

Market

Market Drivers

The main factors affecting the commercial aircraft market include passenger demand for air travel, cargo activity, economic growth cycles, oil prices, national and international regulation (and deregulation), the rate of replacement and obsolescence of existing fleets and the availability of aircraft financing sources. The performance, competitive posture and strategy of aircraft manufacturers, airlines, cargo operators and leasing companies as well as wars, political unrest, pandemics and extraordinary events may also precipitate changes in demand and lead to short-term market imbalances.

According to internal estimates, demand for 39,200 passenger and freight aircraft is forecast in the next 20 years with Asia-Pacific accounting for over 40% of deliveries. In recent years, China and India have emerged as significant new aircraft markets. As a result, Airbus has sought to strengthen its commercial and industrial ties in these countries.

The no-frills / low-cost carriers also constitute a significant sector, and were expected at the end of 2019 to continue growing around the world, particularly in Asia, where emerging markets and continued deregulation could provide increased opportunities. While single-aisle aircraft continue to be a popular choice for these carriers, demand for Airbus' range of twin-aisle aircraft may also increase as some of these carriers develop or further develop their long-range operations.

In addition to these market drivers other factors can serve to constrain growth. These include but are not limited to infrastructure constraints, slot availability at some airports and pilot availability. These particular constraints are often limited to specific markets or regions.

Overall growth. The long-term market for passenger aircraft depends primarily on passenger demand for air travel, which is itself primarily driven by economic or GDP growth, trade, fare levels and demographic growth. Measured in revenue passenger kilometres, air travel increased in every year from 1967 to 2000, except for 1991 due to the Gulf War, resulting in an average annual growth rate of 7.9% for the period. Demand for air transportation also proved resilient in the years following 2001, when successive shocks, including 9/11 and SARS in Asia, dampened demand.

At the end of 2008 and in 2009, the financial crisis and global economic difficulties witnessed resulted in only the third period of negative traffic growth during the jet age, and a cyclical downturn for airlines in terms of traffic (both passenger and cargo), yields and profitability. Despite these perturbations, the market recovered, driven by the underlying demand for air transport. After 2009, the industry benefited from a prolonged period of stability which enabled airlines to collectively deliver profitability at historically high levels.

More recently, air travel demand growth had maintained solid momentum despite a certain weakening of the global economic growth at 2.5% in 2019 versus 3.2% in 2018. In 2019, Airbus operated in a challenging macro environment mainly driven by geopolitical instability, uncertainty around Brexit and imposition of tariffs of 10% on Airbus aircraft imported from the European

Union to the US in October 2019. At the end of 2019, world real GDP growth was projected to be at +2.5% in 2020, and forecast to remain positive with +2.7% in 2021 and +2.7% in 2022.

Preliminary figures released in early 2020, by IATA (International Air Transport Association), estimated that some 4.5 billion passengers made use of the global air transport network for their business, tourism needs or for simply visiting friends and relatives (VFR) in 2019. The annual passenger total is estimated to be up 4.0% compared to 2018. World passenger traffic, expressed in terms of total scheduled revenue passenger-kilometres (RPKs), posted an estimated increase of 3.5% for 2019.

Through its analysis Airbus continues to believe in the long term growth potential of our industry. The commercial aviation industry has been resilient to external shocks and traffic has grown 2.5x since 2000. Based on internal estimates, Airbus forecasts a growth rate of 4.3% annually during the period 2019-2038. If the actual growth rate equals or exceeds this level, Airbus expects that passenger traffic, as measured in revenue passenger kilometres, will double in the next 15 years.

Cyclicity. Despite an overall growth trend in air travel, aircraft order intake can vary significantly from year to year and within different regions, due to the volatility of airline profitability, cyclicity of the economy, aircraft replacement waves and occasional unforeseen events which can depress demand for air travel. However, new product offerings and growth across the market has resulted in good levels of order activity in recent years. For example, in 2019, Airbus added 768 net orders to its order book (compared to 747 in 2018).

Despite some cyclicity in airline demand, Airbus aims to secure at least stable delivery rates from year to year, supported by a strong backlog of orders and a regionally diverse customer base. At the end of 2019, the backlog stood at 7,482 aircraft. Through careful backlog management, close monitoring of the customer base and a prudent approach to production increases, Airbus has successfully increased annual deliveries for 17 years running, even through the financial crisis of 2008-2009.

Regulation / Deregulation. National and international regulation (and deregulation) of international air services and major domestic air travel markets affect demand for passenger aircraft. In 1978, the US deregulated its domestic air transportation system, followed by Europe in 1985. The more recently negotiated "Open Skies Agreement" between the US and Europe, which became effective in 2008, allows any European or US airline to fly any route between any city in the EU and any city in the US. Other regions and countries are also progressively deregulating, particularly in Asia. This trend is expected to continue, facilitating and in some cases driving demand. In addition to providing greater market access (which may have formerly been limited), deregulation may allow for the creation and growth of new airlines or new airline models, as has been the case with the no-frills / low-cost airline model, which has increased in importance throughout major domestic and intra-regional markets since deregulation (e.g., in the US and Europe).

