is also high, with many countries in the region having above world average contributions to their GDP from tourism. This is particularly true for those countries in Emerging Asia.
- Asia Pacific broke a new record in foreign arrivals in 2017, topping a cumulative count of 636 million visitors to the region, according to a report by the Pacific Asia Travel Association (PATA).

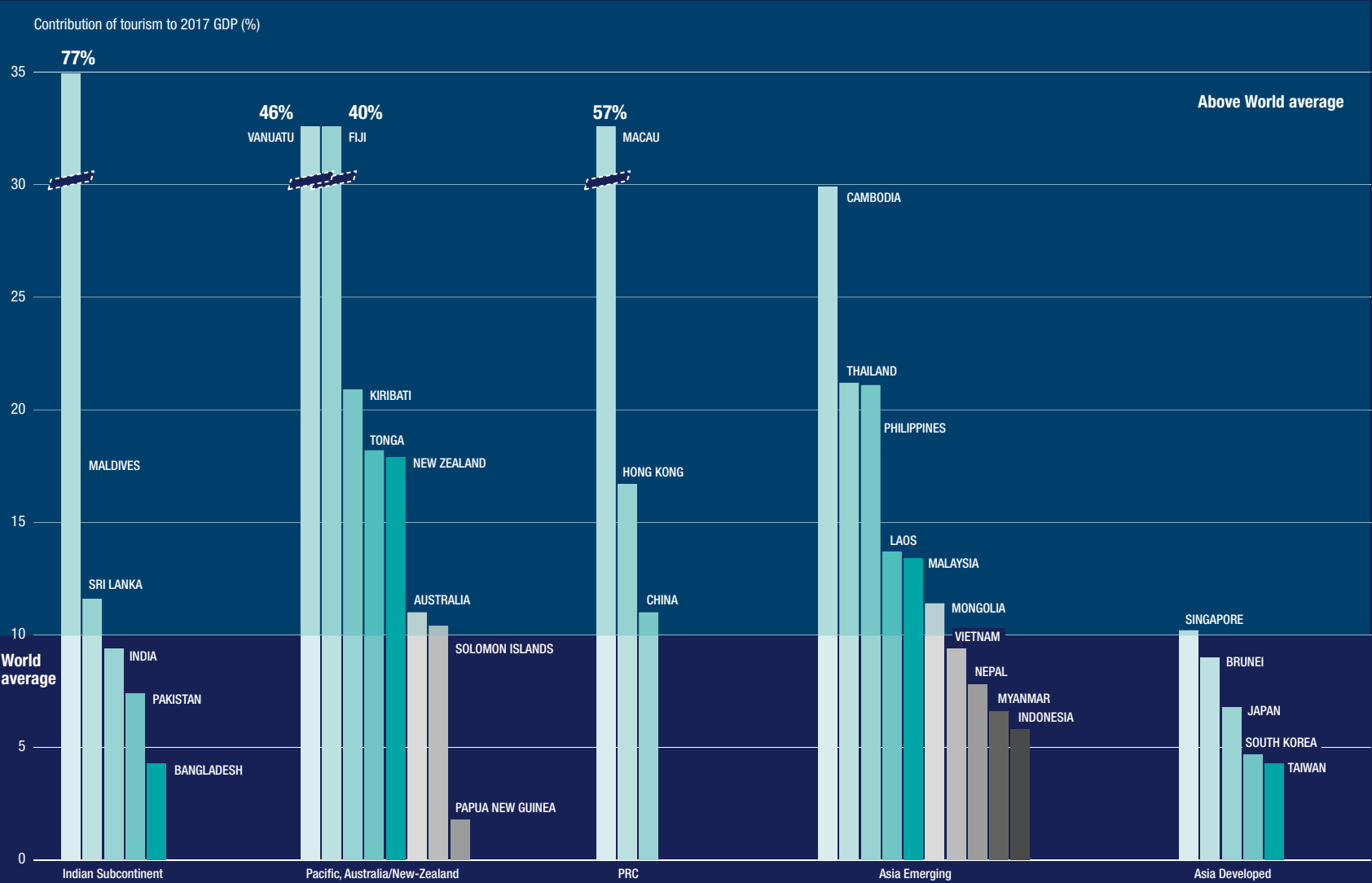
ASIA-PACIFIC IS THE SECOND MOST VISITED REGION IN THE WORLD AFTER EUROPE

Tourist: Overnight visitors travelling by air and other means of transport
UNWTO regions;
Europe including CIS
Source: UNWTO, Airbus GMF 2018



TOURISM PLAYS A MAJOR
ROLE IN ASIA-PACIFIC
ECONOMIES

Source: WTTC, Airbus GMF 2018



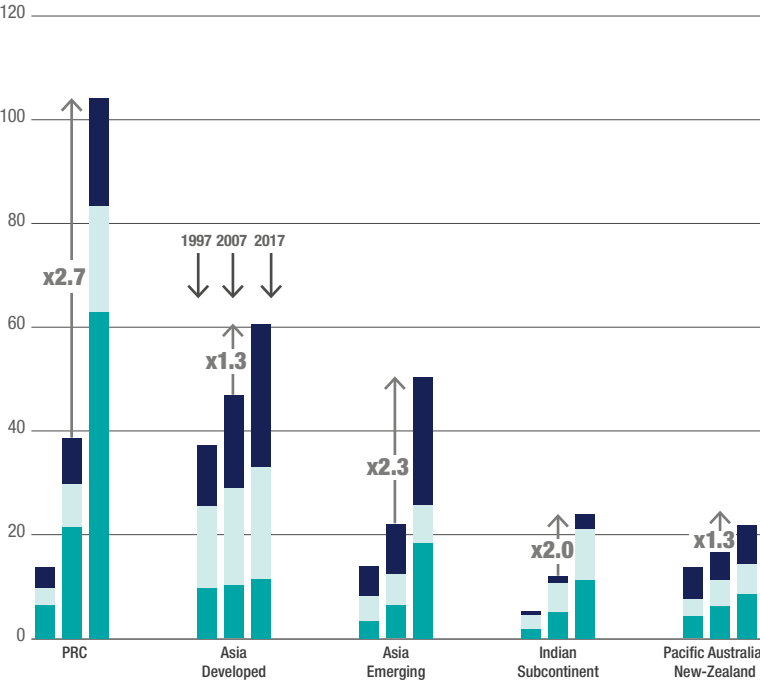
- In terms of outbound travel compared with other parts of the region China and India appear to have more potential for growth in international flights, both within Asia and to destinations outside the region.
- This appears to have been recognised by the CAAC (Civil Aviation Administration of China) for example, who have stated that airline companies are being encouraged to operate from the new Beijing airport when it opens in 2019, and to create more international routes. The CAAC have stated they will endorse new airline routes originating from Beijing's new airport to help develop its international airline network.

POTENTIAL FOR INTERNATIONAL FLIGHTS GROWTH FOR PRC & INDIAN AIRLINES

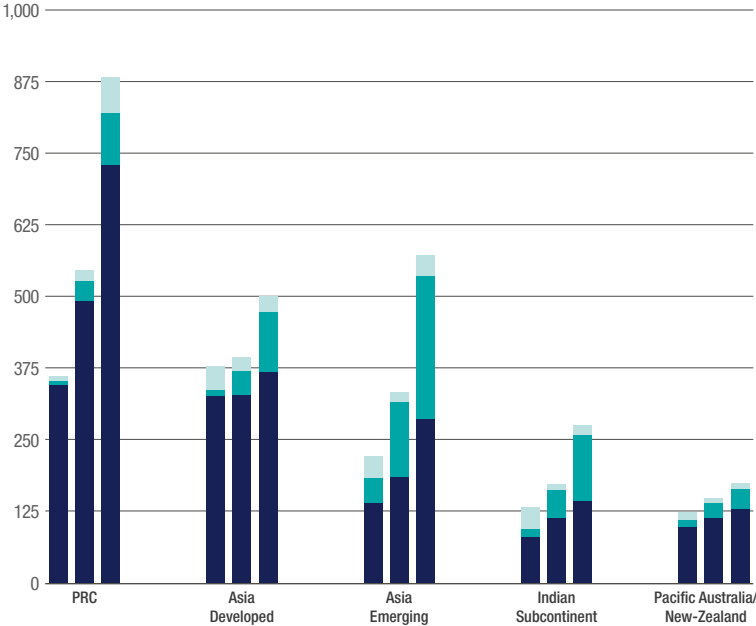
Source: OAG – Month of Sept., Airbus GMF

Domestic
International (out of Asia/Pacific)
International (within Asia/Pacific)

ASKs by airline domiciled in each region, 1997, 2007 and 2017 (Billion)



Total seats from/to/within in each region by business model, 2007, 2012 and 2017 (Million)



STRONG LOW COST CARRIER PENETRATION IN ASIA EMERGING AND INDIAN SUBCONTINENT, STILL ROOM FOR POTENTIAL LCC IN PRC

Source: OAG, Airbus GMF

Full Service Carriers
Low Cost Carriers
Other business models (Regional/Commuter, Charter/Leisure, other)

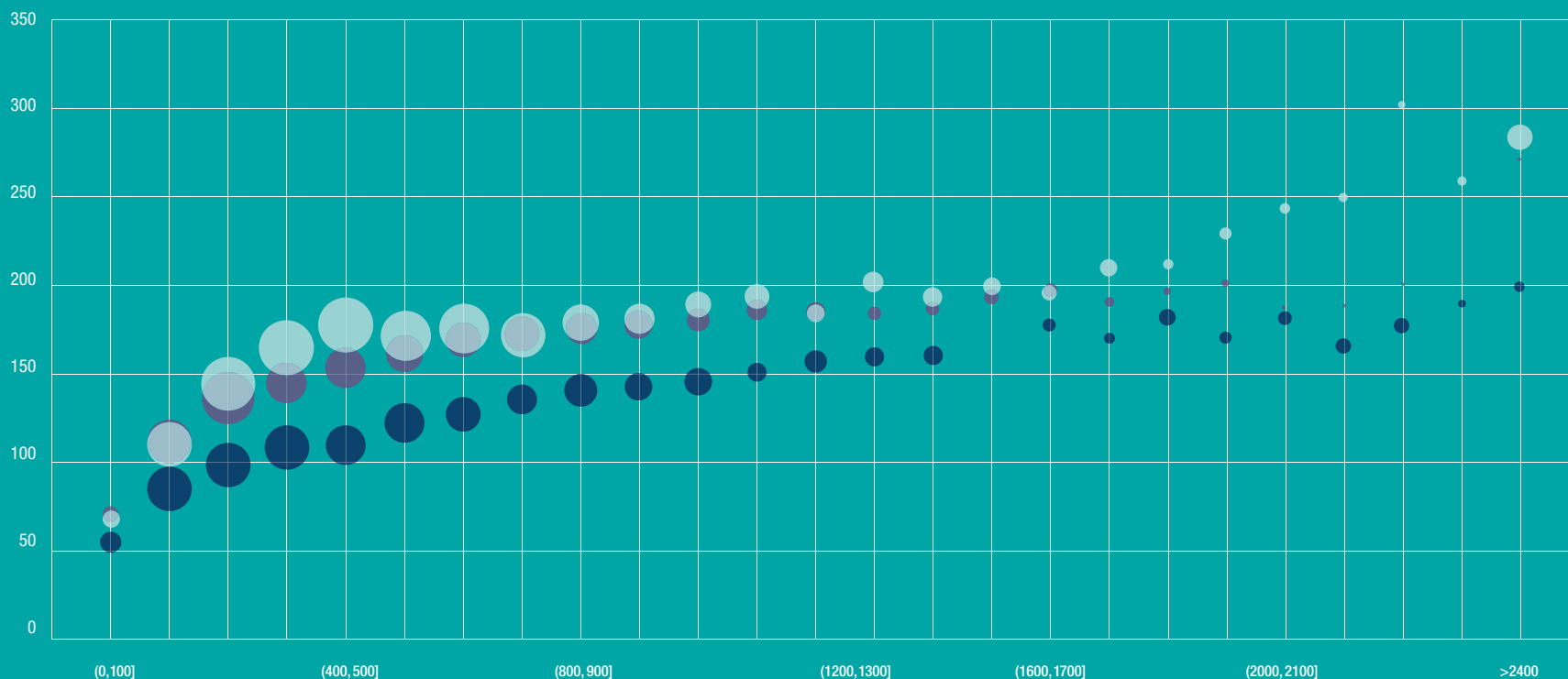
- Airline business models are also evolving and helping to shape the Asia Pacific market. This is particularly evident when examining the seats offered by the various business models over the last ten years, with airlines operating as low-cost airlines contributing significantly to the growth in the number of seats offered within the various Asian markets.
- It is apparent however that some markets have seen more low-cost activity than others, for example to the Asia Emerging market segment, whereas in China there appears more potential to develop.

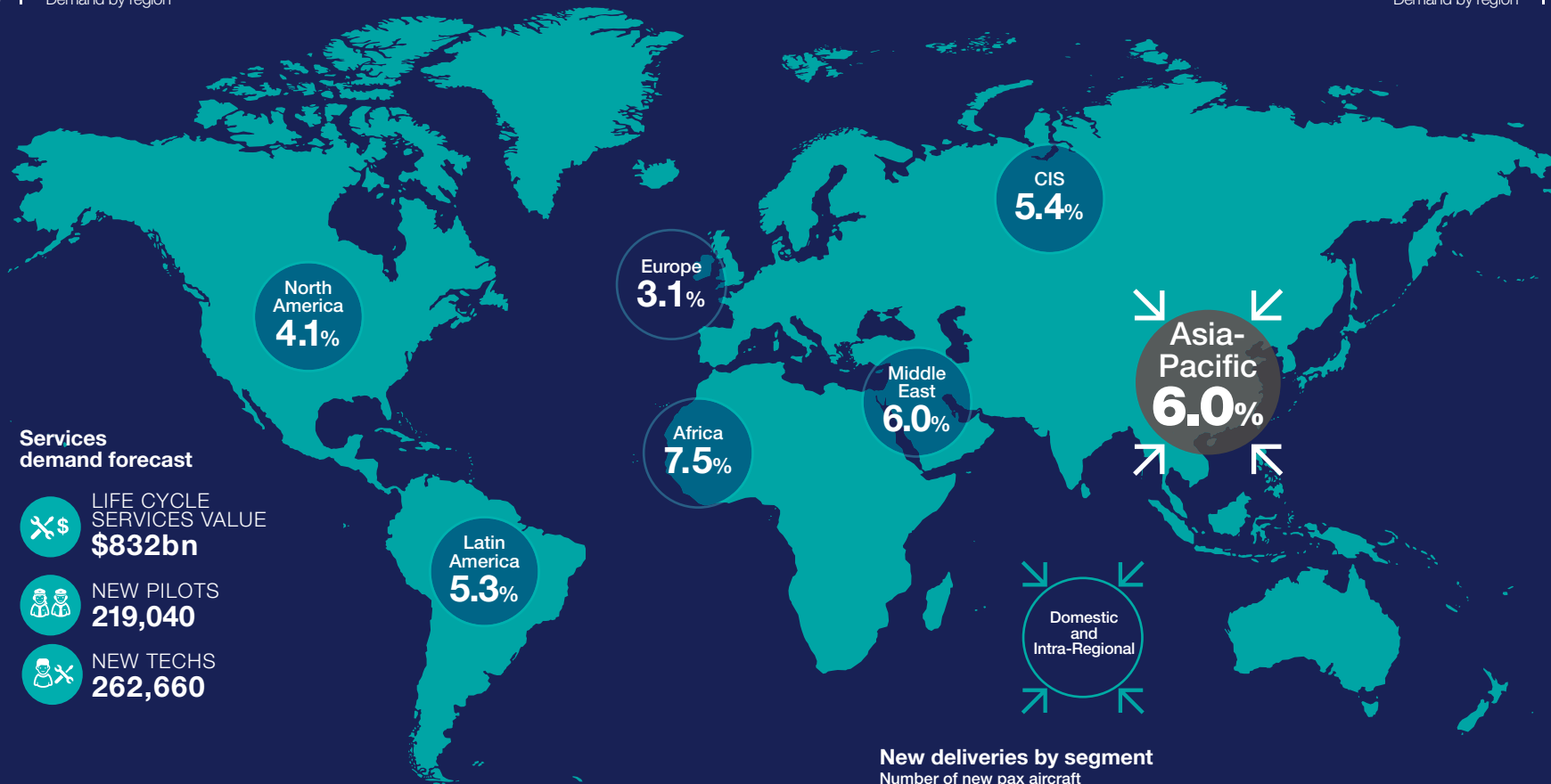
- A factor helping to characterise the intra-regional Asia-Pacific market are the large population centres and relatively large distances between them.
- It is for this reason that compared to other regions the average weighting of the market is over slightly longer distance and for larger aircraft types.

INTRA-REGIONAL ROUTES ARE OPERATED WITH HIGHER CAPACITY IN ASIA/PACIFIC

Source: Airbus GMF

Avg aircraft capacity by distance bracket (nm), bubbles proportionnal to seats offered on domestic & intra-regional by airlines based in each region - 2017



**Economy****

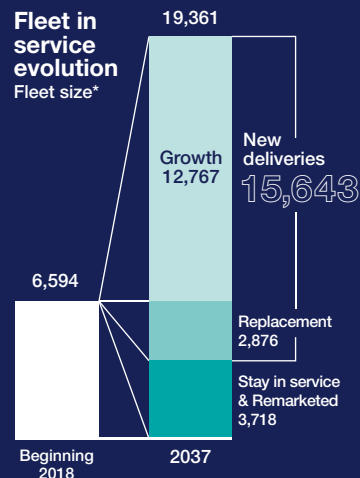
Real Trade 4.3% Real GDP **3.9%**

Traffic**

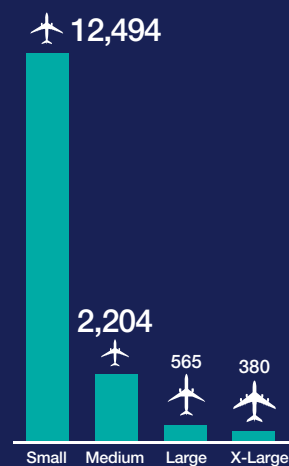
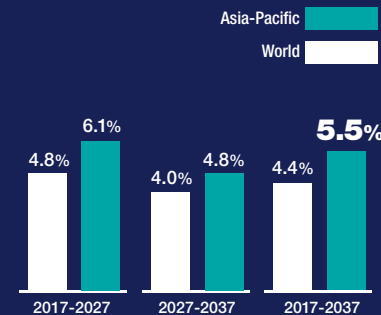
Intra-regional & domestic 6.0%
Inter-regional 4.7%
Total traffic 5.5%

Fleet*

Fleet in service 20 year new deliveries
2018 2037 **15,643**

Fleet in service evolution**New deliveries by segment**

Number of new pax aircraft

**Total RPK traffic growth**

* Passenger aircraft ≥100 seats

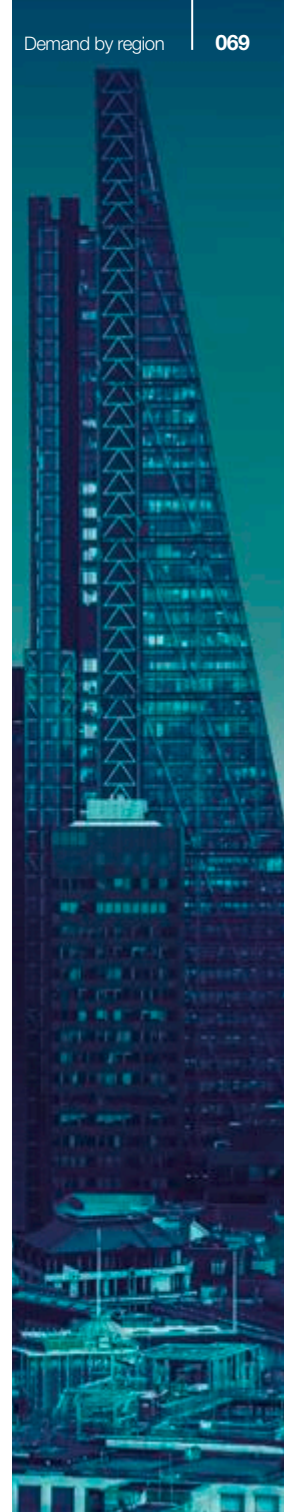
** 2017-2037 CAGR



Europe

ECONOMY

- The upside for European economic growth is being sustained by monetary stimulus, better access to credit, reduced fiscal headwinds, and solid consumer and business confidence, which is above the long-term trend at time of writing.
- The political situation in Europe remains influenced by recent elections and Brexit which are expected to continue into at least the medium term.
- Eurozone long term challenges remain; progress on fiscal and financial union as well as the need for structural reforms on labour, pensions and markets liberalisation.
- Real GDP is expected to grow at **+1.8%** per year in the 2017-2037 period.

