LEAfUET BO DESCRIPTION

Span 13.34m
Length 17.88m
Height 4.47m

Cabin height 1.74m
Cabin width 1.8m

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Learjet 60

turbofans satisfied the performance goals.
The increased thrust improved field per-
formance and the better fuel-efficiency,
coupled with greater fuel capacity and
reduced drag, extended the range, Rey-nolds says.
l^arjet describes the PW305 as a "high-speed, high-altitude" turbofan. The Lear-jet 60 has a maximum cruise speed of Mach 0.81 and a maximum certificated ceiling of 51,000ft. Like previous Learjets, the aircraft is designed to use airspace between 41,000ft and 51,000ft to capture winds aloft and avoid airline traffic.

PROTOTYPE FLIGHT

Learjet flew a proof-of-concept aircraft, basically a Model 55 with .the longer cabin, in October 1990. This aircraft was subsequently fitted with two PW305s and the longer tailcone and flew as the proto-type Learjet 60 in June 1991. The proto-type retained the 55's wing and delta fins. Through working with NASA on the design of the new engine pylons, several aerodynamic improvements were identified. The Learjet 60 was the first full aircraft to be modelled using NASA's Tranair transonic-aerodynamics software, Reynolds explains. Almost 50h on NASA Ames Research Center's Cray supercom-puter resulted in the optimum pylon design — together with a host of wing improvements.
Adding a wing-fuselage fillet
increased leading-edge sweep
and wing area and — coupled
with a redesigned winglet-wing
junction and revised engine
pylon — reduced cruise drag by
more than 4%. Increased root
sweep significantly reduced
cruise shock-wave drag where
the wing and fuselage met. At
the same time, improved buffet
characteristics allowed higher
initial cruise altitudes at in-
creased gross weights. Delta-fin
area was enlarged 19%, increas-

ing the centre-of-gravity range by 13%. Re-profiling of the rear fuselage to minimise interference drag caused by the new, larger engine nacelles forced a reduc-tion in wing inboard-flap span and a consequent increase in field length. Lear-jet compensated by increasing flap chord, but had to accept a lkt increase in stall speed. To overcome this, the PW305s were re-rated from the initial 19.6kN flat-rating to 20.5kN (the engine can produce 23.2kN). Consequently, the Lear-jet 60's balanced field length was im-proved from 1,635m to 1,58.0m..,
The aerodynamic improvements re-sulted in an increase in maximum range from 5,070km to 5,100km. Other changes introduced during development include fully modulated spoilers, allowing variable spoiler deployment during descent for a smoother ride and to minimise trim changes. Landing weight was increased from 8,200kg to 8,800kg, to allow several stops without refuelling. An optional higher take-off weight, up from 10,330kg to 10,500kg, was introduced to allow higher payloads.
Learjet introduced the improvements on the first production aircraft, which was
rolled out in May 1992, just over 18 months after the aircraft's launch. The aircraft joined the Learjet 60 prototype in
the flight-test programme that June. The company says that the aerodynamic

Galley/entertainments
cabinet-

Toilet
(optional

Emergency exit/
Baggage door

—ft

UM1XM
Entrance Closet

Cabin layout

changes substantially improved the Lear-
jet 60's handling characteristics. "The aircraft handles very much like the Learjet 31 A," says Reynolds.

ALL-METAL CRAFT
The Learjet 60 is an all-metal aircraft with a pressurised semi-monocoque fuselage and a high aspect-ratio wing. Conven-tional riveted construction is used, except for the upper section of each winglet, in which the skins are bonded to a honey-comb core.
The maximum internal cabin width is 1.8m and height is 1.7m in the lowered centre aisle, which runs the length of the cabin. The cabin is 5.4m long, from the cockpit divider to the aft pressure-bulkhead. The standard interior has six seats, a forward galley, full-across aft lavatory, and a 0.75m3

baggage compart-
ment loaded from outside and accessible in flight. The tailcone houses an equip-ment bay and the external luggage com-partment. Total baggage capacity is 1.8m3

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A maximum pressure differential of 0.64bar (9.41b/in2

) provides a sea-level
cabin altitude to 27,500ft and an 8,000ft altitude at 51,000ft. The AlliedSignal Aerospace digital cabin-pressure control system is described by Learjet as "a real plus", normal operation requiring only that the pilot set the field elevation of the destination airport before take-off.
The Learjet 60 wing is almost the same as that of the Model 55C, with 13° quarter-chord sweep and eight-spar inter-nal structure with milled skins, cambered leading-edge and supercritical-section winglets. Control surfaces include ailer-ons, spoilers and flaps. The leading-edge is anti-iced using engine bleed air. Modifications are limited to the root, where both sweep and area are increased and the winglet-wing junction.
The T-tail is essentially unchanged from the Model 55, with a five-spar fin and tailplane. The horizontal stabiliser, which pivots for trim, is anti-iced electri-cally. Delta fins — inverted-V strakes on the underside of the tailcone — were introduced on the 55C, to improve stabil-ity at all speeds, eliminate Dutch roll, the stall and reduce approach speed. The delta fins are also
used on the Learjet 31A to im-
prove handling.
The PW305A turbofan was
•developed jointly by Pratt &
Whitney Canada and Germany's MTU, using experience from the
Canadian company's JTL5D
turbofan and PT6 and PW100
turboprop engines, as well as
parent company Pratt & Whit-
ney's PW3000 turboshaft. The
engine has a 4.3:1 bypass ratio
and a JT15D-style fan with 24
blades. The PT6-style compres-

soften

Vanity unit

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