

EQUIPMENT: Landing/taxying light in each wing leading-edge.
Data apply to both versions, except where stated.

DIMENSIONS, EXTERNAL:

Wing span	9.25 m (30 ft 4 in)
Wing chord: at root	2.29 m (7 ft 6 in)
at tip	1.02 m (3 ft 4 in)
Wing aspect ratio	5.9
Length overall	7.34 m (24 ft 1 in)
Max diameter of fuselage	1.22 m (4 ft 0 in)
Height overall	1.98 m (6 ft 6 in)
Tailplane span	3.76 m (12 ft 4 in)
Wheel track	3.15 m (10 ft 4 in)
Wheelbase	4.02 m (13 ft 2 1/4 in)
Propeller diameter: SP20	1.88 m (6 ft 2 in)
SP26	1.98 m (6 ft 6 in)
Propeller ground clearance: SP20	0.76 m (2 ft 6 in)

DIMENSIONS, INTERNAL:

Cabin: Length	1.65 m (5 ft 5 in)
Max width	1.09 m (3 ft 7 in)
Max height	0.99 m (3 ft 3 in)
Baggage volume	0.40 m ³ (14.0 cu ft)

AREAS:

Wings, gross	14.55 m ² (156.6 sq ft)
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WEIGHTS AND LOADINGS:

Weight empty: SP20	839 kg (1,850 lb)
SP26	925 kg (2,040 lb)

Baggage capacity	45 kg (100 lb)
Max aerobatic weight: SP26	1,202 kg (2,650 lb)
Max T-O weight: SP20	1,179 kg (2,600 lb)
SP26	1,292 kg (2,850 lb)
Max landing weight: SP20	1,130 kg (2,492 lb)
SP26	1,243 kg (2,742 lb)
Max ramp weight: SP20	1,193 kg (2,630 lb)
Max wing loading: SP20	81.1 kg/m ² (16.60 lb/sq ft)
SP26	88.9 kg/m ² (18.20 lb/sq ft)
Max power loading: SP20	7.91 kg/kW (13.00 lb/hp)
SP26	6.67 kg/kW (10.96 lb/hp)

PERFORMANCE:

Never-exceed speed (VNE):	
SP20	180 kt (333 km/h; 207 mph)
SP26	195 kt (361 km/h; 224 mph)
Max level speed: SP20	145 kt (269 km/h; 167 mph)
SP26	165 kt (306 km/h; 190 mph)
Max cruising speed at 75% power:	
SP20	135 kt (250 km/h; 155 mph)
SP26	155 kt (287 km/h; 178 mph)
Normal cruising speed at 65% power:	
SP20	128 kt (237 km/h; 147 mph)
SP26	148 kt (274 km/h; 170 mph)
Econ cruising speed at 55% power:	
SP20	120 kt (222 km/h; 138 mph)
SP26	135 kt (250 km/h; 155 mph)

Stalling speed, power off:	
flaps and landing gear up	55 kt (102 km/h; 64 mph)
flaps and landing gear down	49 kt (91 km/h; 57 mph)
Max rate of climb at S/L: SP20	290 m (950 ft)/min
SP26	458 m (1,500 ft)/min
Service ceiling: SP20	3,660 m (12,000 ft)
SP26	5,486 m (18,000 ft)
T-O run: SP20	460 m (1,510 ft)
SP26	244 m (800 ft)
T-O to 15 m (50 ft): SP20	618 m (2,025 ft)
SP26	335 m (1,100 ft)
Landing from 15 m (50 ft): SP20, SP26	610 m (2,000 ft)
Landing run: SP20, SP26	213 m (700 ft)
Range with 30 min reserves: at max level speed:	
SP20, SP26	750 n miles (1,389 km; 863 miles)
at max cruising speed:	
SP20	850 n miles (1,574 km; 978 miles)
SP26	800 n miles (1,481 km; 920 miles)
at econ cruising speed:	
SP20	1,004 n miles (1,859 km; 1,155 miles)
SP26	1,040 n miles (1,926 km; 1,196 miles)
g limits (SP26)	+6/-3

UPDATED

LEARJET

BOMBARDIER AEROSPACE LEARJET
(Subsidiary of Bombardier Inc)

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Company originally founded 1960 by Bill Lear Sr as Swiss American Aviation Corporation (SAAC); transferred to Kansas 1962 and renamed Lear Jet Corporation; prototype Lear Jet 23 (N801L) first flew 7 October 1963; Gates Rubber Company bought about 60 per cent share in 1967 and renamed it Gates Learjet Corporation, moving much of manufacturing to Tucson, Arizona; 64.8 per cent acquired by Integrated Acquisition Inc September 1987 and renamed Learjet Corporation; all manufacturing moved from Tucson to Wichita during 1988, leaving customer service completion and modification centre in Tucson.

Acquisition of Learjet by Canada's Bombardier announced April 1990 and concluded 22 June 1990 for US\$75 million; name changed to Learjet Inc; Bombardier assumed responsibility for Learjet's line of credit; now part of Bombardier Inc. Learjet 31A, 40, 45 and 60 assembled in Wichita and flown to Tucson for completion and delivery.

Some 2,350 Learjets built, including 105 LJ23s, 259 LJ24s, 368 LJ25s, five LJ28s, four LJ29s, 225 LJ31s, 673 LJ35s, 62 LJ36s, 235 LJ45s, 147 LJ55s and 265 LJ60s. 2,000th Learjet, Model 45 N158PH, delivered to Parker Hannifin Corporation in August 1999.

Learjet bought manufacturing and marketing rights and tooling of Aeronca thrust reversers, for application to Learjet and other aircraft, March 1989.

Total of 36 deliveries in 1994; 43 in 1995; 34 in 1996; 45 in 1997; 61 in 1998; 99 in 1999, 134 in 2000; 182 in 2001, and 60 in 2002.

UPDATED

LEARJET 31

TYPE: Business jet.

PROGRAMME: Learjet 31 introduced September 1987 following first flight of aerodynamic prototype (modified Learjet 35A) on 11 May 1987; first production aircraft (N311DF) used as systems testbed; FAA certification 12 August 1988. Learjet 31A and 31A/ER announced October 1990 to replace Learjet 31. Certified in 21 countries, including Argentina, Australia, Bermuda, Brazil, Canada, Czech Republic, Denmark, Germany, Grand Cayman, Guatemala, Indonesia, Italy, Japan, Luxembourg, Mexico, Namibia, Pakistan, Philippines, South Africa, Switzerland and USA. Total fleet time 400,000 hours by 1 October 2000. Will be superseded by Learjet 40 from 2004.

CURRENT VERSIONS: **Learjet 31:** Original version. No longer produced.

Learjet 31A: Current version.

Description applies to Learjet 31A, except where indicated.

Learjet 31A/ER: Optional extended-range version with 2,627 litres (694 US gallons; 578 Imp gallons) of fuel.
CUSTOMERS: Total of 225 built by September 2003, including 36 of original Learjet 31; 14 Learjet 31As delivered in 1994, 19 in 1995, 13 in 1996, 21 in 1997, 22 in 1998, 24 in 1999, 28 in 2000, 17 in 2001 and nine in 2002. Twenty-one were in the Bombardier FlexJets fleet in early 1999. 200th Learjet 31A delivered 3 October 2000, to Falcon Air Services of Phoenix, Arizona.