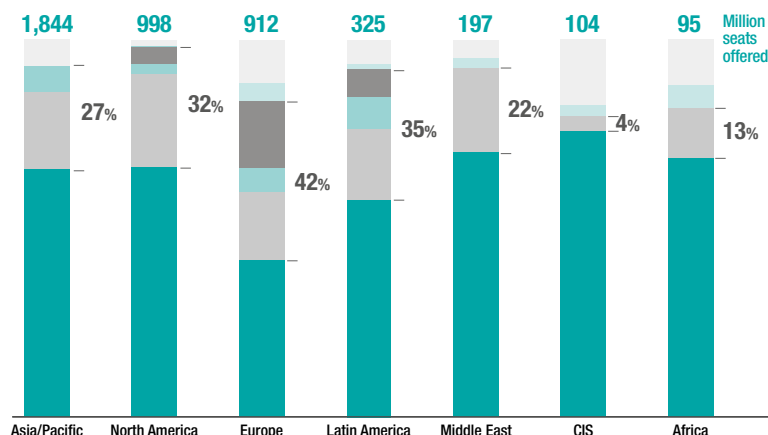


TRENDS

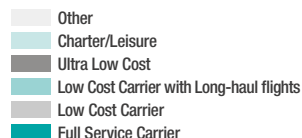
STRONG MARKET PENETRATION FROM LOW COST MODELS PARTICULARLY IN EUROPE

Source: OAG, Airbus GMF,
Business models defined based
on 2017 operations

Share of each business model on Domestic and Intra-regional flights, 2017



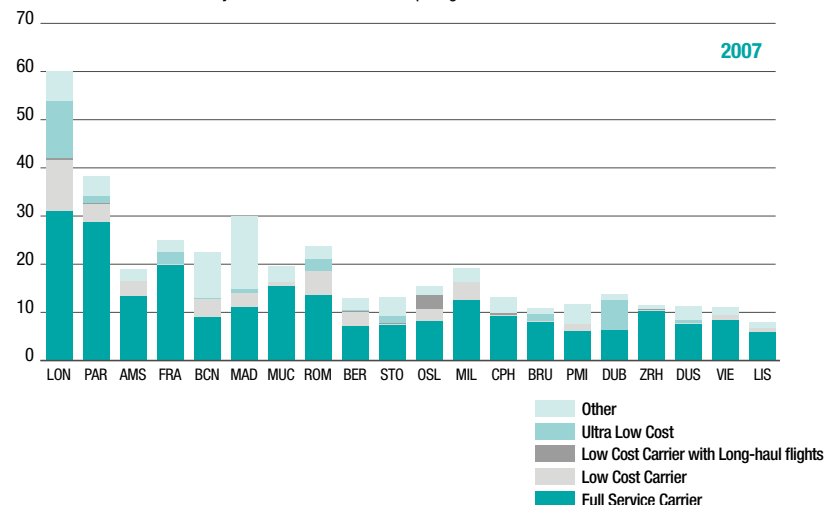
- If you visit airports in Europe the growing presence of the low cost airline business model will be clear.
- Today, 42% of the seats offered on domestic and intra-regional routings (that is flights between or within countries in Europe) are operated by airlines with one of the low cost business models.
- Just focusing on the intra-regional operations of airlines in Europe, it can be seen over just 10 years, how these business models have evolved in the region's top cities for air travel. The share and growth in the variation of the low cost business model has grown significantly.
- This has been achieved by opening new routes to what are often tourist destinations, with the ultra-low cost model also spreading to more points in Europe, and legacy airlines opening their own low cost airlines. At the same time airlines are increasingly learning from and taking the best elements of each model leading to some homogeneity.
- For many passengers flying within Europe today, the major consideration, particularly in terms of cost, isn't the flight but the accommodation or hire car on arrival. Even here the growth in popularity of online products like Airbnb is widening choices and lowering price points.



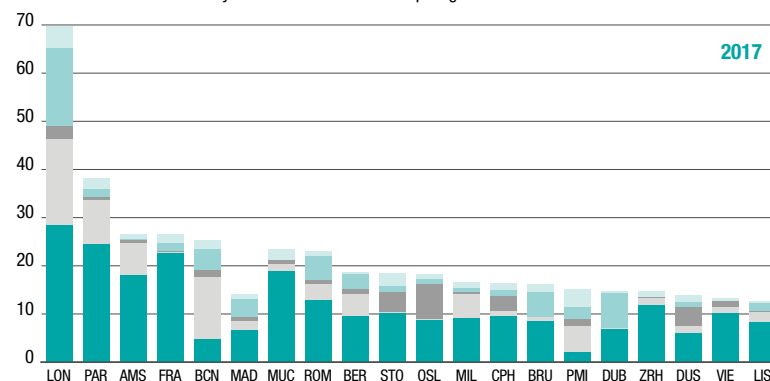
LOW COST CARRIERS PENETRATION IN TOP 20 EUROPEAN CITIES IN 2007...

Source: OAG, Airbus GMF,
Business models defined based
on 2017 operations

Seats offered from each city on domestic and intra-Europe flights



Seats offered from each city on domestic and intra-Europe flights



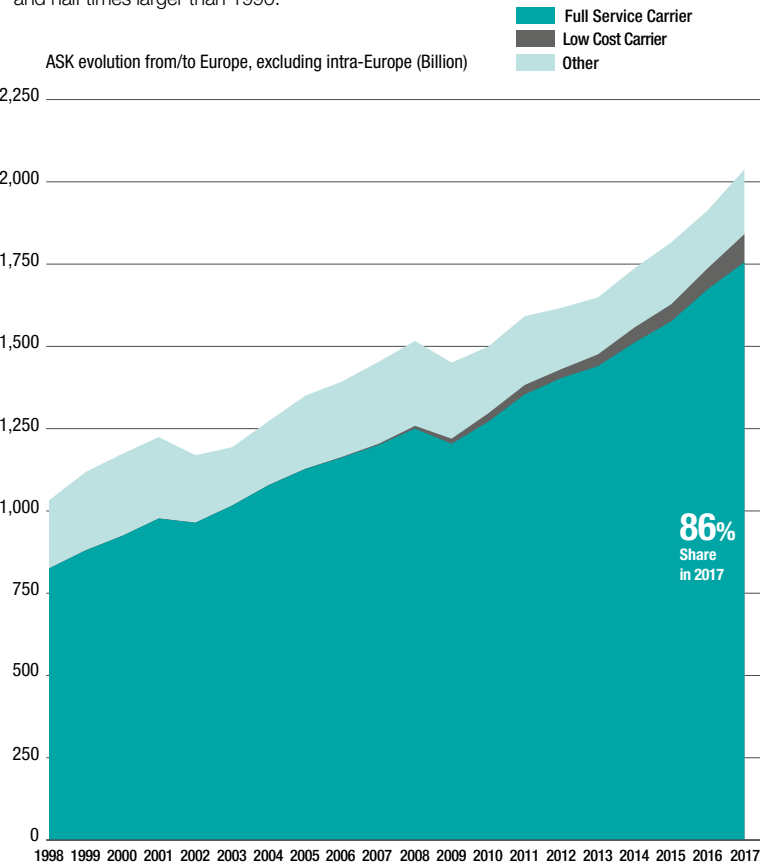
...BY 2017, THE SHARE AND BUSINESS MODEL VARIATION HAD DEVELOPED

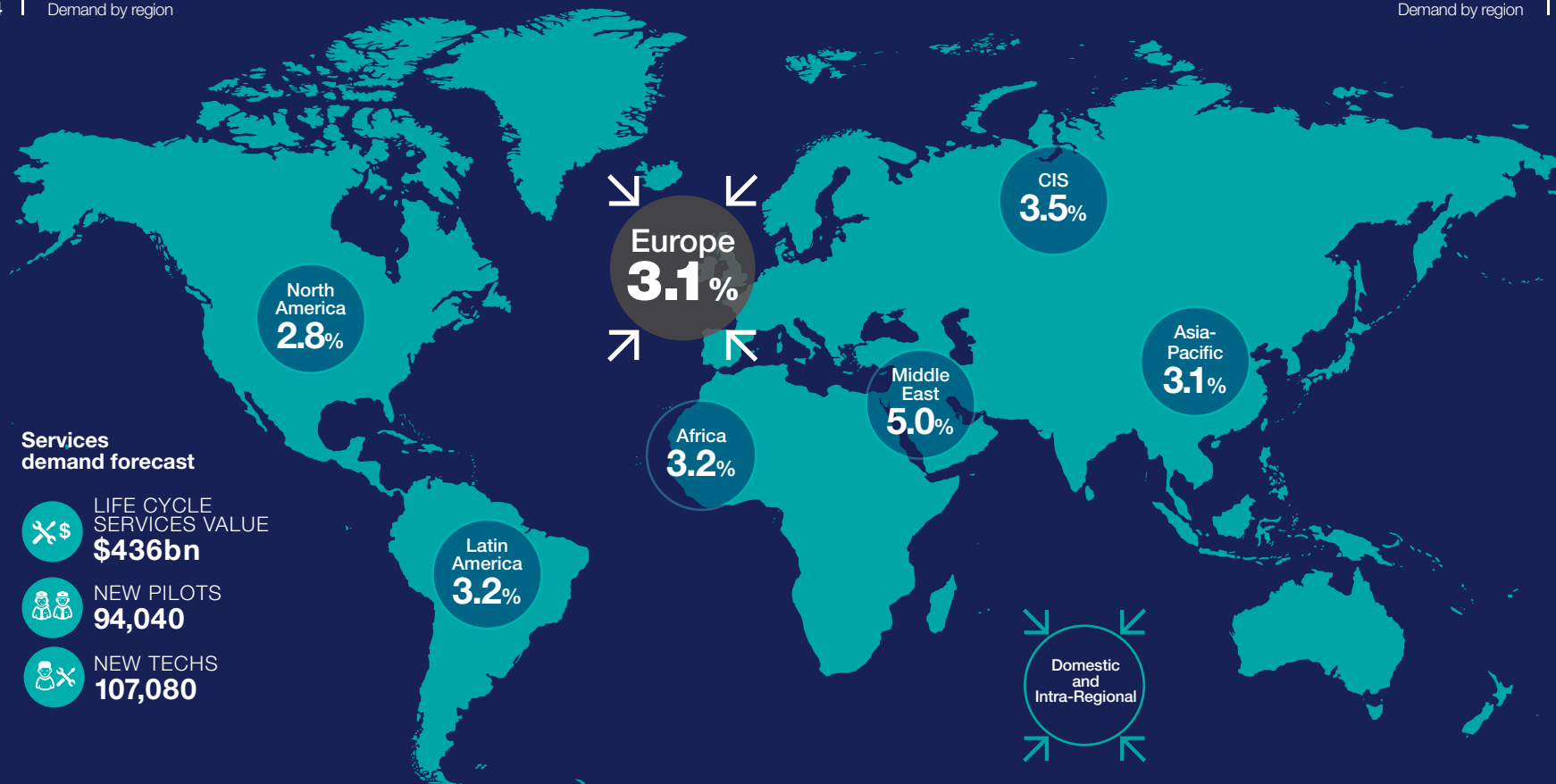
Source: OAG, Airbus GMF,
Business models defined based
on 2017 operations

- Whilst low cost airlines have helped to stimulate growth around Europe, flying to and from Europe has also grown. Since 1998, the capacity flying in and out of Europe has doubled, with the full-service carriers increasing their share of this traffic from 80% in 1998 to 86% in 2017. It is clear that the inter-regional connectivity between important origin and destination points and the multiple cabin product offerings which the full service carriers deliver, remain key components in these markets.
- Tourism is playing its part in this growth, with European international inbound arrivals the largest in the world, with nearly 700 million, in 2017, with this number two and half times larger than 1990.

**INTER-REGIONAL ASKS
FROM/TO EUROPE HAVE
DOUBLED SINCE 1998**

Source: OAG, Airbus GMF,
Business models defined based
on 2017 operations





Services demand forecast

LIFE CYCLE SERVICES VALUE
\$436bn

NEW PILOTS
94,040

NEW TECHS
107,080

Economy**

Real Trade 2.8% Real GDP **1.8%**

Traffic**

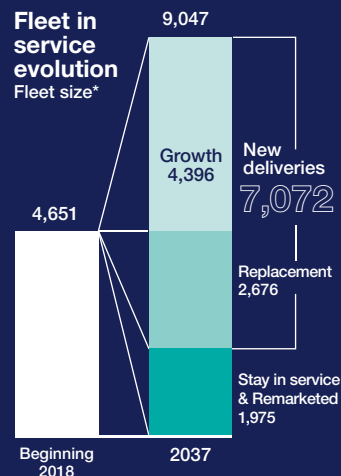
Intra-regional & domestic 3.1%
 Inter-regional 3.4%
Total traffic 3.3%

Fleet*

Fleet in service 20 year new deliveries
2018 2037
4,651 9,047 **7,072**

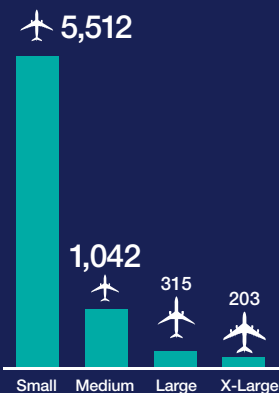
Fleet in service evolution

Fleet size*

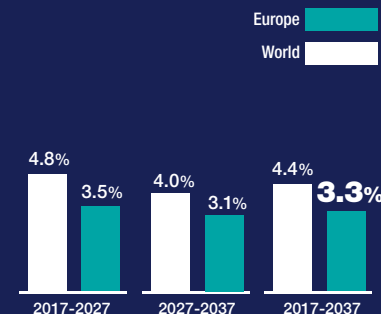


New deliveries by segment

Number of new pax aircraft



Total RPK traffic growth



* Passenger aircraft ≥100 seats

** 2017-2037 CAGR



North America

ECONOMY

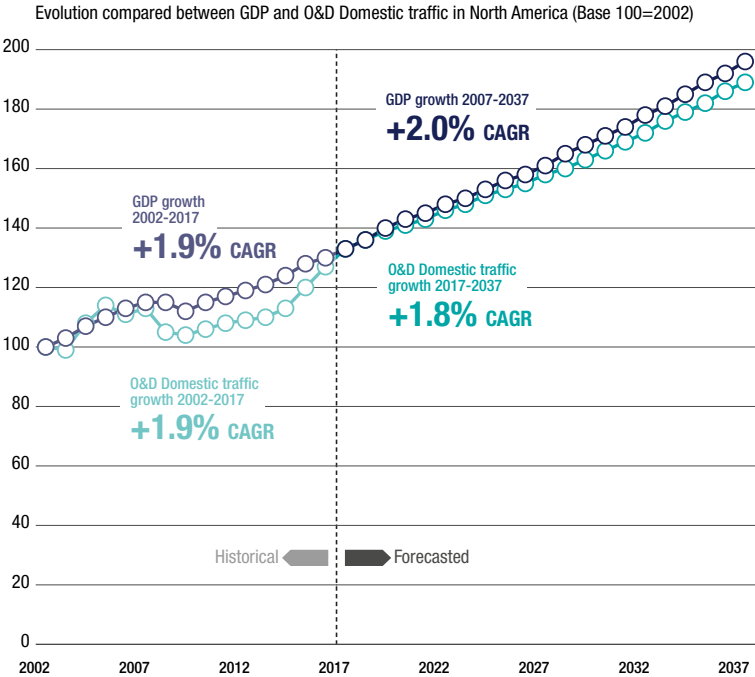
- US expansion is becoming more balanced, with consumer spending, residential construction, business fixed investment and government spending all contributing to sustained economic growth.
 - Consumer spending will drive expansion, supported by growth in employment and real incomes.
 - Business investment is expected to continue to benefit from expanding global markets, an easing of regulatory policies, and a more competitive tax environment.
 - However, trade related tensions and their impact at a regional and global level will need to be monitored.
 - Real GDP growth will hold up fairly well with an average **+2.0%** per year in the 2017-2037 period.
- 

TRENDS

- According to Airlines for America there are 27,000 flights to/from the US alone, more than 800 airports, with 2.3 million passengers and 55,000 tons of cargo transported on a daily basis.
- The US domestic traffic flow is the largest in the world today and is expected to continue to be a major flow in the future. From a North American perspective this flow dominates in terms of the number of origin and destination passengers, being seven times larger than the next largest flow between the US and Western Europe, the trans-Atlantic market.
- Whilst already large, and relatively mature, the US domestic traffic flow grew in line with GDP 1.9% per annum between 2002 and 2017. Our forecast suggests it will grow at a similar rate over the next 20 years.

DOMESTIC MARKET: DESPITE BEING A MATURE MARKET, IT IS STILL GROWING

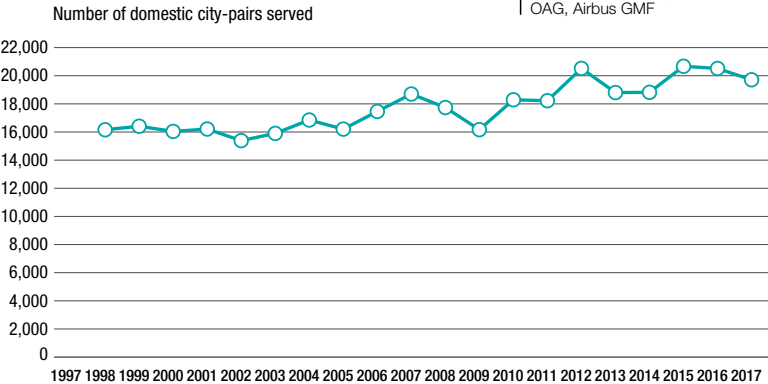
Source: IHS Economics, Sabre GDD, Airbus GMF



- As well as the core routes between the major urban conurbations and aviation hubs in North America continuing to grow, the domestic network has continued to grow through the addition of new routes; 22% additional routings over the last 20 years.
- The growth in domestic traffic and the increase in city pairs served has a number of drivers, one being the growth of low cost airlines in the market and the evolution of that business model to drive for ever lower costs and fares. But also, the region's hubs have also become a focus for airlines of all types, with the largest carriers growing at each others' hubs and smaller carriers, particularly LCCs, also expanding rapidly at these hubs. For example, at Denver 57% of origin and destination passenger traffic was flown by airlines other than the big three (and their predecessors); in 2000, it was just 15%. At New York's airports this number was 31% in 2017, and just 10% in 2000.