Airline network development: “hub” and “point-to-point” networks. Following deregulation, major airlines have sought to tailor their route networks and fleets to continuing changes in customer demand. Accordingly, where origin and destination demand prove sufficiently strong, airlines often employ direct, or “point-to-point” route services. However, where demand between two destinations proves insufficient, airlines have developed highly efficient “hub and spoke” systems, which provide passengers with access to a far greater number of air travel destinations through one or more flight connections.

The chosen system of route networks in turn affects aircraft demand, as hubs permit fleet standardisation around both smaller aircraft types for the short, high frequency and lower density routes that feed the hubs (between hubs and spokes) and larger aircraft types for the longer and higher density routes between hubs (hub-to-hub), themselves large point-to-point markets. As deregulation has led airlines to diversify their route network strategies, it has at the same time therefore encouraged the development of a wider range of aircraft in order to implement such strategies.

Airbus, like others in the industry, believes that route networks will continue to grow through expansion of capacity on existing routes and through the introduction of new routes, which will largely be typified by having a major hub city at least at one end of the route. These new route markets are expected to be well served by the latest product offering, such as the A350 XWB and A330neo. Airbus believes that it is well positioned to meet current and future market requirements given its complete family of products.

Alliances. The development of world airline alliances has reinforced the pattern of airline network development described above. According to data from Cirium, a UK-based aviation industry consultancy, one-third of the world’s jetliner seats being flown today are operated by just 15 airlines. In the 1990s, the major airlines began to enter into alliances that gave each alliance member access to the other alliance members’ hubs and routings, allowing airlines to concentrate their hub investments whilst at the same time extending their product offering and market access.

Market Structure and Competition

Market segments. According to a study conducted by Airbus, some 20,900 passenger aircraft with more than 100 seats were in service with airlines worldwide at the beginning of 2019. Currently, Airbus competes in each of the four principal market segments for aircraft with more than 100 seats.

“Small” aircraft, such as the A220 and A320 Families, having 100 to more than 200 seats, and which are used principally for short-range and medium-range routes of up to 3,000 nautical miles.

“Medium” aircraft typically offering up to 300 seats on routes of up to 5,000 nautical miles. This includes long range versions of the A321 as well as the A330 family.

“Large” aircraft, such as the A350XWB, are wide-body twin-aisle which seat more than 350 passengers on routes of up to 10,000 nautical miles.

Freight aircraft, which form a fourth, related segment, are a combination of new build and converted ex-passenger aircraft.

Converted aircraft are prevalent in the expanding e-commerce market which typically sees relatively low aircraft utilisation. This can provide an economical “second life” for in-service aircraft from the A320 and A330 families. See “— Regional Aircraft, Aerostructures, Seats, Aircraft Conversion and Airbus Canada — EFW”.

Airbus also competes in the corporate, VIP business jet market with the ACJ. Airbus continues to develop corporate jet versions of its modern airliner family, notably the ACJ319neo and ACJ320neo, as well as offering new variants, such as the ACJ330neo and ACJ350 XWB. The increased range of these aircraft extends Airbus’ leadership in cabin comfort to even longer flights.

Geographic differences. The high proportion of single-aisle aircraft in use in both North America and Europe reflects the predominance of domestic short-range and medium-range flights, both from the expansion of the low-cost carrier and particularly in North America due to the development of hubs following deregulation. In comparison with North America and Europe, the Asia-Pacific region uses a greater proportion of twin-aisle aircraft, as populations tend to be more concentrated in fewer large urban centres. The tendency towards use of twin-aisle aircraft is also reinforced by the fact that many of the region’s major airports limit the number of flights, due either to environmental concerns or to infrastructure constraints that limit the ability to increase flight frequency. These constraints necessitate higher average aircraft seating capacity per flight. However, Airbus believes that demand for single-aisle aircraft in Asia will grow over the next 20 years, particularly as domestic markets in China and India and low-cost carriers continue to develop in the region. Aircraft economics will also help to drive aircraft size, with airlines looking to reduce the cost per seat through higher density aircraft cabins and the use of larger aircraft types and variants where possible.

Competition. Airbus has been operating in a duopoly since Lockheed’s withdrawal from the market in 1986 and Boeing’s acquisition of McDonnell Douglas in 1997. As a result, the bulk of the market for passenger aircraft of more than 150 seats have been manufactured by either Airbus or Boeing.

According to the manufacturers’ published figures for 2019, compared to Boeing, Airbus accounted for 69% of total commercial aircraft deliveries, 82% of total gross orders (in units), and 58% of the total year-end backlog (in units). Airbus delivered 863 aircraft in 2019.

