

Also being tested is a noise reduction programme for the -5A/5B aimed at bringing the engines into full compliance with likely Chapter 4 standards. The package includes the chevron nozzles developed in the Tech56 programme, additional noise treatment in the fan duct lining and modifications to the outlet guide vanes behind the fan. The programme, being developed with Airbus, is scheduled to move to full-up engine tests later this year, with the full kit to be available in 2003 for retrofit and new-build engines.

EADS EFW has undertaken a feasibility study into A320 family cargo modifications and expects to launch the programme by 2004. The aircraft will feature a 3m x 2.15m forward cargo door, with the A320 freighter able to hold 11 standard pallets and carry a 20t payload, while the larger A321 will accommodate 14 pallets. EFW forecasts strong demand for freighter conversions of A321s, which could start in 2008. EFW says that final pricing is "quite a long way off" but \$7 million is its initial estimate.

BAE Systems is also considering entering the A320 conversion market, but sees 2005 or 2006 as a more likely estimate of when A320 conversions are likely to be viable.

Thales (formerly Thomson-CSF) is sole supplier of flat-panel LCDs for all production fly-by-wire Airbus types. This will become standard fit starting with the A318, and will also be available for retrofit to the in-service A320 family.

Production

Final assembly of the Airbus narrowbodies is undertaken at two sites – Airbus France builds the A320 at Toulouse; Airbus Deutschland has responsibility for the A318, A319 and A321 at its Hamburg plant. In 2000, 241 A320 family aircraft – 101 A320s and 140 A319/A321s – were delivered.

The single-aisle production rate is steadily increasing to a target of 30 a month between the two assembly lines by the end of next year. Further increases are possible, but it will be sub-assembly production rate, rather than final assembly line capacity, which will dictate the ultimate output level.

As part of the agreement for Airbus Deutschland to build the A318, any A319 production overspill will be transferred from Hamburg to Toulouse as an offset. It emerged earlier this year that Airbus Deutschland is set to take over final assembly of the A320 from its French partner at a yet to be determined point in the future, which will see production move from Toulouse to Hamburg. The deal, which is officially denied by Airbus, was struck as part of last year's agreement to allow final assembly of the 550-seat A380 to be undertaken by Airbus France in Toulouse rather than in Hamburg.

Ordered: 2,788 (136 A318s, 712 A319s, 1,539 A320s, 401 A321s)
Delivered: 1,536 (367 A319s, 962 A320s, 207 A321s)

A330

Airbus launched the A330 twinjet and four-engined A340 in June 1987 as a single, two-pronged aircraft programme, marking the company's entry into the medium-/long-haul market.

Two sizes of A330 are offered: the baseline 335-

seat (two-class) A330-300 which was the first production variant, and the shorter fuselage, 253-seat (three-class) -200. All A330 versions are offered with all of the major engine manufacturers' powerplants, including the GE CF6-80E1, P&W PW4164/4168 and R-R Trent 772.

The -300 was the first version to be developed, making its maiden flight in November 1992 and entering service in January 1994. The first A330-200 was flown in August 1997, entering service in April 1998. It is 10 frames (5.33m) shorter than the -300, has increased weights (through the use of the strengthened wing of the high-gross-weight A340-300) and extra fuel capacity. It is designed to operate 12,000km missions.

An even shorter 222-seat (three-class) A330-500 had been proposed last year as a potential new-generation replacement for the A300/A310 family, but this project is now on the back burner after Airbus failed to attract any launch customers. The aircraft would have been nine fuselage frames shorter than the A330-200 and could have entered service in early 2004.

Potential A330-500 launch customers had included Lufthansa, Hapag-Lloyd and Singapore Airlines, and leasing companies CIT and ILFC had expressed interest in the aircraft. Despite the lessors' initial interest, however, potential airline customers who need an A300/A310 replacement were apparently unimpressed by the long-range A330-500, and favoured a more refined design optimised for shorter-range missions. This lack of demand by airlines caused the leasing companies' interest to wane.

A new long-range variant of the A330-300 is also being studied to provide a direct rival to lower weight Boeing 777 models. Dubbed the A330-300 "high-gross-weight" (HGW), the model would have a 7t increase in MTOW to 240t, associated structural strengthening of the wing, increased fuel capacity (to 139,000litres), and more powerful engines. These changes will boost the range of the 295-seater to around 11,100km.

Airbus is understood to be considering the GE/P&W Engine Alliance GP7000 as a potential powerplant for the proposed model.

Earlier this year, Airbus announced plans for a cargo version of the A330-200, which is due to enter service by mid-2004. Using A300-600 equipment, such as the cargo door and handling system, the 60t payload freighter would have a range of around 8,325km, making it a suitable replacement for the McDonnell Douglas DC-10F.

ILFC's recent deal for 111 aircraft across the entire Airbus range included 21 A330s and the lessor has the right to take the -200 freighter version if it is launched. ILFC is working with Airbus to define the freighter, with the aim of agreeing the definition by the end of the year.

Production

Airbus France (formerly Aerospatiale Matra) performs final assembly of the A330 alongside the A340 at Toulouse. Last year, Airbus delivered 62 A330/A340s, comprising 43 A330s and 19 A340s. The combined production rate is increasing to eight per month during 2002.

Ordered: 409

Delivered: 196

AIRBUS A330

	-200	300
Length (m)	59	63.7*
Wingspan (m)	60.3	60
Height (m)	17.9	16.83
Wing area (m ²)	361.6	361.6
Cabin width (m)	5.28	5.28
Max take-off weight (kg)	230,000	230,000
MTOW option	233,000	233,000
Max landing weight (kg)	182,000	187,000
Operating empty weight (kg)	120,533	123,140
Max zero fuel weight (kg)	170,000	175,000
Max payload (kg)	49,467	51,680
Powerplant	2 x 72,000lb GE CF6-80E1A3 or 2 x 68,000lb P&W PW4168A	2 x 72,000lb GE GE CF6-80E1A3 or 2 x 68,000lb P&W P&W PW4168A
	or 2 x 71,100lb R-R Trent 772	or 2 x 71,100lb R-R Trent 772
Standard fuel capacity (l)	139,090	97,530
Normal operating speed (Mach)	0.82	0.82
Max cruise speed (kt)	492	493
Max cruising altitude (ft)	41,100	41,100
Take-off field length (m, Sea level/ISA)	2,220	2,500
Landing field length (m, Sea level/ISA)	1,750	1,750
Accommodation (1-class)	406	440
Accommodation (2-class)	293	335
Accommodation (3-class)	253	295
Design range/typical load	12,000km/253 pax	10,400km/295 pax
Option	12,300km/253 pax	10,500km/295 pax