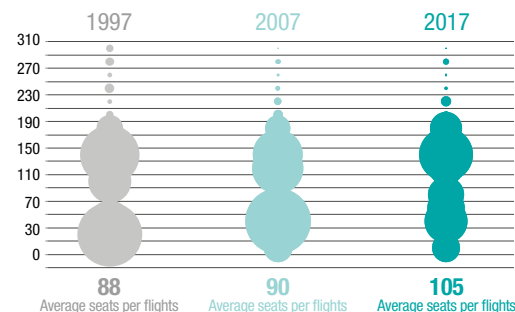
DOMESTIC MARKET: AIRLINES HAVE EXPANDED THEIR DOMESTIC NETWORK (+22% IN 20 YEARS)

Source: Sabre GDD, OAG, Airbus GMF



- Together with these trends, the size of aircraft operating domestically has also grown. In 1997, the average was 88 seats/flight. By 2017, this number had increased to 105. However, when looking at the spectrum of aircraft size used in US domestic operations over time, the weight has moved well above 100 seats, with this trend expected to continue.
- According to Airlines for America, aircraft over 100 seats represented 56% of US domestic departures. Just eight years ago the share was 48%; a clear trend to the use of larger aircraft for US domestic operations.

Number of seats per domestic flights
(Bubble size proportional to number of frequencies in a given seat category)

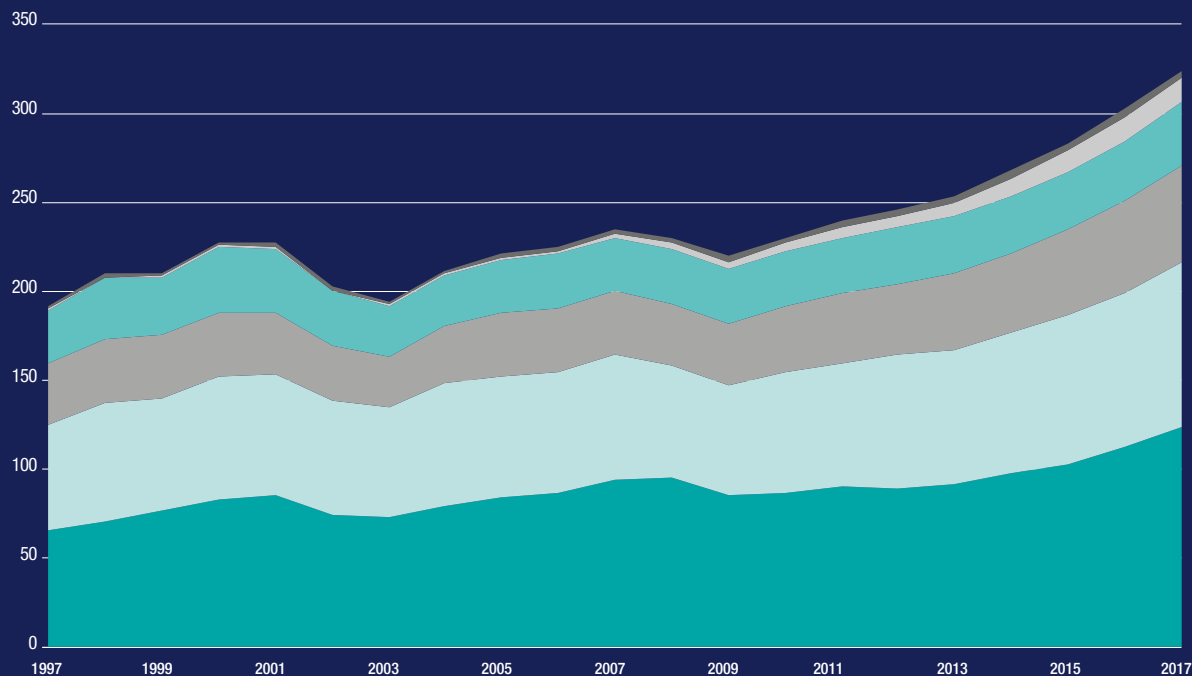


**DOMESTIC MARKET:
...AND HAVE UP-GAUGED
THEIR CAPACITY
ON EXISTING ROUTES**

Source: OAG, Airbus GMF

- North American international traffic has also grown with the addition of 130 million seats since 1997. Economic growth, more liberalisation and greater passport ownership in the US (see the Demand for Air Travel chapter), growth on the trans-Atlantic market stimulated by long-haul LCCs and increased tourism, have all helped to stimulate aviation growth internationally.

Seats offered from/to North America (million)



**~130 MILLION ADDITIONAL
INTERNATIONAL SEATS
OFFERED FROM/TO NORTH
AMERICA SINCE 1997**

Source: OAG annualised
September data, Airbus GMF 2017

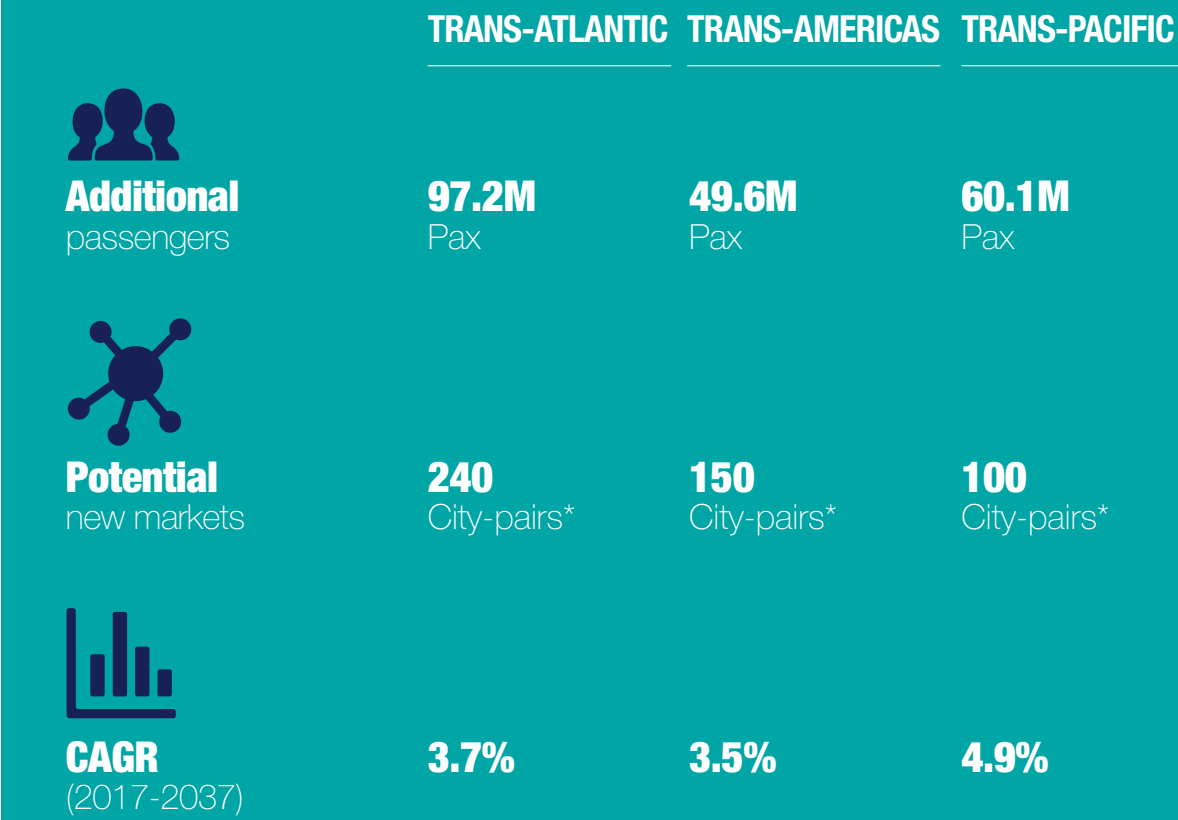


	2007 vs 1997	2017 vs 1997
Other	x1.6	x2.7
Middle East	x3.7	x20.3
Intra-North America, non domestic	x1.0	x1.2
Asia-Pacific	x1.0	x1.6
Latin America	x1.2	x1.6
Europe	x1.4	x1.9
Total	x1.2	x1.7

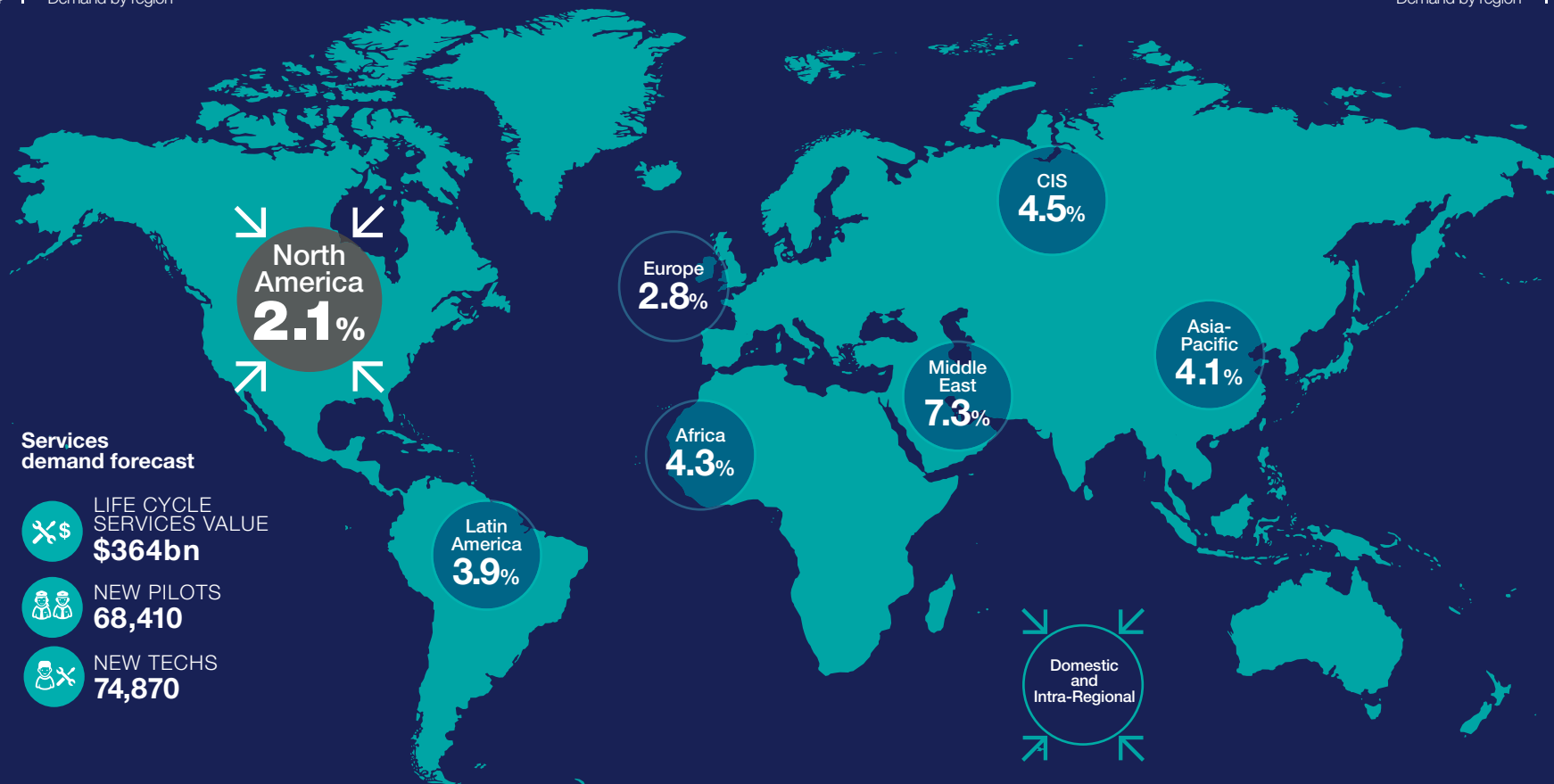
- We expect this trend to continue with another 280 million additional passengers forecast internationally by 2037. The trans-Pacific market is expected to see the highest growth with a 4.9% CAGR. Although the trans-Atlantic will add the most passengers and has the highest new market potential.

INTERNATIONAL TRAFFIC
TO/FROM NORTH AMERICA
280.8M ADDITIONAL
PASSENGER BY 2037

Source: Sabre GDD,
OAG, Airbus GMF



* City-pairs at or above
2,500 pax per month



Services demand forecast

LIFE CYCLE SERVICES VALUE
\$364bn

NEW PILOTS
68,410

NEW TECHS
74,870

Economy**

Real Trade 3.5% Real GDP **2.0%**

Traffic**

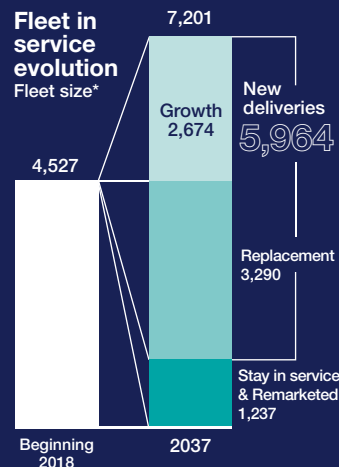
Intra-regional & domestic 2.1%
 Inter-regional 3.8%
Total traffic 3.1%

Fleet*

Fleet in service 20 year new deliveries
2018 2037
4,527 7,201 **5,964**

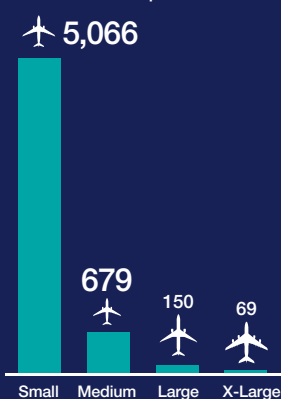
Fleet in service evolution

Fleet size*

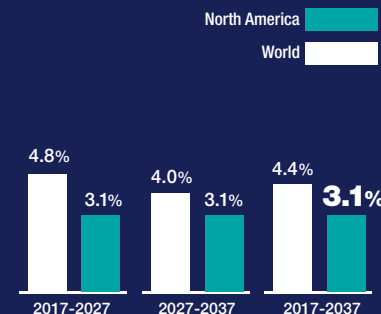


New deliveries by segment

Number of new pax aircraft



Total RPK traffic growth



* Passenger aircraft ≥100 seats
** 2017-2037 CAGR



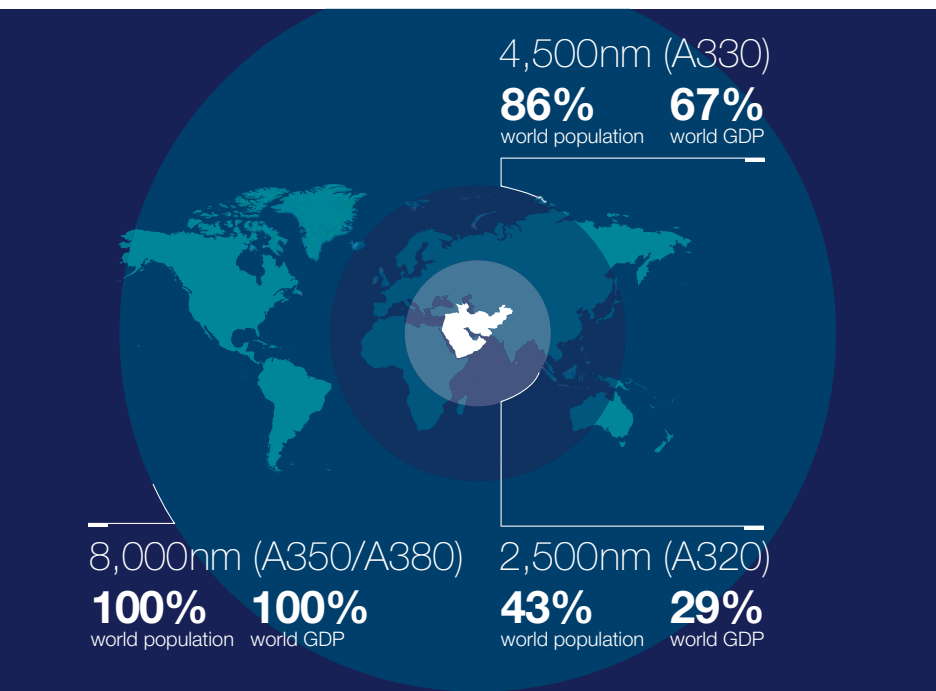
Middle East

ECONOMY

- Low oil revenues, fiscal tightening, and some regional political instability have hindered Middle East economic growth.
- The region shifted from current-account surpluses to deficits recently but a return to surplus is expected in the medium term as oil prices recover somewhat.
- The Middle East's economic outlook remains supported by its substantial petroleum resources, its proximity to energy-hungry Asian economies and a growing tourism potential.
- The region's population is young and is growing at a rate second only to Africa with an annual growth rate of 1.5%. Population growth is a key descriptive variable when forecasting aviation traffic growth.
- Middle East region's real GDP is expected to grow at **+3.4%** per year over the next 20 years.

TRENDS

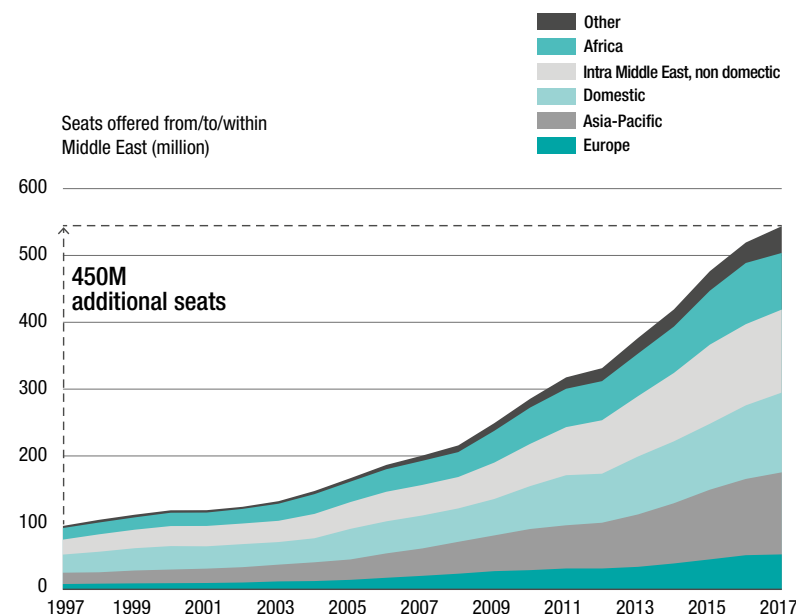
- It is often mentioned that the Middle East is well positioned geographically, but it is less well known that more than 40% of the World's population is within reach of the Middle East with single-aisle aircraft like the A320. Take a twin-aisle like the A330neo and within 4,500nm you cover nearly 90% of the world's population and countries responsible for 67% of global GDP.



MIDDLE EAST AT THE CROSS ROADS BETWEEN EAST AND WEST

- With its location, the ambition of the regions airlines, and its young and growing population, traffic to and from the region has grown rapidly.
- Since 1997, the number of seats has grown more than five times, with an additional 450 million seats offered annually in 2017, compared to 20 years earlier. In 2017, nearly 40% of the seats were offered for travel within the Middle East either domestically or intra-regionally.