Nevertheless, the high technology and high value nature of the business makes aircraft manufacturing an attractive industry in which to participate, and besides Boeing, Airbus faces international competitors. Embraer, (whose commercial aircraft business’ joint venture with Boeing is subject to regulatory approval) who originally was primarily focused on the regional market, has also focused on the development of larger airplanes. Additionally, other competitors from Russia, China and Japan will enter the 70 to 150 seat aircraft market over the next few years, and today are studying larger types.

In October 2017, Airbus SE and Bombardier Inc. agreed to form a partnership in relation to the C Series. Having received all required regulatory approvals, Airbus SE, Bombardier Inc. and Investissement Québec closed the C Series transaction effective on 1 July 2018 and as a result, the Company has

acquired a majority stake in the Airbus Canada Limited Partnership, with C Series subsequently renamed A220. For the latest update, see paragraph 1.3 below.

The partnership brings together two complementary product lines, the A220-100 and A220-300, targeting the 100-150 seat market segment with an addressable market of at least 7,000 new aircraft over the next 20 years in the segments in which they compete.

Airbus Canada benefits from Airbus' global reach, scale, procurement organisation and expertise in selling, marketing and producing the A220. Significant production efficiencies are anticipated by leveraging Airbus' production ramp-up expertise. In August 2019, Airbus officially begun manufacturing the A220 also in Airbus' facility in Mobile, Alabama.

Customers

As of 31 December 2019, Airbus had 421 customers and a total of 20,108 Airbus aircraft had been ordered, of which 12,626 aircraft had been delivered to operators worldwide. The table below shows Airbus' largest commitments in terms of total gross firm orders by customer for the year 2019.

Customer	Firm orders ⁽¹⁾⁽²⁾
Indigo	300
Air Arabia	120
Air France	60
Emirates Airline	50
United Airlines	50
Air Asia X Malaysia	30
Saudia	30
GECAS	25
Accipiter	20
Air China	20
American Airlines	20
Avolon	20
Lufthansa	20
Noirdic Aviation Capital	20
Wizz Air Hungary	20

(1) Options are not included in orders booked or year-end backlog.
 (2) Excludes undisclosed customers.

A220 FAMILY TECHNICAL FEATURES (CURRENT VERSION)

Model	Entry-into-service	Passenger capacity ⁽¹⁾	Range (km)	Length (metres)	Wingspan (metres)
A220-100	2016	116	2,950	35.0	35.1
A220-300	2016	141	3,200	38.7	35.1

(1) Two-class layout.

A320 Family. With more than 15,000 aircraft sold, and nearly 9,350 delivered, the Airbus family of single-aisle aircraft, based on the A320, includes the A319 and A321 derivatives, as well as the corporate jet family (including new members ACJ319neo and ACJ320neo). Each aircraft in the A320 Family shares the same systems, cockpit, operating procedures and cross-section.

Products

The Family Concept – Commonality across the Fleet

Airbus' aircraft families promote fleet commonality. This philosophy takes a central aircraft and tailors it to create derivatives to meet the needs of specific market segments. For example, both variants of the A220 have a significant level of common parts and can be operated by a single pilot pool. Alternatively, the A320, A330, A350 and A380 all share the same cockpit philosophy, fly-by-wire controls and handling characteristics, enabling pilots to transfer among these aircraft within the Airbus family with minimal additional training. Cross-crew qualification across families of aircraft provides airlines with significant operational flexibility. In addition, the emphasis on fleet commonality permits aircraft operators to realise significant cost savings in crew training, spare parts, maintenance and aircraft scheduling. The extent of cockpit commonality within and across families of aircraft is a unique feature of Airbus that, in management's opinion, constitutes a sustainable competitive advantage.

In addition, technological innovation has been at the core of Airbus' strategy since its creation. Each product in the Airbus family is intended to set new standards in areas crucial to airlines' success, such as cabin comfort, cargo capacity performance, economic performance, environmental impact and operational commonality. Airbus innovations often provide distinct competitive advantages, with many becoming standard in the aircraft industry.

A220 Family. Complementing the A320 Family, the A220-100 and A220-300 models cover the segment between 100 and 150 seats and offer a highly comfortable five-abreast cabin. With the most advanced aerodynamics, carbon fiber reinforced polymer (CFRP) materials, high-bypass engines and fly-by-wire controls, the A220 delivers 20 percent lower fuel burn per seat compared with previous generation aircraft. The type will serve a worldwide market for smaller single-aisle airliners, estimated at least at 7,000 such aircraft over the next 20 years. Airbus manufactures, markets and supports A220 aircraft under the "C Series Aircraft Limited Partnership" (formerly CSALP; Airbus Canada Limited Partnership as of 1 June 2019) agreement, finalised in 2018. Primary competitors to the A220 Family are the Embraer EMB190-E2 and EMB195-E2 and the Boeing 737 Max 7.

