AIRFINANCE JOURNAL

An ***Airfinance Journal***

special supplement

Air Investor 2019

Widebodies lose further ground with investors

Airfinance Journal analyses the industry's favourite aircraft and reviews the impact of the new-technology options on the current-engine jets.

Investors' appetite clearly remains in mainstream aircraft. Few investors venture outside the most popular types of narrowbody and widebody aircraft: the Airbus A320 and Boeing 737/Max families and the 787/A350s.

Of the top 10-favoured aircraft in 2018, the first six were narrowbodies. Five years ago, the favoured model was the 777-300ER and the top six included three narrowbodies (737-800/Max 8/A320neo), as well as three widebodies (777-300ER/787-9/A350-900).

The current environment continues to favour current-technology narrowbody aircraft. In 2018, the A320neo-family aircraft was still subject to delays because of engine issues, affecting monthly production rates. Oil prices globally remained at reasonable levels, making a viable case for current-technology aircraft.

This is why the likes of the 777-300ER, A330-300 or even 767-300ER are still mixed up with new-technology widebodies in the charts.

Narrowbodies

The first A320neo aircraft are entering their third year of service, while the Max 8s are now more than 18 months in service.

Despite Airbus and Boeing increasing production rates, it remains unclear when and how residual values for the current-technology aircraft will be impacted. What is certain, given the backlog of orders for the Neo and Max versions, is that the impact on current-technology aircraft continues not to be felt immediately.

Over the past year, second-hand 737-800s have been placed rapidly and demand has been strong. Start-up carriers continue to source eight- to 10-year-old aircraft before committing to newer models.

As a result, the 737-800 model continues to top the charts in *Airfinance Journal*'s Investors' poll.

One leasing company said aircraft trading for the 737-800 model is at a premium and lease rates for newer aircraft are close to the Max 8.

"Some airlines prefer next-generation aircraft to Max at the moment and due to ongoing issues," says the leasing company source.

Airbus A320neo

The 737-800 remains among the most remarketable assets but competition makes it hard to access for value, says another leasing source.

The A321neo claimed the top spot for residual values, narrowly beating the 737-800. The poll shows the Airbus model scored 4.52. The 737-800, which first delivered in 1998, scored 4.48.

Single-aisles

Aircraft type	Residual value	Value for money	Operational success	Remarketing potential	Overall score	Last year's score	Difference
737-800	4.48	4.12	4.95	4.73	4.57	**4.58**	-0.01
A321neo	4.52	4.20	4.06	4.74	4.38	**4.49**	-0.11
A320	4.00	4.04	4.86	4.52	4.36	**4.36**	0.00
737 Max 8	4.33	4.16	4.21	4.58	4.32	**4.29**	0.03
A320neo	4.45	3.90	3.88	4.74	4.24	**4.30**	-0.06
A321	4.12	4.08	4.48	4.35	4.26	**4.13**	0.13
737 Max 10	3.75	3.79	n/a	3.87	3.80	**3.85**	-0.05
A220-300	3.29	3.53	3.71	3.19	3.43	**3.55**	-0.12
737 Max 9	3.28	3.50	3.58	3.35	3.43	**3.17**	0.26
737-900ER	2.91	3.37	3.50	2.86	3.16	**3.29**	-0.13
737-700	2.85	3.22	3.60	2.56	3.06	**3.22**	-0.16
A319	2.65	3.10	3.56	2.57	2.97	**3.27**	-0.30
737 Max 7	2.50	2.79	n/a	2.35	2.55	**2.81**	-0.26
A319neo	2.35	2.54	n/a	2.00	2.30	**2.60**	-0.30
737-600	1.29	1.73	1.77	1.38	1.54	**1.98**	-0.44

Regionals

Aircraft type	Residual value	Value for money	Operational success	Remarketing potential	Overall score	Last year's score	Difference
ATR72-600	3.17	3.32	3.92	3.19	3.40	**3.37**	0.03
Q400	3.03	3.09	3.73	3.03	3.22	**3.34**	-0.12
ATR72-500	2.86	3.31	3.67	2.71	3.13	**3.19**	-0.06
CRJ900	2.92	2.92	3.42	2.92	3.04	**3.23**	-0.19
E175	2.60	2.92	3.64	3.00	3.04	**3.24**	-0.20
A220-100	2.63	3.00	3.23	2.67	2.88	**2.82**	0.06
ATR42-500	2.71	3.00	3.08	2.67	2.87	**2.89**	-0.02
ATR42-600	2.85	2.71	2.96	2.83	2.84	**2.89**	-0.05
E190	2.34	2.84	3.59	2.53	2.83	**3.24**	-0.41
E190-E2	2.69	2.70	2.67	2.67	2.68	**3.40**	-0.72
E195-E2	2.67	2.79	n/a	2.54	2.66	**3.11**	-0.45
E195	2.22	2.80	2.79	2.31	2.53	**3.08**	-0.55
CRJ700	2.38	2.33	2.75	2.33	2.45	**2.77**	-0.32
CRJ1000	2.31	2.63	2.67	1.92	2.38	**2.54**	-0.16
E175-E2	2.15	2.29	n/a	2.08	2.18	**3.11**	-0.93
CRJ200	1.69	2.00	2.83	2.08	2.15	**2.56**	-0.41
E170	2.00	2.08	2.42	2.00	2.13	**2.63**	-0.51
ERJ145	1.50	2.00	2.85	1.77	2.03	**2.24**	-0.21
MRJ	1.62	2.04	n/a	1.64	1.76	**2.27**	-0.51
SSJ100	1.15	1.79	1.25	1.17	1.34	**2.44**	-1.10

In comparison, the A320 remained unchanged at 4.00.

The gap between gets tighter when it comes to remarketing potential. The 737-800 scores 4.73 versus 4.52 for the A320. In 2017, the 737-800 scored 4.67 versus 4.36 for the A320 model.

Interestingly, demand for 737-700 part-out aircraft with engines is still high because of fewer -800 part-outs than expected, says a source.

The 737 Max 8's overall score this year was higher than last year, probably because more units delivered in 2018 compared with 2017, and the model gets more market acceptance.

The A320 remains popular but the A321 aircraft is the model that has shown the biggest progress over the past year. Its residual value is 6% up year on year, while value for money increased by 2%. Remarketing potential shows an increase of 5%. "Cargo conversion opportunity provides more residual support," says one trading source about the A321.

The market continues to be active in second-hand A319s, but the model is rivalled by new-technology aircraft such as the Embraer E195-E2 and A220-300.

Airbus new-technology aircraft remain penalised for their operational success (one of the four criteria in the poll).

The A320neo scores better than the 737 Max 8 in terms of residual values and remarketing potential but less in value for money and operational success.

"Most operators and financiers see the [predominantly Pratt & Whitney-driven] engine issues are short-term issues and thus any impairment in the type's popularity is likely temporary," observes one trader.

The A321neo is dominant in its segment and, as a result, scores higher than competition in three of the four criteria, perhaps highlighting the need for Boeing to address the 225-seat and above market with the New Midsize Aircraft later this year?

"A true competitor won't emerge for some time, though the Max 10 is promising," says one leasing source.

Regionals

The ATR72-600 reclaimed top spot in the regional aircraft market scoring 3.4 overall, a marginal increase over the previous year.

The turboprop is now a mature aircraft and will have more than eight years of service in 2019.

The first ATR72 variant delivered in October 1989. The Franco-Italian manufacturer had delivered 187 ATR72-200s, 365 ATR72-500s, as well as 448 ATR72-600s, when it reached 1,000 deliveries in July 2018.

As the aircraft penetrates more markets, lessors are still in this model. Nordic Aviation Capital remains the largest leasing company for ATR aircraft, but Avation continues to commit for the ATR72-600s.

