

A320 family fleet analysis

The A320 family fleet is dominated by the A320 and A319, which account for 85% of all aircraft sold. The fleet is split 50:50 by CFMI & IAE.

The A320 family is the single most successful commercial jetliner. Orders for the four variants had reached 4,283 by the end of 2005 since the first order was placed in 1983. The 737NG is closest to this, with 2,967 orders since 1992.

The A320's success can partly be attributed to its fly-by-wire (FBW) flight control system, wide seats and cabin comfort, operating efficiency, family concept and commonality, and four models that offer between 107 and 185 seats. The A320 family replaced a large number of BAC 1-11s, Caravelles, F.28s and Tu-134s/-154s, but also managed to win large orders from long-time Boeing and McDonnell Douglas customers.

More than 2,600 aircraft have already been delivered, and the current backlog exceeds 1,650 units. The A320 family's most successful year was 2005, when 918 orders were won. To keep up with demand, Airbus has had to increase its production level several times, and is now increasing it to 32 units per month, equal to 384 per year. This is in contrast to annual production rates of 60 to 200 aircraft up to the end of the 1990s.

The A320 family market is divided between those powered by CFM56-5A or -5B engines and V.2500-A1 or -A5 engines. A third engine, the PW6000 series, is the alternative to the CFM56 on the A318.

The CFM56 powered the first aircraft, and was already established on the 737 and DC-8. These factors helped it win the majority of orders, although its share has declined in recent years. The CFM56 has been chosen to power 2,111 of the A320 family aircraft ordered so far. The V.2500 has been selected for 1,725 aircraft, and the PW6000 for 30. Engine selections are outstanding for about 380 aircraft ordered in late 2005.

A320

The A320 was the first aircraft to be launched, with Air France signing a letter of intent for 25 aircraft in 1981. It is the most successful variant with a total of 2,428 firm orders at the end of 2005 (see table, page 10). The A320 actually achieved its highest annual sales in 2005, with 568 firm orders. The A320 is itself one of the most successful aircraft types. Its firm orders to date exceed those of the 727-100/-200, 737-300/-400/-500 and 737-800. Moreover, the A320 will probably continue to sell well for another eight to 10 years before a successor is launched.

The A320's largest customers include Air Asia (60), Air Berlin (60), Air Canada (52), Air Deccan (62), Air France (67), America West (57), CASC (100), China Eastern (63), Iberia (66), IndiGo (70), jetBlue (173), Northwest Airlines (80), TACA (45), TAM (41), and United Airlines (117). The aircraft is also popular with lessors: AERCAP (ex-Debis AirFinance) has ordered a total of 61; and other large portfolios are held by CIT Leasing (53), GECAS/GPA (158) and ILFC (198).

The A320 market is split almost equally between the CFM56 and V.2500.

Of the 1,152 aircraft ordered with CFM56s, 386 are powered by CFM56-5A1 and -5A3 engines (see *A320 family specifications, page 6*) and the other 766 aircraft by the CFM56-5B4 (see table, page 10).

The major operators of -5A1-powered aircraft are Air Canada (45), Air France (55), All Nippon Airways (38), Iberia (22), Lufthansa (36) and Northwest (33). The largest -5A3 fleets are operated by Condor Berlin (12), Gulf Air (10) and Northwest (45).

More than 310 -5B4-powered A320s are operated by a large number of carriers that include Aer Lingus, Air Berlin, Air Canada, Air China, Air France, Alitalia, Austrian Airlines, Finnair, Philippine Airlines, Swiss, TAP and USAirways. The largest fleets are operated by China Eastern (54) and Iberia (37).

A further 380 -5B4-powered aircraft are on order from IndiGo Aviation (70), Air One (30), Air Berlin (57), Air Asia (57) and GECAS (32). Other outstanding orders have been placed by Air Cairo, Cebu Pacific Air, China Southern, CSA Czech Airlines, Iberia, ILFC, Jazeera Airways, USAirways and Virgin America.

The V.2500 has been chosen for 1,071 A320s to date, split between the V.2500-A1 for 139 aircraft and the V.2527-A5 for 932.

Major -A1 operators include America West (24), Indian Airlines (47) and Mexicana (32). The largest V.2527-A5 fleets are with America West (38), British Airways (17), China Southern (24), jetBlue (82), Jetstar (20), TAM (28) and United (97). Other operators include Dragonair, British Midland Airways, Air New Zealand, Air Deccan, Kingfisher,



The V.2527-A5 has gained share of the A320 market in recent years, and the V.2530/33-A5 now have a larger share of the A321 market than their CFM56-5B series rivals.