Learjet 31A (two Honeywell TFE731-2 turbofans) (Paul Jackson)

NEW/056893

COSTS: US\$6.419 million, equipped (2000).

DESIGN FEATURES: Small, rear-engined business jet; low wing with leading-edge sweepback; T tail and two large strakes below rear fuselage.

Original Learjet 31 combined fuselage/cabin and power plant of Learjet 35A/36A with wing of Learjet 55; delta fins added to eliminate Dutch roll, stabilise aircraft at high airspeeds, induce docile stall and reduce approach speeds and field lengths; stick pusher/puller and dual yaw dampers no longer required; stick shaker and single yaw damper retained for comfort.

Additional features of Learjet 31A include cruise Mach number up to 13,105 m (43,000 ft) increased 4 per cent to 0.81 and V_{MO} increased from 300 kt (556 km/h; 345 mph) to 325 kt (602 km/h; 374 mph) IAS. Increases mainly benefit descent from high altitudes. Learjet 31A also features integrated digital avionics package.

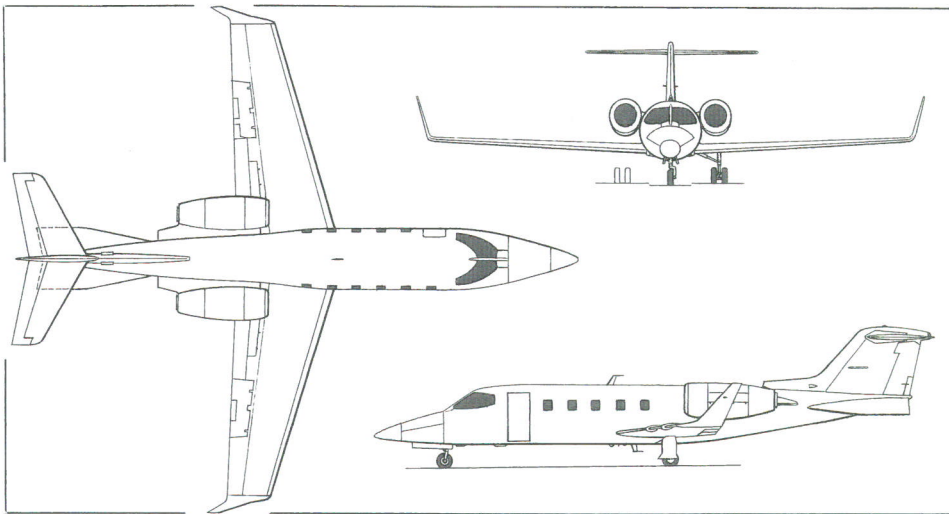
Improvements announced at the NBAA Convention in Atlanta in October 1999, and incorporated from c/n 31A-194, include: increased maximum T-O weight of 7,711 kg (17,000 lb) and maximum landing weight of 7,257 kg (16,000 lb), latter available for retrofit on earlier aircraft; revised winglet design, based on that of Learjet 60, for enhanced high-speed/high-altitude performance and handling; thrust reversers standard; Universal UNS-1C FMS standard; lighter and more reliable AHRS; dual R134a air conditioning systems to provide increased capacity and redundancy, with one system dedicated to

cockpit; and digital engine control for increased reliability and provision of trend monitoring.

FLYING CONTROLS: Conventional and manual. Ailerons have brush seals and geared tabs; electrically actuated trim tab in port aileron. Electrically actuated tailplane incidence control has separate motors for pilot and co-pilot and single-fault survival protection; aircraft can be manually controlled following tailplane runaway and landed with reduced flap. Rudder has electric trim tab; automatic electric rudder assist servo operates automatically if rudder pedal loads exceed 22.6 kg (50 lb). Full-chord fences bracket the ailerons. Single spoiler panel in each wing used as airbrake and lift dumper. Hydraulically actuated flaps extend to 40°. Optional drag parachute mounted on inside of baggage hatch under tail.

STRUCTURE: Semi-monocoque fuselage with eight-spar internal structure; multispar wing with machined skins; winglets have full-depth honeycomb core bonded to skin.
LANDING GEAR: Retractable tricycle gear; main legs retract inward, nose leg forward; twin-wheel main units with anti-skid disc brakes; nosewheel has full-time digital steer-by-wire. Tyres 17.5x5.75-8 (12 ply) main; 18x4.4 (10 ply) nose. Ground turning radius about nosewheel 8.08 m (26 ft 6 in).

POWER PLANT: Two 15.56 kN (3,500 lb st) Honeywell TFE731-2-3B turbofans with N₁ digital electronic engine controller giving engine trend monitoring, automatic retention of power settings above 4,575 m (15,000 ft) and



Learjet 31A business aircraft (Jane's/Dennis Punnett)

special idling control for descent from 15,545 m (51,000 ft). Engine synchroniser fitted. Dee Howard 4000 thrust reverser system standard. One integral fuel tank in each wing standard or ER tank in fuselage (see under Weights and Loadings for quantities); fuselage fuel transferred by gravity or pump; single-point pressure refuelling standard.

ACCOMMODATION: Cabin furnishings include a three-seat divan, four Erda 10-way adjustable individual seats in club seating arrangement, side-facing seat with lavatory, two folding tables, baggage compartment, overhead panels with reading lights, indirect lighting, air vents and oxygen masks. Revised interior offering more headroom and three cabin configurations announced October 1994 and introduced on 100th aircraft May 1995. Aft lavatory option introduced in 1996, providing an additional 0.28 m³ (10.0 cu ft) of baggage space. Optional external baggage locker increases total baggage volume to 1.76 m³ (62.0 cu ft).

SYSTEMS: Hydraulic system operates flaps, landing gear, airbrakes, wheelbrakes and thrust reversers; system pressure 69 to 120.6 bar (1,000 to 1,750 lb/sq in); pneumatic standby for gear extension and wheelbrakes. Normal cabin pressure differential 0.64 bar (9.4 lb/sq in) with automatic flood engine bleed if cabin altitude exceeds 2,820 m (9,250 ft); pop-out emergency oxygen for passengers and masks for crew. Electrical system based on two starter/generators, two lead-acid batteries and two inverters; both busses can run from one engine; electrics operate tailplane incidence, rudder assister and nosewheel steering. Anti-icing by bleed air for wing, engine intakes and windscreen; tailplane electrically heated; fin not protected. Alcohol spray for radome to stop shed ice entering engines; controls prevent internal ice and condensation during long descents.

AVIONICS: Honeywell integrated digital avionics package with five-tube EFIS 50, Universal UNS-IM flight management system (FMS), dual Series III nav/comms, and dual KFC 3100 autopilots/flight directors.

