

DIMENSIONS, INTERNAL:

Cabin; Length	12.50 m (41 ft 0 in)
Max width	4.05 m (13 ft 3 1/4 in)

AREAS:

Rotor disc	914.8 m ² (9,847.0 sq ft)
Vertical tails (total)	40.13 m ² (432.0 sq ft)
Horizontal tail	57.6 m ² (620.0 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	24,948 kg (55,000 lb)
Max T-O weight	59,875 kg (132,000 lb)

PERFORMANCE (estimated):

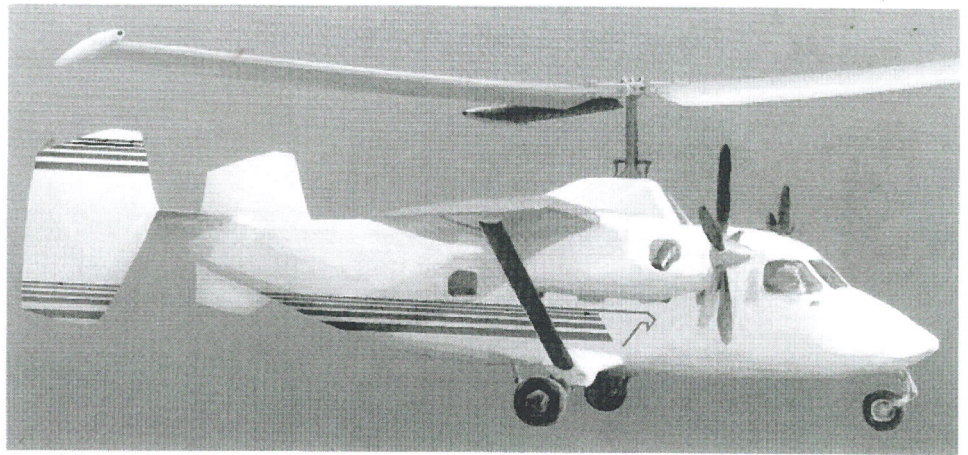
Never-exceed speed (VNE)	270-330 kt (500-611 km/h; 310-379 mph)
Cruising speed at 75% power	250-300 kt (463-556 km/h; 288-345 mph)
Max rate of climb at S/L	366 m (1,200 ft)/min
Service ceiling	5,486 m (18,000 ft)
Take-off and landing run (powered rotor in gyroplane mode)	zero
Range at 75% power	500-1,000 n miles (926-1,852 km; 575-1,150 miles)

NEW ENTRY

GROEN GYROLINER

TYPE: Convertiplane.

PROGRAMME: Groen proposes using same technology projected for its GyroLifter as the basis for a 35-seat,



Artist's impression of Groen GyroLiner based on PZL M28

NEW/1022978

VTOL commuter airliner. Plan calls for mounting rotor system, with tipjets, on an existing high-wing turboprop, such as the Polish-built M28 variant of the Antonov An-28. The resulting 19-passenger gyrodyne would provide rapid point-to-point transit and be the initial member of a family

of civil runway and ATC independent gyrodynes designed to address the congestion problem at many major airports.

NEW ENTRY

GROSSO

GROSSO AIRCRAFT INC

400 W Oak Street, Cottage Grove, Wisconsin 53527-9398

Tel: (+1 608) 345 04 06

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PRESIDENT: Ron Grosso

Grosso Aircraft was set up to market the Easy Eagle ultralight.

UPDATED

GROSSO EASY EAGLE

TYPE: Tandem-seat ultralight biplane kitbuilt.

PROGRAMME: Construction began 1996; Easy Eagle first displayed at Oshkosh 1998. Two-seat Easy Eagle II introduced in 1999.

CURRENT VERSIONS: **Easy Eagle:** Single-seat version.**Easy Eagle II:** Two-seat version.

CUSTOMERS: Three Easy Eagles and one Easy Eagle II flying by mid-2003.

COSTS: Kit US\$9,900 (Easy Eagle) or US\$13,900 (Easy Eagle II) (2002).

DESIGN FEATURES: Classic open-cockpit, single-bay biplane with steel tube cabane and flying struts and steel landing wires. Modified Clark Y aerofoil. No aerofoil on tailplane. Quoted build time 300 to 500 hours for Easy Eagle and 500 to 700 hours for Easy Eagle II.

FLYING CONTROLS: Conventional and manual. Large ailerons on lower wings only.

STRUCTURE: Fabric-covered 4130 steel tube fuselage with metal-covered fuselage forward of cockpit and two-spar wooden wings with aluminium leading-edge.

LANDING GEAR: Tailwheel configuration; one-piece sprung aluminium mainwheel legs. Azusa wheels and cable brakes; tyres 5.00-5 on Easy Eagle and 6.00-6 Easy Eagle II. Solid tailwheel.

POWER PLANT: **Easy Eagle:** One 1,914 cc Volkswagen four-cylinder air-cooled motorcar engine; design accepts



Newly completed Grosso Easy Eagle I (Paul Jackson)

0126879

engines to 63.4 kW (85.0 hp). Wooden propeller. Fuel capacity 45.4 litres (12.0 US gallons; 10.0 Imp gallons).

Easy Eagle II: One 83.5 kW (112 hp) Textron Lycoming O-235 flat-four. Fuel capacity 68.1 litres (18.0 US gallons; 15.0 Imp gallons).