A320 FAMILY SALES & ENGINE SELECTION AT DECEMBER 2005

Aircraft type	A318	A319	A320	A321	Total
Engine type					
CFM56-5B8/P	59				59
CFM56-5B7/P		31			31
CFM56-5B6/P		164			164
CFM56-5B6/2		3			3
CFM56-5B6/2P		32			32
CFM56-5B5/P		295			295
CFM56-5B4/2P			28		28
CFM56-5B4/2			26		26
CFM56-5B4/P			560		560
CFM56-5B4			22		22
CFM56-5B3/2P				20	20
CFM56-5B3/P				137	137
CFM56-5B3				10	10
CFM56-5B2/P				9	9
CFM56-5B2				14	14
CFM56-5B1/2P				5	5
CFM56-5B1/2				6	6
CFM56-5B1/P				2	2
CFM56-5B1				5	5
CFM56-5A5		138			138
CFM56-5A4		9			9
CFM56-5A3			114		114
CFM56-5A1			272		272
Recent orders		28	130	30	188
Total CFM56	59	692	1,122	238	2,111
V.2533-A5				175	175
V.2530-A5				54	54
V.2527M-A5		6			6
V.2527E-A5			78		78
V.2527-A5			744		744
V.2524-A5		225			225
V.2522-A5		148			148
V.2500-A1			139		139
Recent orders		16	110	30	156
Total V.2500	0	395	1,071	259	1,725
PW6124	30				30
Undecided	8	144	205	22	379
Total	97	1,239	2,428	519	4,283

Qatar Airways, Sichuan Airlines, Spanair, Syrianair and Tiger Airways.

The V.2527E-A5 has been specified by a small number of carriers, including Lan Airlines, TACA and TAME Ecuador.

More than 400 A320s, with V.2527-A5s specified, have been ordered by Air Deccan (30), jetBlue (97), Kingfisher (37), South African Airways (15), TAM (20), THY (17) and United Airlines (19). Other

smaller fleets are on order for Asiana, British Airways, Mexicana, Qantas, Sichuan Airlines, Silkair, Tiger Airways and Wizz Air.

A321

The A321 was the second aircraft in the family to be launched, and has won 519 firm orders since winning its first firm sale from ILFC and Egyptair in 1989. More than 100 firm orders were won in 2005. The A321's biggest customers are Air France (13), Alitalia (23), Asiana Airlines (13), CASC (30), China Eastern (15), Iberia (19), IndiGo (30), ILFC (80), Lufthansa (26) and USAirways (41).

Like the A320, the A321 market is split between the CFM56 and V.2500, with the V.2500 being selected for 259 aircraft and the CFM56 powering 238. Engines have yet to be selected for 22 aircraft on order.

There are 54 A321s in service with V.2530-A5 engines, operated by Air Macau, ANA, Asiana, Lufthansa, Onur Air, SAS and TransAsia. Another 115 aircraft are in operation with V.2533-A5 engines. Operators include Asiana, BA, British Midland Airways, China Southern, and Lufthansa.

There are 171 A321s in operation with CFM56-5Bs, and 18 aircraft with -5B1s, which are operated by Air France, Austrian Airlines, Swiss and THY. Alitalia operates 23 -5B2-powered aircraft. There are 130 -5B3-powered aircraft in service with Air Canada, Air France, China Eastern, Iberia, US Airways, and Finnair.

A further 179 A321s are on order, including 67 powered by the CFM56-5B for China Eastern, Iberia, IndiGo Aviation, and USAirways. V.2533-A5s have been selected for another 90 aircraft on order with Kingfisher, TACA, TAM and THY. Engines have not yet been selected for 22 other aircraft on order with AerCap and ILFC.

A319

The A319 is the second most successful variant, with firm orders for 1,239 since its launch order in late 1992. This sales volume compares to 1,260 and 1,113 achieved by the 727-200 and 737-300, as well as 1,173 sold to date by the similarly-sized 737-700.

The A319's largest orders have been placed by AERCAP (35), Air Canada (48), Air France (44), America West (38), British Airways (36), CIT Leasing (37), easyJet (140), Frontier (42), GECAS (75), ILFC (150), Lufthansa (20), Northwest Airlines (82), TAM (18), United Airlines (78), and USAirways (66).

The CFM56 has been selected for 700 aircraft and the V.2500 for 395.

