AIRCRAFT - FIXED-WING - CIVIL/MILITARY, United States

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VERIFIED

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Jane's Aircraft Upgrades

Boeing 737-300

Contents

Type

Airliner.

Programme

First flight of 737-100, 9 April 1967; FAA certification on 15 December 1967. Superseded by 737-200; first flight on 8 August 1967; added to 737-100 type certificate on 21 December 1967; first delivery to United Air Lines on 29 December 1967. Last of 1,114 Boeing 737-200s (and 30 737-100s) delivered in August 1988. Boeing 737 versions up to and including -500 are known as 'Classic' series to differentiate them from 'Next-Generation' variants beginning at -600.

Production go-ahead for Series 300 given in March 1981; first flight on 24 February 1984; certified on 14 November 1984; first delivery (to USAir) on 28 November 1984; 737-300 for Ansett Worldwide (and subsequent lease to British Midland Airways) rolled out at Renton on 19 February 1990 (as 1,833rd 737). Approval for 120-minute ETOPS given in November 1986, but withdrawn in July 1989 due to concerns related to operation in heavy rain and hail; approval restored on 14 September 1990. Commonwealth of Independent States Interstate Aviation Committee certified Boeing 737 family with P&W or CFM engines on 18 January 1993; first delivery for Russian Federation and Associated States (CIS) registration (737-300 to National State Aviacompany Turkmenistan) on 12 November 1992.

On 16 June 1993 the 2,500th 737 'Classic' rolled out; the 3,000th 'Classic' 737, a 737-400 for Alaska Airlines (N793AS) first flew on 16 January 1998. Production of 'Classic' averaged 9.5 per month during 1998, but phased out over following two years. A total of 3,132 'Classic' 737s built and delivered by February 2000 when production moved to 'Next-Generation' 737 versions, see *Jane's All the World's Aircraft*.

Upgrades

Aeronautical Engineers, Inc

Aeronautical Engineers, Inc (AEI) offers a 737-300SF passenger to freighter conversion. The work is conducted AEI's Authorized Conversion Center, Commercial Jet, Inc in Miami, Florida. This is the second 9-position B737-300SF Cargo Air has converted with AEI, with AEI having become a Boeing Licensed STC Provider and its conversion design provides a Main Deck capable of carrying multiple ULD's including: nine 88 × 125 in ULD's or 88 × 108 in ULD's or a combination of both.

Aviation Partners Boeing:

Began flight tests of winglet-equipped B737-300 in late 2002, with Supplemental Type Certification (STC) in January 2003. Addition of composite 2.1 m (7 ft) tall winglets to improve performance.

Design Features

Fuselage stretched 2.64 m (8 ft 8 in) compared with 737-200, by means of 1.12 m (3 ft 8 in) plug forward of wing box and 1.52 m (5 ft 0 in) aft; underfloor freight volume increased by 5.5 m^3 (193 cu ft); wing aerofoil modified by 4.4 per cent extension of leading-edge outboard of engines; new slats; new flap sections and track fairings aft of engines; additional lateral control spoilers outboard; each wingtip extended by 28 cm (11 in); increased dorsal fin area and tailplane span.

Flying Controls

Conventional and powered. All surfaces actuated by two independent hydraulic systems with manual reversion for ailerons and elevator; elevator servo tabs unlock on manual reversion; rudder has standby hydraulic actuator and system. Three outboard-powered overwing spoiler panels on each wing assist lateral control and also act as airbrakes. Variable incidence tailplane has two electric motors and manual standby.

Leading-edge Krueger flaps inboard and three sections of slats outboard of engines; two airbrake/lift dumper panels on each wing, inboard and outboard of engines; triple-slotted trailing-edge flaps inboard and outboard of engines.

FAA Cat. II landing minima system standard using SP-300 dual digital integrated flight director/autopilot: Cat. IIIa capability optional. Common pilot-type ratings for 737-200, -300, -400 and -500.

Structure

Aluminium alloy dual-path fail-safe two-spar wing structure. Aluminium alloy two-spar tailplane. Graphite composite ailerons, elevators and rudder, latter built by Short Brothers (UK). Aluminium honeycomb spoiler/airbrake panels and trailing-edges of slats and flaps. Fuselage structure fail-safe aluminium. Some fins made by Xian Aircraft Co in China. Elevators, rudder and ailerons contain graphite/Kevlar and CFRP; other, unstressed, components in GFRP and CFRP.