DIMENSIONS, EXTERNAL:

Wing span: Easy Eagle	5.49 m (18 ft 0 in)
Easy Eagle II	6.20 m (20 ft 4 in)
Length overall: Easy Eagle	4.37 m (14 ft 4 in)
Easy Eagle II	5.49 m (18 ft 0 in)
Height overall: Easy Eagle	1.78 m (5 ft 10 in)
Easy Eagle II	1.98 m (6 ft 6 in)

AREAS:

Wings, gross: Easy Eagle	9.57 m ² (103.0 sq ft)
Easy Eagle II	13.01 m ² (140.0 sq ft)

WEIGHTS AND LOADINGS:

Weight empty: Easy Eagle	193 kg (425 lb)
Easy Eagle II	328 kg (725 lb)

Max T-O weight: Easy Eagle	328 kg (725 lb)
Easy Eagle II	521 kg (1,150 lb)

PERFORMANCE:

Max operating speed: both	95 kt (177 km/h; 110 mph)
Normal cruising speed: both	78 kt (145 km/h; 90 mph)
Stalling speed: both	40 kt (73 km/h; 45 mph)
Max rate of climb at S/L: both	274 m (900 ft)/min
T-O run: Easy Eagle	92 m (300 ft)
Easy Eagle II	122 m (400 ft)
Landing run: both	92 m (300 ft)
Range with max fuel: Easy Eagle	260 n miles (482 km; 300 miles)
Easy Eagle II	173 n miles (321 km; 200 miles)

UPDATED

GULFSTREAM

GULFSTREAM AEROSPACE CORPORATION

500 Gulfstream Road, Savannah, Georgia 31408

Tel: (+1 912) 965 30 00

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Web: http://www.gulfstream.com

PRESIDENT: Bryan T Moss

CHIEF OPERATING OFFICER: Joe Lombardo

SENIOR VICE-PRESIDENT, MARKETING AND SALES:

Raynor Reavis

SENIOR VICE-PRESIDENT, PRODUCT SUPPORT: Larry R Flynn

SENIOR VICE-PRESIDENT, PROGRAMS, ENGINEERING AND TEST:

Preston Henne

SENIOR VICE-PRESIDENT, GOVERNMENT SALES AND MARKETING:

Buddy Sams

SENIOR VICE-PRESIDENT, FINANCE AND PLANNING: Dan Clare

SENIOR VICE-PRESIDENT, ADMINISTRATION: Ira Berman

VICE-PRESIDENT, ENGINEERING: Richard L Johnson

VICE-PRESIDENT, G100, G150 AND G200 PROGRAMMES:

Dr Dan Nale

VICE-PRESIDENT, MARKETING AND COMMUNICATIONS:

Stephanie Snyder

DIRECTOR OF CORPORATE COMMUNICATIONS: Robert Baugnet

Originally an offshoot of Grumman Corporation; passed through several owners before purchase by General Dynamics for US\$4.8 billion in May 1999; deal completed 31 July 1999.

Corporate HQ and production centre at Savannah, Georgia, has 4,430 employees. Subassembly and support locations are Oklahoma City, Oklahoma (350) and Mexicali, Mexico (600); however, the company announced that its Oklahoma City subsidiary would close by end 2002. Completions and service undertaken at Long Beach, California (865), Dallas, Texas (705), Appleton, Wisconsin (400) and Brunswick, Georgia (215). Service and refurbishment centre at Westfield, Massachusetts (150); a 4,985 m (53,650 sq ft) refurbishment support facility was added at Savannah in April 2000, at which time the total direct workforce was 8,200. In early 2001, Gulfstream exchanged its engine overhaul service in Dallas with units of BBA Aviation, acquiring four regional maintenance centres in Dallas, Las Vegas, Minneapolis and West Palm Beach; the service operation was rebranded as General Dynamics Aviation Services as a result.

The 1,000th Gulfstream, a Gulfstream V, was delivered to the company's Long Beach completion centre in September 1997. During 1998, Gulfstream and Lockheed Martin's Skunk Works were revealed to be undertaking preliminary

studies into the potential of a supersonic business jet; however Skunk Works withdrew from the project in 2000, following financial difficulties.

Gulfstream delivered 51 aircraft (22 Gulfstream IV-SPs and 29 Vs) in 1997 and 61 (32 Gulfstream IV-SPs and 29 Vs) in 1998. Gulfstream simultaneously handed over the 400th Gulfstream IV and 100th Gulfstream V at Savannah, Georgia, on 25 April 2000. Sales for 2000 were 82, comprising 27 new-generation V-SPs, 35 IV-SPs and 20 Vs; deliveries for same period were 70; for 2001 36 IV-SPs and 35 Vs, plus five Gulfstream 100s and 24 200s; for 2002 85 (all models); and five Gulfstream 100/200s and 14 Gulfstream 300/400/500/550 in the first nine months of 2003.

Following the purchase of Galaxy Aerospace of Israel by General Dynamics on 5 June 2001, the former's Astra and Galaxy business jets were incorporated into the Gulfstream product line as the Gulfstream 100 and 200 respectively. Production continues at Tel Aviv with 'green' aircraft flown to Lincoln, Nebraska (100) and Alliance Airport, Texas (200) for outfitting by Gulfstream; the Alliance facility closed in mid-2002 as a completion centre and became a sales and design centre.

On 9 September 2002, Gulfstream announced revised aircraft designations, the G IV becoming G300 and G400; G V becoming G500 and G550; and a widened G100 being

launched as the G150. At the October 2003 NBAA Convention, the G450 was revealed following its previously unannounced maiden flight.

UPDATED

GULFSTREAM G100

US Air Force designation: C-38A

TYPE: Business jet.

PROGRAMME: Descendant of US Aero Commander 1121 Jet Commander (first flight 27 January 1963), acquired by IAI 1967 and developed successively as 1121 Commodore Jet, 1123 and 1124 Westwind and 1124A Westwind 2; sales of 1121/23/24/24A models by Aero Commander and IAI totalled 441 by end of 1987; 1125 model launched at NBAA Convention October 1979, renamed Astra 1981.