EQUIPMENT: Throttle-mounted landing gear warning mute and go-around switches, nacelle heat annunciator, engine synchroniser and synchroscope, recognition light, wing ice light, emergency press override switches, transponder ident switch in pilot's control wheel, flap preselect, crew lifejackets, cockpit dome lights, cockpit speakers, crew oxygen masks and fire extinguisher are standard.

DIMENSIONS, EXTERNAL:

Wing span	13.36 m (43 ft 10 in)
Wing aspect ratio	7.2
Length overall	14.83 m (48 ft 8 in)
Max diameter of fuselage	1.63 m (5 ft 4 in)
Height overall	3.76 m (12 ft 4 in)
Tailplane span	4.48 m (14 ft 8½ in)

DIMENSIONS, INTERNAL:

Cabin:	
Length:	
incl flight deck: 31A	6.63 m (21 ft 9 in)
31A/ER	6.27 m (20 ft 7 in)
excl flight deck: 31A	5.21 m (17 ft 1 in)
31A/ER	4.85 m (15 ft 11 in)
Max width: 31A, 31A/ER	1.50 m (4 ft 11 in)
Max height: 31A, 31A/ER	1.32 m (4 ft 4 in)
Floor area, excl flight deck	3.60 m ² (38.75 sq ft)
Volume, cockpit divider to rear pressure bulkhead	7.7 m ³ (271 cu ft)
Baggage compartment volume: 31A	1.1 m ³ (40 cu ft)
31A/ER	0.76 m ³ (26.7 cu ft)
Optional external baggage locker	0.34 m ³ (12.0 cu ft)

AREAS:

Wings, basic	24.57 m ² (264.5 sq ft)
Horizontal tail surfaces (total)	5.02 m ² (54.0 sq ft)
Vertical tail surfaces (total)	3.57 m ² (38.4 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	4,651 kg (10,253 lb)
Basic operating weight empty, typical	5,087 kg (11,214 lb)
Max payload	1,070 kg (2,360 lb)
Payload with max fuel: standard	878 kg (1,936 lb)
optional	865 kg (1,907 lb)
Max fuel weight:	
wing tanks: 31A	1,272 kg (2,804 lb)
31A/ER	1,282 kg (2,826 lb)

fuselage tank: 31A	599 kg (1,320 lb)
31A/ER	829 kg (1,827 lb)
total: 31A	1,871 kg (4,124 lb)
31A/ER	2,111 kg (4,653 lb)
Max T-O weight: 31A (standard)	7,711 kg (17,000 lb)
31A (optional)	8,028 kg (17,700 lb)
Max ramp weight: 31A (standard)	7,802 kg (17,200 lb)
31A (optional)	8,119 kg (17,900 lb)
Max landing weight	7,257 kg (16,000 lb)
Max zero-fuel weight	6,124 kg (13,500 lb)
Payload with max fuel: 31A (standard)	896 kg (1,976 lb)
31A (optional)	1,089 kg (2,400 lb)
Max wing loading:	
31A (standard)	313.8 kg/m ² (64.27 lb/sq ft)
31A (optional)	326.7 kg/m ² (66.92 lb/sq ft)
Max power loading:	
31A (standard)	248 kg/kN (2.43 lb/lb st)
31A (optional)	258 kg/kN (2.53 lb/lb st)

PERFORMANCE (A: standard max T-O weight, B: optional max T-O weight):

Max operating Mach No. (MMO):	
FL275-FL430	M0.81
FL430-FL470	M0.81-0.79
above FL470	M0.79
Max cruising speed	463 kt (857 km/h; 533 mph)
Typical cruising speeds at mid-cruise weight:	
at FL410	462 kt (856 km/h; 532 mph)
at FL430	456 kt (845 km/h; 525 mph)
at FL 450	447 kt (828 km/h; 514 mph)
at FL 470	435 kt (806 km/h; 501 mph)
Long-range cruising speed	420 kt (778 km/h; 483 mph)
Max speed with landing gear extended	260 kt (481 km/h; 299 mph)
Tyre limiting speed	182 kt (337 km/h; 209 mph)
Approach speed	131 kt (243 km/h; 151 mph) IAS
Stalling speed, flaps and landing gear down	96 kt (178 km/h; 111 mph) IAS
Max rate of climb at S/L: A	1,554 m (5,100 ft)/min
B	1,490 m (4,890 ft)/min
Rate of climb at S/L, OEI: A	494 m (1,620 ft)/min
B	462 m (1,515 ft)/min
Time to FL430	19 min 48 s
Max certified altitude	15,545 m (51,000 ft)
Service ceiling, OEI: A	7,986 m (26,200 ft)
B	7,620 m (25,000 ft)
T-O field length: A	1,064 m (3,490 ft)
B	1,158 m (3,800 ft)
FAR Pt 91 landing distance: A, B	874 m (2,866 ft)
Range with two crew and four passengers:	
VFR: 31A	1,654 n miles (3,063 km; 1,903 miles)
31A/ER	1,882 n miles (3,485 km; 2,166 miles)
IFR reserves:	
31A	1,259 n miles (2,331 km; 1,448 miles)
31A/ER	1,488 n miles (2,755 km; 1,712 miles)

OPERATIONAL NOISE LEVELS (FAR Pt 36):

T-O	81.9 EPNdB
Approach	92.8 EPNdB
Sideline	86.9 EPNdB
	UPDATED

LEARJET 45

TYPE: Business jet.

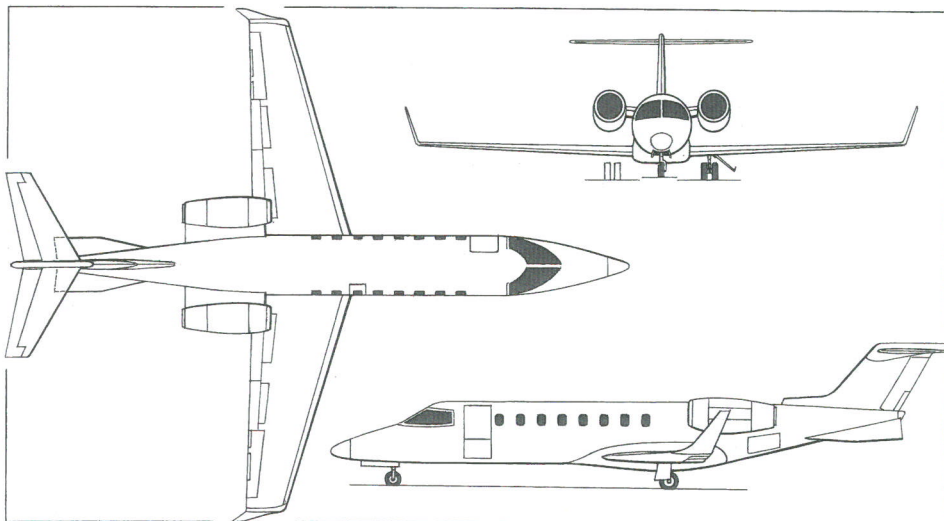
PROGRAMME: Design started September 1992; unveiled at NBAA Convention 20 September 1992. Other members of Bombardier group are involved; Learjet is responsible for project co-ordination, final assembly, testing and certification.