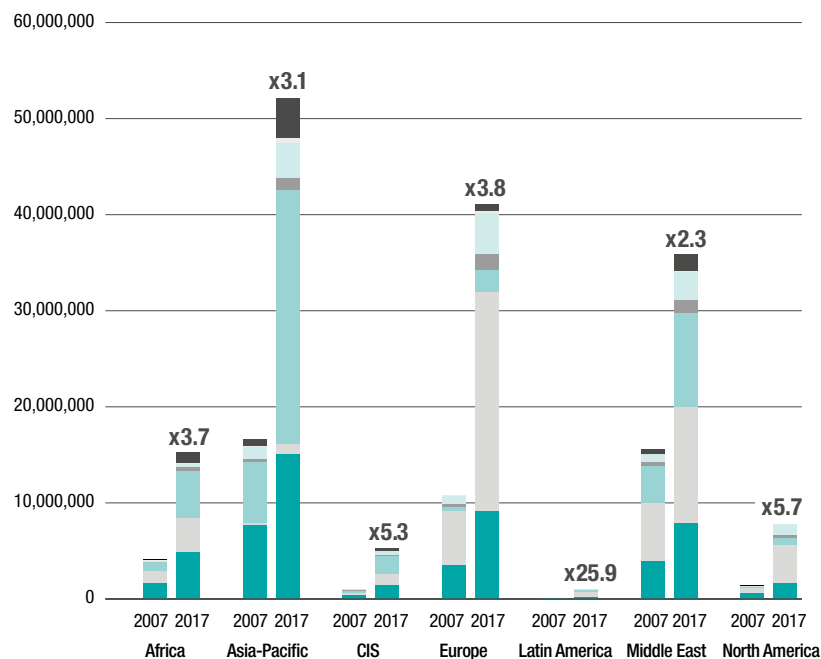
	2007 vs 1997	2017 vs 1997
Other	x2.5	x12.8
Africa	x2.5	x6.3
Intra Middle East, non domestic	x2.1	x4.9
Domestic	x1.8	x4.4
Asia/Pacific	x2.4	x7.2
Europe	x2	x5.5
Total	x2.1	x5.7



SEATS OFFERED TO, FROM AND WITHIN THE MIDDLE EAST HAVE GROWN >5 TIMES IN 20 YEARS

Source: OAG annualised
September data,
Airbus GMF 2018

- As well as the seats offered to, from and within the region, the number of connecting passengers within the Middle East has also grown more than trebling over the last 10 years. It is interesting to note the number of passengers who either originate or have a destination in the region is significant, indicating the importance of the Middle Eastern hubs to more than passengers simply connecting in the region whilst travelling between Europe and Asia for example.



North America
 Latin America
 Africa
 CIS
 Europe
 Asia-Pacific
 Middle East

THE NUMBER OF PASSENGER CONNECTING VIA A MIDDLE EASTERN HUB HAS MORE THAN TREBLED OVER THE LAST 10 YEARS

Source: Sabre annualised September data, Airbus GMF 2018 – Axis: Origin region – Legend: Destination region

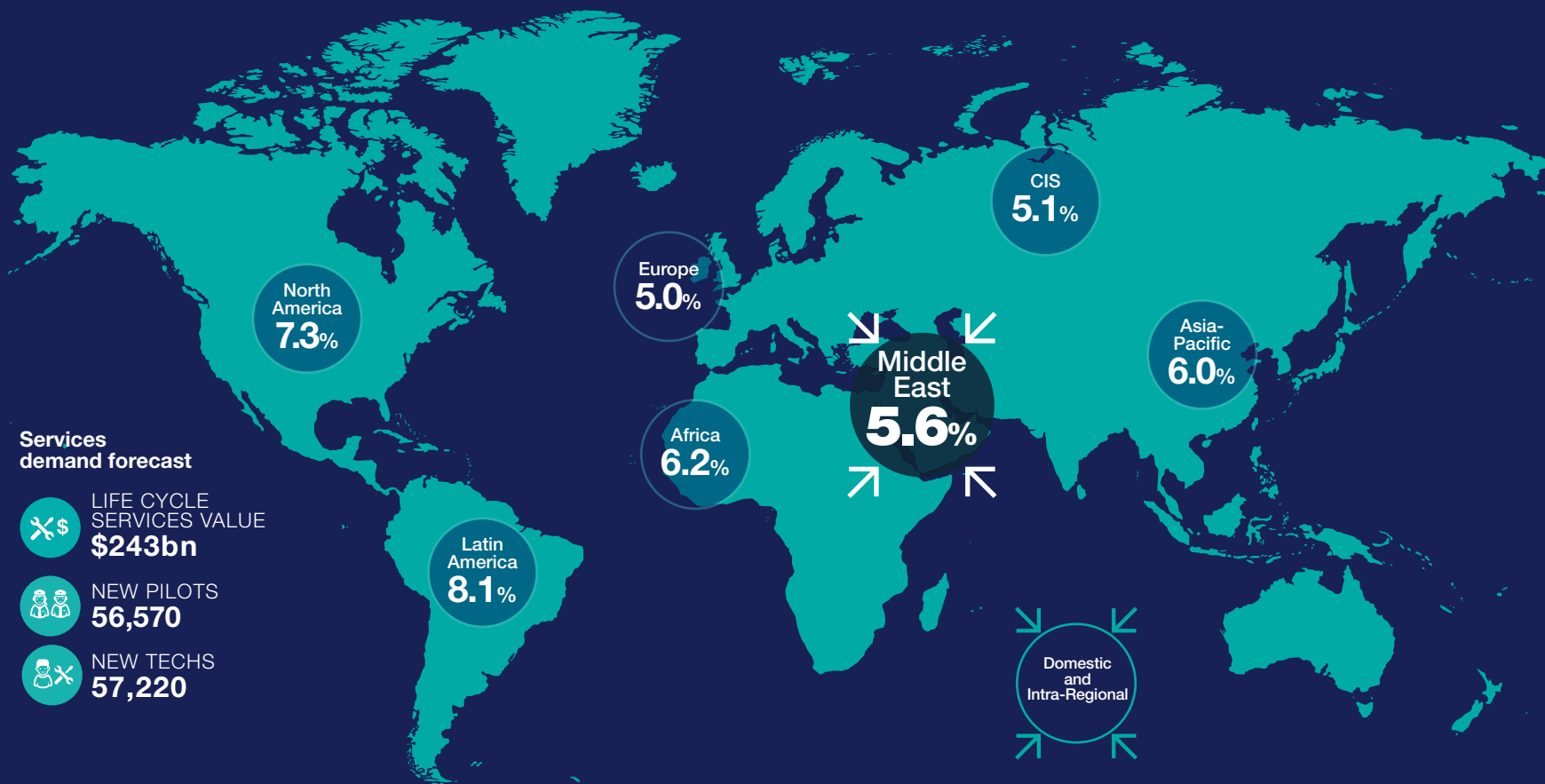
- To meet this growing demand the regions airport infrastructure is developing with reported investment in over 40 projects at existing airports valued at nearly \$100 billion (USD). These include terminal upgrades and runway widening in Abu Dhabi, terminal expansion and a possible new airport in Bahrain, terminal capacity expansion, a runway upgrade in Dubai, and developments in Jeddah, Riyadh, Muscat and Tehran where 100 million passenger a year capacity is reportedly planned.

158,4m
pax in 2017

+220%
vs 2007

\$100 BILLION (USD) OF AIRPORT DEVELOPMENTS SPREAD THROUGHOUT THE REGION





Services demand forecast

LIFE CYCLE SERVICES VALUE
\$243bn

NEW PILOTS
56,570

NEW TECHS
57,220

Economy**

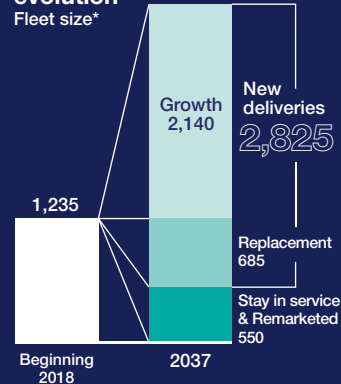
Real Trade 4.2% Real GDP **3.4%**

Traffic**

Intra-regional & domestic 5.6%
 Inter-regional 5.9%
Total traffic 5.9%

Fleet*
Fleet in service 20 year new deliveries
2018 2037
1,235 3,375 **2,825**

Fleet in service evolution

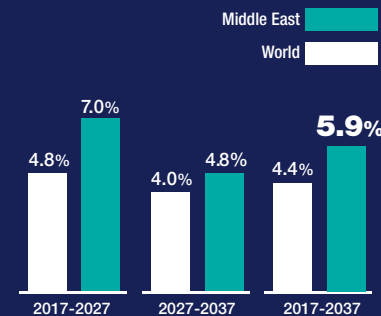


New deliveries by segment

Number of new pax aircraft



Total RPK traffic growth



* Passenger aircraft ≥100 seats

** 2017-2037 CAGR



Latin America & Caribbean

ECONOMY

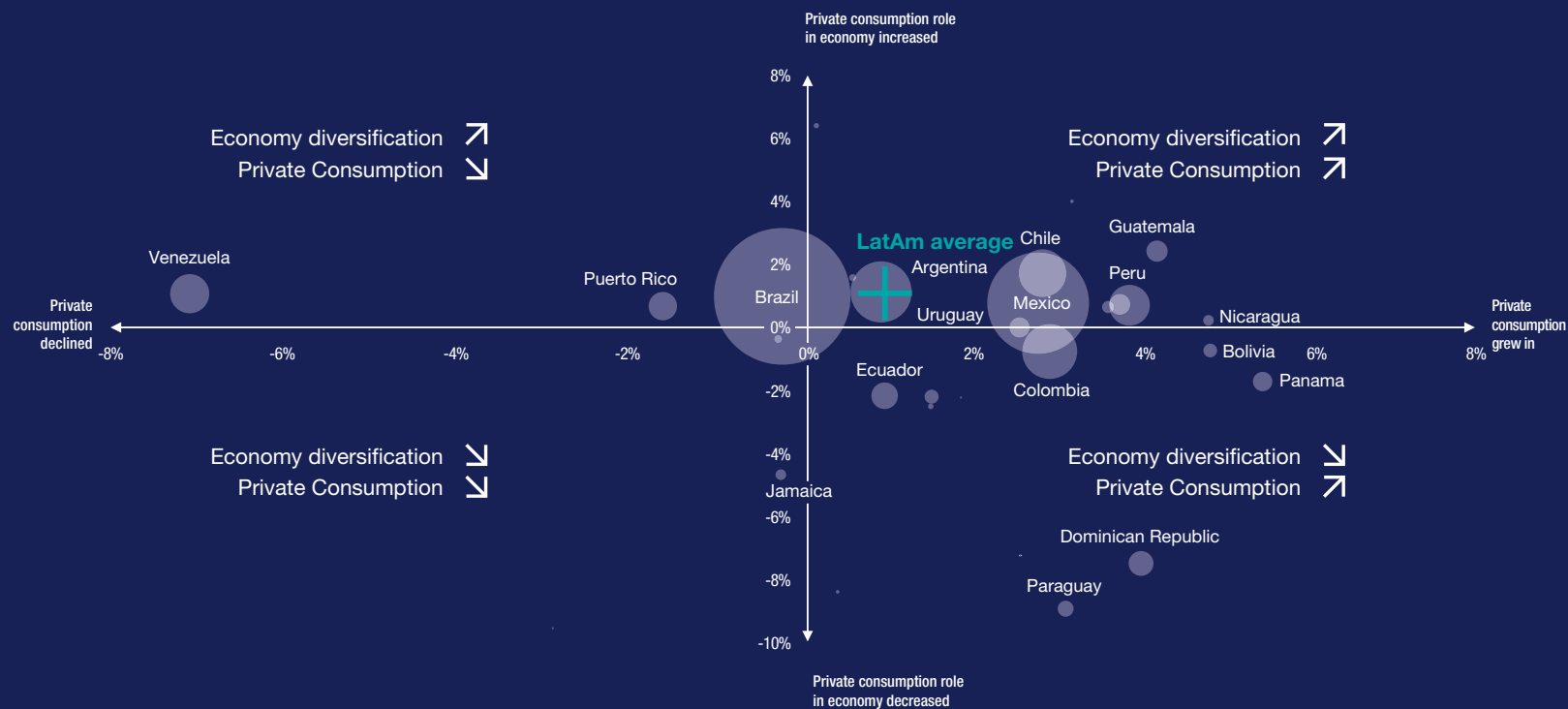
- Economic performance varies across Latin America with the end of the recession in Brazil and Argentina, together with positive growth prospects for Colombia, Chile and Peru.
- Mexico will continue to be strongly linked to the US economy through trade, capital inflows, and remittances.
- Private consumption has grown and today, is a larger part of the economies of many of the regions countries than in 2012.
- Despite long-term challenges including inadequate infrastructure, restrictive business environments and income inequality, the long-term prospects for Latin America remain positive.
- Real GDP growth is expected to average **+3.0%** per year over the period 2017-2037.



**THE LATIN AMERICAN
ECONOMY IS DIVERSIFYING,
WITH PRIVATE
CONSUMPTION GROWING**

Source: IHS Economics,
Airbus GMF 2017

Real GDP, Private consumption 2012-2017 evolution

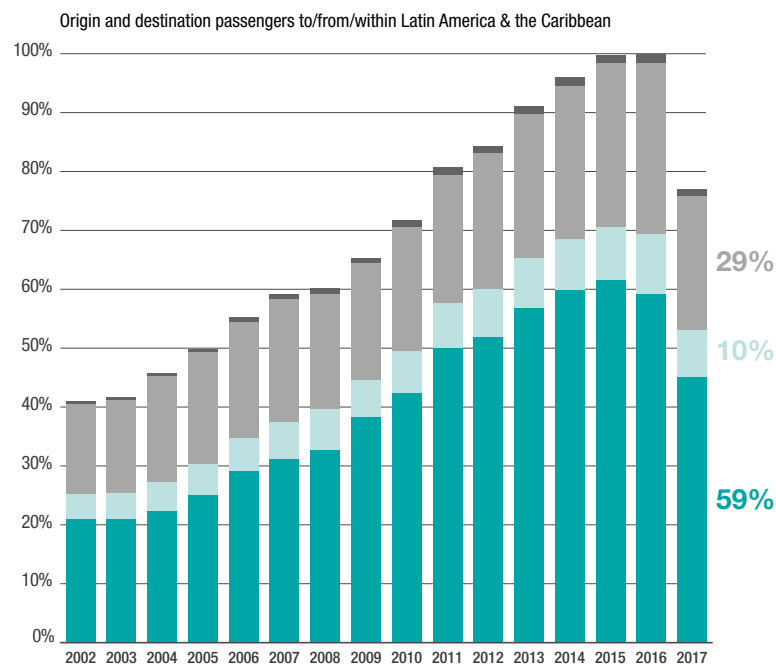


TRENDS

- In absolute terms Latin American domestic passengers have more than doubled helping to take its share of all passenger traffic to, from and within the region to nearly 60%. The share of traffic from the region to and from North America has declined eight percentage points to 29%, although in the absolute number of passengers has increased by about a third over the same period
- At the end of 2017, about 70% of the regions passengers travelled within the region, with the majority flying domestically, suggesting there is opportunity for greater intra-regional flying.

~70% OF TRAFFIC TO/FROM LATIN AMERICA IS WITHIN THE REGION, OF WHICH 85% IS DOMESTIC

Source: Airbus GMF 2017



- Year on Year domestic traffic in the region has traditionally grown faster than origin and destination intra-regional passenger traffic and that to and from North America. Recently however intra-regional traffic growth has outpaced growth on other flows connecting the region.

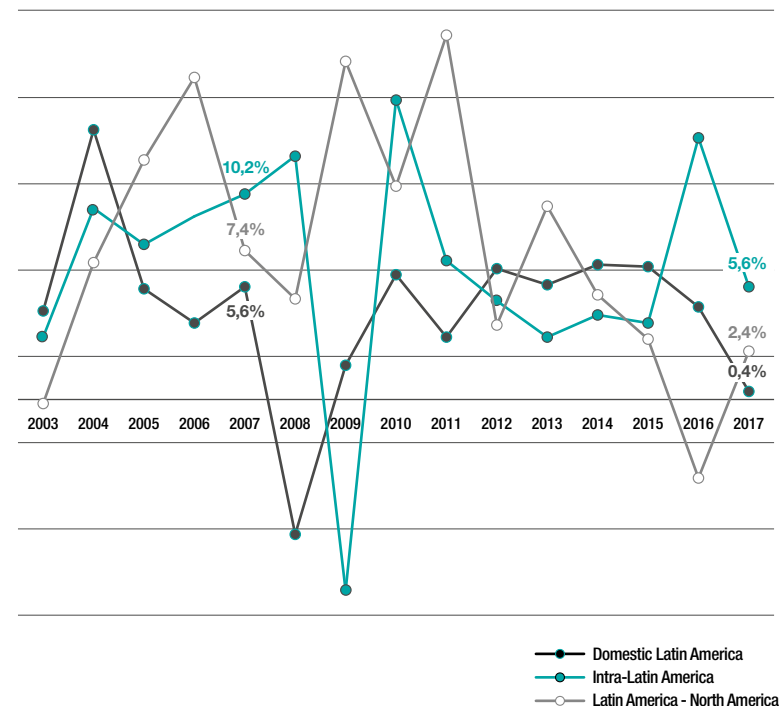
■ Domestic Latin America
■ Latin America - Latin America
■ Latin America - North America
■ Latin America - Other regions

- Growth between the region and North America has been good in recent years. New routes have played their part, also helping to increase connectivity to the region. For example, a number of new routes to points in Mexico have opened from North America including routes from Boston, New York, Philadelphia, Sacramento, San Diego, San Francisco, San Jose and Vancouver. These new services also highlight the strong economic links Mexico has with North America. With these and other new operations from other regions the Mexican Tourism Board have estimated that 1.5 million seats on direct flights will be added to the country in 2018. This is particularly important as nearly half of the international visitors to the country arrived by air in 2017.

HISTORICALLY, DOMESTIC TRAFFIC HAS GROWN FASTER, BUT INTRA-REGIONAL TRAFFIC IS NOW PICKING-UP

Source: Airbus GMF 2017

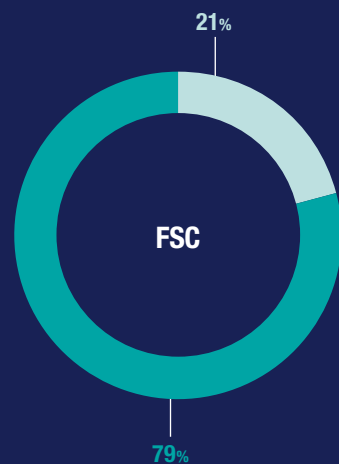
Origin and destination passengers to/from/within Latin America & the Caribbean, year-on-year growth



- The low-cost carriers have a 32% share of passengers in the region, of which 94% of their passengers are on domestic routings. The region's full service carriers have a greater share of intra-regional routings in their operations.
- Nearly 40% of this intra-regional traffic involves at least one stop, in Europe, with its large number of low cost operations this number is much lower at eight percent.

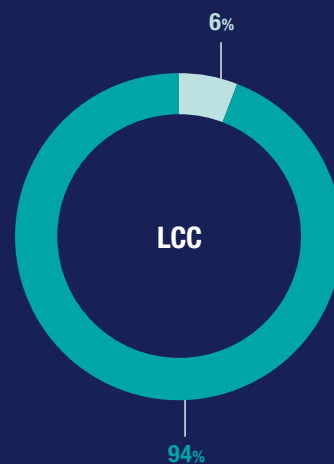
- This possibly suggests an opportunity for greater low cost operations within the region, helping to stimulate a greater movement of passengers from the ground transportation used today, like the buses, onto the region's aircraft.

Origin and destination passengers



LATIN AMERICAN LCCS ARE CURRENTLY FOCUSED ON DOMESTIC TRAFFIC...