Construction of two prototypes and one static/fatigue test aircraft started April 1982; roll-out 1 September 1983; first flight (4X-WIN, c/n 001) 19 March 1984; first flight 4X-WIA (c/n 002) August 1984; first flight production Astra (4X-CUA) 20 March 1985; FAR Pts 25 and 36 certification 29 August 1985; first delivery 30 June 1986. Astra SP introduced at NBAA Convention October 1989; first delivery of this version (N60AJ) late 1990.

Astra SPX announced at NBAA Convention 1994 and certified by FAA 8 January 1996; type certificate acquired by Gulfstream Aerospace in June 2001, renamed Gulfstream 100 and formally unveiled as such at Paris on 17 June 2001; Gulfstream G100 name adopted from September 2002. Production rate 12 to 15 per year.

CURRENT VERSIONS: **Astra:** Initial version; 32 production aircraft; see 1992-93 and earlier *Jane's All the World's Aircraft*.

Astra SP: Introduced 1989; superseded by SPX; 36 built; details in 1997-98 *Jane's*

Gulfstream G100: First flight (as Astra SPX, 4X-WIX) 18 August 1994; FAA certification 8 January 1996; production deliveries from early 1996. Winglets and Rockwell Collins Pro Line 4 avionics. Change to more powerful TFE731-40R-200G turbofans with FADEC, hydromechanical fuel control back-up and Dee Howard thrust reversers; increased weights and payload/range performance and shorter T-O run. Type Certificate amended with G100 designation 9 August 2002.

Detailed description applies to Gulfstream 100 from c/n 138 onwards.

C-38A: Two Astra SPXs, outfitted by Tracor Flight Systems for transport and medevac duties; delivered as C-38As to 201st Airlift Squadron of the US Air National Guard at Andrews AFB, Maryland, in April and May 1998, replacing C-21A Learjets.

Gulfstream G150: Wide-cabin version; described separately.

Gulfstream G200: Improved and redesigned version; described separately.

CUSTOMERS: Combined production of Astra and Astra SP totalled 68 (plus two prototypes), of which approximately 80 per cent to US customers.

Total of 52 SPXs and 18 G100s produced up to end of 2002, including customer deliveries of 14 in 1998, 12 in 1999, 11 in 2000 and five in 2001; no figures released for 2002. Only three further aircraft registered in first nine months of 2003, increasing G100 total to 21 (although only final five of these were officially registered as G100s, beginning with c/n 146).

ASTRA/G100 PRODUCTION
(to late 2003)

Variant	Qty	Remarks
Prototypes (flying)	2	
Astra	32	
Astra SP	36	
Astra SPX	52	
Astra SPX/G100*	16	Registered as SPX
G100	5	Registered as G100
Total	143	

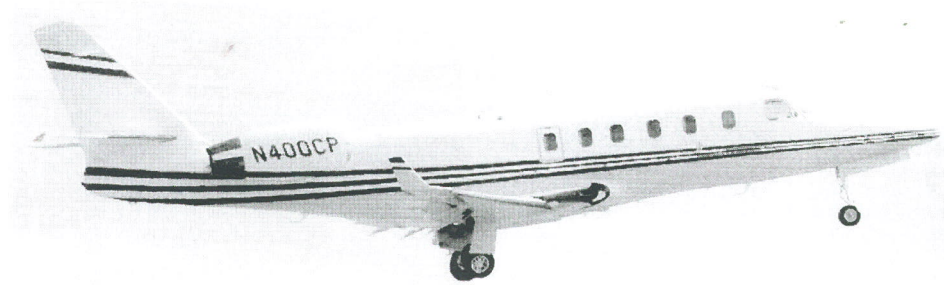
* Produced after G100 name announcement; eligible for official change of designation

DESIGN FEATURES: Typical swept wing, rear-engined business jet configuration. Meets FAR Pt 36 Stage 3 (noise), SFAR Pt 27 (fuel venting and exhaust emission) and RVSM requirements.

Wing section high-efficiency IAI Sigma 2; leading-edge sweep 34° inboard, 25° outboard; dihedral 2°; trailing-edge sweep on outer panels; winglets.

FLYING CONTROLS: Conventional, with hydraulically powered ailerons, manually actuated elevators and rudder. Control surfaces operated by pushrods; tailplane incidence controlled by three motors running together to protect against runaway or elevator disconnect; ailerons can be separated in case of jam; spoiler/lift dumper panels ahead of Fowler flaps; elevators and horn-balanced rudder each have geared tab; flaps interconnected with outboard leading-edge slats, both electrically actuated.

STRUCTURE: One-piece, two-spar wing with machined ribs and skin panels, attached by four main and five secondary



Gulfstream G100 twin-turboprop business transport (Paul Jackson)

NEW/0567036

frames; wing/fuselage fairings, elevator and fin tips and tailcone of GFRP; ailerons, spoilers, inboard leading-edges and wingtips of Kevlar and Nomex honeycomb; nose avionics bay door and nosewheel doors of Kevlar; Kevlar-reinforced nacelle doors and panels; chemically milled fuselage skins; some titanium fittings; heated windscreens of laminated polycarbonate with external glass layer to resist scratching.

LANDING GEAR: SHL hydraulically retractable tricycle type, with oleo-pneumatic shock-absorber and twin wheels on each unit. Trailing-link main units retract inward, nosewheels forward. Tyre sizes 23x7.00-12 (10 ply) (main), 16x4.4-10 (6 ply) deflector type (nose), pressures 8.55 bar; 124 lb/sq in and 6.90 bar; 100 lb/sq in respectively. Hydraulic extension, retraction and nosewheel steering ($\pm 58^\circ$); hydraulic multidisc anti-skid mainwheel brakes. Compressed nitrogen cylinder provides additional power source for emergency extension.