Engine testing began January 1995 with TFE731-20 installed in one nacelle of Learjet 31A testbed. Wing and fuselage of first production aircraft (N45XL) mated at Wichita 4 November 1994; first flight 7 October 1995; second prototype (N452LJ) first flown 6 April 1996, assigned to flutter testing; third aircraft (N453LJ), first flown 24 April 1996, assigned to avionics testing; fourth aircraft assigned to HIRF and lightning-strike testing, engine testing and fuel system operation; fifth aircraft fitted with production interior and assigned to function and reliability testing, including interior noise measurement.

Initial FAA certification granted 22 September 1997 followed by full approval in May 1998; JAA certification achieved 3 July 1998; FAA RVSM approval granted 25 July 2000. First customer delivery (N903HC) 28 July 1998, to Hytrol Conveyor of Jonesboro, Arkansas. First delivery to Europe (N459LJ) 8 September 1998 for Eifel Holdings Ltd of Jersey. More than 210 delivered by December 2002, including 2,000th Learjet, N158PH, to Parker Hannifin Corporation in August 1999. 100th Learjet 45 delivered in October 2000, initially as Bombardier company demonstrator, but destined for a Philippine operator; 200th delivered in April 2002.

CURRENT VERSIONS: **Learjet 45:** Current version, as described.

Learjet 45^{XR}: Improved version offering enhanced payload/range capability. Announced at Farnborough International Air Show, 21 July 2002 and formally launched at NBAA Convention, Orlando, Florida, 10 September 2002; certification and service entry scheduled for second quarter 2003; not achieved and prototype demonstrated at NBAA Convention, Orlando, 7 to 9 October 2003 (N45XR c/n 232). Features include a 454 kg (1,000 lb) increase in maximum T-O weight; 15.57 kN (3,500 lb st) Honeywell TFE731-20-BR turbofans flat rated at ISA +25°C (104°F) with 0.67 kN (150 lb st) automatic power reserve at T-O; and redesigned cabin interior with seats that are 5 cm (2 in) wider and increase legroom by 15 cm (6 in), increased galley storage, LED lighting system that reduces heat emissions, improved access to systems behind the aft lavatory, and quick (20



Learjet 45 business jet (two Honeywell TFE731-20-AR turbofans) (Jane's/Dennis Punnett)



Prototype Learjet 45^{XR}, twin-turboprop business jet (Paul Jackson)

NEW/0568398

min) removal of interior components. Learjet 45^{XR} maximum T-O weight increase and engine upgrade will be retrofitable to existing Learjet 45s.

CUSTOMERS: Total of 234 delivered by September 2003; deliveries began with seven in 1998, followed by 43 in 1999, 71 in 2000, 63 in 2001 and 33 in 2002. Major orders include 40, with 10 options, by JetSolutions for its FlexJets fractional ownership scheme. Recent customers include Singapore Airlines, which ordered two in April 2001, supplementing four aircraft delivered in 1998, Cathay Pacific Airways, which has ordered two for crew training, operated by BAE Systems Flight Training (Australia) Pty Ltd at Adelaide, South Australia, of which the first was delivered on 24 August 2001 with the second scheduled for delivery in 2002, Gold Air International which ordered five 45^{XR}s on 5 February 2003, Ocean Air Aero Taxi Ltd of Brazil, which ordered one 45^{XR} on 12 March 2003, Hughes Air Corporation of Calgary, Canada, which took delivery of a 45 on 10 July 2003, and the Irish Government, which ordered one for delivery in December 2003.

COSTS: Learjet 45 US\$9.848 million, Learjet 45^{XR} US\$10.423 million (both 2002).

DESIGN FEATURES: Generally as Model 31; Learjet 45 designed to combine docile handling characteristics of 31/31A and 60 with exceptional fuel efficiency and good overall performance, and offer increased maintainability and reliability; new larger fuselage, wing and tail unit; increased head and shoulder room; wing carry-through spar recessed beneath floor; latest technology systems. Wing designed with NASA; winglets; sweepback 13° 25' at 25 per cent chord.

Performance enhancement package announced at the Paris Air Show in June 1999 includes maximum T-O weight increased by 136 kg (300 lb); reductions in T-O speeds; improved nosewheel steering and removal of 40 kt (74 km/h; 46 mph) steering system limitation; improved brake-by-wire effectiveness; reconfiguration of flap selector module to permit use of 8° flap setting, instead of 20°, for approach climb in the event of a go-around; improved climb performance with bleed air anti-icing systems operating; and updated Honeywell avionics software.

FLYING CONTROLS: Conventional and manual. Two spoiler/lift dumper panels in each wing. Horn-balanced elevators. Trim tab in rudder; two in each aileron. Flaps.

Further improvements introduced in late 2000 include restyled seats providing greater freedom of movement in the cabin, a 10 to 12 dB reduction in cabin noise levels and improvements in the cabin air distribution system.

STRUCTURE: Unigraphics, CATIA and Computerized digital design systems adopted by Learjet, de Havilland of Canada and Shorts for engineering design. Short Brothers of UK manufactures the fuselage and de Havilland Canada the wings.

LANDING GEAR: Retractable tricycle type; semi-articulated trailing-link main legs retract inward, nose leg forward; twin-wheel main units, size 22x5.75-12 (10 ply) with brake-by-wire anti-skid carbon multidisk brakes; nosewheel has dual-chine tyre, size 18x4.4 (10 ply), with steer-by-wire.

POWER PLANT: Two Honeywell TFE731-20-AR turbofans, each flat rated at 15.57 kN (3,500 lb st) at ISA +16°C (61°F); Dee Howard target-type thrust reversers; digital electronic engine control. Total fuel capacity 3,426 litres (905 US gallons; 754 Imp gallons).



First production Learjet 40 (Paul Jackson)

NEW/0567042

ACCOMMODATION: Two crew and up to nine passengers; eight-passenger cabin typically with PMP fully adjustable swivelling and reclining seats in double club arrangement, galley/refreshment centre and storage cabinet at front of cabin; lavatory, doubling as optional ninth seat, at rear; cabin pressurised, maximum differential 0.65 bar (9.43 lb/sq in); clamshell door with integral steps on port side at front of cabin, upper part serves as emergency exit; eight cabin windows per side, one forward of starboard wing leading-edge serving as emergency exit; externally accessible heated and lined baggage compartment, capacity 227 kg (500 lb), in aft fuselage accessed via door on port side beneath engine nacelle.

SYSTEMS: Honeywell air conditioning and pressurisation system, maximum differential 0.65 bar (9.4 lb/sq in), with dual independent digital control system and pneumatic redundancy; dual-zone automatic temperature control. Gaseous oxygen system, pressure 127.6 bar (1,850 lb/sq in). Main and auxiliary back-up hydraulic systems, pressure 207 bar (3,000 lb/sq in). Dual independent anti-icing and de-icing systems comprising bleed air anti-icing on wing and tailplane leading-edges and engine inlets, electric de-icing on pitot-static probes and electric anti-icing and de-fogging on windshield. Honeywell RE 100 APU optional.