At 3.95 metres diameter, the A320 Family has the widest fuselage cross-section of any competing single-aisle aircraft. This provides a roomy six-abreast passenger cabin, a high comfort level and a spacious under floor cargo volume. The A320 Family incorporates digital fly-by-wire controls, an ergonomic cockpit and a modern structural material selection. The A320 Family's primary competitor is the Boeing 737 series.

To ensure this market leader keeps its competitive edge, Airbus continues to invest in improvements across the product line, including development of the A320neo Family. The A320neo incorporates many innovations including latest generation engines, Sharklet wing-tip devices and cabin improvements, which together deliver up to 20% in fuel savings compared with earlier A320 family aircraft. The A320neo received joint Type Certification from the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA) in November 2015. The A320neo with Pratt & Whitney engines was the first variant in the Neo Family to receive Type Certification. The A320neo with CFM engines was certified in May 2016. The A321neo with Pratt & Whitney engines received Joint Type Certification in December 2016 and with CFM engines in March 2017. Type Certification for the A319neo with CFM engines was achieved in December 2018 with the Pratt & Whitney engine variant the following year.

The A320neo Family versions have over 95% airframe commonality with the A320ceo (current engine option) versions, enabling them to fit seamlessly into existing A320 Family fleets – a key factor for Airbus customers and operators.

Further innovation saw Airbus launch the long range A321XLR in 2019, combining single-aisle efficiency with widebody range and comfort.

Since its launch in December 2010, the A320neo Family has received 7,188 firm orders from more than 100 customers, with a total of 1,186 aircraft delivered to the end of 2019. A320neo deliveries commenced in February 2016 followed by the first A321neo in April 2017 and in November 2018 the first A321 LR. Overall, the A320 family retains a 57% share of the backlog against the Boeing 737 Family.

During 2019, Airbus received 796 gross orders for the A320 Family of aircraft and 654 net orders.

A320 FAMILY TECHNICAL FEATURES (CURRENT VERSION)

Model	Entry-into-service	Passenger capacity ⁽¹⁾	Range (km)	Length (metres)	Wingspan (metres)
A318	2003	107	5,750	31.4	34.1
A319	1996	124	6,950 ⁽²⁾	33.8	35.8
A320	1988	150	6,100 ⁽²⁾	37.6	35.8 ⁽³⁾
A321	1994	185	5,950 ⁽²⁾	44.5	35.8 ⁽³⁾
A319neo	2020	140	6,950	33.8	35.8
A320neo	2016	165	6,500	37.6	35.8
A321neo	2017	206	7,400	44.5	35.8
A321XLR		206	8,700	44.5	35.8

(1) Two-class layout.

(2) Range with sharklets.

(3) Wingspan with sharklets.

A330 Family. With 1,823 aircraft sold (of which 337 A330neo) and 1,492 delivered, the A330 Family covers all market segments with one twin-engine aircraft type and is designed to typically carry between 250 and 300 passengers in 3-class configurations or over 400 passengers in high-density. The A330 Family offers high levels of passenger comfort as well as large under-floor cargo areas. The aircraft is also offered as a cargo variant and as a military platform. The competitors of the A330 Family are the Boeing 767, 777 and 787 aircraft series.

The newest evolution to the A330 Family is the A330neo (new engine option), comprising the A330-800neo and A330-900neo versions. These aircraft incorporate latest generation Rolls-Royce Trent 7000 engines and enhanced aerodynamics for improved

fuel efficiency. The first flight took place in October 2017 and both Type Certification and first delivery were achieved in 2018, with TAP taking delivery of its first three A330-900s during the year. The final assembly of the A330-800 started in November 2017 and the aircraft performed its first flight on 6 November 2018.

Airbus is continuously developing the A330 Family to keep the aircraft at the leading edge of innovation and from 2020, versions of the A330neo will offer increased take-off weight of up to 251 tonnes, offering a 15,000 km range for the A330-800.

In 2019, Airbus received 104 gross orders (89 net) for the A330neo Family of aircraft, and delivered 41 A330neo aircraft plus 12 A330ceo totaling 53 aircraft to customers.

A330 FAMILY TECHNICAL FEATURES (CURRENT VERSION)

Model	Entry-into-service	Passenger capacity ⁽¹⁾	Maximum range (km)	Length (metres)	Wingspan (metres)
A330-200	1998	247	13,450	58.8	60.3
A330-300	1994	277	11,750	63.7	60.3
A330-800neo		257	13,900	58.8	64
A330-900neo	2018	287	12,130	63.7	64

(1) Three-class configuration.

A350 XWB Family. The A350 XWB is a family of wide-body aircraft, designed to accommodate between 325 and 400 passengers. The A350 XWB features a wider fuselage than that of competing new generation aircraft, Rolls-Royce Trent XWB engines, A380 systems technology and over 50% composite material. The A350 XWB's main competitors are the Boeing 787 and 777 aircraft series.