Source: Airbus GMF 2017



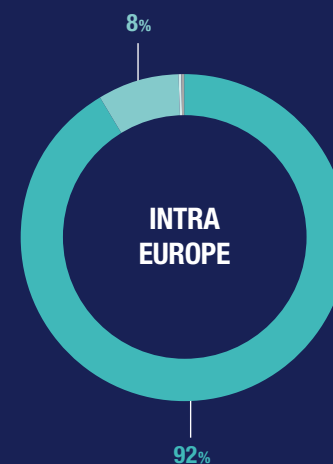
■ Intra-regional
■ Domestic

Origin and destination intra-regional passengers by number of legs



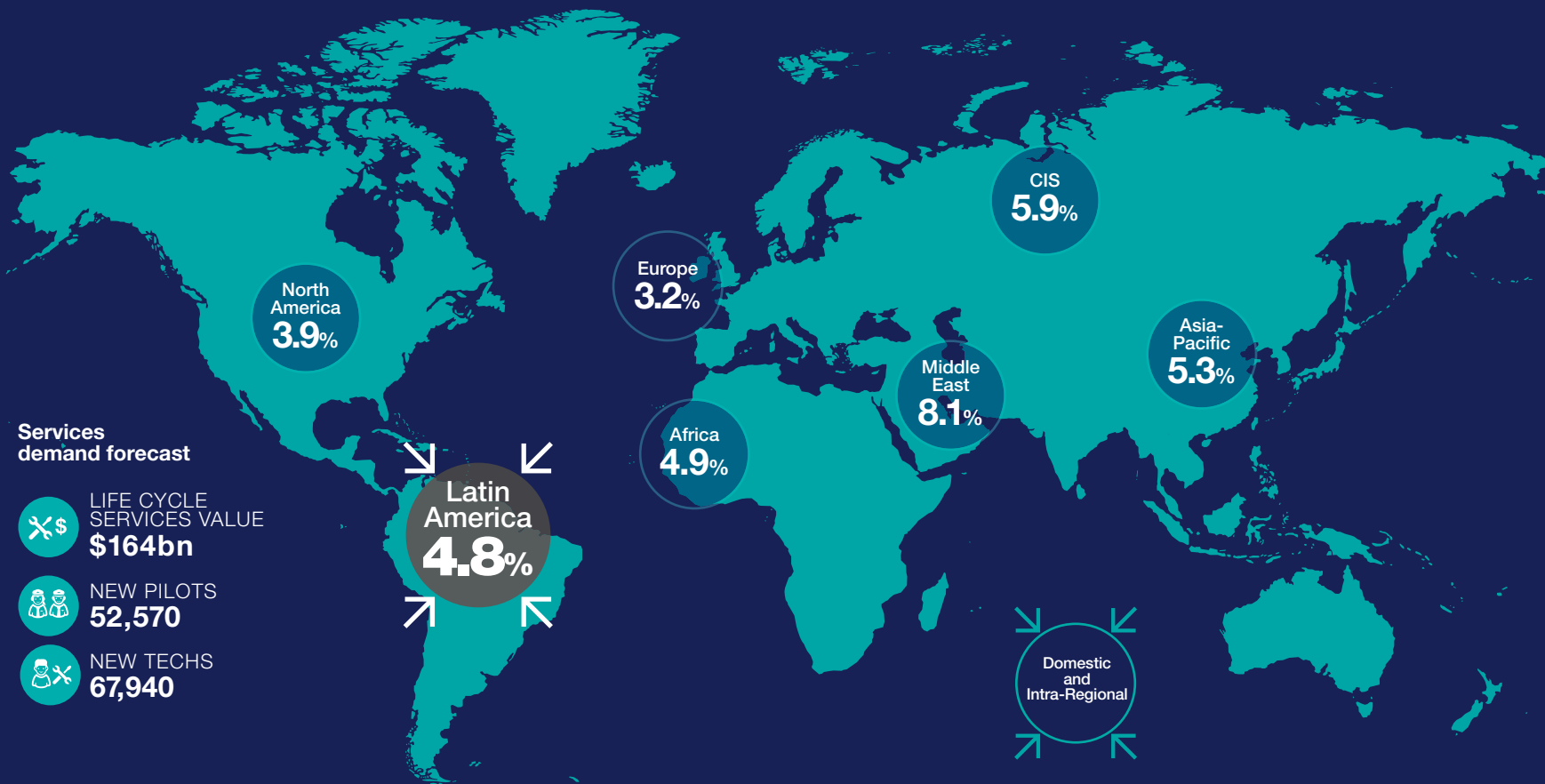
...WITH A LARGE SHARE OF INTRA-REGIONAL TRAFFIC TRANSITS VIA (MAJOR) HUBS UNLIKE EUROPE

Source: Airbus GMF 2017



Number of connections

■ 1
■ 2
■ 3
■ 4



Services demand forecast

LIFE CYCLE SERVICES VALUE
\$164bn

NEW PILOTS
52,570

NEW TECHS
67,940

Economy**

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

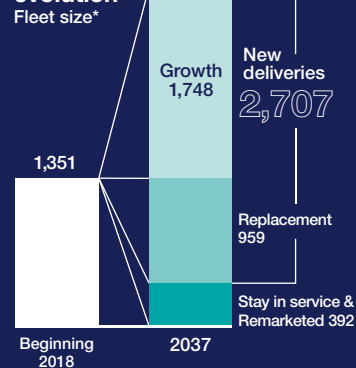
Traffic**

Intra-regional & domestic 4.8%
 Inter-regional 3.8%
Total traffic 4.2%

Fleet*

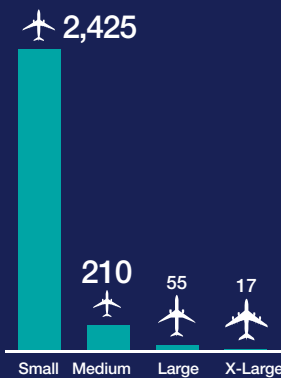
Fleet in service 20 year new deliveries
2018 2037
1,351 3,099 **2,707**

Fleet in service evolution

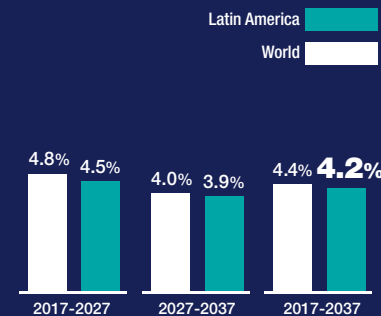


New deliveries by segment

Number of new pax aircraft



Total RPK traffic growth



* Passenger aircraft ≥100 seats

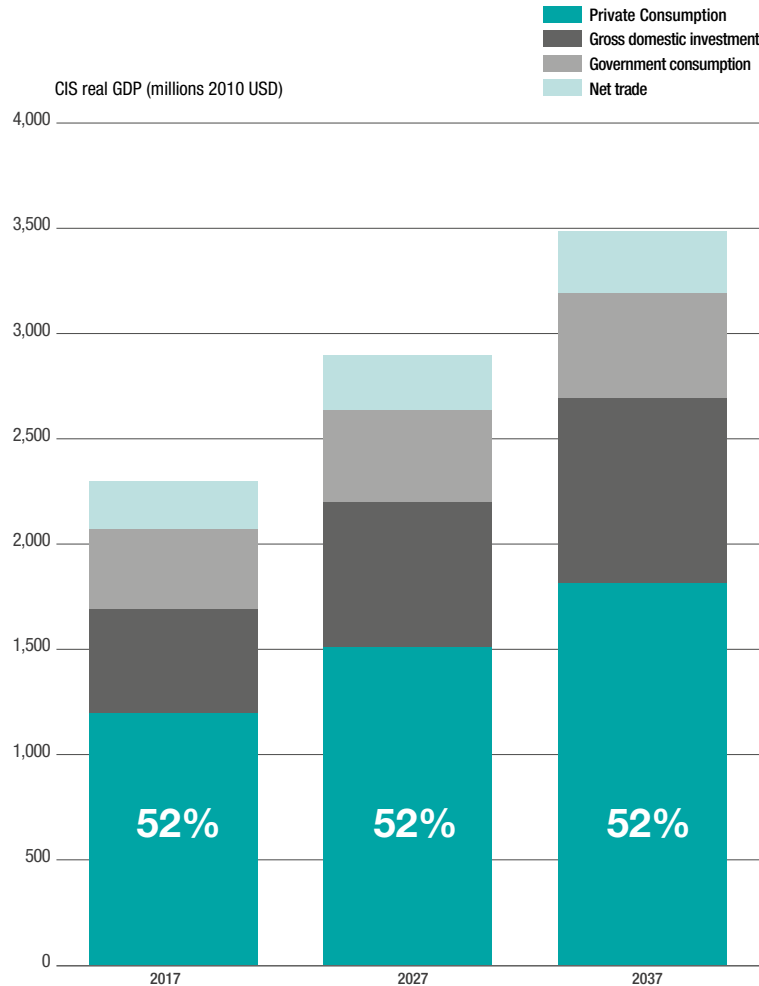
** 2017-2037 CAGR



Commonwealth of Independent States

ECONOMY

- After two years of decline, the Russian economy, an important part of the overall CIS economic performance, has picked-up, led by upturns in consumer spending and fixed investment.
- Generating and attracting investment in order to diversify its economy and sustain robust growth in the CIS will require further structural and institutional reform to improve the business environment.
- Russia accounts for 76% of the CIS Real GDP and is a major trading partner for most economies in the region, but at the same time has the lowest growth in the Region.
- The Armenia, Azerbaijan and Kazakhstan's economies are all positively impacted by upturns in oil prices.
- Private Consumption remains the main driver of the GDP growth within the CIS, especially in Kyrgyzstan, Tajikistan, Armenia and Ukraine (representing more than 70% of GDP).
- The CIS region's real GDP is expected to grow at +1.9% per year over the next 20 years.

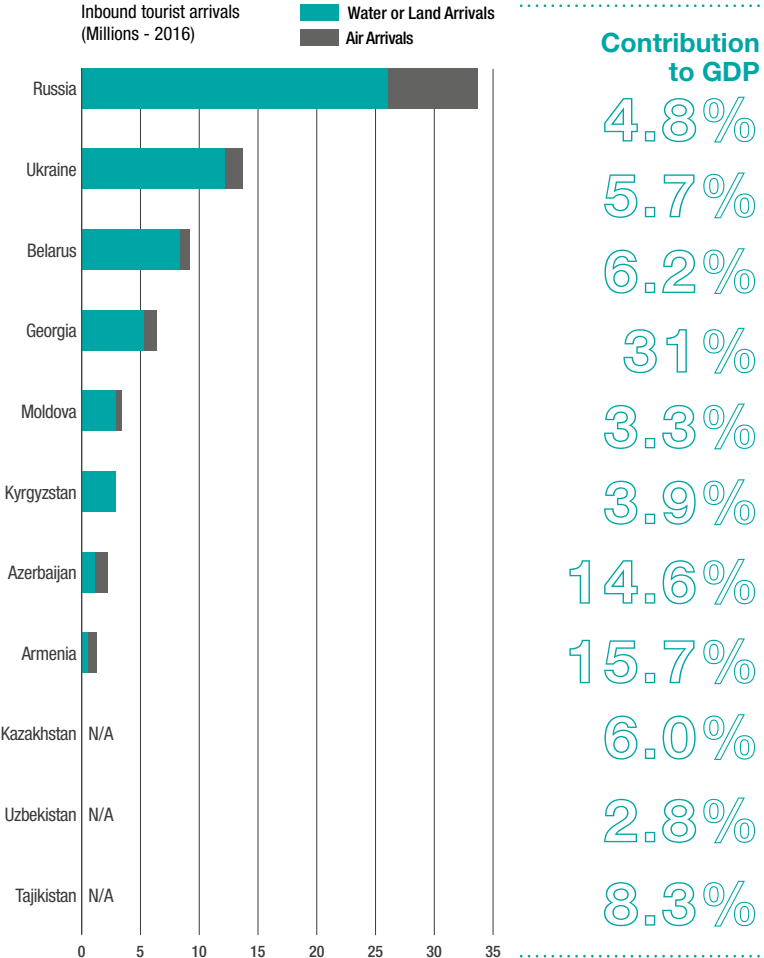


**CIS'S PRIVATE
CONSUMPTION TO GROW
AT 2.1% P.A. OVER
THE NEXT 20 YEARS**

Source: Airbus GMF

TRENDS

- Tourism is another important driver for growth, especially in Azerbaijan and Armenia where economies are strongly linked to tourism. It is also important in Russia where a rebound is expected.
- Countries in the region have made efforts to stimulate more inbound tourism. Since the beginning January 2018, citizens of 77 countries have the right to enter certain parts of the Hrodna and Brest regions of Belarus without a visa and stay for ten days.
- In Kazakhstan the government is currently considering measures such as improving investment flows to the industry, adopting and including relevant tourism indicators in local governments' strategic plans, introducing measures that facilitate visa issuance while considering the possibility of adopting no visa rules for passengers who face extended transit times and diversifying air transportation routes. All actions to meet their plan to grow tourism's share of GDP from 0.9% to 8% by 2025. Tourists from Russia and China are amongst those particularly targeted by the countries tourism authorities.
- Belarus has recently allowed a 5-day visa-free stay for citizens of 80 countries, including the US and European states.
- In 2018, Russia is expected to have a bumper year for tourism with the football World Cup games being played across 11 host cities. According to reports more than a million fans are expected to visit Russia for the World Cup. The largest number of foreign fans will be from the US, with more than 80,000 tickets purchased.



**ECONOMIC OUTLOOK –
A STRONG CONTRIBUTION
OF TOURISM (13.5M
AIR ARRIVALS IN 2016)**

Source: UNWTO, WTTC
Note: Total contribution
is shown which is higher
than the direct contribution

• As well as tourism and business being drivers of aviation growth, demographic factors such as migration can help to stimulate another category of air transport, namely VFR or visiting friends and relatives. The flow of people between the various CIS countries over the last 20 years has been significant. In fact, Russia has the third highest foreign-born population globally behind the US and Germany, many of these effectively an internal migration within the Former Soviet Union (FSU). However, since then, particularly for Russia migration has continued largely revolving around the region's nations. These links help drive air travel both today and in the future. In our forecast for example, three of the top five flows over the next 20 years will be from, to and between Russia and the other CIS nations.

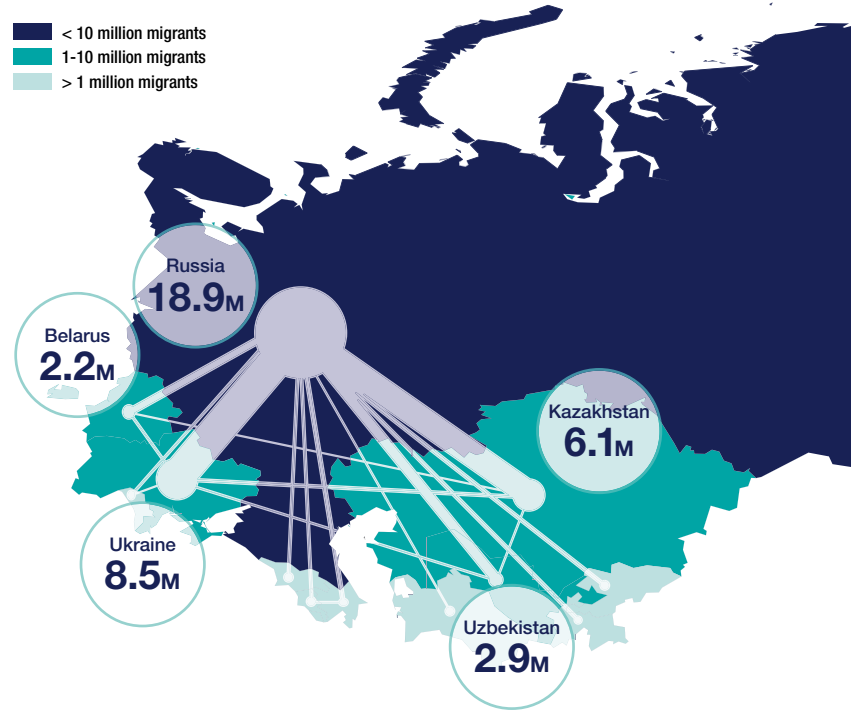
**MIGRATIONS FLOWS: 83%
BETWEEN CIS COUNTRIES**

Cumulated number of migrants
(immigrants + emigrants)
since 1990

Source: UN (Migrants stock
by Origin and Destination)

Bubble is for population
Line size is proportional
to flow volumes

- < 10 million migrants
- 1-10 million migrants
- > 1 million migrants



DOMESTIC MARKETS



4.4M

Additional pax



8 Markets

- Russia (89%)
- Kazakhstan (7%)
- Uzbekistan (1%)
- Others (3%)



3.3%

CAGR
(2017-2037)

INTRA-CIS MARKETS



1.8M

Additional pax



10 country-pairs
accounting for
90% of the market



3.7%

CAGR
(2017-2037)

EXTRA-CIS MARKETS



7.4M

Additional pax



52%

of the traffic
growth is between
CIS and Europe



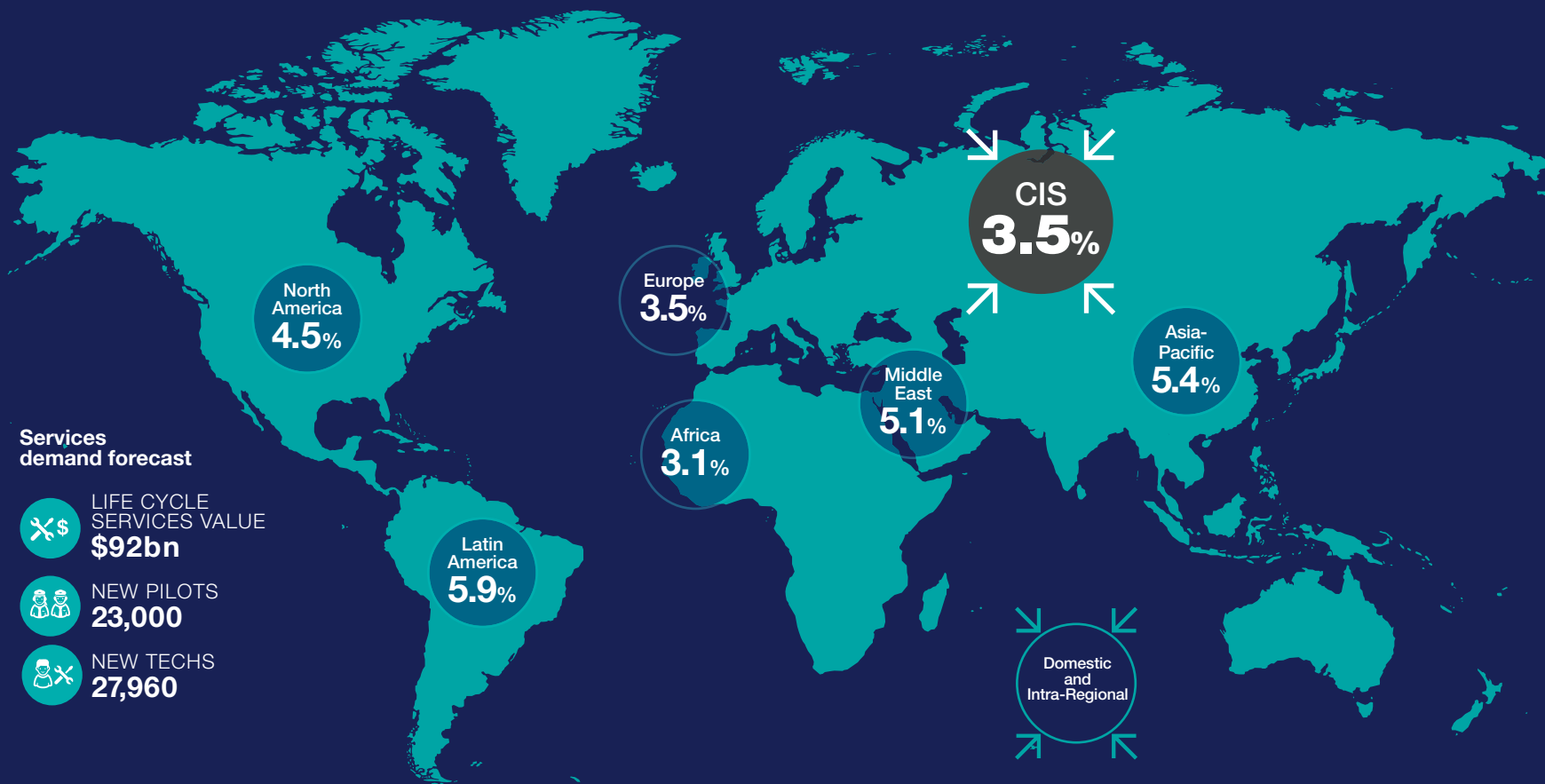
4.4%

CAGR
(2017-2037)

- This having been said, origin and destination traffic growth outside the region is set to grow faster than within CIS markets, although from a lower base in many cases. Forecast traffic growth to and from Europe and the Middle East from Russia however stand out, being the second and fourth largest flows and are expected to more than double and treble respectively.