AVIONICS: Honeywell Primus 1000 integrated avionics system.

Comms: Dual Primus II nav/ident radios.

Radar: Primus 660 weather radar standard.

Flight: Dual Primus II nav radios. Primus 1000 digital autopilot/flight director standard; Honeywell traffic-alert and collision-avoidance (TCAS II) optional.

Instrumentation: Primus 1000 with EICAS; dual PFDs and MFDs; flight and navigation information displayed on four 203 x 178 mm (8 x 7 in) EFIS screens; heart of system is IC-600 integrated avionics computer, which combines EFIS and EICAS processor.

DIMENSIONS, EXTERNAL:

Wing span	14.56 m (47 ft 9 1/4 in)
Wing aspect ratio	7.3
Length overall	17.81 m (58 ft 5 in)
Max diameter of fuselage	1.75 m (5 ft 9 in)
Height overall	4.31 m (14 ft 1 1/2 in)
Wheel track	2.84 m (9 ft 4 in)
Wheelbase	7.87 m (25 ft 9 3/4 in)

DIMENSIONS, INTERNAL:

Cabin:	
Length: incl flight deck	7.52 m (24 ft 8 1/4 in)
excl flight deck	6.02 m (19 ft 9 in)
Max width	1.55 m (5 ft 1 in)
Max height	1.50 m (4 ft 11 in)
Floor area, excl flight deck	6.11 m ² (65.8 sq ft)
Volume, excl flight deck	11.6 m ³ (410 cu ft)
Baggage compartment volume	1.4 m ³ (50 cu ft)

AREAS:

Wings, basic	28.95 m ² (311.6 sq ft)
WEIGHTS AND LOADINGS (A: Learjet 45, B: Learjet 45 ^{XR}):	
Weight empty: A	5,797 kg (12,780 lb)
B	5,869 kg (12,939 lb)
Basic operating weight, typical:	
A, B	6,259 kg (13,799 lb)
Max payload: A, B	1,030 kg (2,271 lb)
Payload with max fuel: A	435 kg (959 lb)
B	889 kg (1,959 lb)
Max fuel weight: A, B	2,750 kg (6,062 lb)
Fuel with max payload: A	2,154 kg (4,750 lb)
B	2,608 kg (5,750 lb)
Max T-O weight: A	9,298 kg (20,500 lb)
B	9,752 kg (21,500 lb)
Max landing weight: A, B	8,709 kg (19,200 lb)
Max ramp weight: A	9,412 kg (20,750 lb)
B	9,866 kg (21,750 lb)
Max zero-fuel weight: A, B	7,257 kg (16,000 lb)
Max wing loading: A	321.2 kg/m ² (65.79 lb/sq ft)
B	336.9 kg/m ² (69.00 lb/sq ft)
Max power loading: A	299 kg/kN (2.93 lb/lb st)
B	313 kg/kN (3.07 lb/lb st)

PERFORMANCE:

Max operating speed (VMO)	330 kt (611 km/h; 379 mph)
Max operating Mach No. (Mmo)	0.81
High cruising speed: A, B	464 kt (859 km/h; 534 mph)
Normal cruising speed: A, B	457 kt (846 km/h; 526 mph)
Long-range cruising speed:	
A, B	430 kt (796 km/h; 495 mph)
Time to FL430 after MTOW departure:	
A	23 min 6 s
B	24 min 54 s
Max certified altitude: A, B	15,545 m (51,000 ft)
T-O field length: A	1,326 m (4,350 ft)
B	1,542 m (5,060 ft)
FAR Pt 91 landing distance: A, B	811 m (2,660 ft)
Range with two crew and four passengers, NBAA IFR reserves:	
A, B	2,098 n miles (3,885 km; 2,414 miles)
Range with two crew and eight passengers, IFR reserves:	
B	2,007 n miles (3,717 km; 2,309 miles)
OPERATIONAL NOISE LEVELS:	
T-O: A, B	74.4 EPNdB
Sideline: A	85.2 EPNdB
B	85.1 EPNdB
Approach: A, B	93.4 EPNdB

UPDATED

LEARJET 40

TYPE: Business jet.

PROGRAMME: Announced at Farnborough International Air Show 21 July 2002 as replacement for Learjet 31A. Prototype (N40LX, converted from Learjet 45 prototype) first flight 31 August 2002, immediately followed by first production aircraft (45-2001/N40LJ) 5 September. Public debut (N40LJ) and formal launch at NBAA Convention, Orlando, Florida, 10 September 2002; prototype and first production aircraft undertook flight test programme, leading to FAA certification on 11 July 2003, (and award of first airworthiness certificate to N40LJ on 18 September 2003), followed by JAA certification and service entry in first quarter 2004.

COSTS: Approximately US\$6.915 (2004).

DESIGN FEATURES: Generally as for Learjet 45, but fuselage shortened by 0.62 m (2 ft 0 1/2 in) forward of wing, three cabin windows removed and capacity of fuselage fuel tank reduced.

POWER PLANT: As Learjet 45.

ACCOMMODATION: Two crew and up to seven passengers in forward club arrangement with galley on starboard side at front of cabin and full-width lavatory at rear. Compared with Learjet 45, cabin features redesigned seats that are 5 cm (2 in) wider and increase legroom by 15 cm (6 in), and an LED lighting system. The first 40 aircraft will feature an optional racing car-inspired red and black custom interior reflecting a sponsorship agreement between Bombardier and Indianapolis Motor Speedway Corporation.

DIMENSIONS, EXTERNAL:

Length overall	16.95 m (55 ft 6 in)
Wheelbase	7.86 m (25 ft 9 3/4 in)

DIMENSIONS, INTERNAL:

Cabin: Length: incl flight deck	6.92 m (22 ft 8 1/4 in)
excl flight deck	5.38 m (17 ft 8 in)
Floor area, excl flight deck	5.47 m ² (58.9 sq ft)
Volume, excl flight deck	10.28 m ³ (363 cu ft)

WEIGHTS AND LOADINGS:

Weight empty	5,779 kg (12,740 lb)
Basic operating weight	6,184 kg (13,633 lb)
Payload: max	1,074 kg (2,367 lb)
with max fuel	756 kg (1,667 lb)



Learjet 40 Indy 500 cabin interior (Bombardier Aerospace)