The ATR72-600

The lessor recently exercised options for the type and confirmed interest in converting some of its backlog to the freighter version, which launched in November 2017 with a FedEx order.

New ATR sales activity in 2018 is expected to slow down and the manufacturer is unlikely to match the 2017 tally of 113 firm orders and 40 options.

But the year has been tough in the regional market and, in the eyes of the investors, the ATR remains a solid and stable programme when compared with the Bombardier Q products, which will be sold to Viking Air in 2019.

Bombardier's only jet performer, the CRJ900 model, is one of the highest-ranked regional jets in this year's poll with average residual value and value for money close to the Q400 turboprop.

The Embraer E175 ranked equally to the CRJ900, which reflects the battle between the two manufacturers in the North America market. The E175 beats the CRJ900 on remarketing potential, perhaps reflecting the higher percentage of second-hand activity.

Embraer introduced the E195-E2 and the E190-E2 models to service this year and both are expected to score better next year as the Brazilian manufacturer increases deliveries and reports more data on the in-service performance. However, its future may lie via a joint venture with Boeing.

Widebodies

The 787-9 aircraft was the clear winner in the twin-aisle category. Its notable market popularity significantly outstrips the other options, with the A350-900 trailing behind.

However, both scored less than previously, which reflects a certain malaise in the widebody market.

Still, the ubiquity of both among airlines makes it a tried-and-tested favourite of the investor community year after year.

Five years ago, when both aircraft entered service, the 777-300ER and the A330-300 topped the charts the same way.

The 777-300ER has expensive transition costs. "Too many aircraft available in the secondary market [with leases attached] and may face issues of having too many returning from lease [and thus requiring remarketing] in the coming few years," says one leasing source.

The A330-300, perhaps with not too many available in the second-hand market with leases attached, is the only widebody that scored higher in 2018 than in 2017.

The 767-300ER model is enjoying a resurgence in residual value and remarketabiltiy because of freighter demand according to one trader.

The Boeing 787-9 model topped the widebody category

Twin-aisles

Aircraft type	Residual value	Value for money	Operational success	Remarketing potential	Overall score	Last year's score	Difference
787-9	4.18	4.10	4.44	4.21	4.23	**4.34**	-0.11
A350-900	3.90	3.83	3.93	3.76	3.86	**4.17**	-0.32
787-8	3.44	3.56	3.54	3.24	3.45	**3.65**	-0.21
A330-300	3.04	3.33	4.06	3.15	3.40	**3.26**	0.14
767-300ER	3.11	3.13	3.93	3.29	3.37	**3.68**	-0.32
787-10	3.29	3.47	n/a	3.27	3.34	**3.67**	-0.33
777-9	3.15	3.67	n/a	3.15	3.32	**3.33**	-0.01
777-300ER	2.70	3.15	4.42	2.55	3.21	**3.38**	-0.18
A350-1000	3.18	3.27	3.30	2.93	3.17	**3.41**	-0.24
A330-900neo	2.94	3.40	n/a	2.88	3.07	**3.09**	-0.02
777-8	2.77	3.00	n/a	2.75	2.84	**3.04**	-0.20
A330-200	2.30	2.86	3.59	2.35	2.78	**2.89**	-0.12
A350-800	2.56	2.43	n/a	2.14	2.38	**2.80**	-0.42
A330-800neo	2.29	2.58	n/a	2.08	2.32	**2.42**	-0.10
777-200ER	1.80	2.33	3.00	1.50	2.16	**3.11**	-0.95
777-200LR	2.00	2.13	2.23	1.88	2.06	**2.60**	-0.54
747-400	1.50	2.06	3.47	1.18	2.05	**2.60**	-0.55
767-400ER	1.80	2.08	2.38	1.57	1.96	**2.13**	-0.17
A380	1.19	2.24	3.00	1.16	1.90	**2.08**	-0.18
747-8I	1.44	2.14	2.31	1.29	1.80	**1.95**	-0.16
A340-600	1.13	1.38	1.33	1.07	1.23	**1.46**	-0.23
A340-500	1.00	1.46	1.08	1.00	1.14	**1.38**	-0.25

The **numbers**

The following pages include key data for current-production commercial aircraft. Aircraft that have not yet entered service are not included, because the information available has not been confirmed by in-service experience.

Technical characteristics
The maximum take-off weight (MTOW) shows the minimum and maximum options available for the type in question. There may be intermediate weights available. The operating empty weight (OEW) is based on the manufacturers' figures. Airline weights are likely to be higher than those quoted.

Fuels and times
The figures shown for fuels and times are *Airfinance Journal*'s estimates based on a variety of sources. They are intended to reflect 60% passenger load factors, international standard atmosphere (ISA) conditions en-route, zero winds and optimum flight levels.

Indicative maintenance costs
The maintenance figures are intended as a guide to the order of magnitude of reserves associated with the various aircraft types. The figures are intended to reflect mature costs with no account taken of warranty effects and other reductions associated with new aircraft.

The C-check and heavy-check reserves are based on typical check costs and intervals. No allowance is made for cabin refurbishment. The cost quoted for component overhaul excludes inventory support.

Engine maintenance cost estimates are based on figures quoted in the *Airfinance Journal* guide to financing and investing in engines 2018, page 37. Unless stated, the engine costs refer to the most common engine type for the aircraft model in question.

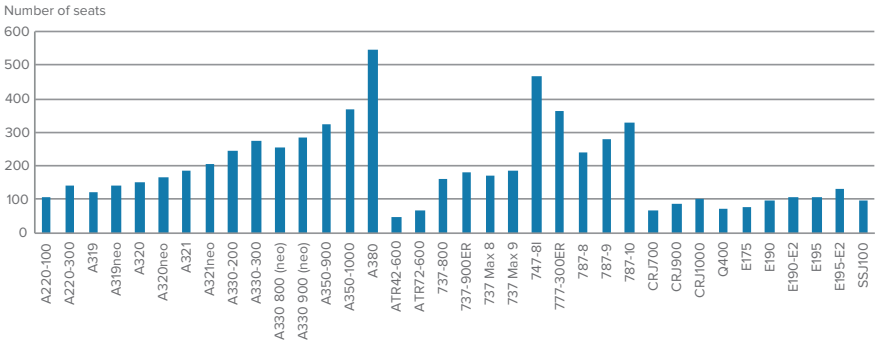
The information used to estimate the indicative maintenance reserves has been collected from a wide variety of sources. While *Airfinance Journal* has made every effort to normalise the data, direct comparisons between aircraft types may be misleading.

It should also be noted that maintenance costs of a particular type are highly dependent on the route structure, operating environment and maintenance philosophy of the airline with which the aircraft is in service. As such, our estimates are difficult to reconcile with the numbers provided by manufacturers.

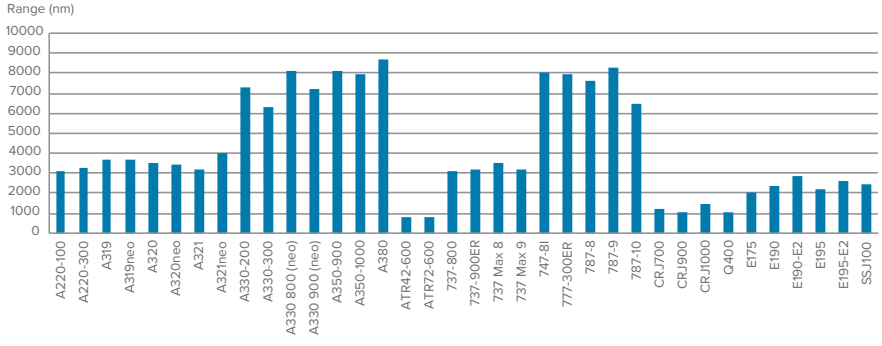
Seating/range
The numbers quoted for seating capacity are based on the manufacturers' selling standards. Large variations are possible, particularly for widebody aircraft. The ranges shown are for still-air conditions, optimum flight levels and are based on the typical seating figure and the operating empty weight quoted by the manufacturer. Ranges in airline operation are likely to be significantly less than the figures quoted.