CIS O&D TRAFFIC GROWTH IN A GLANCE

Source: Airbus GMF



Services demand forecast

LIFE CYCLE SERVICES VALUE
\$92bn

NEW PILOTS
23,000

NEW TECHS
27,960

Economy**

Real Trade 2.8% Real GDP **1.9%**

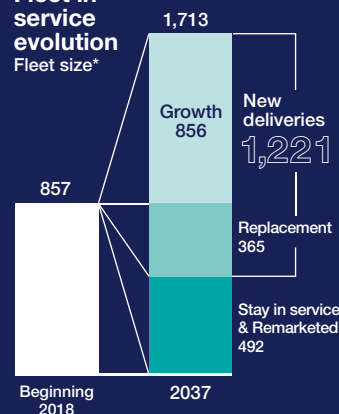
Traffic**

Intra-regional & domestic 3.5%
 Inter-regional 4.6%
Total traffic 4.1%

Fleet*
Fleet in service 20 year new deliveries
2018 2037
857 1,713 **1,221**

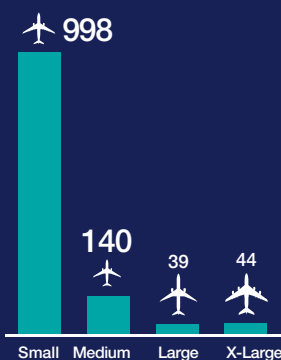
Fleet in service evolution

Fleet size*

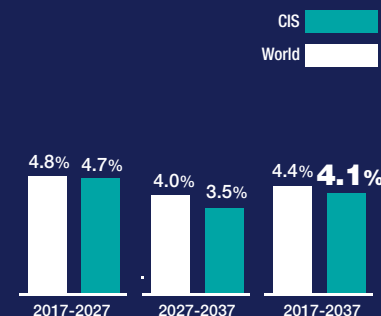


New deliveries by segment

Number of new pax aircraft



Total RPK traffic growth



* Passenger aircraft ≥100 seats

** 2017-2037 CAGR



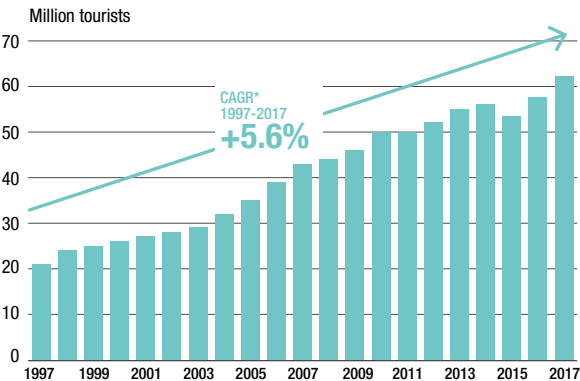
Africa

ECONOMY

- Africa is forecast to be one of the world's top performing regions in terms of future economic growth. This is expected to come from a recovering commodity market, expanding domestic markets, increasing population, a growing middle-class and tourism.
- Africa's population growth is expected to represent 48% of world population growth over the next 20 years.
- Real GDP for the African region expected to grow at **+3.4%** per year over the next 20 years.
- Poor infrastructure, political instability, and regional integration remain obstacles for the region to fully realise its economic growth potential.

TRENDS

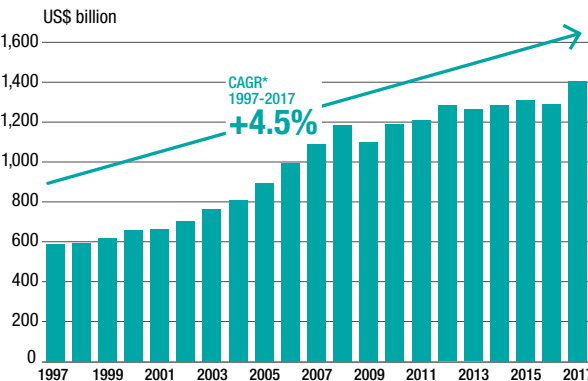
- Over the last 20 years, Africa's growth in inbound tourism (5.6% CAGR) has exceeded the world average (4.1% CAGR). As well as the usual country origin for visitors Africa is becoming increasingly popular with tourists from China. Increases to destinations such as Morocco and Tunisia are largely due to relaxation of visa requirements for Chinese nationals.
- Chinese passport holders have been granted visa-free access to visit Morocco since June 2016 and Tunisia since February 2017, and also visa-on-arrival access to enter Tanzania and Egypt. There was a 378% year-over-year growth in Chinese arrivals in Morocco and 240% in Tunisia during the six months after the easing of visa requirements.
- But tourism has not been one way, for example over 120,000 Kenyan passengers have flown to Guangzhou since 2015, when direct flights between Nairobi and the Chinese city were established.



AFRICA INBOUND TOURISM

BOOMING TOURISM AND TRADE ACTIVITIES WITH AFRICA

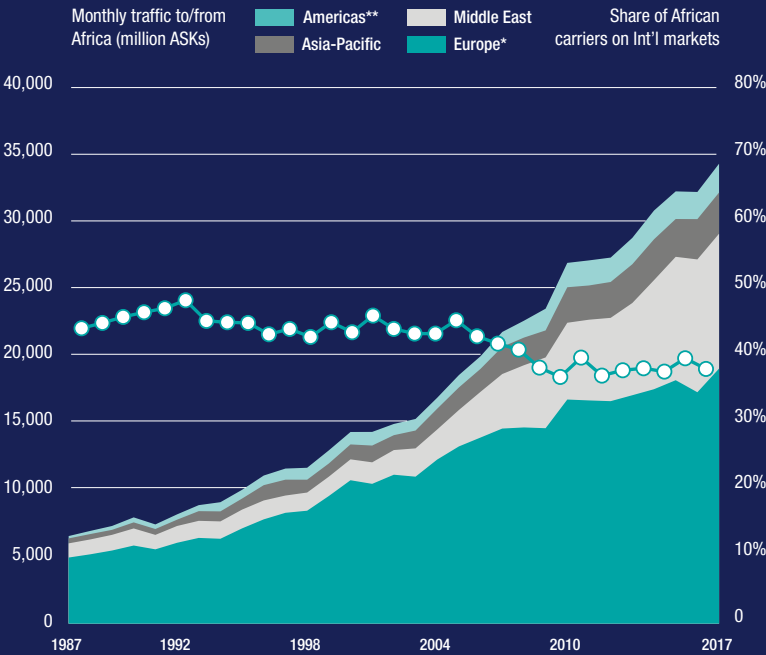
Source: WTO, IHS Economics, Airbus



AFRICAN TRADE

* Compound Annual Growth Rate

- These developments have seen strong growth in international traffic to and from Africa with five times more international traffic than 30 years ago, with significant volumes added for both Europe and the Middle East.
- Whilst in absolute terms the amount of traffic operated by African airlines has grown more than four times, their share has declined over the last 30 years. More positively their share has stabilised since 2009 at ~38%. Greater planned liberalisation within the African market may see shares increase over time as African airlines leverage the potential within the continent.

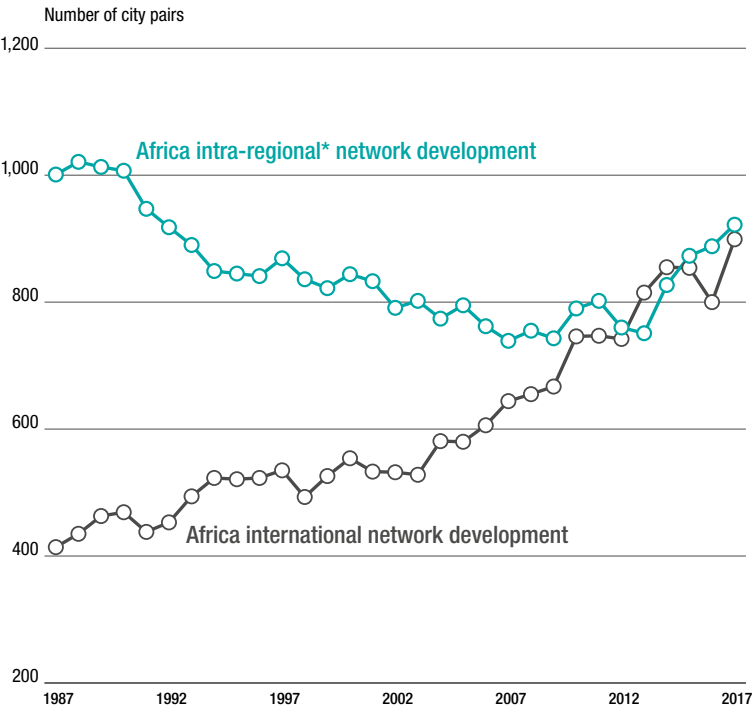


STRONG GROWTH OF AFRICAN INT'L TRAFFIC, BUT AFRICAN CARRIERS SHARE DOWN TO LESS THAN 40% IN 2017

Source: September ASK traffic from OAG, Airbus

* includes CIS
** includes North America and Latin America

• In January 2018, twenty-three African states including South Africa, Nigeria and Kenya, launched a single aviation market in a bid to boost connectivity, reduce fares and stimulate economic growth, this more than three decades after such a concept was first considered. The hope is that eventually a situation like the liberalised aviation market in Europe can be achieved.



AFRICAN INTRA-REGIONAL* MARKET HAS NOT YET BEEN STIMULATED BY NETWORK DEVELOPMENT

Source: September traffic from OAG, Airbus

* Intra-regional includes domestic

• Whilst the number of international city pairs connecting Africa has more than doubled, city pairs connecting African states declined until 2012, with the number recovering to around 920 by the end of 2017. This number was still lower than the number of city pairs operated 30 years earlier. With more tangible steps to greater liberalisation in the region, and assuming aviation infrastructure can grow in parallel, it can be expected the number of routes within Africa will also continue to grow.

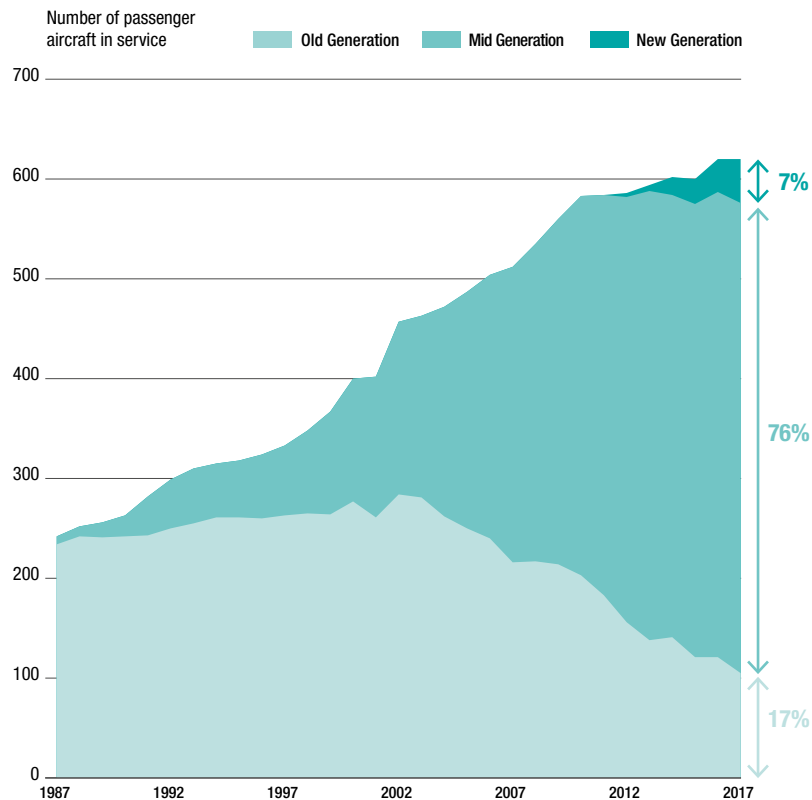


AFRICAN AIR TRANSPORT CENTRE OF GRAVITY* MOVING SOUTH AND EAST

Source: OAG, Airbus

• African traffic has historically been focused in the north and south of the continent. In recent years however, airlines and airports in the west and east have gained in importance in terms of air transport. When the gravity of traffic at an airport level is calculated over time the centre of air traffic gravity has moved south and east reflecting these developments. Today, Africa's centre of gravity is located more centrally in the continent indicating a more balanced weighting between north, south, east and west.

* Centre of gravity latitude and longitude calculated as a yearly weighted average of seats offered at each African airport

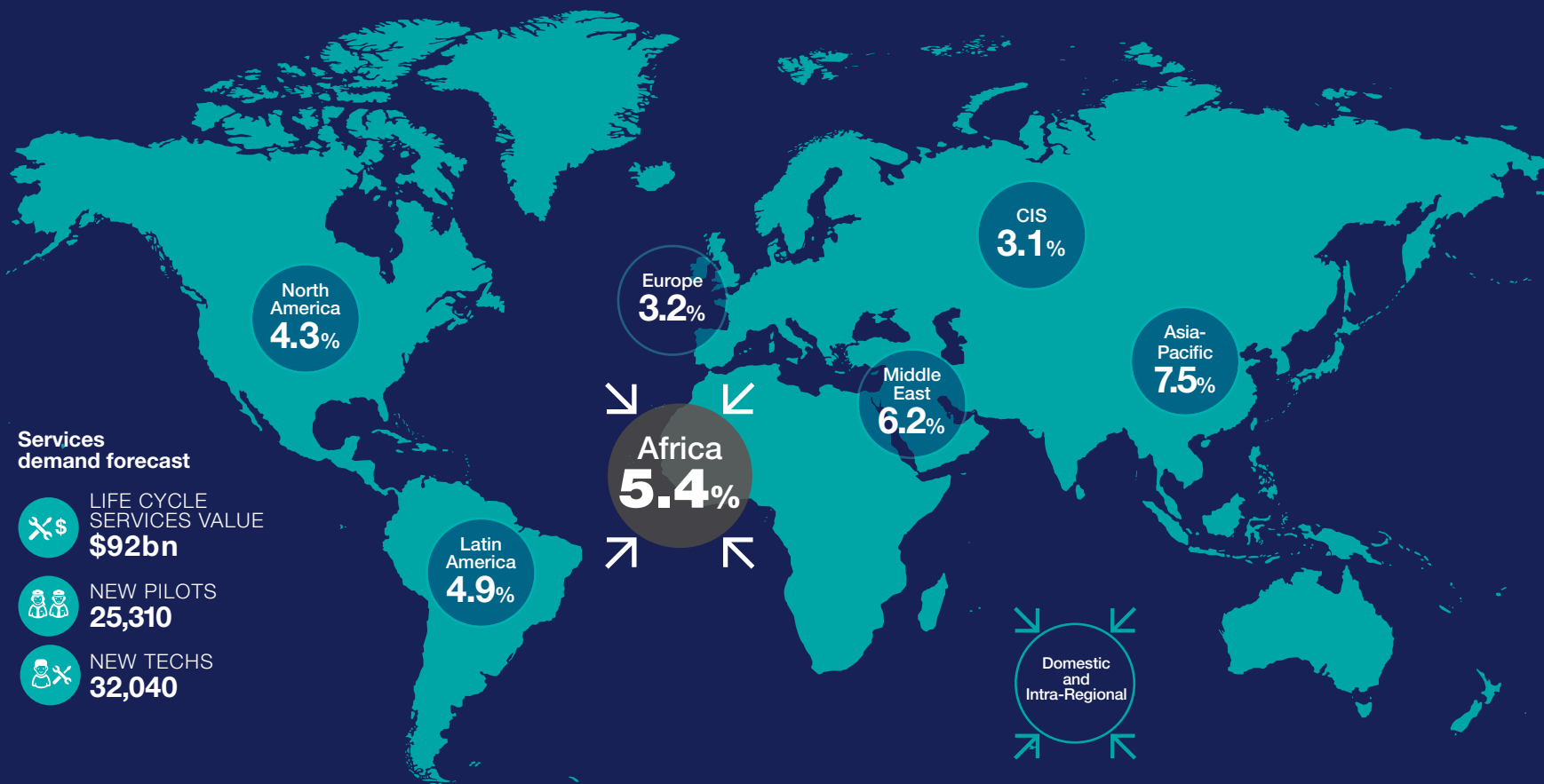


**MORE THAN 100
(OR 17%) OLD GENERATION
PASSENGER AIRCRAFT
STILL IN SERVICE IN AFRICA**

Source: Ascend, Airbus

- Another area that has evolved is the regions fleet which has grown to more than 600 aircraft. Whilst still the oldest fleet in the world, averaging ~13 years old, it is only marginally older than that operated in the US also ~13 years and the CIS at ~12 years old. The world's fleet averages 9.6 years of age. Today, 7% of the African fleet can be considered "new generation", aircraft like the A320neo and A350XWB. The vast majority of the fleet, 75%, are categorised as mid-generation types, a number of which are manufactured today.



**Economy****

Real Trade 4.5% Real GDP **3.4%**

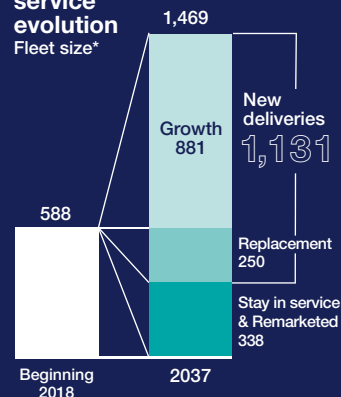
Traffic**

Intra-regional & domestic 5.4%
Inter-regional 4.8%
Total traffic 4.9%

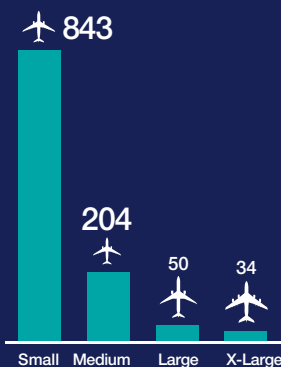
Fleet*
Fleet in service 20 year new deliveries
2018 2037
588 1,469 **1,131**

Fleet in service evolution

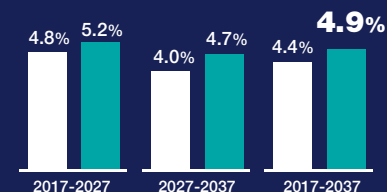
Fleet size*

**New deliveries by segment**

Number of new pax aircraft

**Total RPK traffic growth**

Africa
World



* Passenger aircraft ≥100 seats

** 2017-2037 CAGR



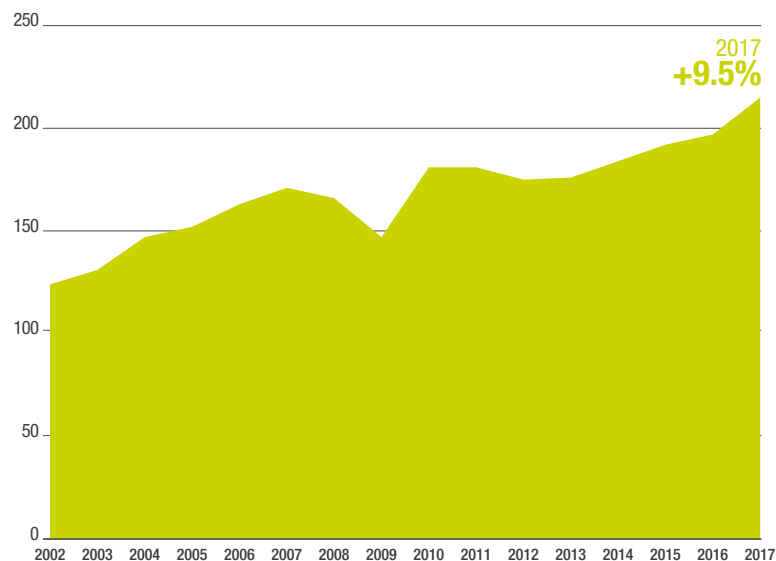
06

Freighter forecast

THE FREIGHT MARKET TODAY

- In 2017, air cargo traffic saw a rebound after years of slow growth, with year on year traffic growth of +9.5%, driven in large part by a global recovery of trade.
- During the period following the financial crisis 2010-2015, many freighter aircraft were stored, and older types retired. Since the beginning of 2015, oil prices have also decreased allowing airlines including freighter airlines to become more profitable.
- The freighter fleet declined and then stabilised post the financial crisis, with an increase in the freighter fleet from 2014.
- Traffic was not the end of the story; importantly in 2017, cargo load factors and yields also increased.
- Air cargo traffic growth is expected to stabilise in the short-term, with about ~4-5% growth per year over the next 5 years.