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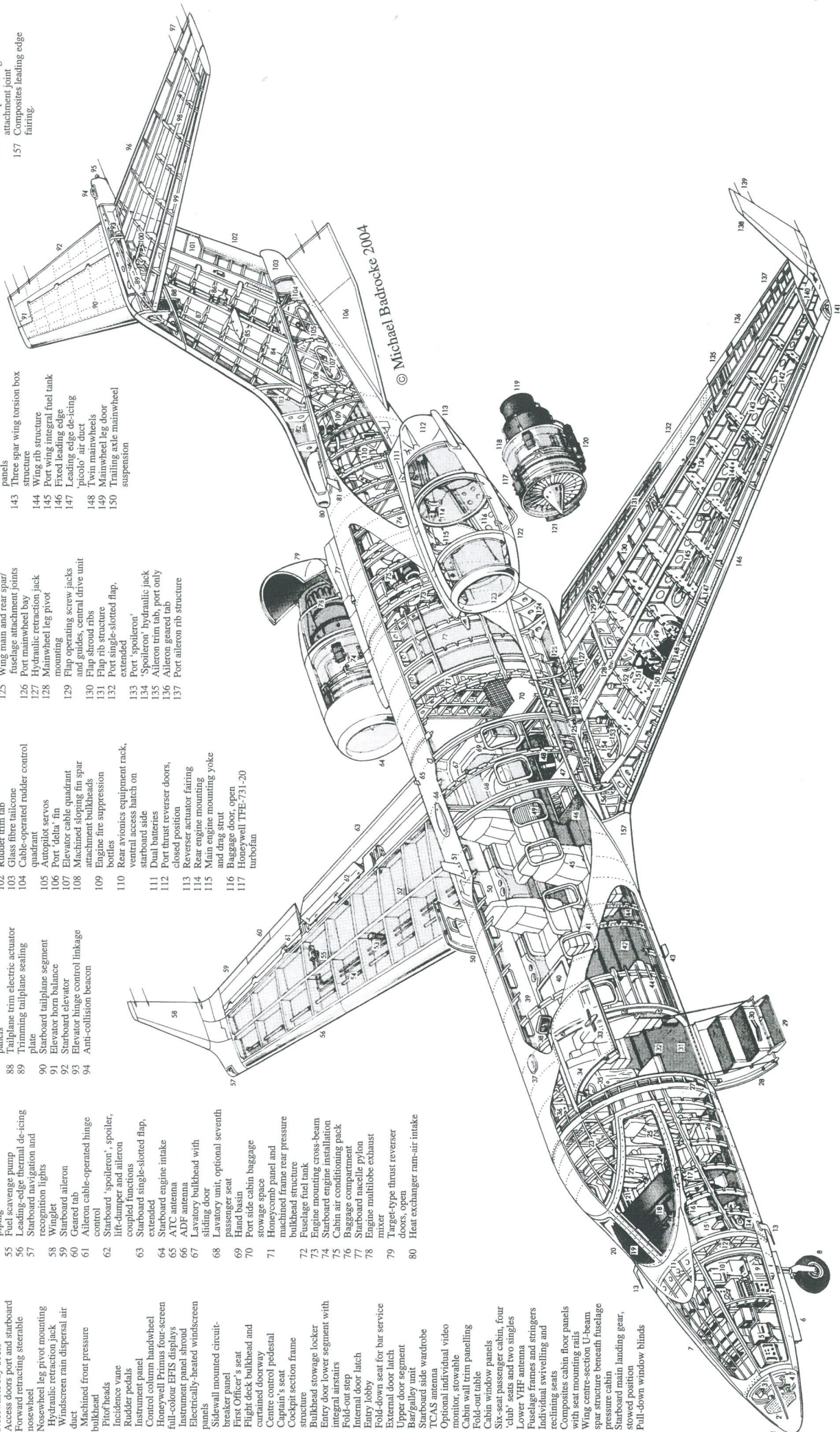
KAI T-50/A-50 Golden Eagle, cutaway drawing key

- 1 Glass fibre radome with lightning diverter strips
2 Weather radar scanner
3 Dual ILS glide-slope antennas
4 Radar scanner mounting
5 Nose avionics equipment bay
6 Nosewheel leg doors
7 Access doors port and starboard
8 Forward retracting steerable nosewheel
9 Nosewheel leg pivot mounting
10 Hydraulic retraction jack
11 Windscreen rain dispersal air duct
12 Machined front pressure bulkhead
13 Pitot heads
14 Incidence vane
15 Rudder pedals
16 Instrument panel
17 Control column handwheel
18 Honeywell Primus four-screen full-colour EFIS displays
19 Instrument panel shroud
20 Electrically-heated windscreen panels
21 Side-wall mounted circuit-breaker panel
22 First Officer's seat
23 Flight deck bulkhead and curtain doorway
24 Centre control pedestal
25 Captain's seat
26 Cockpit section frame structure
27 Bulkhead storage locker
28 Entry door lower segment with integral airstair
29 Fold-out step
30 Entry lobby
31 Entry door
32 Fold-down seat for bar service
33 External door latch
34 Upper door segment
35 Baggage unit
36 Starboard side wardrobe
37 TCAS antenna
38 Optional individual video monitor, stowable
39 Cabin wall trim panelling
40 Fold-out table
41 Cabin window panels
42 Six-seat passenger cabin, four 'club' seats and two singles
43 Lower VHF antenna
44 Fuselage frames and stringers
45 Individual swivelling and reclining seats
46 Composites cabin floor panels with seat mounting rails
47 Wing centre-section U-beam spar structure beneath fuselage pressure cabin
48 Starboard main landing gear, stowed position
49 Pull-down window blinds
- 50 Starboard side emergency escape hatch
51 Upper VHF antenna
52 Starboard wing integral fuel tank
53 Fuel capacitance probe
54 Fuel system vent and feed piping
55 Fuel scavange pump
56 Leading edge thermal de-icing
57 Starboard navigation and recognition lights
58 Winglet
59 Starboard aileron
60 Graced tab
61 Aileron cable-operated hinge
62 Starboard 'spoileron', spoiler, life-chopper and aileron coupled functions
63 Starboard single-slotted flap, slotted
64 Starboard engine intake
65 ATC antenna
66 ADF antenna
67 Lavatory bulkhead with sliding door
68 Lavatory unit, optional seventh passenger seat
69 Bath basin
70 Port side cabin baggage storage space
71 Honeycomb panel and machined frame rear pressure bulkhead structure
72 Fuelage fuel tank
73 Engine mounting cross-beam
74 Starboard engine installation
75 Cabin air conditioning pack
76 Baggage compartment
77 Starboard nacelle pylon
78 Engine multi-lobe exhaust mixer
79 Target-type thrust reverser doors, open
80 Heat exchanger ram-air intake

- 81 ELT antenna
82 Composites fin root fairing
83 Tailplane de-icing air duct
84 Three-spar fin torsion box structure
85 VOR antenna
86 Elevator control rods
87 Fin ribs, skins and stringer panels
88 Tailplane trim electric actuator
89 Trimming tailplane sealing plate
90 Starboard tailplane segment
91 Elevator horn balance
92 Starboard elevator
93 Elevator hinge control linkage
94 Anti-collision beacon
95 Tail navigation light
96 Port elevator rib structure
97 Static dischargers
98 Three-spar and rib tailplane torsion box structure
99 Leading edge de-icing air duct
100 Tailplane pivot mounting
101 Rudder rib structure
102 Rudder trim tab
103 Glass fibre tailcone
104 Cable-operated rudder control quadrant
105 Autopilot servos
106 Port 'delta' fin
107 Elevator cable quadrant
108 Machined sloping fin spar attachment bulkheads
109 Engine fire suppression bottles
110 Rear avionics equipment rack, ventral access hatch on starboard side
111 Dual batteries
112 Port thrust reverser doors, closed position
113 Reverser actuator fairing
114 Rear engine mounting
115 Main engine mounting yoke and drag strut
116 Baggage door, open
117 Honeywell TFE-731-20 turbofan