Fleet information
Data is based on *Airfinance Journal*'s Fleet Tracker December 2018.

Current production aircraft seating



Current production aircraft range



Aircraft data index

Aircraft **data**

Airbus A220-100 (formerly CS100)

SEATING/RANGE	
Max seating	133
Typical seating	108
Maximum range	3,100nm (5,740km)
TECHNICAL CHARACTERISTICS	
MTOW	54.9 tonnes (option 60.8)
OEW	33.3 tonnes
MZFW	50.3 tonnes
Fuel capacity	22,040 litres
Engines	PW1521G/1524G/1525G
Thrust	21,000lbs to 23,3000lbs
FUELS AND TIMES	
Block fuel 200nm	1,340kg
Block fuel 500nm	2,510kg
Block fuel 1,000nm	4,500kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	2016
In service:	9
Operators (current and planned)	3
In storage	1
On order	69
Build peak year (2016)	5
Estimated production 2019	10
Average age (years)	1.5
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$55-60 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$95-100 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per propeller hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are estimates based on similar aircraft types pending in-service confirmation of manufacturer claims.

Airbus A220-300 (formerly CS300)

SEATING/RANGE	
Max seating	160
Typical seating	140
Maximum range	3,300nm (6,110km)
TECHNICAL CHARACTERISTICS	
MTOW	59.9 tonnes (option 67.6)
OEW	34.3 tonnes
MZFW	50.3 tonnes
Fuel capacity	22,040 litres
Engines	PW1521G/1524G/1525G
Thrust	21,000lbs to 23,3000lbs
FUELS AND TIMES	
Block fuel 200nm	1,390kg
Block fuel 500nm	2,5610kg
Block fuel 1,000nm	4,700kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	2016
In service:	37
Operators (current)	4
In storage	0
On order	308
Build peak year (2018)	22
Estimated production 2019	35
Average age (years)	1.0
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$55-60 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$105-110 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per propeller hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are estimates based on similar aircraft types pending in-service confirmation of manufacturer claims.

Airbus A319

SEATING/RANGE	
Max seating	145
Typical seating	124
Typical range	3,700nm (6,850km)
TECHNICAL CHARACTERISTICS	
MTOW	75.5 tonnes
OEW	40 tonnes
MZFW	58 tonnes
Fuel capacity	23,860 litres/29,840 litres
Engines	CFM56-5B
Thrust	22,000lbs (98kN)
FUELS AND TIMES	
Block fuel 200nm	1,710kg
Block fuel 500nm	3,140kg
Block fuel 1,000nm	5,620kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET (INCLUDING CORPORATE JET VERSIONS)	
Entry into service	1996
In service:	1,292
Operators (current)	164
In storage	42
On order	18
Built peak year (2005)	142
Estimated production 2019	5
Average age (years)	13
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$60-65 per flight hour
Higher checks reserve	$55-60 per flight hour
Engine overhaul	$100-105 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Airbus A319neo

SEATING/RANGE	
Max seating	156
Typical seating	140
Typical range	3,700nm (6,850km)
TECHNICAL CHARACTERISTICS	
MTOW	75.5 tonnes
OEW	43 tonnes
MZFW	60.3 tonnes
Fuel capacity	23,760 litres/26,750 litres
Engines	Leap-1A/PW1100G
Thrust	24,100lbs (107kN)
FUELS AND TIMES	
Block fuel 200nm	1,450kg
Block fuel 500nm	2,670kg
Block fuel 1,000nm	4,780kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET (INCLUDING CORPORATE JET VERSIONS)	
Entry into service (planned)	2019
In service:	none
Operators (current)	none
In storage	none
On order	53
Built peak year	Not applicable
Estimated production 2019	10
Average age (years)	less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$60-65 per flight hour
Higher checks reserve	$55-60 per flight hour
Engine overhaul	$100-105 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are based on A319 current engine model pending confirmation of manufacturer's claimed reductions for new engine model.

Airbus A320

SEATING/RANGE	
Max seating	180
Typical seating	150
Typical range (with sharklets)	3,500nm (6,500km)
TECHNICAL CHARACTERISTICS	
MTOW	73.5 tonnes/78 tonnes
OEW	42 tonnes
MZFW	61 tonnes/62.5 tonnes
Fuel capacity	24,210 litres/27,200 litres
Engines	CFM56-5B/V2500
Thrust	25,000lbs (120kN)
FUELS AND TIMES	
Block fuel 200nm	1,850kg
Block fuel 500nm	3,390kg
Block fuel 1,000nm	6,080kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET (INCLUDING CORPORATE JET VERSIONS)	
Entry into service	1988
In service:	5,005
Operators (current and planned)	277
In storage	112
On order	134
Built peak year (2013)	352
Estimated production 2019	20
Average age (years)	9.5
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$60-65 per flight hour
Higher checks reserve	$55-60 per flight hour
Engine overhaul	$105-110 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Airbus A320neo

SEATING/RANGE	
Max seating	194
Typical seating	150-165
Typical range	3,400nm (6,300km)
TECHNICAL CHARACTERISTICS	
MTOW	79 tonnes
OEW	44.5 tonnes
MZFW	62.8 tonnes/64.3 tonnes
Fuel capacity	23,760 litres/26,750 litres
Engines	Leap-1A/PW1100G
Thrust	27,000lbs (120kN)
FUELS AND TIMES	
Block fuel 200nm	1,570kg
Block fuel 500nm	2,880kg
Block fuel 1,000nm	5,170kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	2016
In service:	162
Operators (current and planned)	79
In storage	4
On order	3,855
Built peak year (2018)	203
Estimated production 2019	500
Average age (years)	0.7
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$60-65 per flight hour
Higher checks reserve	$55-60 per flight hour
Engine overhaul	$105-110 per engine flight hour
Engine LLP	$120-125 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are based on A320 current engine model pending confirmation of manufacturer's claimed reductions for new engine model

Airbus A321-200

SEATING/RANGE	
Max seating	220
Typical seating	185
Maximum range	3,200nm (5,950km)
TECHNICAL CHARACTERISTICS	
MTOW	89 tonnes/93.5 tonnes
OEW	48 tonnes
MZFW	71.5 tonnes/73.8 tonnes
Fuel capacity	23,860 litres/29,840 litres
Engines	CFM56-5B/V2500
Thrust	27,000-33,000lbs (120-148kN)
FUELS AND TIMES	
Block fuel 200nm	2,310kg
Block fuel 500nm	4,230kg
Block fuel 1,000nm	7,590kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET (INCLUDING -100S)	
Entry into service	1996
In service:	1,640
Operators (current and planned)	110
In storage	30
On order	105
Built peak year (2013)	215
Estimated production 2019	10
Average age (years)	7.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$65-70 per flight hour
Higher checks reserve	$60-65 per flight hour
Engine overhaul	$120-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Airbus A321neo

SEATING/RANGE	
Max seating	244
Typical seating	206
Maximum range	3,995nm (7,400km)
TECHNICAL CHARACTERISTICS	
MTOW	97 tonnes
OEW	50.1 tonnes
MZFW	73.3 tonnes/75.6 tonnes
Fuel capacity	23,600 litres/29,580 litres
Engines	Leap-1A/PW1100G
Thrust	32,000lbs (143kN)
FUELS AND TIMES	
Block fuel 200nm	1,960kg
Block fuel 500nm	3,600kg
Block fuel 1,000nm	6,450kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	2017
In service:	105
Operators (current and planned)	73
In storage	
On order	2,116
Build peak year (2018)	70
Estimated production 2019	200
Average age (years)	less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$60-65 per flight hour
Higher checks reserve	$55-60 per flight hour
Engine overhaul	$120-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$120-130 per cycle
APU	$75-80 per APU hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are based on A321 current engine model pending confirmation of manufacturer's claimed reductions for new engine model.