With the Ultra-Long Range (ULR) version of the A350-900 launched in 2015, the A350 XWB demonstrates its versatility by offering the capability to perform flights of up to 19 hours. The first

A350-900 ULR was delivered in September 2018 to Singapore Airlines. Highlighting the type flexibility, Airbus delivered the first A350-900 Domestic to Japan Airlines during 2019.

Airbus has also developed the larger A350-1000, which is now certified by EASA and the FAA and was delivered to its first customer in February 2018.

In 2019, Airbus received 113 gross orders for the A350 XWB Family (32 net), and delivered 112 aircraft, achieving the target rate of about 10 aircraft per month by the end of the year.

A350 XWB FAMILY TECHNICAL FEATURES

Model	Entry-into-service	Passenger capacity ⁽¹⁾	Maximum range (km)	Length (metres)	Wingspan (metres)
A350-900	2014	325	15,000	66.8	64.8
A350-1000	2018	366	15,557	73.8	64.8

(1) Three-class layout.

A380. The double-deck A380 is the world's largest commercial aircraft flying today. Its cross-section provides flexible and innovative cabin space, allowing passengers to benefit from wider seats, wider aisles and more floor space, tailored to the needs of each airline. Carrying 575 passengers in a comfortable four-class configuration and with a range of 8,000 nm / 14,800 km, the A380 offers superior economic performance, lower fuel consumption, less noise and reduced emissions.

In 2019, Airbus Commercial Aircraft delivered 8 aircraft.

In February 2019, following a review of its operations, and in light of developments in aircraft and engine technologies, Emirates announced the intention to reduce its A380 orderbook from 162 to 123 aircraft. As a consequence and given the lack of order backlog with other airlines, Airbus will cease deliveries of the A380 in 2022.

A380 TECHNICAL FEATURES

Model	Entry-into-service	Passenger capacity ⁽¹⁾	Maximum range (km)	Length (metres)	Wingspan (metres)
A380-800	2007	575	14,800	72.7	79.8

(1) Four-class layout.

Customer Services

Airbus targets to remain at the forefront of the industry by expanding its customer services offering to meet customers' evolving needs. As a result, Airbus is developing a wide range of customer centric and value-added services. This approach provides Airbus operators with solutions to significantly reduce their operating costs, increase aircraft availability, enhance the quality of their operations and passenger experience.

Customer Services' primary role is to support its customers in operating their Airbus fleet safely and profitably and to the satisfaction of passengers all around the world. As a result of its continued growth, Airbus' customer base has increased consistently over the past years reaching more than 11,000 aircraft in operation by the end of 2019 operated by more than 450 operators. The fleet is maintained by more than 200 Maintenance and Repair Organisations (internal and external to Airbus).

A worldwide network of more than 7,250 people (including subsidiaries) cover all areas of support from technical engineering / operational assistance and spare parts supply to crew and maintenance training. Hundreds of technical specialists provide Airbus customers with advice and assistance 24 hours a day, 7 days a week. There are 151 field service stations available worldwide for on-site assistance to 180 of our operators, 189

operators are covered by 17 Hubs. Airbus worldwide support is also based on an international network of 69 locations all around the world, including 18 training locations, 6 FHS (Flight Hour Services) pools and 10 spares warehouses.

As the worldwide fleet is growing (to an estimated 15,000 aircraft by 2025), so is the demand in the services market. At the same time customers expect an increased service level. Airbus offers optimised aircraft operational availability, streamlined flight operations and enhanced passenger experience by covering the full aircraft lifecycle and focusing on adding value to its customers. Growing fast on the market with organic growth, JVs, co-developments and acquisitions in recent years, here are some examples:

- in 2016, full acquisition of Navtech, now re-named Navblue, offering products in the Flight Operations area and Air Traffic Management area;
- in 2017, full acquisition of Sepang Aircraft Engineering (SAE), an MRO centre based in Kuala Lumpur, Malaysia, that had been partially owned by Airbus since 2011;
- launch of Airbus Interiors Services (2017) specialised in timely and flexible solutions for cabin equipment;
- the Airbus MRO alliance was launched in 2017 and now counts 6 affiliated members with a specific focus on the Asia Pacific Region to accompany the strong market growth in this region;

- the Airbus Training network currently counts 18 training network locations around the world; the latest acquisition being a flight training center in Santiago de Chile (December 2019) with SKY (a Chilean-based low-cost carrier) as launch customer for the new Airbus Chile Training Centre;
- in December 2018, Airbus and the French Civil Aviation University, ENAC, have obtained EASA certification for a co-developed Ab-initio Pilot Cadet Training Programme. The first cadets are now trained according to this programme in ab-initio flight schools Escuela de Aviacion Mexico (EAM) in Mexico City and more recently the Airbus Flight Academy Europe (in Angoulême, France), thus contributing to meeting the need for new pilots in the next 20 years;
- acquisition of a start-up - VRnam - to boost innovation for flight training through virtual reality.