- 118 Cold stream exhaust
119 Hot stream exhaust
120 Accessory equipment gearbox
121 Engine oil tank
122 Hinged engine cowling panels
123 Inake lip, bleed-air de-iced edge fairing
124 Composites wing root trailing edge fairing
125 Wing main and rear spar/fuselage attachment joints
126 Port mainwheel bay
127 Hydraulic retraction jack
128 Mainwheel leg pivot mounting
129 Flap operating screw jacks and guides, central drive unit
130 Flap shroud ribs
131 Flap rib structure
132 Port single-slotted flap, extended
133 Port 'spoileron'
134 'Spoileron' hydraulic jack
135 Aileron trim tab, port only
136 Aileron geared tab
137 Port aileron rib structure

- 138 Port winglet
139 Static dischargers
140 Two-spar winglet mounting ribs
141 Port navigation and recognition lights
142 Wing tank bottom skin access panels
143 Three-spar wing torsion box structure
144 Wing rib structure
145 Port wing integral fuel tank
146 Fixed leading edge
147 Leading edge de-icing 'picolo' air duct
148 Twin mainwheels
149 Mainwheel leg door
150 Trailing axle mainwheel suspension
151 Shock absorber leg strut
152 Leg-mounted landing light
153 Fuel collector box and pump bay
154 Wing tank end rib
155 Wing/fuselage mounting drag link
156 Front spar/fuselage attachment joint
157 Composites leading edge fairing



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Fuel weight: max	2,404 kg (5,300 lb)
with max payload	2,087 kg (4,600 lb)
Max ramp weight	9,344 kg (20,600 lb)
Max T-O weight	9,230 kg (20,350 lb)
Max landing weight	as Learjet 45
Max zero-fuel weight	as Learjet 45
Max wing loading	318.9 kg/m ² (65.31 lb/sq ft)
Max power loading	296 kg/kN (2.91 lb/lb st)

PERFORMANCE:	
Max operating Mach No. (Mmo)	as Learjet 45
Cruising speed: high	as Learjet 45
normal	as Learjet 45
long-range	as Learjet 45
Time to FL430 at MTOW	22 min
Max certified altitude	as Learjet 45
T-O balanced field length	1,306 m (4,285 ft)
FAR Pt 91 landing distance	as Learjet 45
Range with two crew and four passengers:	
NBAA, IFR reserves	1,857 n miles (3,439 km; 2,137 miles)
OPERATIONAL NOISE LEVELS: As Learjet 45.	

UPDATED

LEARJET 60

TYPE: Business jet.
PROGRAMME: Announced 3 October 1990 as Learjet 55C successor; first flight of proof-of-concept aircraft with one PW305 turbofan 18 October 1990; flight testing resumed 13 June 1991 with two PW305s and stretched fuselage (more than 300 hours flown by May 1992); first production aircraft first flight (N601LJ) 15 June 1992; certification awarded 15 January 1993; deliveries started immediately. Certified in Argentina, Austria, Bermuda, Brazil, Canada, China, Denmark, Germany, Grand Cayman, Italy, Luxembourg, Malaysia, Mexico, the Philippines, South Africa, Switzerland, Turkey, the United Arab Emirates and USA.
CUSTOMERS: Total of 265 built by June 2003, including 22 delivered in 1994, 24 in 1995, 23 in 1996, 24 in 1997, 32 in 1998, 32 in 1999, 35 in 2000, 29 in 2001 and 18 in 2002. Recent customers include Publix Super Markets Inc, Canadian National Railway company, Sears Roebuck & Co and Krispy Kreme Doughnut Corporation.

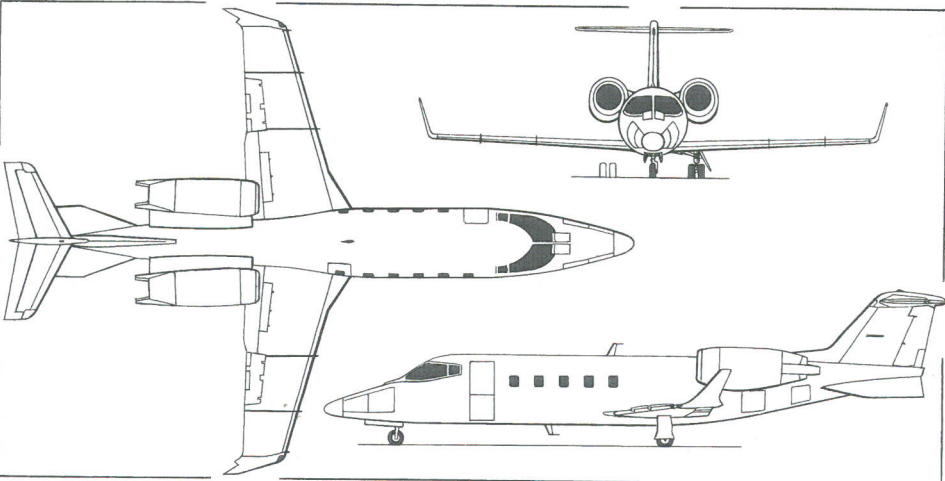
COSTS: US\$12.45 million (2002).
DESIGN FEATURES: Largest Learjet; otherwise generally as for earlier versions.

FLYING CONTROLS: As Learjet 31A. Spoilers can be partially extended to adjust descent rates.

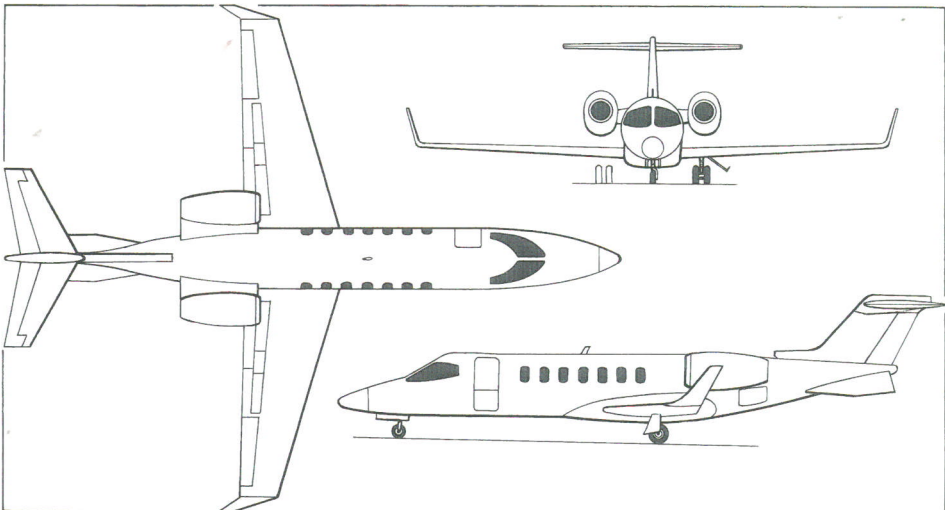
LANDING GEAR: Retractable tricycle type, hydraulically actuated and electrically controlled; single wheel on nose unit and twin wheels on main units; nosewheel retracts forward, mainwheels inward; steerable nosewheel ($\pm 60^\circ$). Mainwheel tyre size 17.5x5.75-8, pressure 14.76 bar (214 lb/sq in); nosewheel tyre size 18x4.4 (10 ply), pressure 7.24 bar (105 lb/sq in).