While CFMI offers several variants of the CFM56-5A and -5B across the A320 family, a few engines dominate each family member. The -5B5 and -5B6 dominate the A319 fleet, the -5B4 and -5A1 dominate the A320 fleet, and the -5B3 dominates the A321 fleet.

The CFM56 is divided between the -5A4/-5A5 models and the -5B5, -5B6 and -5B7 variants.

Only nine aircraft are operated by Air France with the -5A4, while 131 are in service with the -5A5. The largest fleets are with Air Canada (35), Lufthansa (16) and Northwest (73). German Wings and Tunis Air also operate smaller fleets.

The -5B5 is in operation with 161 aircraft for: Air France (31), easyJet (58), Frontier (32), TAP Air Portugal (16), and other smaller fleets operated by Air China and Iberia.

The -5B6 powers 188 aircraft in service, with the largest fleets being operated by Air Canada (13), Alitalia (12), China Eastern (10), Frontier (10), German Wings (15), Mexicana (12) and USAirways (47). Other smaller fleets are operated by Austrian Airlines, China Southern, Croatian Airlines, Swiss and SN Brussels.

A smaller fleet of 21 aircraft are in service with the -5B7, mainly for Air China and Air France.

A total of 492 A319s are on order. The CFM56 has been selected for 190 of these, with the -5B5 being chosen for 134 aircraft. Customers include easyJet (80), Frontier (11), GECAS (27), Iberia (7) and ILFC (6). The -5B6 has been selected for 11 aircraft for Shenzen and CSA Czech, while the -5B7 has been chosen for 10 aircraft. Northwest has ordered five -5A5-powered A319s.

The V.2522/24-A5 has been chosen for 158 aircraft on order. The V.2522-A5 has 36 orders, including 23 aircraft for United. The V.2524-A5 has 113 orders, including America West, Kingfisher, German Wings, TAM, LAN Airlines, Spirit Airlines and Volaris.

Engine selections have yet to be made for 144 A319s on order. These include aircraft for CASC and AerCap.

A318

The smallest variant, the 107-seat A318, has won 97 firm orders since receiving its first order in 1999. Although its sales performance is disappointing compared to that of the other three variants, it nevertheless exceeds that of its closest competitor, the 737-600.

The A318's customers include 60 CFM56-5B8-powered aircraft for: Air France (18), Comlux Aviation (3), Frontier (5), Iberia (10), ILFC (10)



Mexicana (10), and Tarom (4).

Another 30 PW6124-powered aircraft have been ordered by America West (15) and LAN Airlines (15).

National Air Service has yet to select engines for the five aircraft it has ordered.

Common fleets

The main appeal of the A320 is the family concept, which allows a single type rating for all four variants, the common use of components, and the possibility to share the same engine between two, three or four variants.

The A320 family is operated by more than 180 different airlines, the majority of which take advantage of the family concept and operate two or three variants. The main benefits of the A320 family's commonality features are the cross-crew qualification (CCQ) and single type rating allowed by its FBW flight control system, and possible use of a common engine between two, three or even all four types. Use of the common engine across all four types is only possible with the CFM56-5B series engine. The V.2500-A5 can be used across the A319/320/321, while the CFM56-5A is restricted to the A319 and A320.

Common engine use gives airlines the ability to operate the engine initially at a high thrust rating on the A321 or A320. The engine is then de-rated when most of its exhaust gas temperature (EGT) margin

is used. This process gives the engine more EGT margin, which can be used while operating on-wing with a smaller type, either the A320 or A319. Overall, this process extends the total time on-wing between shop visits. A common engine type also contributes to lower costs related to engine inventory.

Many large operators have taken advantage of these commonality benefits by ordering two or more A320 family variants, and selecting a common engine type for them.

Airlines operating aircraft with -5A1 and -5A3 engines include Air Canada, Air France, German Wings, Northwest Airlines, and Tunis Air.

Air France and Iberia use the CFM56-5B across all four variants. Airlines that use the -5B series across two or three variants include Aer Lingus, Aeroflot, Air Canada, Air China, Alitalia, Austrian Airlines, China Eastern, CSA Czech, Finnair, Swiss, TAP and USAirways.

The V.2500-A1 only powers lower gross weight variants of the A320-200, but the V.2500-A5 is used on two or three family variants by several airlines. Airlines that have the A319, A320 and A321 include British Airways, British Midland, China Southern, Sichuan Airlines and TACA. Airlines with two family variants include Air Macau, America West, Dragonair, Kingfisher, Qatar Airways, Spirit Airlines, South African Airways, United Airlines and Wizz Air. [AC](#)