Landing Gear

Hydraulically retractable tricycle type, with Boeing oleo-pneumatic shock-absorbers; inward-retracting main units have no doors, wheels forming wheel well seal; nose unit retracts forward; free-fall emergency extension. Compared with 737-200, nose unit is repositioned downwards by 13 cm (5 in) and modified to ensure adequate ground clearance for larger engine nacelles. Twin nosewheels have tyres size 27 × 7.75. Main units have heavy-duty twin wheels, H40 × 14.5-19 heavy-duty tyres, and AlliedSignal or Goodrich heavy-duty wheel brakes as standard. Mainwheel tyre pressure 13.45 to 14.00 bars (195 to 203 lb/sq in). Nosewheel tyre pressure 11.45 to 11.85 bars (166 to 172 lb/sq in).

Power Plant

Basic aircraft has two CFM International CFM56-3C-1 turbofans rated at either 89.0 kN (20,000 lb st) or 97.9 kN (22,000 lb st), introduced 1988. Engines pylon-mounted forward of wings, and higher than those of 737-200; each has external strake on inboard side. Standard fuel capacity up to 20,104 litres (5,311 US gallons; 4,422 Imp gallons), with integral fuel cells in wing centre-section and integral wing tanks. Fuel options up to 23,830 litres (6,295 US gallons; 5,242 Imp gallons) with Rogerson tanks in underfloor cargo bays (from 1989). Single-point pressure refuelling under leading-edge of starboard wing.

Accommodation

Crew of two side by side on flight deck. Alternative cabin layouts seat from 128 to 149 passengers. Typical arrangements offer eight first class seats four-abreast at 91 cm (36 in) pitch and 120 tourist class seats six-abreast at 81 cm (32 in) in mixed class; and 141 or 149 all-tourist class at seat pitches of 81 cm (32 in) or 76 cm (30 in) respectively. One plug-type door at each corner of cabin, with passenger doors on port side and service doors on starboard side. Airstair for forward cabin door optional. Overwing emergency exit on each side. One or two galleys and one lavatory forward, and one or two galleys and lavatories aft, depending on configuration. Lightweight interior, using advanced crushed core materials, providing total overhead baggage capacity of 6.8 m^3 (240 cu ft), equivalent to 0.048 m^3 (1.7 cu ft) per passenger. Underfloor freight holds forward and aft of wing, with doors on starboard side.

Systems

AlliedSignal bleed air control system for thermal anti-icing, air conditioning and pressurisation systems; maximum differential 0.52 bar (7.5 lb/sq in); two functionally independent hydraulic systems with a third standby system, using fire-resistant hydraulic fluid, for flying controls, flaps, slats, landing gear, nosewheel steering and brakes; pressure 207 bars (3,000 lb/sq in). No pneumatic system. Electrical supply since 1991 from two 50 kVA variable-speed constant-frequency generators. AlliedSignal GTCP-5-129(C) APU (GTCP36-280 from 1988 and APS 2000 from 1991) for air supply and electrical power in flight and on ground as well as engine starting.

Avionics

Avionics fit is common to 737-300, -400 and -500.

Radar:

Digital colour weather radar.

Flight:

Flight management computer provides lateral, vertical and time navigation using pilot-set waypoints; dual digital flight management computers introduced 1993; dual ring laser gyro inertial system.

Instrumentation:

Four EFIS CRT screens show map, flight plan, full or partial compass rose, weather and, optionally, integrated airspeed scale; electronic engine instrument system has coloured LED dials, with secondary panel, secondary engine and hydraulics indications; windshear alerting with recovery guidance in attitude indicator; full flight regime autothrottle.

	737-300
Dimensions, External	
Overall	

length:	33.40 m (109 ft 7 in)
height:	11.13 m (36 ft 6 in)
Wings	
wing span:	28.88 m (94 ft 9 in)
wing chord:	4.71 m (15 ft 5½ in) [at root]
wing aspect ratio:	7.9
Tailplane	
tailplane span:	12.70 m (41 ft 8 in)
Cabin door	
height:	1.83 m (6 ft 0 in) [forward, port]
width:	0.86 m (2 ft 10 in) [forward, port]
height to sill:	2.62 m (8 ft 7 in) [forward, port]
Cabin door	
height:	1.83 m (6 ft 0 in) [aft, port]
width:	0.76 m (2 ft 6 in) [aft, port] 0.86 m (2 ft 10 in) [aft, port, with airstair]
height to sill:	2.74 m (9 ft 0 in) [aft, port]
Service door	
height:	1.65 m (5 ft 5 in) [forward, starboard, galley]
width:	0.76 m (2 ft 6 in) [forward, starboard, galley]
height to sill:	2.62 m (8 ft 7 in) [forward, starboard, galley]
Service door	
height:	1.65 m (5 ft 5 in) [aft, starboard]
width:	0.76 m (2 ft 6 in) [aft, starboard]
height to sill:	2.74 m (9 ft 0 in) [aft, starboard]
Emergency exit	
height:	0.97 m (3 ft 2 in) [overwing, port]
width:	0.51 m (1 ft 8 in) [overwing, port]
Emergency exit	
height:	0.97 m (3 ft 2 in) [overwing, starboard]
width:	0.51 m (1 ft 8 in) [overwing, starboard]
Hold door	
height:	1.22 m (4 ft 0 in) [forward, starboard]
width:	1.30 m (4 ft 3 in) [forward, starboard]
height to sill:	1.30 m (4 ft 3 in) [forward, starboard]
Hold door	
height:	1.22 m (4 ft 0 in) [aft, starboard]
width:	1.22 m (4 ft 0 in) [aft, starboard]
height to sill:	1.55 m (5 ft 1 in) [aft, starboard]
Wheels	