POWER PLANT: Two Pratt & Whitney Canada PW305A turbofans with FADEC, each flat rated at 20.46 kN (4,600 lb st) at up to 27°C (80°F). Fuel details under Weights and Loadings below. Single-point pressure refuelling system standard; gravity-feed fuel filler ports in each wing.

ACCOMMODATION: Two crew and up to 10 passengers; gross pressure cabin volume 15.57 m³ (550 cu ft); compared with 55C, main cabin is 0.71 m (2 ft 4 in) longer and rear baggage hold section 0.38 m (1 ft 3 in) longer; full-across aft lavatory has flat floor, large mirror, wardrobe and external servicing; total 1.67 m³ (59 cu ft) baggage capacity divided between an externally accessible hold (larger than that of Learjet 55C) and internal pressurised, heated compartment that is accessible in flight; galley cabinet has warming oven, cold liquid dispensers, ice compartment and storage for dinnerware; entertainment centre; 10-way adjusting seating is standard. New interior introduced in 1998 (from c/n 115), featuring redesigned passenger service unit, wider headliner, revised beverage cabinet, optional television monitor and wider choice of upholstery fabrics and leather trim.



Learjet 60 business transport (Jane's/Dennis Punnett)



Learjet 40 business jet (James Goulding)

NEW/052698



Learjet 60 (Pratt & Whitney PW305 turbofans) (Paul Jackson)

NEW/056832

SYSTEMS: Environmental control system uses engine bleed air for air conditioning and pressurisation, maximum differential 0.65 bar (9.4 lb/sq in), maintaining sea level cabin altitude to 7,835 m (25,700 ft) and 2,440 m (8,000 ft) cabin altitude to 15,545 m (51,000 ft). Hydraulic system, pressure 103.4 bar (1,500 lb/sq in), provided by two engine-driven, variable volume pumps, with electrically driven auxiliary pump. Electrical system comprises two 30 V DC 400 A engine-driven starter-generators and two 24 V DC batteries. Oxygen system, capacity 2.18 m³ (77.0 cu ft), with demand-type masks for crew and drop-down constant-flow masks for passengers. Bleed air anti-icing on wing leading-edges, engine inlets, engine spinners and inlet guide vanes, electric anti-icing on windscreen. Hamilton Sundstrand T-20G-10C3A APU.

AVIONICS: Standard fully integrated all-digital Rockwell Collins Pro Line 4.

Radar: Rockwell Collins WXR840 colour weather radar.
Flight: Four-tube (152 x 178 mm; 6 x 7 in) EFIS, dual digital air data computers, dual navigation and communications radios, UNS-1C FMS, dual automatic AHRS, Rockwell Collins AMS-850 avionics management system, advanced autopilot and long-range navaid as standard; circuit breaker and control panels redistributed, as in Learjet 31A.

DIMENSIONS, EXTERNAL:	
Wing span	13.34 m (43 ft 9 in)
Wing chord: at root	2.74 m (9 ft 0 in)
at tip	1.12 m (3 ft 8 in)
Wing aspect ratio	7.2
Length: overall	17.89 m (58 ft 8 1/4 in)
fuselage	17.02 m (55 ft 10 in)
Fuselage max diameter	1.96 m (6 ft 5 in)
Height overall	4.44 m (14 ft 6 1/4 in)

Tailplane span	4.48 m (14 ft 8 1/2 in)
Wheel track	2.51 m (8 ft 3 in)
Wheelbase	7.73 m (25 ft 4 1/2 in)
Cabin door: Width	0.64 m (2 ft 1 in)
Height to sill	0.69 m (2 ft 3 in)

DIMENSIONS, INTERNAL:	
Cabin: Length: incl flight deck	7.07 m (23 ft 2 1/2 in)
excl flight deck	5.38 m (17 ft 8 in)
Max width	1.80 m (5 ft 11 in)
Max height	1.73 m (5 ft 8 in)
Floor area, excl flight deck	6.40 m ² (68.9 sq ft)
Volume, excl flight deck	12.8 m ³ (453 cu ft)

AREAS:	
Wings, gross	24.57 m ² (264.5 sq ft)
Horizontal tail surfaces (total)	5.02 m ² (54.00 sq ft)
Vertical tail surfaces (total)	4.79 m ² (51.53 sq ft)

WEIGHTS AND LOADINGS:	
Weight empty	6,364 kg (14,030 lb)
Basic operating weight empty	6,641 kg (14,640 lb)
Max payload	1,070 kg (2,360 lb)
Payload with max fuel	544 kg (1,200 lb)
Max usable fuel weight	3,588 kg (7,910 lb)
Max T-O weight	10,659 kg (23,500 lb)
Max ramp weight	10,773 kg (23,750 lb)
Max landing weight	8,845 kg (19,500 lb)
Max wing loading	433.8 kg/m ² (88.85 lb/sq ft)
Max power loading	260 kg/kN (2.55 lb/lb st)

PERFORMANCE:	
Max operating speed (Vmo):	
S/L-FL80	300 kt (555 km/h; 345 mph) IAS
FL80-FL200	340 kt (629 km/h; 391 mph) IAS
FL200-FL230	
340-330 kt (630-611 km/h; 391-378 mph) IAS	
FL230-FL267-5	330 kt (611 km/h; 378 mph) IAS
Max operating Mach No. (Mmo):	
FL265-FL370	0.81
FL370-FL430	0.81-0.78
above FL430	0.78

Cruising speed: high	466 kt (863 km/h; 536 mph)
normal	453 kt (839 km/h; 521 mph)
long-range	422 kt (782 km/h; 486 mph)
Stalling speed, flaps and landing gear down	
106 kt (197 km/h; 122 mph) CAS	
139 kt (257 km/h; 160 mph) IAS	

Approach speed	1,371 m (4,500 ft)/min
Max rate of climb at S/L	378 m (1,240 ft)/min
Rate of climb at S/L, OEI	18 min 30 s
Time to FL410 after MTOW departure	15,545 m (51,000 ft)
Max certified altitude	7,195 m (23,600 ft)
Service ceiling, OEI	1,661 m (5,450 ft)
T-O balanced field length	1,043 m (3,420 ft)
FAR Pt 91 landing distance	

Range with two crew and four passengers:	
VFR	2,685 n miles (4,972 km; 3,089 miles)
NBAA IFR	2,510 n miles (4,648 km; 2,888 miles)

OPERATIONAL NOISE LEVELS:	
T-O	78.9 EPNdB
Sideline	83.2 EPNdB
Approach	87.7 EPNdB

UPDATED