Airbus A330-200

SEATING/RANGE	
Max seating	440
Typical seating	247
Maximum range	7,270nm (13,450km)
TECHNICAL CHARACTERISTICS	
MTOW	230 tonnes/242 tonnes
OEW	121 tonnes
MZFW	168 tonnes/170 tonnes
Fuel capacity	139,090 litres
Engines	PW4000/CF6-80E1/Trent 700
Thrust	68,000-72,000lbs (303-316kN)
FUELS AND TIMES	
Block fuel 1,000nm	12,720kg
Block fuel 2,000nm	23,710kg
Block fuel 4,000nm	45,680kg
Bock time 1,000nm	184 minutes
Block time 2,000nm	299 minutes
Block time 4,000nm	529 minutes
FLEET	
Entry into service	1998
In service:	547
Operators (current and planned)	104
In storage	21
On order	17
Build peak year (2013)	51
Estimated production 2019	10
Average age (years)	9.5
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$265-270 per engine flight hour
Engine LLP	$245-250 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Airbus A330-200 Freighter

SEATING/RANGE	
Max Payload	65 tonnes
Maximum range	4,000nm (7,400km)
TECHNICAL CHARACTERISTICS	
MTOW	233 tonnes
OEW	115 tonnes
MZFW	178 tonnes
Fuel capacity	97,530 litres
Engines	RR Trent700/PW4000
Thrust	68,000-72,000lbs (302-320kN)
FUELS AND TIMES	
Block fuel 1,000nm	12,720kg
Block fuel 2,000nm	23,710kg
Block fuel 4,000nm	45,680kg
Bock time 1,000nm	184 minutes
Block time 2,000nm	299 minutes
Block time 4,000nm	529 minutes
FLEET	
Entry into service	2010
In service:	37
Operators (current and planned)	10
In storage	1
On order	4
Build peak year (2012)	8
Estimated production 2019	4
Average age (years)	5.4
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$265-270 per engine flight hour
Engine LLP	$245-250 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Airbus A330-300

SEATING/RANGE	
Max seating	440
Typical seating	277
Maximum range	6,340nm (11,750km)
TECHNICAL CHARACTERISTICS	
MTOW	230 tonnes/242 tonnes
OEW	121 tonnes
MZFW	173 tonnes/175 tonnes
Fuel capacity	97,530 litres
Engines	PW4000/CF6-80E1/Trent 700
Thrust	68,000-72,000lbs (303-316kN)
FUELS AND TIMES	
Block fuel 1,000nm	13,120kg
Block fuel 2,000nm	24,460kg
Block fuel 4,000nm	47,120kg
Bock time 1,000nm	184 minutes
Block time 2,000nm	299 minutes
Block time 4,000nm	529 minutes
FLEET	
Entry into service	1993
In service:	699
Operators (current and planned)	77
In storage	22
On order	31
Build peak year (2014)	74
Estimated production 2019	10
Average age (years)	8.6
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$265-270 per engine flight hour
Engine LLP	$245-250 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Airbus A330-800

SEATING/RANGE	
Max seating	406
Typical seating	257
Typical range	8,150nm (15,090km)
TECHNICAL CHARACTERISTICS	
MTOW	251 tonnes
OEW	110 tonnes
MZFW	176 tonnes
Fuel capacity	139,090 litres
Engines	Trent 7000
Thrust	68,000lbs (303kN)
FUELS AND TIMES	
Block fuel 1,000nm	10,950kg
Block fuel 2,000nm	21,040kg
Block fuel 4,000nm	40,520kg
Bock time 1,000nm	184 minutes
Block time 2,000nm	299 minutes
Block time 4,000nm	529 minutes
FLEET	
Entry into service (planned)	2019
In service	none
Operators (current and planned)	1
In storage	none
On order	8
Built peak year	Not applicable
Estimated production 2019	8
Average age	Not applicable
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100/flight hour
Engine overhaul	$265-270/engine flight hour
Engine LLP	$245-250/engine cycle
Landing gear refurbishment	$150-155/cycle
Wheels, brakes and tyres	$375-380/cycle
APU	$105-110/APU hour
Component overhaul	$420-425/flight hour

Maintenance reserves are based on A330-300 model pending confirmation of manufacturer's claimed reductions for new engine model.

Airbus A330-900neo

SEATING/RANGE	
Max seating	440
Typical seating	287
Maximum range	7,200nm (13,330km)
TECHNICAL CHARACTERISTICS	
MTOW	242 tonnes
OEW	115 tonnes
MZFW	181 tonnes
Fuel capacity	139,090 litres
Engines	Trent 7000
Thrust	68,000lbs (303kN)
FUELS AND TIMES	
Block fuel 1,000nm	11,280 kg
Block fuel 2,000nm	21,040 kg
Block fuel 4,000nm	40,520 kg
Bock time 1,000nm	184 minutes
Block time 2,000nm	299 minutes
Block time 4,000nm	529 minutes
FLEET	
Entry into service	2018
In service:	none
Operators (current and planned)	17
In storage	none
On order	242
Build peak year	Not applicable
Estimated production 2019	50
Average age (years)	Not applicable
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$265-270 per engine flight hour
Engine LLP	$245-250 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Maintenance reserves are based on A330-300 model pending confirmation of manufacturer's claimed reductions for new engine model.

Airbus A350-900

SEATING/RANGE	
Max seating	440
Typical seating	325
Maximum range	8,100nm (15,000km)
TECHNICAL CHARACTERISTICS	
MTOW	268 tonnes
OEW	161 tonnes
MZFW	192 tonnes
Fuel capacity	138,000 litres
Engines	Trent XWB
Thrust	84,000lbs (374kN)
FUELS AND TIMES	
Block fuel 1,000nm	11,810kg
Block fuel 2,000nm	22,010kg
Block fuel 4,000nm	42,410kg
Bock time 1,000nm	179 minutes
Block time 2,000nm	291 minutes
Block time 4,000nm	512 minutes
FLEET	
Entry into service	2014
In service:	207
Operators (current and planned)	51
In storage	none
On order	543
Build peak year (2018 estimated)	65
Estimated production 2019	175
Average age (years)	1.5
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$295-300 per engine flight hour
Engine LLP	$270-275 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Airbus A350-1000

SEATING/RANGE	
Max seating	440
Typical seating	366
Maximum range	7,950nm (14,800km)
TECHNICAL CHARACTERISTICS	
MTOW	308 tonnes
OEW	116 tonnes
MZFW	220 tonnes
Fuel capacity	156,000 litres
Engines	Trent XWB
Thrust	97,000lbs (432kN)
FUELS AND TIMES	
Block fuel 1,000nm	13,860kg
Block fuel 2,000nm	25,840kg
Block fuel 4,000nm	49,770kg
Bock time 1,000nm	179 minutes
Block time 2,000nm	291 minutes
Block time 4,000nm	512 minutes
FLEET	
Entry into service	2018
In service:	10
Operators (current and planned)	13
In storage	none
On order	165
Build peak year (2018 estimated)	Not applicable
Estimated production 2019	45
Average age (years)	Less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$105-110 per flight hour
Higher checks reserve	$95-100 per flight hour
Engine overhaul	$315-320 per engine flight hour
Engine LLP	$290-295 per engine cycle
Landing gear refurbishment	$150-155 per cycle
Wheels brakes and tyres	$375-380 per cycle
APU	$105-110 per APU hour
Component overhaul	$420-425 per flight hour

Maintenance reserves are based on A350-900 model pending confirmation of manufacturer's claimed reductions for new engine model.