World air cargo traffic (billion FTK)

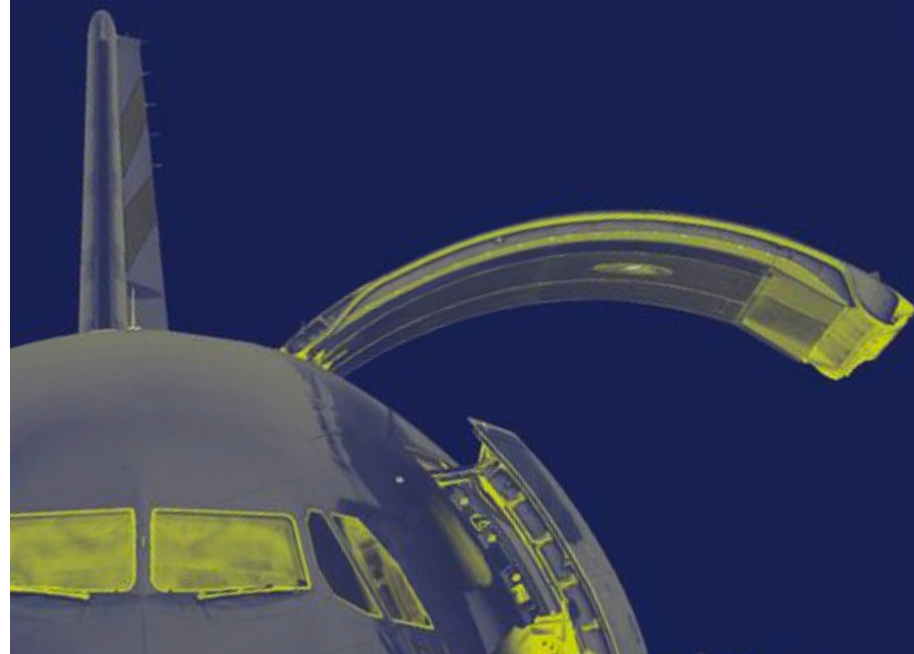
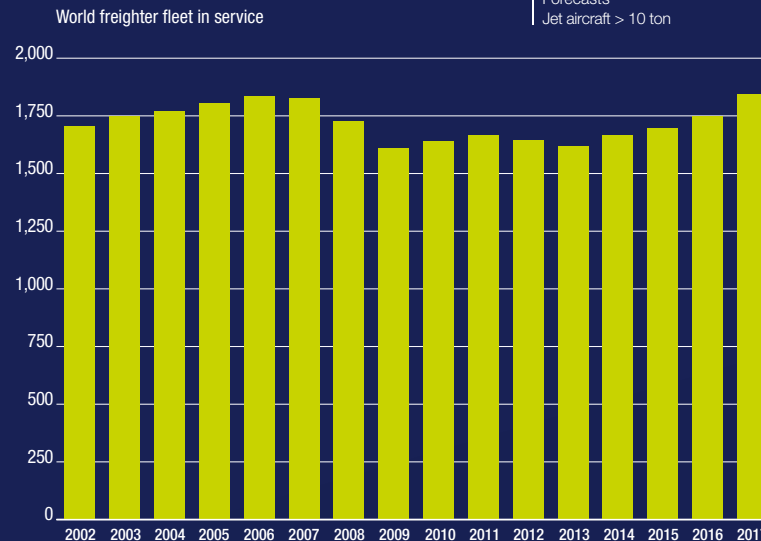


WORLD AIR CARGO TRAFFIC RECOVERED AFTER A FEW YEARS OF SLUGGISH GROWTH

Source: IATA, Seabury, Airbus Market Forecasts

AFTER RETIREMENT OF OLDER TYPES, THE FREIGHTER FLEET IN SERVICE IS GROWING AGAIN

Source: Ascend (data as of end of each year), Airbus Market Forecasts
Jet aircraft > 10 ton



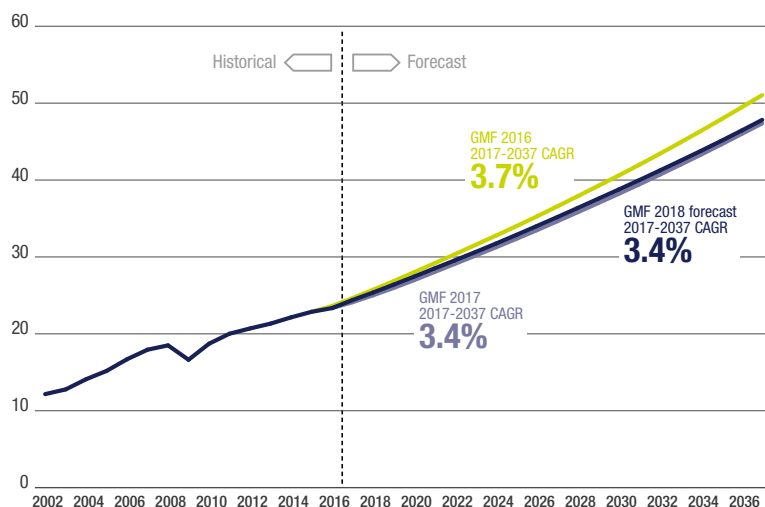
GMF FREIGHT FORECAST

- After the financial crisis in 2009, trade forecasts were progressively revised downwards, these have now stabilised with forecasts suggesting that trade will double over the next twenty years.
- Asia-Pacific is expected to become the largest region for international trade, representing about ~39% in 2037, this driven by the intra-Asia-Pacific market (increasing 2.4 times in the next twenty years). Emerging markets will continue to contribute to international trade growth with a 5.2% yearly increase in trade between emerging countries.

WORLD INTERNATIONAL TRADE EXPECTED TO DOUBLE IN THE NEXT TWENTY YEARS

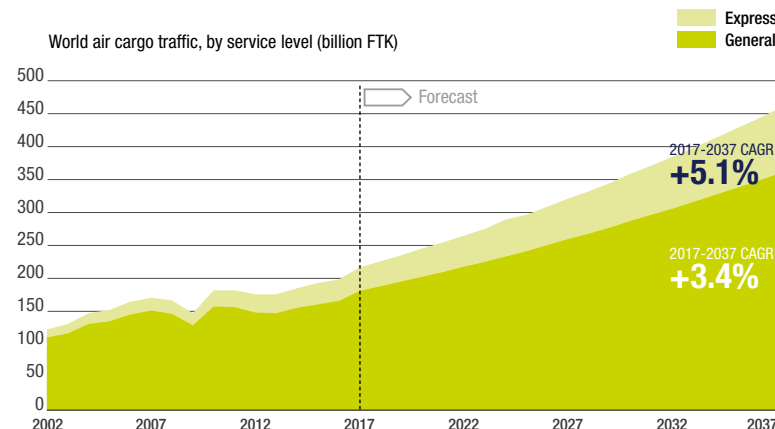
Source: IHS Economics, Airbus Market Forecasts
Trade of goods and non-factor services

World international trade, by date of forecast (trillion 2010 \$US)



- Although growing more slowly, like the passenger market, freight traffic measured in Freight Tonne Kilometres (FTKs), is expected to double over the next 20 years. The largest share of traffic will come from general cargo, although the fastest growth will be from the express market, dominated by the large integrators with 5.1% growth per annum to 2037.
- Historically, the shipping industry has proved a strong alternative, particularly in terms of price compared to air, with some modal shift occurring as a result. However, in recent years, a decreasing oil price aiding the profitability of passenger and freight airlines, together with the growth of express/e-commerce services has helped to reduce the effects of this competition. Today, the share of air in world trade is ~1% in tonnage but >30% in value.

World air cargo traffic, by service level (billion FTK)



AIR CARGO TRAFFIC TO DOUBLE IN THE NEXT TWENTY YEARS

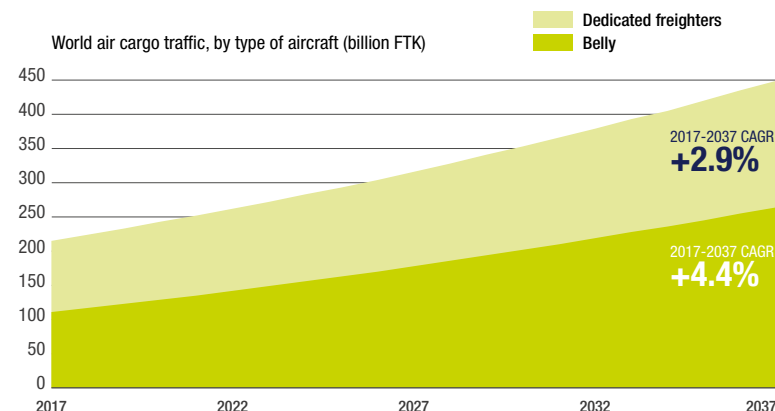
Source: IATA, Seabury, Airbus Market Forecasts
Express definition from Seabury Express Database
Typical descriptor: within 3-5 days for intercontinental, 2-3 days for intra-regional

- In our forecast we assume that belly load factors will remain constant, so there will be some shift from dedicated freighters to passenger aircraft.
- There will be limits to this movement however, for example oversized or dangerous goods cannot be carried in aircraft holds. Also, express traffic (with a need for speed/reliability) should be less impacted by increased belly capacity. Overall, our forecast assumes that belly air freight traffic will increase by 2.4 times in the next twenty years, and dedicated freighter traffic by ~75%.

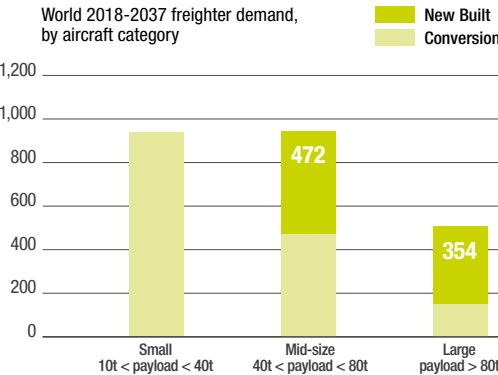
BELLY CARGO TRAFFIC EXPECTED TO GROW FASTER THAN DEDICATED FREIGHTERS

Source: IATA, Seabury, Airbus Market Forecasts
Assumption: constant belly load factor at World level

World air cargo traffic, by type of aircraft (billion FTK)



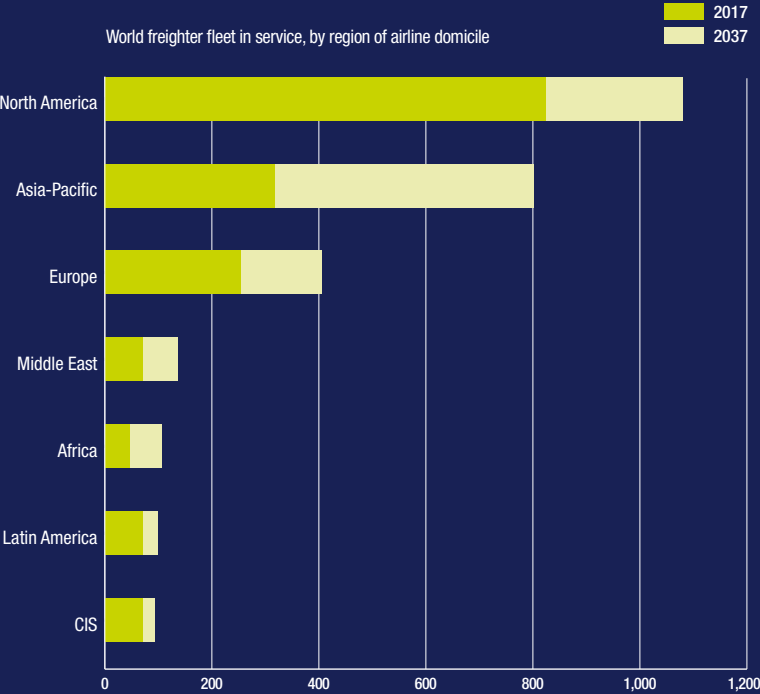
- The GMF Freight forecast shows total demand for ~2,400 freighter aircraft, some 55% for replacement, and the remaining ~45% for growth.
- This year we have made a small change to our forecast segmentation with our “Small” category now up to 40t structural payload (against 30t in 2017’s GMF). We have made this change to better reflect the way in which the B757SF fleet (>200 aircraft) largely contributes to operations in this smaller category.
- Allowing for conversions which are driven to a large extent by the availability of a “feed stock” of suitable aircraft, that is passenger aircraft which have sufficient availability, with the right age and therefore price, our forecast shows a need for 800 new build freighters.
- Demand for small aircraft is assumed to be satisfied by converted freighter aircraft like A320/A321P2F or B737. The future demand for small aircraft is expected to reach ~950.
- The demand for Mid-size freighters is expected to reach ~950 over the next twenty years. In the future, we assume that ~50% mid-size freighters will be satisfied by new-built (typically, A330F/B767F) and ~50% converted (typically, B767ERSF / A330P2F).
- The demand for large freighters is expected to reach ~500 over the next twenty years. We assume ~30% large freighters to be converted, ~70% new-built. This aligns with the long-term historical split between converted and new-built large freighters.



Conversion rates
50%
for mid-size category
30%
for large category

DEMAND FOR MORE THAN 800 NEW FREIGHTER AIRCRAFT IN THE NEXT TWENTY YEARS
Source: Airbus Market Forecasts
Jet aircraft >10 ton

- With this increase in traffic combined with a small productivity increase from freight load factors, aircraft utilisation and a trend towards larger aircraft, the freighter fleet in service is forecast to increase by 65%.
- In the past, the freighter fleet in service has gradually up-gauged to more mid-size and large freighters. For example in 2007 they represented ~60% of the fleet, in 2017 it was ~64%. Our forecast indicates the share of mid-size freighters alone to grow to 39% from about a third today.



FREIGHTER FLEET EXPECTED TO INCREASE BY 65% IN THE NEXT TWENTY YEARS
Source: Airbus Market Forecasts
Jet aircraft > 10 ton

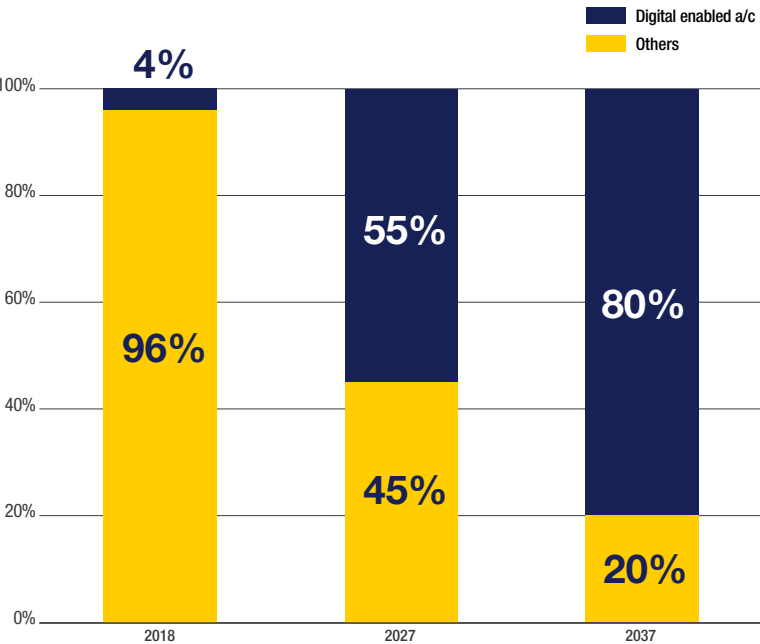


07

**Services
forecast**

NEW GLOBAL SERVICES FORECAST

- The Airbus GMF, which is the basis of the Global Services Forecast (GSF), estimates that the fleet will more than double from today's ~ 21,500 aircraft to nearly 48,000 in 20 years' time. **The growth in the fleet will drive the services business, which will more than double over the next 20 years**, from US\$150 billion in 2018, to more than 330 billion a year by 2037, a cumulative US\$4.6 trillion.
- Over that period, **new technologies, including an increase in the number of "connected" aircraft, will lead to a growth in the e-enabled services.** Digitalisation is expected to bring new opportunities to deliver services that will benefit not just our customers, but also the passenger. Access and analysis to data from aircraft and their operations will be at the heart of these innovations.



MORE AIRCRAFT, MORE CONNECTED AIRCRAFT
Source: Airbus forecast

We will help you to reach the sky and let you simply fly

Services Market

\$4.6Tn

2018-2037 (cumulative)



- Airlines have made great strides in maximising the efficiency of their operations through tools and techniques to minimise cost, maximize load factors (occupancy) and the utilisation of their aircraft.

GLOBAL SERVICES FORECAST

Source: Airbus Global Service Forecast 2018

- **Increased outsourcing** for example will play a significant role in the future as pressure from competition and lower yields continue.
- To reflect these new trends and opportunities, our **Services Forecast** has also evolved, with an **expanded scope compared to last year**.
- With passenger at heart, and airline in mind, we have grouped the result into three main areas:
 - **Aircraft Easy to Operate** including hangar activities: Maintenance, spares, pool access, tooling, technician training, e-solutions, system upgrades
 - **Flight Operations Services** including the services needed to operate the aircraft: Pilot training, pilot pools, e-solutions
 - **Passenger experience** including the services needed to maximise the flight experience: cabin upgrades, cabin crew training, In Flight Entertainment, connectivity, booking

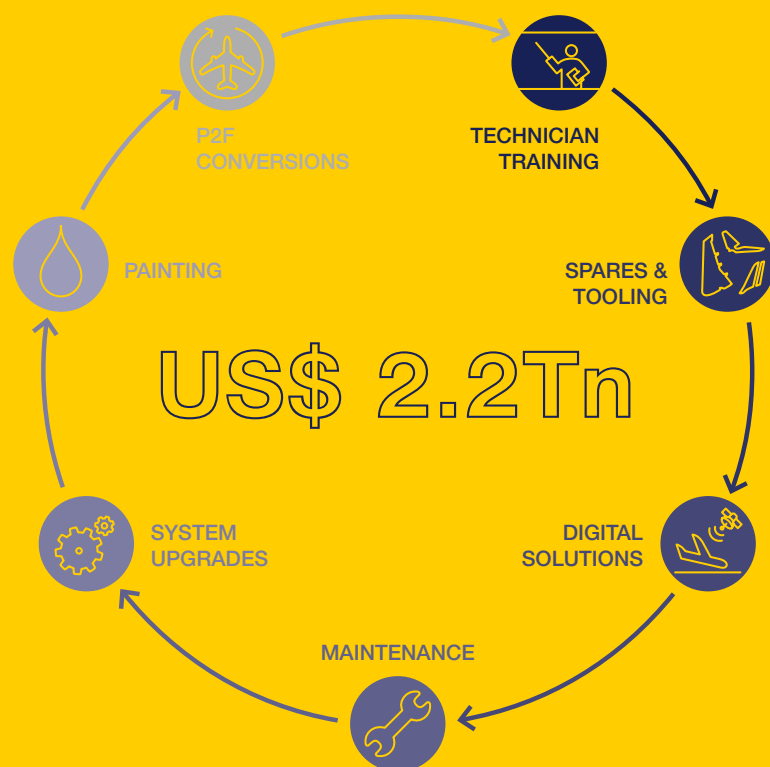
AIRCRAFT EASY TO OPERATE

- We expect the **maintenance market to double**, from US\$76 billion in 2018 to more than 160 billion a year by 2037, or cumulative 2.2 trillion over the same period.

