IBA.iQ

Aircraft Values Book

Issue: 20A – February 2020

Member of ISTAT

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Editorial

IBA's 2020A edition of the Aircraft Values Book is released in a time of great uncertainty and struggle. The Novel Coronavirus, Covid-19, has placed us in totally unprecedented territory; its effects are not localised or industry-specific but touch all aspects of our lives. In the current environment, traffic demand in the aviation sector has fallen and a large number of aircraft have been parked and stored, which has in turn created a significant challenge to airlines. Government support for airlines, and support from aircraft lessors in terms of rental holidays or deferrals, will be essential for the survival of many airlines through these difficult times.

The opinion you will find in this publication has not been adjusted for the effects of Covid-19. In accordance with IBA's valuation methodology, its value opinion is guided by empirical value transaction data and market sentiment. Given a decline in transactions due to the increased market volatility, it will take time for the full effects of Covid-19 to manifest in IBA's Value and lease rate opinions and we are monitoring the situation on a daily basis. Whilst market activity holds, IBA's value opinion has not yet been adjusted as a direct result of the impact of the current Covid-19 pandemic.

In recent years, ageing widebody aircraft types have come under pressure in terms of values and lease rates. These include the Airbus A340 and Boeing 747 whose higher operating costs have favoured younger, twin-engine aircraft models. However, even the Airbus A330 and the Boeing 777 have faced challenges, as the supply of aircraft entering the secondary market has exceeded demand. With the new generation of widebody aircraft well-established in the form of the Airbus A350 and Boeing 787, IBA has reassessed its long-term outlook for Airbus A330ceo and existing Boeing 777 aircraft models. Given the challenges presented by Covid-19 and its effects on global air traffic, further negative widebody performance is likely, as we see accelerated retirements of older examples.

Narrowbody aircraft performed well through 2019, supported by the absence of the new generation Boeing 737 MAX family, which continues to face challenges in recertification and re-entry into service. A highly competitive leasing market, overheated by a flood of capital and new market entrants, created an environment in which asset values remained high, yet lease rates faced continued pressure for the most attractive asset types. Popular, latest generation narrowbodies in the form of the Airbus A320neo and A321neo are among the strongest performers, with mid-life and older aircraft receiving strong acclaim from investors and operators. The Boeing 737 NG and Airbus A320ceo aircraft families have exhibited favourable performance in the market, supported by demand for passenger operations, freight conversion and part-out alike; the most popular members being the Boeing 737-800 and Airbus A321-200 models, which is reflected in their value performance.

Considering the challenges faced by the aviation industry and the resulting effect on demand for commercial passenger aircraft, IBA expects values to weaken over the near term. Whilst market activity holds, IBA's value opinion has not yet been adjusted as a direct result of the impact of the current Covid-19 pandemic.

IBA abides by the principals of ISTAT appraisal practice and its value definitions. The circumstances currently afflicting the aviation industry do not create an environment in which transactions comfortably align with the definition of current market value. In IBA's view, normal trading activity has ceased and transitioned to a market where the predominant transaction is purchase leaseback, sought by airlines to strengthen their heavily impaired and weakening cash positions.

This situation, in the current climate, implies a somewhat pressured transaction and therefore the ISTAT Market Value caveat of “under no unusual pressure for a prompt sale” would not apply. Market Value, as defined by ISTAT, also assumes an “open and unrestricted market”. With the restriction of travel and access to aircraft, the ability for purchasers of aircraft to transact is restricted, further impinging on the fundamental principles of the definition of Market Value.

Given the diminished applicability of Current Market Value in the current environment, whilst the global pandemic, Covid-19, continues to impede normal trading patterns, IBA expects that market conditions more closely reflect a Soft Value scenario. IBA’s definition of soft value is as follows. Please note this is not an ISTAT defined term.

'Soft' Value is a relative term, used in widely varying circumstances by all types of party with differing interests in the market. No industry standard 'benchmark' definition is associated with it, other than that it implies a market characterised by an imbalance of supply and demand (with supply exceeding demand). In order for valuations to be meaningful, IBA believes that an aircraft value should be presented with an accompanying explanation of the market (or assumed market) into which it is being sold. For the purpose of this report, IBA has interpreted the term ‘soft’ market in the following way:

“A soft market is the lower limit of ‘normal’ market conditions. It is a result of negative market influences. While there is some demand for aircraft, it does not correspond with the number of aircraft being offered to the market, which exceeds the demand. Typical influences that may produce a soft market include a slowdown in economic activity, reduced air traffic levels and increased fuel prices. In a soft market, new-technology aircraft with good penetration may experience storage levels of up to 10 percent of total fleet size, while for older-technology types, up to 40 percent of the fleet may be stored. Soft market conditions may result in the abbreviation of useful economic life for an aircraft being maintained with the final withdrawal from operation in view.”