Airbus A380

SEATING/RANGE	
Max seating	853
Typical seating	544 (four class)
Maximum range	8,700nm (15,200km)
TECHNICAL CHARACTERISTICS	
MTOW	575 tonnes
OEW	277 tonnes
MZFW	369 tonnes
Fuel capacity	320,000 litres
Engines	GP7200/Trent 900
Thrust	70,000lbs (311kN)
FUELS AND TIMES	
Block fuel 1,000nm	26,590kg
Block fuel 2,000nm	50,580kg
Block fuel 4,000nm	104,290kg
Bock time 1,000nm	146 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	501 minutes
FLEET	
Entry into service	2007
In service:	228
Operators (current and planned)	19
In storage	4
On order	98
Build peak year (2012)	30
Estimated production 2019	4
Average age (years)	5.4
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$160-165 per flight hour
Higher checks reserve	$145-150 per flight hour
Engine overhaul	$195-200 per engine flight hour
Engine LLP	$200-205 per engine cycle
Landing gear refurbishment	$200-205 per cycle
Wheels brakes and tyres	$565-570 per cycle
APU	$155-160 per APU hour
Component overhaul	$575-580 per flight hour

ATR42-600

SEATING/RANGE	
Max seating	50
Typical seating	48
Maximum range	800nm (1,480km)
TECHNICAL CHARACTERISTICS	
MTOW	18.6 tonnes
OEW	11.5 tonnes
MZFW	16.7 tonnes
Fuel capacity	5,700 litres
Engines	PW127M
Thrust	2,160 shp
FUELS AND TIMES	
Block fuel 100nm	340kg
Block fuel 200nm	560kg
Block fuel 500nm	1,210kg
Bock time 100nm	33 minutes
Block time 200nm	55 minutes
Block time 500nm	122 minutes
FLEET	
Entry into service	2012 (1996 for -500)
In service:	38 (274 all versions)
Operators (current and planned)	18
In storage	none
On order	21
Build peak year (2014)	7
Estimated production 2019	5
Average age (years)	3.7
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$35-40 per flight hour
Higher checks reserve	$25-30 per flight hour
Engine overhaul	$100-105 per engine flight hour
Engine LLP	$30-35 per engine cycle
Landing gear refurbishment	$20-25 per cycle
Wheels brakes and tyres	$35-40 per cycle
APU	$15-20 per propeller hour
Component overhaul	$115-120 per flight hour

ATR72-600

SEATING/RANGE	
Max seating	78
Typical seating	70
Maximum range	825nm (1,526km)
TECHNICAL CHARACTERISTICS	
MTOW	22.8 tonnes
OEW	14 tonnes
MZFW	20.8 tonnes
Fuel capacity	6,370 litres
Engines	PW127M
Thrust	2,475 shp
FUELS AND TIMES	
Block fuel 100nm	370kg
Block fuel 200nm	610kg
Block fuel 500nm	1,310kg
Bock time 100nm	36 minutes
Block time 200nm	58 minutes
Block time 500nm	125 minutes
FLEET	
Entry into service	2011 (1998 for -500)
In service:	348 (815 all versions)
Operators (current and planned)	88
In storage	4
On order	224
Build peak year (2015)	79
Estimated production 2019	95
Average age (years)	2.4
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$35-40 per flight hour
Higher checks reserve	$25-30 per flight hour
Engine overhaul	$100-105 per engine flight hour
Engine LLP	$30-35 per engine cycle
Landing gear refurbishment	$20-25 per cycle
Wheels brakes and tyres	$35-40 per cycle
APU	$15-20 per propeller hour
Component overhaul	$125-130 per flight hour

Boeing 737-800

SEATING/RANGE	
Max seating	189
Typical seating	162
Maximum range (with winglets)	3,115nm (5,767km)
TECHNICAL CHARACTERISTICS	
MTOW	79 tonnes
OEW	41.1 tonnes
MZFW	61.7 tonnes
Fuel capacity	26,020 litres/40,580 litres
Engines	CFM56-7B
Thrust	27,300lbs (121kN)
FUELS AND TIMES	
Block fuel 200nm	2,000kg
Block fuel 500nm	3,530kg
Block fuel 1,000nm	6,190kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	1998
In service:	4,839
Operators (current and planned)	207
In storage	27
On order	85
Build peak year (2016)	408
Estimated production 2019	40
Average age (years)	7.9
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$65-70 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$120-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$45-50 per cycle
Wheels brakes and tyres	$70-75 per cycle
APU	$80-85 per propeller hour
Component overhaul	$210-220 per flight hour

Boeing 737-900ER

SEATING/RANGE	
Max seating	215
Typical seating	180
Maximum range	3,200nm (5,924km)
TECHNICAL CHARACTERISTICS	
MTOW	85.1 tonnes
OEW	42.5 tonnes
MZFW	67.8 tonnes
Fuel capacity	29,660 litres
Engines	CFM56-7B
Thrust	27,300lbs (121kN)
FUELS AND TIMES	
Block fuel 200nm	2,080kg
Block fuel 500nm	3,660kg
Block fuel 1,000nm	6,420kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service	2001
In service:	470
Operators (current and planned)	25
In storage	4
On order	37
Build peak year (2015)	73
Estimated production 2019	21
Average age (years)	5.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$70-75 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$120-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$45-50 per cycle
Wheels brakes and tyres	$70-75 per cycle
APU	$80-85 per propeller hour
Component overhaul	$210-220 per flight hour

Boeing 737 Max 8

SEATING/RANGE	
Max seating	200
Typical seating	162-172
Maximum range	3,515nm (6,510km)
TECHNICAL CHARACTERISTICS	
MTOW	82.2 tonnes
OEW	45.1 tonnes
MZFW	65.9 tonnes
Fuel capacity	25,810 litres
Engines	Leap-1B
Thrust	26,780lbs (119kN)
FUELS AND TIMES	
Block fuel 200nm	1,720kg
Block fuel 500nm	3,040kg
Block fuel 1,000nm	5,320kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service (planned)	2017
In service:	230
Operators (current and planned)	93
In storage	none
On order	3,686 including Max 200
Build peak year (2018)	194
Estimated production 2019	200
Average age (years)	less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$65-70 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$120-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$45-50 per cycle
Wheels brakes and tyres	$70-75 per cycle
APU	$80-85 per propeller hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are estimates based on 737-800 model pending in-service feedback and confirmation of claimed savings.

Boeing 737 Max 9

SEATING/RANGE	
Max seating	220
Typical seating	178-193
Maximum range	3,215nm (5,960km)
TECHNICAL CHARACTERISTICS	
MTOW	88.3 tonnes
OEW	45.1 tonnes
MZFW	71.0 tonnes
Fuel capacity	25,810 litres
Engines	Leap-1B
Thrust	27,300 (121kN)
FUELS AND TIMES	
Block fuel 200nm	1,790kg
Block fuel 500nm	3,150kg
Block fuel 1,000nm	5,520kg
Bock time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	160 minutes
FLEET	
Entry into service (planned)	2018
In service:	11
Operators (current and planned)	15
In storage	none
On order	299
Build peak year	Not applicable
Estimated production 2019	45
Average age (years)	Less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$70-75 per flight hour
Higher checks reserve	$50-55 per flight hour
Engine overhaul	$20-125 per engine flight hour
Engine LLP	$125-130 per engine cycle
Landing gear refurbishment	$45-50 per cycle
Wheels brakes and tyres	$70-75 per cycle
APU	$80-85 per propeller hour
Component overhaul	$210-220 per flight hour

Maintenance reserves are estimates based on 737-900 model pending in-service feedback and confirmation of claimed savings.