Aircraft Easy to Operate

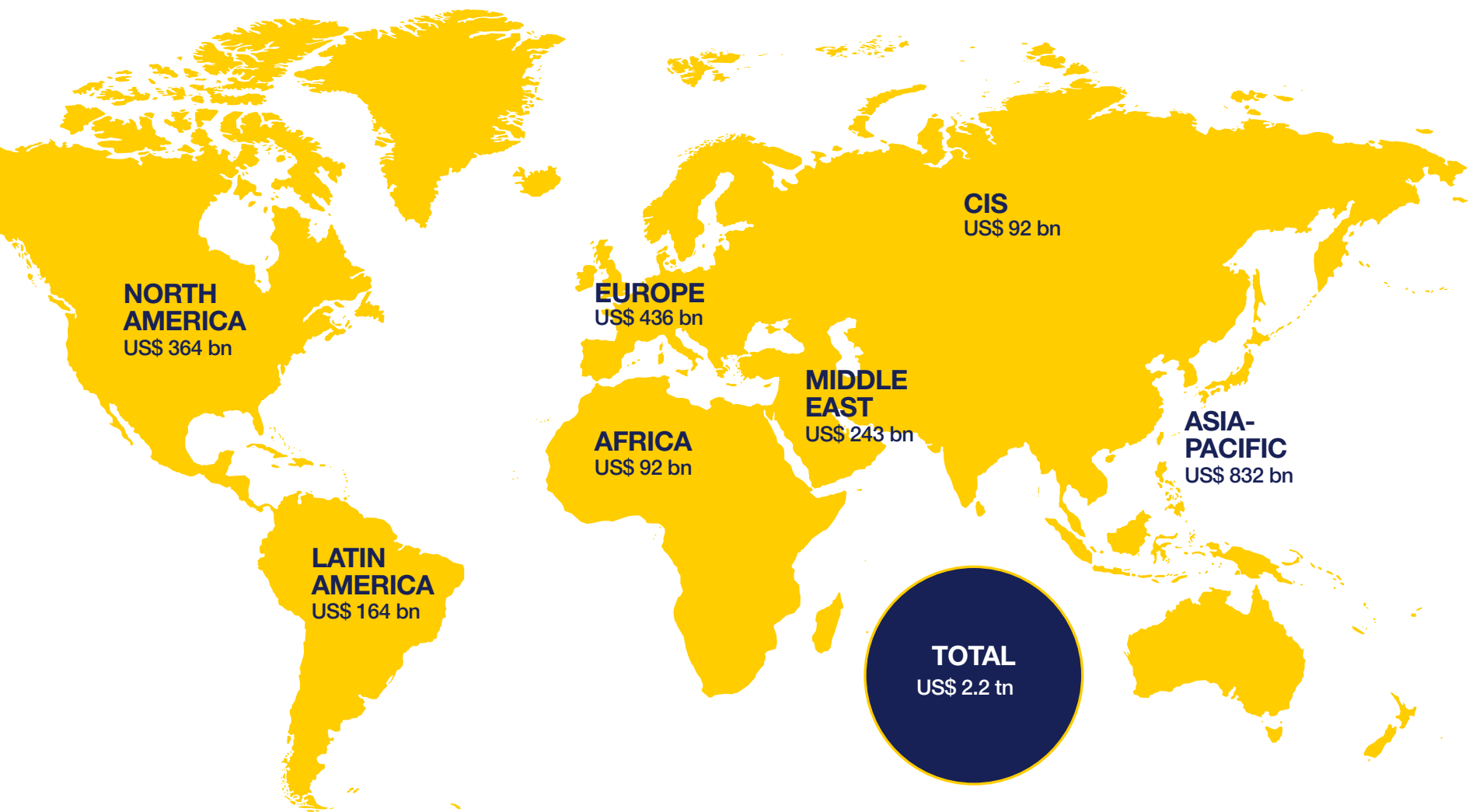
More a/c means a larger maintenance market which will **more than double** over the next

20 years



AIRCRAFT LIFE CYCLE

Source: Airbus Global Service Forecast 2018



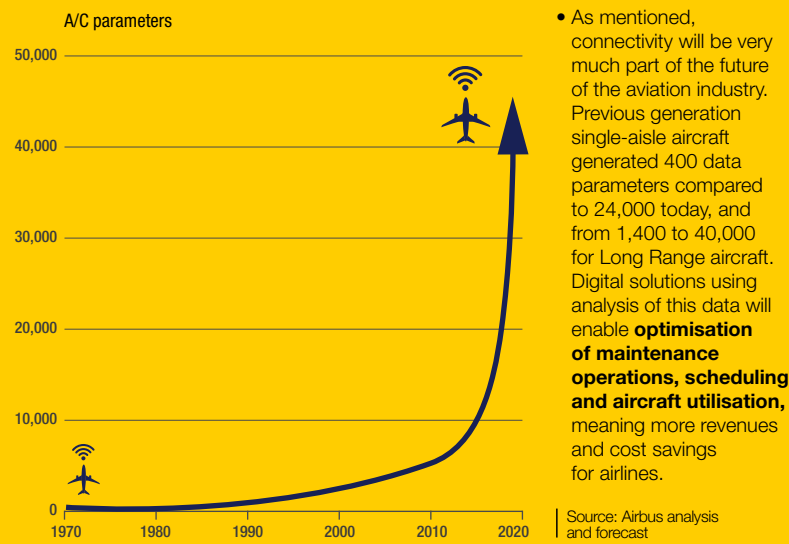
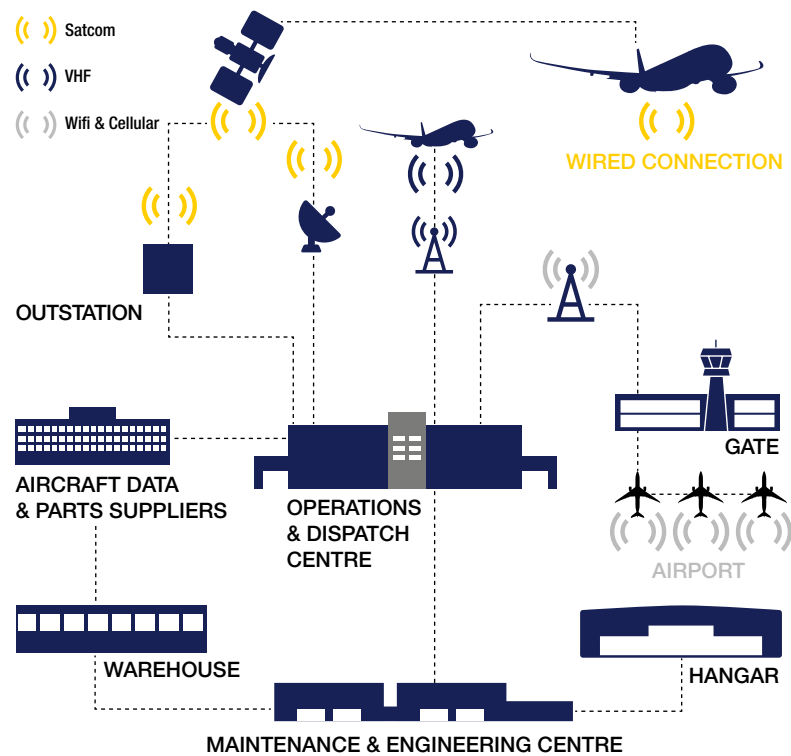
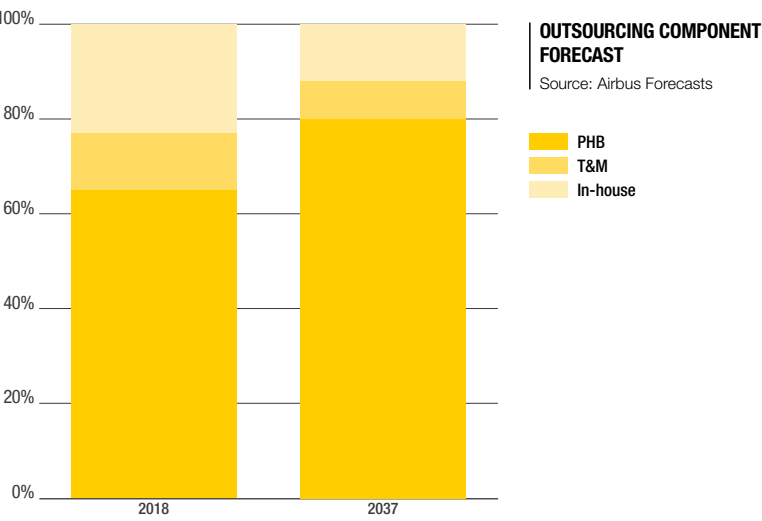
- The strongest growth is where fleet increases are the highest. Clearly, Asia-Pacific will be an important region for services, but others are expected to grow strongly.

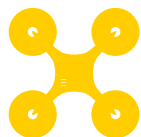
AIRCRAFT LIFE CYCLE SERVICES VALUE

Source: Airbus

MATERIAL MANAGEMENT

- As aircraft technology and materials develop, like composite repairs, more connected aircraft and digitalisation, there **is a strong trend for more maintenance outsourcing**. Component and engine maintenance markets show the strongest increase in the trend toward all-subcontracted activities.
- Airline behaviour regarding **inventory management** is also evolving as airlines seek to leverage the power and benefits the **increasing use of data analytics** brings. Having the right level of spares inventory has a significant impact on airlines' on-time performance, which it also represents a high level of up-front investment, also tying up capital.
- Selecting component **PBH (Paid By the Hour) agreements allows airlines to optimise their fleet profitability** by optimising their maintenance cost, and maximising aircraft availability and therefore revenues. They benefit from guaranteed spare part availability through dynamic stock management and real time visibility of the full supply chain.





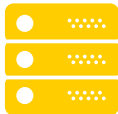
Automated inspection



ALM*/ 3D printing



Predictive Maintenance



Internet of Things

*Additive layer manufacturing

MRO INDUSTRY

- In the future, the MRO industry (Maintenance, Repair and Overhaul) will need to meet the challenge of maintaining more technological and connected aircraft, while facing an **increasing volume of maintenance activities due to fleet growth**.
- **MROs will need to develop innovative solutions**, invest in new tooling (drone-based inspection systems for example), IoT 'Internet of Things', and connected tools. Digitalisation and automation of tasks will become the key to optimise maintenance, minimise aircraft downtime during checks and maximise revenues for all the stakeholders.

FLIGHT OPERATIONS SERVICES

Increasing operational efficiency

- New data analytics tools will transform the way that airlines maintain and operate aircraft, especially as networks and many key airports become increasingly congested. Advanced data analytics can also help airlines avoid unnecessary fuel consumption, therefore cost, during flight, particularly during the descent and approach flight phases. Customer data can be leveraged, providing added-value to their operations, by automatically adjusting the aircraft's flight plan computation and the flight management system according to the aircraft's actual performance and operational environment in real-time.





High Pilot demand

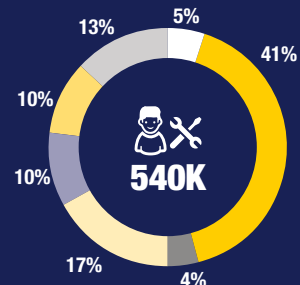
- As the world fleet grows so will the need for more pilots, and technicians to meet the requirements of airlines and ultimately the passenger.
- Larger fleets combined with significant pilot retirement rates and the rapid growth of airlines in emerging countries is already generating high demand for new pilots. One result is that several airlines have had to open or even re-open pilot cadet academies. Another has been the increase in pilot leasing entities.

Airbus forecast that over the next 20 years more than half a million pilots will need to be trained.

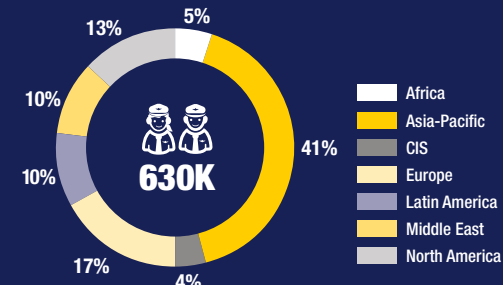
NEW PILOTS AND TECHNICIANS DEMAND FORECAST

For passenger aircraft ≥ 100 seats over the next 20 years

Source: Airbus GMF 2018



NEW PILOTS - % by region (2018-2037)



NEW TECHNICIANS - % by region (2018 - 2037)



PASSENGER EXPERIENCE

- Airlines want to combine comfort, efficiency and capacity. At the same time cabin product offerings from OEMs and suppliers evolve to meet these needs.
- Cabin interiors need to be refreshed to keep pace with competition, and to homogenise airline fleets.
- One solution is to perform cabin retrofits often focused on space savings (space efficient monuments enabling extra seats) and weight efficiency (lightweight seats).
- Baggage requirements are also evolving, and feature in cabin retrofit decision making, as airlines strive for improvements in airline operational efficiency and revenue, by limiting the impact on associated passenger comfort and handling levels. Therefore, airlines are increasingly balancing baggage revenues with OHSC (Overhead Bin Stowage Compartment) volume, turn-around times and passenger perception.
- Airlines are intensifying efforts across the entire passenger travel experience. The cabin is becoming an integrated part to drive the overall passenger experience and connectivity is key to drive passenger experience and revenue generation.
- Inflight entertainment (IFE) remains a key airline differentiator with increasing screen sizes, multi-screen applications and enriched content options all trends today. There is a growth of "bring your own devices" for shorter range operations. Conversely wide-body types who typically operate longer sectors remain the focus for imbedded IFE systems.
- On-board connectivity is reaching critical mass across both wide-body and single-aisle aircraft and is moving towards full broadband capability, with a growing trend of "always-on" passengers demanding to be connected along their entire travel experience with their own devices.



Flight

10 flight training centres (8 open and 2 to come)



2 Instructors services offices

Maintenance

5 Maintenance training centres



6 MTS3 (Franchise) in 17 locations

- As the pace of change can be rapid in this area, any decisions at the time of line or retro-fit is an important consideration.

Services By Airbus was founded to deliver world leading integrated aviation services, creating value and enhancing customer performance. We are progressively expanded our training network to support fleet growth worldwide and to support our customers by expanding our training capabilities locally. In the last four years, we have moved from 5 to 17 training locations. We will continue to extend our network and move closer to our customers through the proposal of tailored training solutions. Following the Airbus Flight Training Reference designed to enhance quality and safety, these solutions cover the entire pilot career path from cadet to the operational environment.

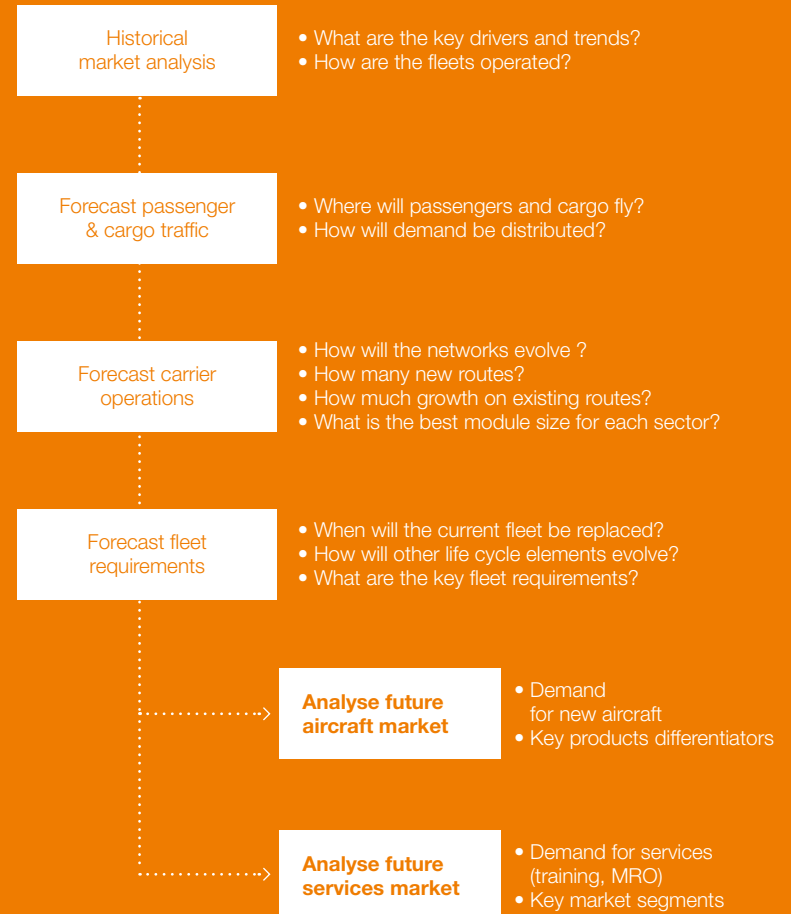
AIRBUS TRAINING NETWORK

- Flight
- Cabin crew
- Flight Operations
- Maintenance + MTOE Members
- Structure

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,
Oxford Economics, DoT,
Eurocontrol, IATA, ICAO

NEW DELIVERIES 2018-2037

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SMALL	843	12,494	998	5,512	2,425	1,214	5,066	28,552
MEDIUM	204	2,204	140	1,042	210	533	679	5,012
LARGE	50	565	39	315	55	466	150	1,640
X-LARGE	34	380	44	203	17	612	69	1,359
TOTAL	1,131	15,643	1,221	7,072	2,707	2,825	5,964	36,563

NEW PASSENGER AIRCRAFT
DELIVERIES BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SMALL	-	-	-	-	-	-	-	-
MEDIUM	18	102	16	55	13	16	252	472
LARGE	2	52	8	17	-	13	32	124
X-LARGE	3	98	14	31	-	25	59	230
TOTAL	23	252	38	103	13	54	343	826

NEW FREIGHT AIRCRAFT
DELIVERIES BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
CONVERSIONS	78	473	33	258	79	33	606	1,560

CONVERTED FREIGHT
AIRCRAFT BY REGION

	AFRICA	ASIA-PACIFIC	CIS	EUROPE	LATIN AMERICA	MIDDLE EAST	NORTH AMERICA	TOTAL
SMALL	843	12,494	998	5,512	2,425	1,214	5,066	28,552
MEDIUM	222	2,304	156	1,097	223	549	931	5,484
LARGE	52	617	47	332	55	479	182	1,764
X-LARGE	37	478	58	234	17	637	128	1,589
TOTAL	1,154	15,895	1,259	7,175	2,720	2,879	6,307	37,389

NEW PASSENGER AND
FREIGHT AIRCRAFT
DELIVERIES BY REGION

Source: Airbus 100+ seats
(passenger aircraft) and 10t+
(freighters), Airbus GMF 2018

SAFE HARBOUR STATEMENT

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- Competition and consolidation in the aerospace and defence industry;
- Significant collective bargaining labour disputes;
- The outcome of political and legal processes, including the availability of government financing for certain programmes and the size of defence and space procurement budgets;
- Research and development costs in connection with new products;
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AIRBUS

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