Many thanks from IBA’s Valuation Team.

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2020A Edition

Section 1: Airbus

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ISTAT Definitions

All the data contained in this publication is in accordance with ISTAT definitions, which are included below.

Base Value is the Appraiser's opinion of the underlying economic value of an aircraft in an open, unrestricted, stable market environment with a reasonable balance of supply and demand, and assumes full consideration of its "highest and best use". An aircraft's Base Value is founded in the historical trend of values and in the projection of value trends and presumes an arm's-length, cash transaction between willing, able and knowledgeable parties, acting prudently, with an absence of duress and with a reasonable period of time available for marketing.

In most cases, the Base Value of an aircraft assumes its physical condition is average for an aircraft of its type and age, and its maintenance time status is at mid-life, mid-time (or benefiting from an above-average maintenance status if it is new or nearly new, as the case may be).

Market Value or **Current Market Value** (if the value pertains to the time of the analysis) is the Appraiser's opinion of the most likely trading price that may be generated for an aircraft under the market circumstances that are perceived to exist at the time in question. Market Value assumes that the aircraft is valued for its highest, best use, that the parties to the hypothetical sale transaction are willing, able, prudent and knowledgeable, and under no unusual pressure for a prompt sale, and that the transaction would be negotiated in an open and unrestricted market on an arm's-length basis, for cash or equivalent consideration, and given an adequate amount of time for effective exposure to prospective buyers.

Fair Market Value is synonymous with Market Value, and likewise Current Fair Market Value is synonymous with Current Market Value, because the criteria typically used in those documents that employ the term "Fair", reflect the same criteria set forth in the above definition of Market Value.

The Aircraft Values Book contains Current Fair Market Values and Base Values for various aircraft based on the current “standard specification” as discussed in the Methodology section below.

Rating Score

The IBA ratings are a result of several factors, both qualitative and quantitative in nature. The qualitative and quantitative factors are primarily based on an assessment of the aircraft types' attributes. The main issues affecting an aircraft type’s rating include: future residual values, impact of a weak market on values and re-marketability. There are several market factors that influence the aforementioned issues and these include; technology of the aircraft, operator

base, fleet size, order backlog, remaining useful life, freight conversion potential, market share, maintenance cost, specific fuel consumption, greenhouse gas emissions and general market acceptance. All of these factors have been taken into account by IBA to determine the rating for each aircraft type. The rating scale ranges from A++ for a low risk asset to E-- for a high risk asset as follows:

Low Risk				Moderate Risk								High/Moderate Risk							High Risk				
A+	A	A-	A--	B++	B+	B	B-	B--	C++	C+	C	C-	C--	D++	D+	D	D-	D--	E++	E+	E	E-	E--

Aircraft Values Book Methodology

The Aircraft Values Book has been constructed around the following criteria:

Scope: Modern technology passenger jet aircraft with an entry into service date of post-1980 or within six months of publication of the Aircraft Values Book.

Method: Determination of values includes account of replacement price, age, market condition, depreciation based on resale history and useful economic life. Aircraft are considered within the market segment to which they belong and compared with the competitor aircraft in the segment.

Assumptions:

- average annual new price escalation (inflation) for forecasting of 1.5%
- current / balanced market condition with balance achieved at levels perceived appropriate for today's market
- each aircraft type depreciates over a fixed economic lifetime
- standard / mid-time maintenance condition
- good /average physical condition
- typical utilisation
- configured for typical passenger service
- standard / average specification unless otherwise indicated

NB: Depreciation matrices are validated semi-annually against the latest available data.

Standard / Average Specification

When an aircraft is new to the market the values are based on the initial (“basic”) specification as published by the manufacturer. This specification will include items such as aircraft weights, engine manufacturer and model, seating configuration and avionics fit, to name a few. However, as production and orders develop, airlines and lessors will select various options. It is usual, as the aircraft program matures, for the level of specification typically ordered to become more advanced. IBA considers the most typical (“standard”) level of specification recently ordered to be that which is most relevant for determining the aircraft values in this book.

For aircraft that are no longer in production, the level of specification most prevalent in the market, across the whole of the type's fleet, is considered to represent the “standard” level of specification and IBA's values are based upon this standard. Aircraft with inferior or superior levels of specification when compared to the “standard specification” aircraft, will attract negative or positive value adjustments to the values shown, as appropriate.

Market Reference Data Definitions

Information regarding general characteristics of the aircraft is given for comparison purposes at the beginning of each section. Every effort has been made to convey correct technical information.