Boeing 747-8I

SEATING/RANGE	
Max seating	605
Typical seating	467
Maximum range	8,000nm (14,815km)
TECHNICAL CHARACTERISTICS	
MTOW	447.7 tonnes
OEW	218 tonnes
MZFW	295 tonnes
Fuel capacity	238,610 litres
Engines	GEnx-2B67
Thrust	66,500lbs (374kN)
FUELS AND TIMES	
Block fuel 1,000nm	20,370kg
Block fuel 2,000nm	38,760kg
Block fuel 4,000nm	79,910kg
Bock time 1,000nm	146 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	501 minutes
FLEET	
Entry into service	2011
In service:	41 (plus 5 BBJs)
Operators (current and planned)	5
In storage	2
On order	1
Build peak year (2015)	11
Estimated production 2019	none
Average age (years)	4.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$155-160 per flight hour
Higher checks reserve	$115-120 per flight hour
Engine overhaul	$170-175 per engine flight hour
Engine LLP	$260-265 per engine cycle
Landing gear refurbishment	$160-165 per cycle
Wheels brakes and tyres	$750-755 per cycle
APU	$105-110 per APU hour
Component overhaul	$505-510 per flight hour

Boeing 747-8F

SEATING/RANGE	
Max Payload	137.7 tonnes
Maximum range	4,120nm (7,630km)
TECHNICAL CHARACTERISTICS	
MTOW	447.7 tonnes
OEW	197 tonnes
MZFW	329.8 tonnes
Fuel capacity	226,180 litres
Engines	GEnx-2B
Thrust	66,500 (296kN)
FUELS AND TIMES	
Block fuel 1,000nm	20,730kg
Block fuel 2,000nm	38,760kg
Block fuel 4,000nm	79,910kg
Bock time 1,000nm	146 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	501 minutes
FLEET	
Entry into service	2010
In service:	82
Operators (current and planned)	14
In storage	0
On order	21
Build peak year (2013)	20
Estimated production 2019	1
Average age (years)	4.7
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$155-160 per flight hour
Higher checks reserve	$115-120 per flight hour
Engine overhaul	$170-175 per engine flight hour
Engine LLP	$260-265 per engine cycle
Landing gear refurbishment	$160-165 per cycle
Wheels brakes and tyres	$750-755 per cycle
APU	$105-110 per APU hour
Component overhaul	$505-510 per flight hour

Boeing 777-300ER

SEATING/RANGE	
Max seating	550
Typical seating	365 (three class)
Maximum range	7,930nm (14,685km)
TECHNICAL CHARACTERISTICS	
MTOW	351.5 tonnes
OEW	168 tonnes
MZFW	238 tonnes
Fuel capacity	181,280 litres
Engines	GE90-115BL
Thrust	115,300lbs (504kN)
FUELS AND TIMES	
Block fuel 1,000nm	15,610kg
Block fuel 2,000nm	29,840kg
Block fuel 4,000nm	60,900kg
Bock time 1,000nm	152 minutes
Block time 2,000nm	277 minutes
Block time 4,000nm	525 minutes
FLEET	
Entry into service	2003
In service:	794
Operators (current and planned)	48
In storage	3
On order	37
Build peak year (2016)	89
Estimated production 2019	20
Average age (years)	6.5
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$125-130 per flight hour
Higher checks reserve	$90-95 per flight hour
Engine overhaul	$295-300 per engine flight hour
Engine LLP	$450-455 per engine cycle
Landing gear refurbishment	$160-165 per cycle
Wheels brakes and tyres	$480-485 per cycle
APU	$105-110 per APU hour
Component overhaul	$410-415 per flight hour

Boeing 787-8

SEATING/RANGE	
Max seating	350
Typical seating	242
Maximum range	7,650nm to 8,200nm (14,200km to 15,200km)
TECHNICAL CHARACTERISTICS	
MTOW	227.9 tonnes
OEW	110 tonnes
MZFW	172 tonnes
Fuel capacity	126,920 litres
Engines	GEnx/Trent 1000
Thrust	64,000lbs (280kN)
FUELS AND TIMES	
Block fuel 1,000nm	10,170kg
Block fuel 2,000nm	18,970kg
Block fuel 4,000nm	36,540kg
Bock time 1,000nm	178 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	510 minutes
FLEET	
Entry into service	2011
In service:	355
Operators (current and planned)	54
In storage	3
On order	87
Build peak year (2014)	104
Estimated production 2019	20
Average age (years)	3.3
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$110-115 per flight hour
Higher checks reserve	$80-85 per flight hour
Engine overhaul	$300-310 per engine flight hour
Engine LLP	$305-310 per engine cycle
Landing gear refurbishment	$75-80 per cycle
Wheels brakes and tyres	$100-105 per cycle
APU	$105-110 per APU hour
Component overhaul	$315-320 per flight hour

Boeing 787-9

SEATING/RANGE	
Max seating	408
Typical seating	280 (two class)
Maximum range	8,300nm (14,370km)
TECHNICAL CHARACTERISTICS	
MTOW	252.7 tonnes
OEW	120 tonnes
MZFW	181 tonnes
Fuel capacity	138,700 litres
Engines	GEnx1B/Trent 1000
Thrust	71,000lbs (320kN)
FUELS AND TIMES	
Block fuel 1,000nm	10,480kg
Block fuel 2,000nm	19,500kg
Block fuel 4,000nm	37,630kg
Bock time 1,000nm	178 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	510 minutes
FLEET	
Entry into service	2014
In service:	387
Operators (current and planned)	63
In storage	4
On order	401
Build peak year (2017)	110
Estimated production 2019	125
Average age (years)	1.8
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$110-115 per flight hour
Higher checks reserve	$85-90 per flight hour
Engine overhaul	$310-315 per engine flight hour
Engine LLP	$320-325 per engine cycle
Landing gear refurbishment	$75-80 per cycle
Wheels brakes and tyres	$100-105 per cycle
APU	$125-130 per APU hour
Component overhaul	$320-325 per flight hour

Boeing 787-10

SEATING/RANGE	
Max seating	440
Typical seating	330
Maximum range	6,430nm (11,9100km)
TECHNICAL CHARACTERISTICS	
MTOW	254.0 tonnes
OEW	130.0 tonnes
MZFW	192.7 tonnes
Fuel capacity	126,370 litres
Engines	GEnx-1B/Trent 1000
Thrust	76,000 (340kN)
FUELS AND TIMES	
Block fuel 1,000nm	11,310kg
Block fuel 2,000nm	21,080kg
Block fuel 4,000nm	40,620kg
Bock time 1,000nm	146 minutes
Block time 2,000nm	265 minutes
Block time 4,000nm	501 minutes
FLEET	
Entry into service (planned)	2018
In service:	8
Operators (current and planned)	10
In storage	2
On order	152
Build peak year	Not applicable
Estimated production 2019	50
Average age (years)	Less than one
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$120-125 per flight hour
Higher checks reserve	$90-95per flight hour
Engine overhaul	$315-320 per engine flight hour
Engine LLP	$320-325 per engine cycle
Landing gear refurbishment	$75-80 per cycle
Wheels brakes and tyres	$105-110 per cycle
APU	$125-130 per APU hour
Component overhaul	$330-335 per flight hour

Bombardier CRJ700

SEATING/RANGE	
Max seating	78
Typical seating	70
Maximum range	1,220nm (2,260km)
TECHNICAL CHARACTERISTICS	
MTOW	33 tonnes
OEW	20.1 tonnes
MZFW	28.3 tonnes
Fuel capacity	10,990 litres
Engines	CF34-8C5B1
Thrust	12,670lbs (56kN)
FUELS AND TIMES	
Block fuel 200nm	1,150kg
Block fuel 500nm	1,950kg
Block time 200nm	45 minutes
Bock time 500nm	88 minutes
FLEET	
Entry into service	2001
In service:	315
Operators (current and planned)	3
In storage	16
On order	8
Build peak year (2005)	68
Estimated production 2019	5
Average age (years)	13.0
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$105-110 per engine cycle
Landing gear refurbishment	$30-35 per cycle
Wheels brakes and tyres	$45-50 per cycle
APU	$55-60 per APU hour
Component overhaul	$150-160 per flight hour