POWER PLANT: Two 18.90 kN (4,250 lb st) Honeywell TFE731-40R-200G turbofans, with Dee Howard hydraulically actuated target-type thrust reversers and FADEC, pylon-mounted in nacelle on each side of rear fuselage. Standard fuel in left and right outer wing tanks, each 1,094 litres (289 US gallons; 241 Imp gallons) and integral tank in wing centre-section and upper and lower tanks in centre-fuselage (combined capacity 2,744 litres; 725 US gallons; 604 Imp gallons). Total normal fuel 4,932 litres (1,303 US gallons; 1,085 Imp gallons), of which 4,910 litres (1,297 US gallons; 1,080 Imp gallons) are usable. Additional fuel can be carried in 378.5 litre (100 US gallon; 83.3 Imp gallon) removable auxiliary tank in forward area of baggage compartment (with baggage weight limitation imposed), all usable. Single pressure refuelling point in lower starboard side of fuselage aft of wing, or single gravity point in upper fuselage, allow refuelling of all tanks from one position. Fuel sequencing automatic.

ACCOMMODATION: Crew of two on flight deck. Dual controls standard. Sliding door between flight deck and cabin. Standard accommodation in pressurised cabin for six persons, two in forward-facing seats at front and four in club layout; galley (port or starboard) at front of cabin, coat closet forward (starboard), lavatory at rear. All six seats individually adjustable fore and aft, laterally, and can be swivelled or reclined; all fitted with armrests and headrests. Two wall-mounted foldaway tables between club seat pairs. Coat closet houses stereo tape deck. Maximum accommodation for nine passengers.

New cabin interior (first redesign since 1986), introduced in September 1999, has less intrusive (curved) cabinetry and galley units; restyled headliner and sidewall panels; new seats, tables and lighting. Forward club seating maximises recline angle and personal space for each occupant; lavatory has brighter lighting; more storage space for coats and carry-on baggage.

Plug-type airstair door at front on port side; emergency exit over wing on each side. Heated baggage compartment aft of passenger cabin, with external access and service ladder. Service compartment in rear fuselage houses aircraft batteries (or optional APU), electrical relay boxes, inverters and miscellaneous equipment.

SYSTEMS: Honeywell environmental control system, using engine bleed air, with normal pressure differential of 0.61 bar (8.8 lb/sq in). Honeywell 36-150(W) APU available optionally. Two independent hydraulic systems, each at pressure of 207 bar (3,000 lb/sq in). Primary system operated by two engine-driven pumps for actuation of anti-skid brakes, landing gear, nosewheel steering, spoilers/lift dumpers and primary control surfaces. Back-up system, operated by electrically driven pump, provides power for emergency/parking brake, primary control surfaces and thrust reversers.

Electrical system comprises two Lucas Aerospace 300 A 30 V DC engine-driven starter/generators, with two 1 kVA single-phase solid-state inverters operating in unison to supply single-phase 115 V AC power at 400 Hz and 26 V AC power for aircraft instruments. Two 24 V 24 Ah Ni/Cd batteries for engine starting and to permit operation of essential flight instruments and emergency equipment. 28 V DC external power receptacle standard.

Pneumatic de-icing of wing leading-edge slats and tailplane leading-edges; thermal anti-icing of engine intakes. Oxygen system for crew (pressure demand) and passengers (drop-down masks) supplied by 2.18 m³ (77 cu ft) cylinder, with second cylinder of same capacity optional. Two-bottle Freon-type engine fire extinguishing system standard.

AVIONICS: Rockwell Collins Pro Line 4 suite standard.

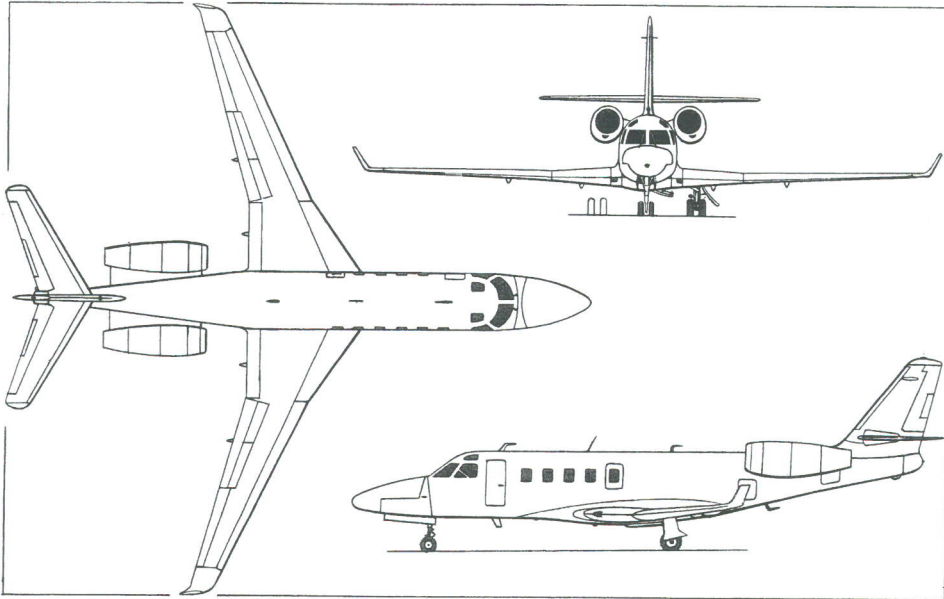
Comms: Dual VHF-422C radios, RTU-4220 radio tuners, TDR-94D transponders, Baker B12135 audio systems and Magnastar Flightphones, Rockwell Collins HF 9000 HF, Motorola NA-1335 Selcal, Artex ELT and Universal CVR-30B CVR.