Airbus' worldwide support is also based on an international network of support centres, training centres and spares warehouses all around the world, offering customers the solutions they need close to their operational base. To ensure this proximity Airbus empowered local teams and developed hubs in the regions, most recently in Asia, China, Africa and Middle East.

Since the launch of Skywise at Le Bourget in 2017, Airbus has accelerated with its digital transformation. In October 2018, Airbus created the Skywise campus – “a place to foster internal and external collaboration” – and developing new ways of working, with customers at the heart of each service, to offer the best value proposition across the full lifecycle, securing and optimising their operations end-to-end, providing tailored solutions that deliver impactful outcomes and enhancing the user's experience all along the way.

Skywise brings all the ecosystem data to a single platform. More than 100 airlines are now connected to the Skywise platform, representing a potential of over 9,000 aircraft of which approximately one third are not Airbus aircraft.

Leveraging on Skywise digital capabilities, Airbus' Customer Services portfolio offer is evolving to provide the best and most efficient solutions available on the market:

- launch of Skywise Reliability Services (October 2018);
- launch of Skywise Predictive Maintenance (October 2018);
- launch of “FHS (Flight Hour Services) powered by Skywise” enhancing the existing FHS offering to improve aircraft availability while optimising resources utilisation and components inventory (June 2019);
- launch of Skywise Digital Alliance (October 2019): Airbus will form an alliance with Delta Airlines to experiment, develop and market new predictive maintenance cross-fleet solutions. The Alliance is open to receive other members from airlines and systems OEMs.

Preparing the future, Airbus Services is on a continuing growth pattern and on track to achieve the US\$ 10 billion revenues ambition announced at the Farnborough 2018 Airshow.

Customer Finance

Airbus favours cash sales, and does not envisage customer financing as an area of business development. However, Airbus recognises the commercial need for manufacturers to assist customers in arranging financing of new aircraft purchases, and in certain cases to participate in financing those aircraft for the airline.

Extension of credit or assumption of exposure is subject to corporate oversight and monitoring, and follows strict standards of discipline and caution. Airbus' dedicated customer finance team has accumulated decades of expertise in aircraft finance. When Airbus finances a customer, the financed aircraft generally serves as collateral, with the engine manufacturer participating in the financing. These elements assist in reducing the risk borne by Airbus. The difference between the gross exposure resulting from the financing and the collateral value is fully provisioned for (for further information, please refer to the “— Notes to the IFRS Consolidated Financial Statements — Note 27: Sales Financing Transactions”). Airbus' customer financing transactions are designed to facilitate subsequent sell-down of the exposure to the financial markets, third-party lenders or lessors.

In 2019, Airbus continued to benefit from market appetite for both aircraft financing and sale and leaseback lessor opportunities, supported by a high level of liquidity available in the market at good rates for Airbus aircraft. Airbus customer financing exposure remained limited in 2019 and decreased compared to 2018. Airbus will continue to provide direct aircraft financing support as it deems necessary. Management believes, in light of its experience, that the level of provisioning protecting Airbus from default costs is adequate and consistent with standards and practice in the aircraft financing industry. See “— Risk Factors – Financial Market Risks – Sales Financing Arrangements”.

Asset Management

The Asset Management department was established in 1994 to manage and re-market used aircraft acquired by Airbus, originally as a result of customer bankruptcies, and subsequently in the context of certain buy-back commitments. The department operates with a dedicated staff and manages a fleet comprised of used aircraft across a wide range of models. Through its activities, the Asset Management department helps Airbus to respond more efficiently to the medium- and long-term fleet requirements of its customers.

Its key roles comprise commercial, technical and financial risk management of its used aircraft portfolio, as well as the enhancement of all Airbus products' residual value.

It also provides a full range of remarketing services, including assistance with entry-into-service, interior reconfiguration and maintenance checks. Most of the aircraft are available to customers for cash sale, while some can also be offered on operating lease. In the latter, the Airbus Asset Management team aims at eventually selling down the aircraft with lease attached to further reduce its portfolio exposure.

Operations

Industrial Organisation

Airbus' industrial organisation reflects the end-to-end industrial flow in single-aisle and widebody value streams respectively. Production flows from the supply chain, through constituent and major component (wing, forward and aft fuselage, and nose and centre fuselage) assembly through to final assembly in Toulouse, Hamburg, Tianjin and Mobile. Aircraft are then handed over to programme management for delivery to customers. The industrial flow is secured by Quality and enabled by Procurement as well as four transverse functions responsible

to provide the skills, standards and services necessary for (1) smooth industrial planning, logistics and transport, (2) integrated manufacturing engineering, (3) eradication of non-quality, and (4) highest operational excellence and sound performance management.

The Procurement organisation is responsible for both the contractual and operational relationship with the supplier base. Its aim is to ensure that purchased parts and services are delivered at the most competitive conditions, on time, cost and quality. A dedicated Procurement Operations team manages the delivery stream from the supply chain in accordance with the agreed conditions to enable the production flow.