Six market reference charts have been included which have been used as the partial basis for IBA’s opinion on aircraft value. These charts detail current and historical demand based on airframe and engine type, as well as geographical placement of the airlines and aircraft. The effective date for all data in this issue (Issue 20A of the Aircraft Values Book) is 10th February 2020 and has been sourced from IBA.iQ.

Orderbook History

Net orders and cancellations are shown from the year of program launch to the most recent year of production except where noted. Net orders represents the total number of firm orders placed with the manufacturer in a given year minus the cancellations in that same year. Cancellations show the number of aircraft orders cancelled by airlines and lessors in the year in which they were cancelled and can include orders which have been switched to another type (i.e. 5x ERJ 135s which have been switched to 5x ERJ 145s will be displayed as five cancellations on the ERJ 135 chart and five new orders on the ERJ 145 chart).

Delivery Stream Based on Current Orders & Manufacture Rates

Scheduled and delivered aircraft are shown from the year of first delivery through confirmed deliveries, based on aircraft on orders and options, and also include an element of planned manufacture rates, when known. If an aircraft is currently out of production, the delivery month and year of the last aircraft has been noted on the summary page at the beginning of the section.

Fleet Ownership for Aircraft Type

This chart provides a snapshot of the ownership status on a geographical basis of the active passenger fleet. Where the operator and owner are the same, "Owner" is recorded. Where the operator differs from the owner, "Lessor" is recorded.

Geographic Distribution

Similar to the Fleet Ownership chart, this graph shows the geographic spread of the passenger configured aircraft currently operating and parked throughout the world regions. Also included is the quantity currently in storage and on order, broken down by geographic location. From this chart, a greater geographic spread indicates greater opportunity for secondary market trading, and a high proportion of stored aircraft usually indicates a depressed market or a change of aircraft role.

Engine Demand

Based on the current passenger fleet, demand for each engine variant for a given airframe is detailed as well as the number of airlines operating a given engine. These two charts combine to develop a profile of proliferation and acceptance of a given engine type. It may indicate a situation whereby a large population of

a given engine is spread over a low number of operators and therefore may generate few re-marketing possibilities. If that were the case, a discount to the values may be appropriate and therefore reflected in the aircraft value page.

Average Availability

Aircraft that have been listed for sale and/or lease are summarised in this chart to give an indication of movement in the second-hand market for each type. Values for availability are given as an average per month over the quarter. For example, if the following availability were reported in each of month 1, 2 & 3 – 12 aircraft, 0 aircraft & 7 aircraft – an average of 6.3 aircraft ((12+0+7)/3) would be reported for that quarter.

Disclaimer

IBA Group Limited (IBA) has prepared the enclosed aircraft values book (Aircraft Values Book). The Aircraft Values Book is subject to the disclaimer below.

IBA has no present interest in the aircraft being appraised for the purpose of the Aircraft Values Book (Aircraft). At the date of the Aircraft Values Book, IBA does not anticipate acquiring any subsequent interest in the Aircraft. Unless otherwise stated, IBA has had no prior interest in the Aircraft. IBA's appraisal of the Aircraft is honestly held and the Aircraft Values Book shall be deemed advisory only, with such advice being solely to the extent noted in the Aircraft Values Book. To the fullest extent permitted by law, IBA assumes no responsibility or legal liability for any action taken, or not taken, whether directly or indirectly by the Client or by any third party, with regard to the Aircraft and the Client agrees that IBA shall bear no such responsibility or legal liability in respect of the same.

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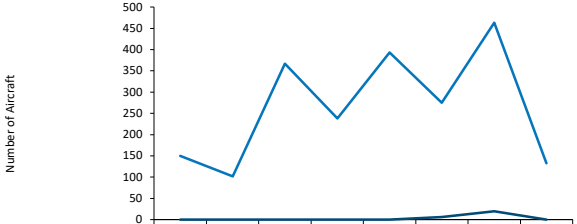
Airbus A321neo

Section 1: Airbus Industrie
180-230 Seat Commercial Jets
Predominantly 2-Class Configurations

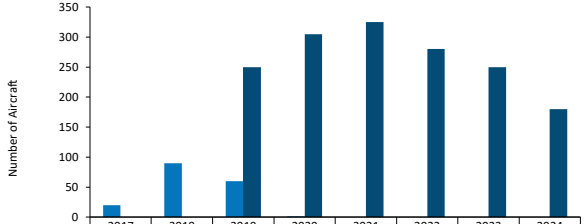
Market Reference Data

A321neo Orderbook History
2011 to Present



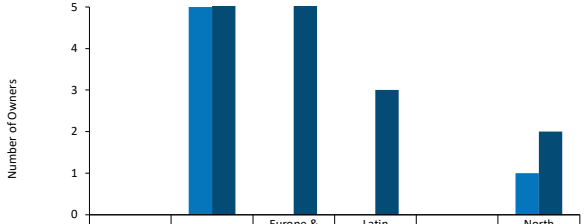
	2011	2012	2013	2014	2015	2016	2017	2018
Net Orders	150	102	367	238	393	275	463	133
Cancellations	0	0	0	0	0	6	20	0