Radar: TWR-850 colour weather radar and WXP-4220 control panel.

Flight: Dual Universal UNS-1C FMS with embedded GPS, Rockwell Collins FCC-4005 autopilots, AHC-85E AHRs, ADC-850C air data systems, VIR-432 nav/GS/markers and DME-442; single ADF-462, ALT-55B radio altimeter, TCAS-94 and Honeywell EGPWS.

Instrumentation: Rockwell Collins EFD-4077 EFIS displays all flight information on four 18.4 cm (7¼ in) screens; dual Grimes engine displays and Davtron M850A digital clocks; single Flight Line 8047-10 standby altimeter, 8059-2B standby ASI, Jet AI-804CE standby AI, Precision PAI-700-02 standby compass and Hobbs 15007 hour meter.

EQUIPMENT: Standard equipment includes electric windscreen wipers, electric (warm air) windscreen demisting, wing ice inspection lights, landing light in each wingroot, taxiing



Gulfstream G100 business transport (two Honeywell TFE731-40R-200G turbofans) (Jane's/Dennis Punnett)

light inboard of each mainwheel door, navigation and Precise Flight pulse lights at wingtips and tailcone, rotating beacons under fuselage and on top of fin, provision for DeVore logo light and wing/tailplane static wicks.

DIMENSIONS, EXTERNAL:

Wing span over winglets	16.64 m (54 ft 7 in)
Wing mean aerodynamic chord	2.19 m (7 ft 2¼ in)
Wing aspect ratio	8.8
Length overall	16.94 m (55 ft 7 in)
Fuselage: Max width	1.57 m (5 ft 2 in)
Max depth	1.91 m (6 ft 3 in)
Height overall	5.54 m (18 ft 2 in)
Tailplane span	6.40 m (21 ft 0 in)
Wheel track (c/l of shock-struts)	2.77 m (9 ft 1 in)
Wheelbase	7.34 m (24 ft 1 in)
Passenger door (fwd, port): Height	1.37 m (4 ft 6 in)
Width	0.66 m (2 ft 2 in)
Overwing emergency exits (each):	
Height	0.69 m (2 ft 3 in)
Width	0.48 m (1 ft 7 in)

DIMENSIONS, INTERNAL:

Cabin: Length: incl flight deck	6.86 m (22 ft 6 in)
excl flight deck	5.21 m (17 ft 1 in)
Max width	1.45 m (4 ft 9 in)
Max height	1.70 m (5 ft 7 in)
Volume, incl flight deck	12.03 m³ (425 cu ft)
Baggage compartment volume (A: with, B: without fuel tank extension):	
A	1.2 m³ (42 cu ft)
B	1.6 m³ (55 cu ft)

AREAS:

Wings, gross (excl winglets)	29.41 m² (316.6 sq ft)
Ailerons (total)	1.20 m² (12.92 sq ft)
Trailing-edge flaps (total)	4.20 m² (45.18 sq ft)
Leading-edge slats (total)	2.39 m² (25.76 sq ft)
Winglets (total)	0.52 m² (5.57 sq ft)
Fin	3.34 m² (35.97 sq ft)
Rudder (incl tab)	1.17 m² (12.63 sq ft)
Tailplane	4.86 m² (52.28 sq ft)
Elevators (total, incl tabs)	2.01 m² (21.66 sq ft)

WEIGHTS AND LOADINGS:

Basic operating weight empty	6,214 kg (13,700 lb)
Max usable fuel: standard	3,942 kg (8,692 lb)
with long-range tank	4,248 kg (9,365 lb)
Max payload	1,073 kg (2,365 lb)
Payload with max fuel	363 kg (800 lb)
Baggage compartment capacity (A: with, B: without fuel tank extension):	
A	168 kg (370 lb)
B	499 kg (1,100 lb)
Max ramp weight	11,249 kg (24,800 lb)
Max T-O weight	11,181 kg (24,650 lb)
Max landing weight	9,389 kg (20,700 lb)
Max zero-fuel weight	7,711 kg (17,000 lb)
Max wing loading	380.3 kg/m² (77.89 lb/sq ft)
Max power loading	296 kg/kN (2.90 lb/lb st)

PERFORMANCE:

Max operating Mach No. (MMO)	0.875
Max operating speed (VMO), S/L to FL270	353 kt (653 km/h; 406 mph) IAS
Max cruising speed at FL330, 8,618 kg (19,000 lb) mid-cruise weight	484 kt (896 km/h; 557 mph)
Normal cruising speed	M0.80 (459 kt; 850 km/h; 528 mph)
Long-range cruising speed	430 kt (796 km/h; 495 mph)
Max rate of climb at S/L	1,160 m (3,805 ft)/min
Rate of climb at S/L, OEI	411 m (1,348 ft)/min
Initial cruise altitude	12,497 m (41,000 ft)
Max certified altitude	13,715 m (45,000 ft)
FAR Pt 25 T-O balanced field length	1,645 m (5,395 ft)
FAR Pt 25 landing distance at MLW	890 m (2,920 ft)
Range: with eight passengers	2,286 n miles (4,235 km; 2,631 miles)
with four passengers, max fuel and NBAA IFR reserves	2,949 n miles (5,461 km; 3,393 miles)
with max fuel, VFR reserves	3,256 n miles (6,030 km; 3,747 miles)

OPERATING NOISE LEVELS (FAR Pt 36, Stage 3):