In 2019 all new aircraft developments and major modifications benefited from the largely deployed Advanced Production Quality Planning (APQP) method across Airbus and at suppliers. The Quality First initiative launched in the second half of 2019 in Hamburg, with a strong focus on standards and quality gate adherence will be further deployed along the value streams in 2020. The Quality function ensured the granting in 2019 of all necessary EASA certification, POA, DOA, MOA and EN9100 accreditations through compliance to our internal standards and processes and associated audits.

This way of working along end-to-end value streams promotes a strong sense of collaboration in the service of customers with the highest safety and quality standards.

2019 delivery performance and rate evolution:

- A220 family: 48 A220 delivered. Ramp-up to a maximum target rate of 14 A220 per month by mid-decade;
- A320 family: record deliveries of 642. Rate 63 per month targeted in 2021;
- A330: 53 deliveries achieved;
- A350: record deliveries of 112, production ramp-up accomplished in 2019;
- A380: 8 deliveries achieved, preparation for end of production.

Engineering

Airbus Engineering is a global organisation that develops civil aircraft and aircraft components, and that conducts innovative research applicable to the next generation of aircraft. Airbus Engineering operates transnationally, with most engineers employed in France, Germany, the UK and Spain. A growing population of experienced aerospace engineers is also employed worldwide at five other engineering centres in Wichita (Kansas, US), Mobile (Alabama, US), Moscow (Russia), Bangalore (India) and Beijing (China).

A key part of the Airbus engineering organisation is the architect and integration centre, which ensures, together with a team of senior aircraft architects and the programme chief engineers, that a consistent and multi-disciplinary approach is applied during aircraft development.

Research & Technology activities continue to deliver incremental innovations for existing aircraft, matured breakthrough technologies, with reinforced focus on industrial aspects. Airbus Engineering is a major contributor to numerous international initiatives dedicated to the preservation of the environment and the reduction of noise and CO₂ emissions. Fully integrated change projects are also implemented to continuously implement innovative and efficient ways of working.

Regional Aircraft, Aerostructures, Seats, Aircraft Conversion and Airbus Canada

ATR

ATR (*Avions de Transport Régional*) is a world leader in the market for regional aircraft up to 90 seats. Its aircraft has over 200 operators in more than 100 countries. ATR is an equal partnership between Airbus and Leonardo, with Airbus' 50% share managed by Airbus. Headquartered in Toulouse, ATR employs more than 1,400 people. Since the start of the programme in 1981, ATR has registered net orders for 1,765 aircraft (507 ATR 42s and 1,258 ATR 72s).

In 2019, ATR delivered 68 new aircraft (compared to 76 in 2018) and recorded net firm orders for 48 new aircraft (compared to 46 in 2018), including orders from Nordic Aviation Capital (NAC). As of 31 December 2019, ATR had a backlog of 185 aircraft (compared to 205 in 2018).

By the end of 2019, ATR had delivered 1,580 aircraft.

Products and Services

ATR 42 and ATR 72. ATR has developed a family of high-wing, twin turboprop aircraft in the 30- to 78-seat market which comprises the ATR 42 and ATR 72, designed for optimal efficiency, operational flexibility and comfort. Like Airbus, the ATR range is based on the family concept, which provides for savings in training, maintenance operations, spare parts supply and cross-crew qualification. The ATR 72-600 is the lowest seat per mile cost aircraft on the 70 seat segment.

ATR is entering the cargo market by launching the ATR 72-600F (Freighter) with a brand new windowless fuselage, a forward Large Cargo Door (LCD) and a rear upper hinged cargo door. The ATR 72-600F will enter into service in 2020. The Company's aircraft family is also being extended with the brand new addition of the 42-600S. With the "S" representing Short Take-Off and Landing (STOL), this new version of the ATR 42-600 offers take-off and landing capabilities on runways as short as 800m with 40 passengers on board in standard flight conditions. Its entry into service is scheduled for 2022.

Customer service. ATR has established a worldwide customer support organisation committed to supporting aircraft over their service life. Service and training centres and spare parts stocks are located in Toulouse, Paris, Miami, Singapore, Bangalore, Auckland, Sao Paulo and Johannesburg. ATR worldwide presence also includes representative offices in Beijing and Tokyo.

ATR Asset Management addresses the market for second-hand aircraft by assisting in the placement and financing of used and end-of-lease aircraft.

Production

The ATR fuselage is produced in Naples, Italy, and ATR wings are manufactured in Merignac near Bordeaux, France. Final assembly takes place in Saint Martin near Toulouse on the Airbus commercial aircraft production site. Flight-testing, certification and deliveries also occur in Toulouse. ATR outsources certain areas of responsibility to Airbus, such as wing design and manufacturing, flight-testing and information technology.

STELIA Aerospace

STELIA Aerospace is a wholly-owned subsidiary of Airbus and offers global solutions for aeronautical manufacturers and airlines supported by its aerostructure, tubes and ducts, cabin interior and pilot seat branches.