Bombardier CRJ900

SEATING/RANGE	
Max seating	90
Typical seating	88
Maximum range	1,040nm (1,940km)
TECHNICAL CHARACTERISTICS	
MTOW	36.5 tonnes
OEW	21.8 tonnes
MZFW	31.8 tonnes
Fuel capacity	10,990 litres
Engines	CF34-8C5
Thrust	13,360lbs (59kN)
FUELS AND TIMES	
Block fuel 200nm	1,240kg
Block fuel 500nm	2,100kg
Block time 200nm	45 minutes
Bock time 500nm	88 minutes
FLEET	
Entry into service	2003
In service:	438
Operators (current and planned)	27
In storage	9
On order	69
Build peak year (2008)	59
Estimated production 2019	30
Average age (years)	7.9
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$50-55 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$105-110 per engine cycle
Landing gear refurbishment	$30-35 per cycle
Wheels brakes and tyres	$50-55 per cycle
APU	$60-65 per APU hour
Component overhaul	$160-165 per flight hour

Bombardier CRJ1000

SEATING/RANGE	
Max seating	104
Typical seating	100
Maximum range	1,425nm (2,640km)
TECHNICAL CHARACTERISTICS	
MTOW	40.8 tonnes
OEW	23.2 tonnes
MZFW	35.2 tonnes
Fuel capacity	10,990 litres
Engines	CF34-8C5A1
Thrust	13,3600lbs (59kN)
FUELS AND TIMES	
Block fuel 200nm	1,320kg
Block fuel 500nm	2,200kg
Block time 200nm	45 minutes
Bock time 500nm	88 minutes
FLEET	
Entry into service	2011
In service:	62
Operators (current and planned)	8
In storage	2
On order	5
Build peak year (2011)	17
Estimated production 2019	5
Average age (years)	5.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$50-55 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$105-110 per engine cycle
Landing gear refurbishment	$30-35 per cycle
Wheels brakes and tyres	$50-55 per cycle
APU	$60-65 per APU hour
Component overhaul	$160-165 per flight hour

Bombardier Q400

SEATING/RANGE	
Max seating	90
Typical seating	74
Maximum range	1,010nm (1,870km)
TECHNICAL CHARACTERISTICS	
MTOW	29.5 tonnes
OEW	17.8 tonnes
MZFW	26.3 tonnes
Fuel capacity	6,700 litres
Engines	PW150A
Thrust	5,070shp
FUELS AND TIMES	
Block fuel 100nm	525kg
Block fuel 200nm	855kg
Block fuel 500nm	1,860kg
Bock time 100nm	35 minutes
Block time 200nm	55 minutes
Block time 500nm	108 minutes
FLEET	
Entry into service	1999
In service:	519
Operators (current and planned)	64
In storage	34
On order	68
Build peak year (2007)	42
Estimated production 2019	24
Average age (years)	8.4
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$34-35 per flight hour
Engine overhaul	$150-155 per engine flight hour
Engine LLP	$45-50 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$45-50 per cycle
APU	$55-60 per propeller hour
Propeller	$15-20 per flight hour
Component overhaul	$145-150 per propeller hour

Embraer E175

SEATING/RANGE	
Max seating	88
Typical seating	78
Maximum range	2,000nm (3,706km)
TECHNICAL CHARACTERISTICS	
MTOW	37.5 tonnes
OEW	21.62 tonnes
MZFW	31.7 tonnes
Fuel capacity	11,670 litres
Engines	CF34-8E
Thrust	13,800lbs
FUELS AND TIMES	
Block fuel 200nm	1,180kg
Block fuel 500nm	2,390kg
Block time 200nm	45 minutes
Bock time 500nm	81 minutes
FLEET	
Entry into service	2005
In service:	554
Operators (current and planned)	24
In storage	2
On order	103
Build peak year (2016)	84
Estimated production 2019	40
Average age (years)	5.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$105-110 per engine cycle
Landing gear refurbishment	$30-35 per cycle
Wheels brakes and tyres	$50-55 per cycle
APU	$55-60 per APU hour
Component overhaul	$150-160 per flight hour

Embraer E190

SEATING/RANGE	
Max seating	114
Typical seating	98
Maximum range	2,400nm (4,448km)
TECHNICAL CHARACTERISTICS	
MTOW	47.8 tonnes
OEW	27.72 tonnes
MZFW	40.8 tonnes
Fuel capacity	16,210 litres
Engines	CF34-10E
Thrust	18,500lbs
FUELS AND TIMES	
Block fuel 200nm	1,340kg
Block fuel 500nm	2,710kg
Block time 200nm	46 minutes
Bock time 500nm	83 minutes
FLEET	
Entry into service	2005
In service:	533
Operators (current and planned)	66
In storage	31
On order	10
Build peak year (2011)	71
Estimated production 2019	10
Average age (years)	8.1
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$95-100 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$55-60 per cycle
APU	$70-75 per APU hour
Component overhaul	$180-185 per flight hour

Embraer E190-E2

SEATING/RANGE	
Max seating	114
Typical seating	106
Maximum range	2,850nm (5,280km)
TECHNICAL CHARACTERISTICS	
MTOW	61.5 tonnes
OEW	Data not available
MZFW	Data not available
Fuel capacity	16,500 litres
Engines	Pratt & Whitney PW1919
Thrust	19,000lbs (85kN)
FUELS AND TIMES	
Block fuel 200nm	1,140kg
Block fuel 500nm	2,300kg
Block time 200nm	46 minutes
Bock time 500nm	83 minutes
FLEET	
Entry into service	2018
In service:	3
Operators (current and planned)	7
In storage	none
On order	59
Build peak year (2019)	Not applicable
Estimated production 2018	17
Average age (years)	Not applicable
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	No data
Engine LLP	No data
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$55-60 per cycle
APU	$70-75 per APU hour
Component overhaul	$18-185 per flight hour

Maintenance reserves are estimates based on E190 model pending in-service feedback and confirmation of claimed savings.

Embraer E195

SEATING/RANGE	
Max seating	122
Typical seating	108
Maximum range	2,200nm (4,077km)
TECHNICAL CHARACTERISTICS	
MTOW	48.79 tonnes
OEW	28.85 tonnes
MZFW	42.5 tonnes
Fuel capacity	16,210 litres
Engines	CF34-10E
Thrust	18,500lbs
FUELS AND TIMES	
Block fuel 200nm	1,420kg
Block fuel 500nm	2,870kg
Block time 200nm	47 minutes
Bock time 500nm	85 minutes
FLEET	
Entry into service	2006
In service:	154
Operators (current and planned)	24
In storage	5
On order	5
Build peak year (2011)	
Estimated production 2019	5
Average age (years)	6.9
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40 per flight hour
Engine overhaul	$75-80 per engine flight hour
Engine LLP	$95-100 per engine cycle
Landing gear refurbishment	$35-40 per cycle
Wheels brakes and tyres	$55-60 per cycle
APU	$70-75 per APU hour
Component overhaul	$180-185 per flight hour

Embraer E195-E2

SEATING/RANGE	
Max seating	146
Typical seating	132
Typical range	2,600nm (4,800km)
TECHNICAL CHARACTERISTICS	
MTOW	61.5 tonnes
OEW	Data not available
MZFW	Data not available
Estimated fuel capacity	16,5000 litres
Engines	Pratt & Whitney PW1919
Thrust	19,000lbs (85kN)
FUELS AND TIMES	
Block fuel 200nm	1,140kg
Block fuel 500nm	2,300kg
Bock time 200nm	46 minutes
Block time 500nm	83 minutes
FLEET	
Entry into service (planned)	2019
In service	0
Operators (current and planned)	5
In storage	none
On order	73
Built peak year	Not applicable
Estimated production 2019	20
Average age	Not applicable
INDICATIVE MAINTENANCE RESERVES	
C-check reserve	$45-50 per flight hour
Higher checks reserve	$35-40/flight hour
Engine overhaul	No data
Engine LLP	No data
Landing gear refurbishment	$35-40/cycle
Wheels, brakes and tyres	$55-60/cycle
APU	$70-75/APU hour
Component overhaul	$18-185/flight hour

Maintenance reserves are estimates based on E195 model pending in-service feedback and confirmation of claimed savings.