T-O	79.1 EPNdB
Sideline	89.5 EPNdB
Approach	91.9 EPNdB

UPDATED

GULFSTREAM G150

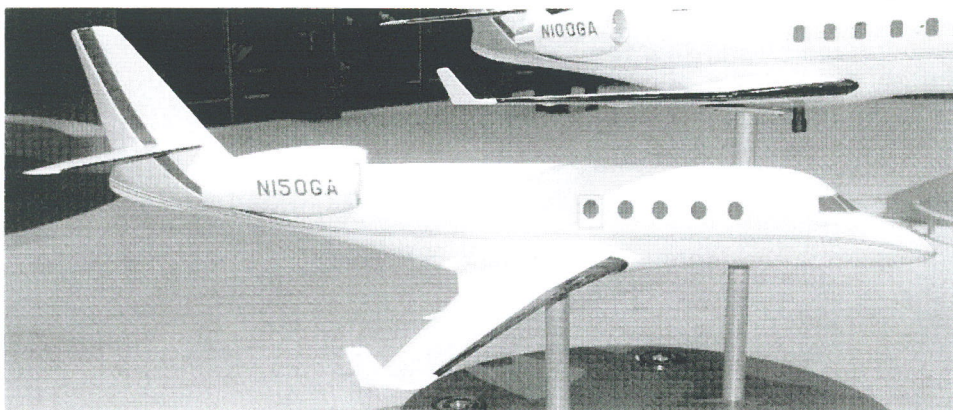
TYPE: Business jet.

PROGRAMME: Announced on eve of NBAA Convention at Orlando, Florida, 8 September 2002. Deliveries to launch customer NetJets were scheduled to begin in second quarter of 2005, but by early 2003 programme amended to include May 2005 first flight, certification in January 2006 and first deliveries in August 2006.

CUSTOMERS: Launch customer NetJets Inc ordered 50, plus 50 options, on 9 September 2002, for delivery between 2005 and 2010.

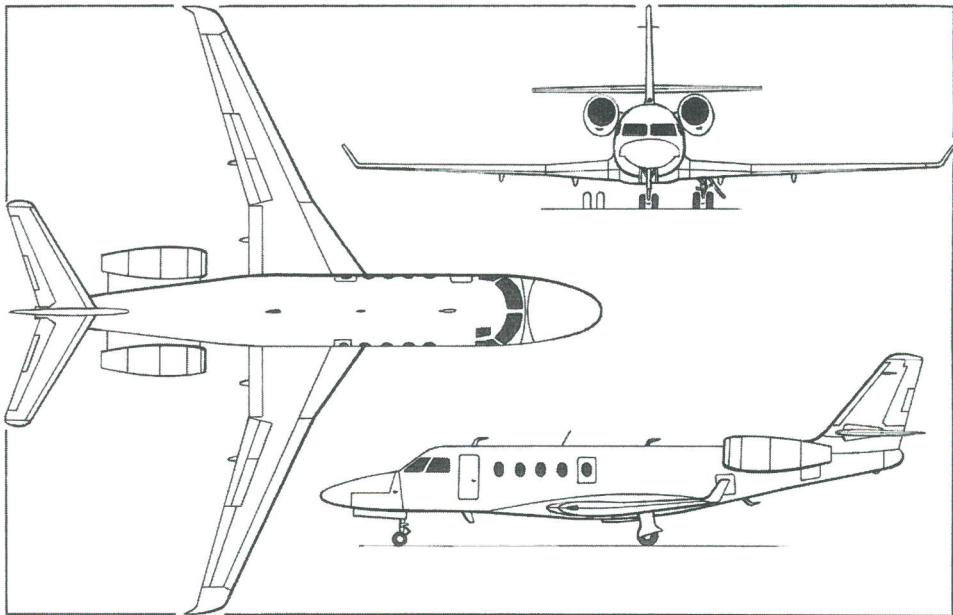
COSTS: US\$14.5 million (2003).

DESIGN FEATURES: Wide-cabin version of G100; max internal dimensions increased by 31 cm (12¼ in) in width and 5 cm (2 in) in height. Up-rated engines, increased weights, but same range and cruising speed. G200-style windscreen and cabin windows, latter reduced in number from six to five.



Model of projected Gulfstream G150 (Paul Jackson)

NEW/0567041



Gulfstream G150, widened derivative of G100 (James Goulding)

NEW/0568985

Differences from G100 summarised below:

POWER PLANT: Two 19.6 kN (4,400 lb st) Honeywell TFE731-40R turbofans.

ACCOMMODATION: Two pilots and between six and eight passengers in three choices of interior.

DIMENSIONS, EXTERNAL:

Wing span	16.94 m (55 ft 7 in)
Length overall	17.25 m (56 ft 7¼ in)
Height overall	5.54 m (18 ft 2 in)

DIMENSIONS, INTERNAL:

Cabin: Length	5.41 m (17 ft 9 in)
Max width	1.75 m (5 ft 9 in)
Max height	1.75 m (5 ft 9 in)
Volume	13.17 m³ (465 cu ft)

Baggage volume:

main compartment	1.56 m³ (55 cu ft)
overhead bins	0.25 m³ (8.8 cu ft)

WEIGHTS AND LOADINGS:

Basic operating weight (including two pilots)	6,849 kg (15,100 lb)
Payload: max	1,089 kg (2,400 lb)
with max fuel	363 kg (800 lb)
Max fuel weight	4,581 kg (10,100 lb)

Max T-O weight	11,725 kg (25,850 lb)
Max landing weight	9,843 kg (21,700 lb)
Max zero-fuel weight	7,938 kg (17,500 lb)
Max power loading	300 kg/kN (2.94 lb/lb st)

PERFORMANCE:

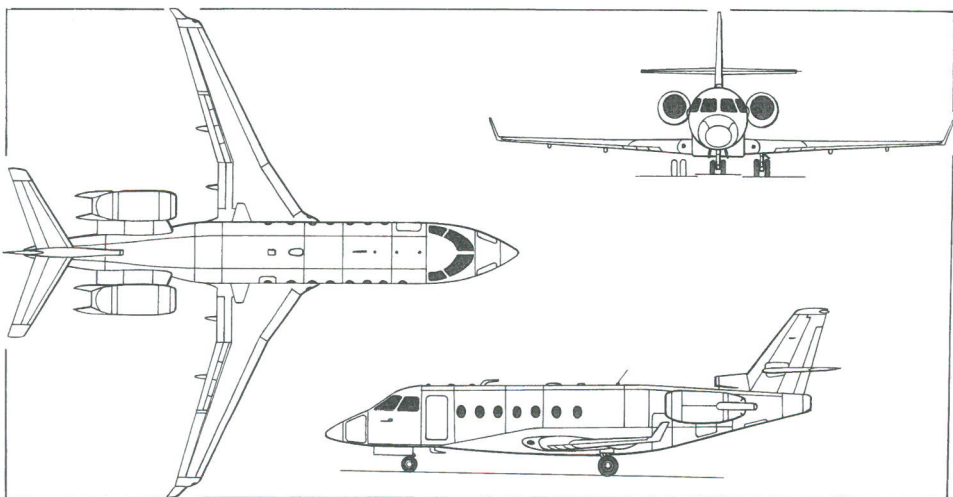
Max operating Mach No. (MMO)	0.85
Normal cruising speed	459 kt; (850 km/h; 528 mph)
Long-range cruising speed	430 kt (796 km/h; 495 mph)
FAR Pt 25 T-O balanced field length	1,777 m (5,830 ft)
FAR Pt 25 landing distance at MLW	1,052 m (3,450 ft)

UPDATED

GULFSTREAM G200

TYPE: Business jet.

PROGRAMME: Initiated as IAI 1126 derivative of Astra SP; design (then called Astra IV) finalised late 1992 in anticipation of 1993 launch; co-production with Yakovlev of Russia discussed during early part of 1993; formal announcement of launch as Galaxy, with minor design changes, announced 20 September 1993 just before NBAA Convention in Atlanta, Georgia, USA, followed next day by news that Yakovlev to be risk-sharing partner; other

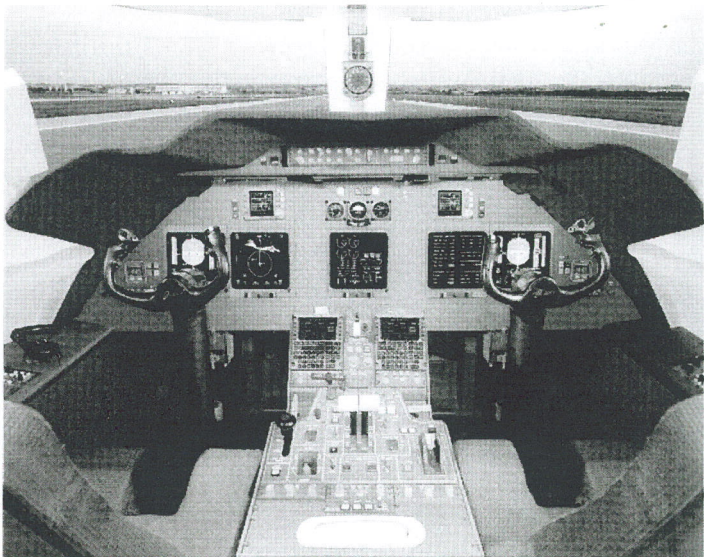


Gulfstream G200 twin-turboprop business and commuter transport (James Goulding)

0062974



Typical Gulfstream G200 business jet interior



Flight deck of Gulfstream G200 with Rockwell Collins Pro Line 4 avionics

0099570

0100870

partners to be Rockwell Collins (avionics supplier) and eventual engine manufacturer (P&WC since selected). Replacement for Yakovlev sought in 1995, and Sogerma (France) contracted August 1996 to build production aircraft fuselages and tail units, but latter contract terminated mid-2001.

Four prototypes (003 and 004 flying plus 001 static and 002 fatigue test); first flight rescheduled for fourth quarter 1996 (later changed to second quarter 1997 and later still to fourth quarter 1997); 003 rolled out 4 September 1997 and made first flight (4X-IGA) 25 December 1997. Static testing of 001 completed September 1998. Second flight test aircraft (4X-IGO, c/n 004) made first flight 21 May 1998; 005 (company demonstrator 4X-IGB/N505GA) first flew on 23 September 1998; combined total of 750 hours in 260 flights by three aircraft by December 1998. Israeli CAA and US FAA certification to FAR Pt 25 Amendment 25 and FAR Pts 34 and 36 awarded 16 December 1998; European JAA certification process started mid-1999. First customer delivery, to TTI of Fort Worth, Texas, made in January 2000. Production rate two per month in mid-2000. Type certificate acquired by Gulfstream Aerospace in June 2001, aircraft renamed Gulfstream 200 and formally unveiled as such at Paris on 17 June 2001; name Gulfstream G200 adopted in September 2002 although Type Certificate had been amended with new designation on 16 January 2002. G200 applies to c/n 057 and subsequent aircraft, although retrospective redesignation is permissible under US rules. Civil Aviation Administration of China certification achieved 10 September 2002.

CURRENT VERSIONS: Seen as four/eight-passenger business/executive (standard model), with option of alternative interior seating up to 18 passengers for regional transport operation.

CUSTOMERS: Between 45 and 50 commitments by October 1999, of which about 35 per cent from non-US operators in Canada, Europe, Israel, Mexico and South America. First bulk order, for seven, plus option on 15 more, placed mid-1999 by charter operator ILI Aviation of Zurich, Switzerland. IAI estimates break even at 100 sales and potential market for 200. Totals of one delivered in 1999, six in 2000, 24 in 2001, and 12 in the first six months of 2002. Orders by September 2002 included 50 firm and 50 options by Executive Jet Inc, three by Hainan Airlines of Beijing, China, and one by MetroJet of Hong Kong. Total 82 (including prototypes) supplied to completion centres or customers by July 2003.