As one of the world leading tier-1 aerostructure suppliers, STELIA Aerospace designs, develops, manufactures and industrialises workpackages and fully equipped and tested aircraft sections for civil and military programmes.

STELIA Aerospace is a global partner for major aeronautical players worldwide, such as Airbus, ATR, or Bombardier Aerospace.

With more than 7,000 employees worldwide based mainly in France, Canada, Morocco and Tunisia, STELIA Aerospace has a wide range of capabilities, from Build-to-Print to Design & Build solutions, including mechanical milling of rolled and stretched panels.

STELIA Aerospace designs, develops and manufactures bended and welded tubes and ducts covering all ATA systems.

Through its cabin interior specialty, STELIA Aerospace designs and manufactures luxury First Class and Business Seats for key partners in the world including Etihad Airways, Singapore Airlines or Thai Airways.

By combining innovative materials and technology with a drive to improve the passenger experience, STELIA Aerospace has created an outstanding range of seats used in civil aircraft globally.

STELIA Aerospace – a joint world leader Pilot seats manufacturer – provides cockpit and pilot seats for all kinds of aircraft, and offers support from design to production, including after-sales service.

As part of its development strategy, STELIA Aerospace has established a new subsidiary in Portugal. STELIA Portugal was founded end of 2019 and should start operations in 2020, enabling STELIA Aerospace to continue to support its customers ramp-up needs with additional production capacity.

Premium AEROTEC

Premium AEROTEC, a wholly owned subsidiary of the Company, is one of the world's leading tier-1 suppliers of commercial and military aircraft structures and is a partner in the major European international aerospace programmes.

Its core business is the development and production of large aircraft components from aluminum, titanium and carbon fiber composites (CFRP). Premium AEROTEC is Europe's no. 1 in this segment with roughly 9,000 employees at various sites in Germany and Romania. Premium AEROTEC is represented by its products in all Airbus commercial aircraft programmes. The current military programmes include the Eurofighter "Typhoon" and the military transport aircraft A400M.

Besides main customer Airbus, Premium AEROTEC will further intensify business with other customers and actively approach other aircraft or structural manufacturers. Premium AEROTEC is also striving to expand its maintenance, repair and spare parts business.

In order to contribute successfully to the shaping of the future of aviation, the engineers and developers at Premium AEROTEC are continuously working on the new and further development of lightweight and highly durable aircraft structures. They cooperate closely with universities and research institutes in the process. Premium AEROTEC plays a significant role in the design of new concepts in such fields as carbon composite technologies (including thermoplastic processes) or 3D-printing of aircraft components made of titanium or aluminum.

Elbe Flugzeugwerke GmbH – EFW

EFW combines various aviation and technology activities under a single roof: development and manufacturing of flat fibre-reinforced composite components for structures and interiors, the conversion of passenger aircraft into freighter configuration, maintenance and repair of Airbus commercial aircraft as well as engineering services in the context of certification and approval.

On 17 June 2015, Airbus signed an agreement with Singapore-based ST Aerospace Ltd. (STA) to offer passenger-to-freighter (P2F) conversion solutions for its A320 and A321 aircraft. STA acquired an additional 20% of the shares of EFW, Dresden (Germany) by way of a contribution in kind and a capital increase to EFW. The transaction closed on 4 January 2016. Consequently, 45% of the shares of EFW were retained and Airbus effectively lost its control over EFW (previously reported in Airbus).

Airbus Canada Limited Partnership

Airbus Canada Limited Partnership ("Airbus Canada") has been established on 1 July 2018 following the transaction between Airbus, Bombardier and Investment Quebec. At the end of 2019, Airbus Canada shareholding structure was 50.26% Airbus, 33.72% Bombardier and 16.02% Investment in Quebec. At the end of 2019, Airbus Canada had over 2,700 employees. For the latest update, see section 1.3 below.

In 2019, Airbus Canada has delivered 48 aircraft, compared to 20 aircraft in 2018 (from 1 July 2018). Airbus Canada has a backlog of 495 aircraft (600 orders – 105 deliveries in total as of December 2019).

Airbus Canada Products

Airbus Canada has developed a family of all-new design efficient aircraft with two products: the A220-100 and the A220-300, launched by Bombardier before the establishment of Airbus Canada. The A220-100 is a solution for opening new routes with urban and challenging operations. The A220-100 has a capacity between 100 and 135 passengers and a range of 6,300 km. The A220-300 is well suited to be one of the best network feeder. The A220-300 has a capacity between 130 and 160 passengers and a range of 6,200 km. From the creation of Airbus Canada until the end of December 2019, 68 A220 were delivered.

Airbus Canada Industrial Footprint

A220 final assembly line is in Mirabel. In 2019, the A220 has also begun to be manufactured in a new final assembly line in Mobile, for delivering to our American customers. The first A220 delivery from Mobile is expected in Q3 2020.