wheelbase:	12.45 m (40 ft 10 in)
wheel track:	5.23 m (17 ft 2 in)
Dimensions, Internal	
Cabin	
length:	24.18 m (79 ft 4 in) [aft of flight deck to rear pressure bulkhead]
width:	3.53 m (11 ft 7 in) [aft of flight deck to rear pressure bulkhead]
height:	2.13 m (7 ft 0 in) [aft of flight deck to rear pressure bulkhead]
floor area:	75.1 m² (808 sq ft) [aft of flight deck to rear pressure bulkhead]
Hold	
volume:	30.2 m³ (1,068 cu ft) [basic] 22.4 m³ (792 cu ft) [with max optional fuel]
Areas	
Wings	
Gross wing area:	105.4 m² (1,135.0 sq ft)
Wing control surfaces	
Ailerons:	2.49 m² (26.80 sq ft) [total]
Flaps, trailing-edge:	16.87 m² (181.60 sq ft) [total]
Slats:	7.23 m² (77.80 sq ft) [total]
Spoilers:	5.00 m² (53.80 sq ft) [ground] 2.64 m² (28.40 sq ft) [flight]
Vertical tail control surfaces	
Rudder:	5.22 m² (56.20 sq ft)
Fins	
Tail fin:	23.13 m² (249.00 sq ft)
Horizontal tail control surfaces	
Elevators:	6.55 m² (70.50 sq ft) [incl tabs]
Tailplane	
Tailplanes:	31.31 m² (337.00 sq ft)
Weights and Loadings	**A:** standard aircraft **B:** high gross weight option
Weight	
Operating weight, empty:	32,881 kg (72,490 lb) [A] 32,881 kg (72,490 lb) [B]
Max zero-fuel weight:	47,625 kg (105,000 lb) [A] 49,710 kg (109,600 lb) (est) [B]
Max ramp weight:	56,695 kg (125,000 lb) [A] 63,500 kg (140,000 lb) (est) [B]
Max T-O weight:	56,470 kg (124,500 lb) [A] 62,825 kg (138,500 lb) [B]
Max landing weight:	51,710 kg (114,000 lb) [A] 52,890 kg (116,600 lb) (est) [B]
Loading	

Max wing loading:	535.6 kg/m² (109.69 lb/sq ft) [A] 595.8 kg/m² (122.03 lb/sq ft) [B]
Max thrust loading:	89.0 kN 317.1 kg/kN (3.11 lb/lb st) [A] 352.8 kg/kN (3.46 lb/lb st) [B] 97.9 kN 288.6 kg/kN (2.83 lb/lb st) [A] 321.2 kg/kN (3.15 lb/lb st) [B]
Performance	**C:** at brake release weight of 56,470 kg; 124,500 lb **D:** at optional brake release weight of 62,820 kg; 138,500 lb
T-O	
T-O field length:	S/L, at 29°C (84°F) 2,030 m (6,660 ft) [C] 2,286 m (7,500 ft) [D]
Altitude	
Service ceiling:	5,425 m (17,800 ft) [OEI]
Cruising altitude:	10,195 m (33,440 ft) [initial]
Speed	
Max operating Mach number:	0.82
Cruising Mach number:	0.745
Approach speed:	135 kt (250 km/h; 155 mph)
Range:	still air, with 128 passengers, T-O at S/L 1,625 n miles (3,009 km; 1,870 miles) [C] max T-O weight limited to 60,636 kg (133,680 lb), still air 2,260 n miles (4,185 km; 2,600 miles) [D]
Landing	
Landing field length:	1,433 m (4,700 ft) [at max landing weight]

Aircraft Manufacturer

Boeing Commercial Airplanes

United States.

Boeing 737-800 of Sweden's Novair Jet (Paul Jackson)

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Additional Information
Equipment Details [Equipment - Classification - Manufacturer]: 737-300 - Passenger aircraft - Boeing 737-300SF - Cargo aircraft - AEI 737-300 winglet upgrade - Passenger aircraft - Aviation Partners