Sukhoi SSJ100

SEATING/RANGE	
Max seating	108
Typical seating	98
Maximum range (basic version)	1,645nm (3,048km)
Maximum range (LR version)	2,470nm (4,578km)
TECHNICAL CHARACTERISTICS	
MTOW (basic version)	45.8 tonnes
MTOW (LR version)	48.5 tonnes
OEW (basic version)	24.3 tonnes
OEW (LR version)	25.1 tonnes
MZFW (basic version)	36.6 tonnes
MZFW (LR version)	37.4 tonnes
Fuel capacity	13,135 litres
Engines	PowerJet SaM146-1S17/8
Thrust	17,800lbs with automatic power reserve
FUELS AND TIMES	
Block fuel 200nm	1,150kg
Block fuel 500nm	2,340kg
Block time 200nm	46 minutes
Bock time 500nm	83 minutes
FLEET	
Entry into service	2011
In service:	129
Operators (current and planned)	32
In storage	25
On order	140
Build peak year (2017)	26
Estimated production 2019	30
Average age (years)	3.7
INDICATIVE MAINTENANCE RESERVES	
Insufficient data available	

New aircraft market values ($ million)

Model	Avitas view	CV view	IBA view	ICF view	MBA view	Oriel view	Average
Airbus							
A220-100	31.5	29.3	35.3	31.9	34.0	36.9	**33.2**
A220-300	36.6	35.2	39.3	34.6	38.3	43.0	**37.8**
A319	36.5	36.1	35.2	33.6	36.0	28.4	**34.3**
A319neo	-	-	-	-	37.2	-	**37.2**
A320	44.1	42.6	44.2	40.8	45.2	45.0	**43.7**
A320neo	50.4	51.2	50.0	47.9	49.6	47.0	**49.3**
A321	51.4	50.7	52.5	48.7	54.3	53.0	**51.8**
A321neo	56.4	58.2	58.0	53.7	57.7	58.5	**57.1**
A330-200	88.7	87.4	82.7	79.3	94.3	83.0	**85.9**
A330-200 Freighter	-	-	-	-	94.4	-	**94.4**
A330-300	100.8	95.6	96.0	93.3	104.4	99.0	**98.2**
A330 900 (neo)	-	-	-	-	110.4	-	**110.4**
A350-900	153.1	156.0	152.1	136.7	150.6	148.0	**149.4**
A350-1000	-	-	-	-	169.0		**169.0**
A380	217.6	245.7	231.0	196.1	232.0	193.0	**219.2**
Boeing							
737-800	46.3	45.0	47.9	44.4	48.0	46.0	**46.3**
737-900ER	50.6	45.6	49.9	46.9	52.0	46.8	**48.6**
737 Max 8	52.4	52.3	52.1	49.2	51.5	50.3	**51.3**
737 Max 9	-	-	-	-	52.5	-	**52.5**
747-8I	159.9	150.1	164.5	160.7	-	143.0	**155.6**
747-8F	187.7	180.2	173.9	170.7	193.2	192.0	**183.0**
777-300ER	158.2	155.4	159.5	148.1	161.3	141.0	**153.9**
787-8	120.0	118.6	122.8	113.1	122.3	114.0	**118.5**
787-9	148.1	148.5	143.6	136.6	144.8	140.0	**143.6**
787-10	-	-	-	-	150.5	-	**150.5**
ATR							
ATR42-600	16.0	16.5	16.6	14.3	15.7	18.0	**16.2**
ATR72-600	20.7	20.4	21.0	19.4	20.5	19.3	**20.2**
Bombardier							
CRJ700	25.9	24.5	24.5	21.1	25.9	22.7	**24.1**
CRJ900	28.4	25.6	24.8	24.5	28.6	25.4	**26.2**
CRJ1000	30.5	25.8	28.3	27.2	29.0	28.2	**28.2**
Q400	23.0	21.5	20.0	18.5	21.6	19.6	**20.7**
Embraer							
E175	29.3	29.4	27.7	26.8	30.4	27.5	**28.5**
E190	33.5	34.3	32.3	30.1	32.7	29.8	**32.1**
E190-E2	-	-	-	-	34.1	34.9	**34.5**
E195	35.8	34.7	34.2	33.1	34.5	31.0	**33.9**
Sukhoi							
SSJ100	24.9	26.1	25.1	23.2	21.8	18.6	**23.3**

New aircraft lease rates ($'000s per month)

Model	Avitas view	CV view	IBA view	ICF view	MBA view	Oriel view	Range
Airbus							
A220-100	240-260	235	260	204	239-262	280	**204-280**
A220-300	280-300	280	290	284	276-303	305	**276-305**
A319	260-280	270	265	242.3	257-283	230	**230-283**
A319neo	-	-	-	-	266-293	-	**266-293**
A320	295-315	320	300	323.5	322-353	335	**295-353**
A320neo	350-370	350	340	356.9	349-383	350	**340-383**
A321	350-370	375	360	392.8	386-424	390	**350-424**
A321neo	380-400	420	390	442.1	404-444	430	**380-444**
A330-200	700-740	670	640	686.1	684-745	700	**640-745**
A330-200 Freighter	-	-	-	-	657-715	-	**657-715**
A330-300	730-770	785	690	768.5	765-833	760	**690-833**
A330 900 (neo)	-	-	-	-	801-872	-	**801-872**
A350-900	1,050-1,150	1,100	1,080	1,096	1,098-1,195	1,075	**1,050-1,195**
A350-1000	-	-	-	-	1,233-1,342	-	**1,233-1,342**
A380	1,620-1,720	1,950	1,950	1,503	1,692-1,842	1,695	**1,503-1,842**
Boeing							
737-800	310-330	345	320	361	331-364	340	**310-364**
737-900ER	330-350	365	330	374	358-394	355	**330-394**
737 Max 8	360-380	365	350	395	358-394	350	**350-395**
737 Max 9	-	-	-	-	368-404	-	**368-404**
747-8I	1,064-1,264	1,050	1,200	990	-	1,075	**990-1,264**
747-8F	1,370-1,570	1,350	1,280	1,178	1,341-1,460	1,550	**1,178-1,570**
777-300ER	1,100-1,300	1,200	1,254	1,178	1,134-1,234	1,050	**1,050-1,300**
787-8	815-915	875	930	925	855-931	845	**815-931**
787-9	1,000-1,200	1,100	1,090	1,066	1,017-1,107	950	**950-1,200**
787-10	-	-	-	-	1,053-1,146	-	**1,053-1,146**
ATR							
ATR42-600	120-130	138	153	117	119-131	145	**117-153**
ATR72-600	175-185	180	178	144	156-172	155	**144-185**
Bombardier							
CRJ700	165-185	220	175	153	184-202	200	**153-220**
CRJ900	195-215	235	193	170	202-222	225	**170-235**
CRJ1000	220-240	235	213	182	202-222	255	**182-255**
Q400	180-200	195	180	140	165-181	170	**165-200**
Embraer							
E175	205-225	240	218	230	211-232	235	**205-240**
E190	245-265	275	244	260	230-252	240	**230-275**
E190-E2	-	-	-	-	239-263	255	**239-263**
E195	245-265	280	253	211	248-273	245	**211-280**
Sukhoi							
SSJ100	185-205	190	190	165	153-166	165	**153-205**

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