Delivery Stream Based on Current Orders
& Manufacture Rates



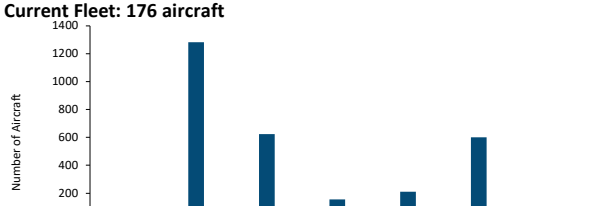
	2017	2018	2019	2020	2021	2022	2023	2024
Delivered	20	90	60	1	0	0	0	0
Scheduled	0	0	250	305	325	280	250	180

Fleet Ownership for A321neo
Total: 6 owners & 19 lessors



	Africa	Asia Pacific	Europe & CIS	Latin America	Middle East	North America
Owners	0	5	0	0	0	1
Lessors	0	7	7	3	0	2

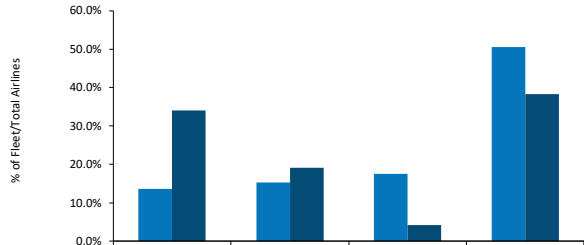
Geographic Distribution of A321neo Fleet
Current Fleet: 176 aircraft



	Africa	Asia Pacific	Europe & CIS	Latin America	Middle East	North America	Undisclosed
In Service	0	104	20	15	0	27	0
On Order	2	1283	623	157	211	599	84
Stored	0	4	2	1	0	3	0

Current fleet represents in service & stored aircraft

Engine Demand for A321neo



	LEAP-1A32	LEAP-1A33	PW1130G	PW1133G
% of Aircraft	13.6%	15.3%	17.6%	50.6%
% of Operators	34.0%	19.1%	4.3%	38.3%

A321neo Average Availability
Sale and/or Lease, 3Q 2014 - 4Q 2019

	3Q 14	4Q 14	1Q 15	2Q 15	3Q 15	4Q 15	1Q 16	2Q 16	3Q 16	4Q 16	1Q 17	2Q 17	3Q 17	4Q 17	1Q 18	2Q 18	3Q 18	4Q 18	1Q 19	2Q 19	3Q 19	4Q 19
Avg. Avail.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Fleet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Airbus A321neo

Section 1: Airbus Industrie
180 - 230 Seat Commercial Jets
Predominantly 2-Class Configuration

93,000kg, Leap 1A33 or PW1133G, 1 ACT fitted, non-ACF
Current Market Value & Base Values

IBA Aircraft Rating : *A*
Valid for January delivered aircraft in January only
Values in US Dollars (millions)
Annual inflation of 1.5% assumed

Year of Delivery	CMV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
2020	**59.63**	58.75	55.66	52.42	49.44	46.59	43.85	41.22	38.69	36.27	33.95	31.71	29.58	27.57	25.65	23.82	22.11
2019	**55.86**	55.03	51.84	48.93	46.12	43.43	40.85	38.36	35.98	33.70	31.52	29.42	27.43	25.53	23.72	22.04	20.51
2018	**52.17**	51.65	48.77	46.00	43.33	40.77	38.31	35.95	33.69	31.53	29.46	27.48	25.59	23.79	22.12	20.59	19.13
2017	**48.53**	48.53	45.77	43.12	40.57	38.12	35.78	33.53	31.38	29.32	27.35	25.46	23.67	22.01	20.49	19.04	17.74

Comments

Arguably the type which has the most momentum behind it at the moment is the Airbus A321-200neo, as Airbus continue to push the type to new limits. In addition to the baseline A321-200neo, we also have the A321-200LR and A321-200XLR, the latest variation by Airbus. Both the A321-200LR and A321-200XLR will allow airlines to operate lower demand long-haul rotations more efficiently than had previously been possible, hence why there is so much excitement surrounding the type, in that it allows for more hub to point long-haul services than hub to hub as is the norm. With the variations Airbus offer with the A321neo they cover a number of areas within the narrowbody market, from high-capacity short-haul operations to low demand long-haul routes. The Airbus A321-200neo is very close to becoming a true successor to the Boeing 757-200, if not already.