GALAXY/G200 PRODUCTION
(at October 2003)

Variant	Qty	Remarks
Prototypes (flying)	2	
Galaxy	48	Eligible for change of designation
G200	32	
Total	82	

COSTS: Approximately US\$18 million flyaway (July 2000); total development programme cost forecast at approximately US\$152 million (1993).

Detailed description applies to Gulfstream G200 from c/n 40 onwards.

DESIGN FEATURES: Designed for transatlantic range (non-stop Paris to New York). Essentially same wing as Gulfstream 100, except for 34° 30' inboard leading-edge sweep and addition of Krueger flaps; new wide-body fuselage is longer and has more headroom.

FLYING CONTROLS: All-hydraulic dual actuation except for rudder (manual); aileron movement 10° up/15° down,

elevators 27° up/20° down, rudder 20° left/right; tailplane and rudder tab have electric trim. Wings fitted with outboard leading-edge slats (25° fully out), inboard Krueger leading-edge flaps (110°), four-segment upper surface airbrakes/lift dumpers (45° fully up) and Fowler single-slotted inboard and outboard trailing-edge flaps (settings 0, 12, 20 and 40°). Ailerons and elevators can be operated manually in event of hydraulic failure.

STRUCTURE: Generally similar to that described for G100. Sogerma (France) produced tail units, doors, access panels, tailcones and wing/fuselage fairings for prototypes. Flight Environments cabin flame protection and sound attenuation system.

LANDING GEAR: Hydraulically retractable tricycle type; twin wheels and oleo-pneumatic shock-absorbers on each unit. Nose unit has electrohydraulic steering (± 60°) and retracts forward. Trailing-link mainwheel units retract inward and are equipped with Honeywell multidisc anti-skid carbon brakes.

POWER PLANT: Two FADEC-equipped Pratt & Whitney Canada PW306A turbofans, each flat rated at 26.9 kN (6,040 lb st), pylon-mounted on sides of rear fuselage. Nardam nacelles and thrust reversers. Fuel in seven tanks: right and left wing, each 1,334 litres (352.5 US gallon; 293.5 Imp gallons); right and left feed, each 102 litres (26.9 US gallons; 22.4 Imp gallons); centre 1,533 litres (405 US gallons; 337 Imp gallons); forward 1,011 litres (267 US gallons; 222 Imp gallons); and fuselage 3,115 litres (823 US gallons; 685 Imp gallons). Total fuel 8,532 litres (2,254 US gallons; 1,877 Imp gallons), of which 8,479 litres (2,240 US gallons 1,865 Imp gallons) are usable.

ACCOMMODATION: One or two pilots; provision for jump-seat for third crew member. Standard club-type seating for four to eight persons in business/executive version; legroom between facing seats allows enough space for full reclining and berthing; large galley with room for refrigerator, microwave oven, coffee maker and storage. Alternative 10-passenger layout has four club seats at front, with a four-place conference group and two on a divan to the rear, plus optional lavatory and additional baggage space aft. Three-abreast seating for up to 18 passengers, with single aisle, can be provided in corporate shuttle configuration. Generous baggage compartment in rear fuselage, accessed by external airstair door, can accommodate baggage for all 18 passengers. Entire accommodation, including baggage compartment, is pressurised. Airshow in-flight cabin entertainment system optional.

SYSTEMS: Dual hydraulic systems, each 207 bar (3,000 lb/sq in). Electrical system comprises three (including one on APU) Lucas Aerospace 28 V 400 Ah engine-driven starter/generators, two 24 V 43 Ah Ni/Cd batteries and a Honeywell GTCP36-150 APU. Third (24 V 27 Ah) battery for back-up powering of essential flight instruments and emergency systems. Pneumatic system for emergency extension of landing gear, actuation of wheel brakes and

thrust reversers, and de-icing of wing leading-edges. Cabin pressurisation and air conditioning system, differential 0.61 bar (8.8 lb/sq in). One (optionally two) oxygen bottles.

AVIONICS: Rockwell Collins Pro Line 4 suite standard.

Comms: Dual VHF-422C radios, RTU-4220 radio tuners, TDR-94D transponders, Bendix/King KHF 950 HF and Baker B1045-F512 audio systems; triple Magnastar Flightphones; single Avtech Selcal, Artex ELT and Universal CVR-30B CVR.

Radar: TWR-850 colour weather radar with turbulence detection and WXP-4220 control panel.

Flight: Dual Universal UNS-1C FMS with embedded GPS, Rockwell Collins FCC-4005 autopilots, AHS-3000 AHRS, ADC-850C air data systems, VIR-432 VOR/ILS/GS/markers and DME-442; single ADF-462, ALT-4000 radio altimeter, TCAS-4000, Honeywell Laseref IV IRS, EGPWS Mk V and FDR.

Instrumentation: Rockwell Collins EFD-4077 EFIS displays all flight and EICAS information on five 18.4 cm (7¼ in) screens; dual Davtron M850A digital clocks; Flight Line 8047-10 standby altimeter, 8059-2B standby ASI, Jet AI-804CE standby AI, Precision PAI-700-04 standby compass and Hobbs 15007 hour meter.

DIMENSIONS, EXTERNAL:

Wing span	17.70 m (58 ft 1 in)
Length overall	18.97 m (62 ft 3 in)
Wing aspect ratio	9.1
Height overall	6.53 m (21 ft 5 in)
Tailplane span	6.86 m (22 ft 6 in)
Wheel track	3.30 m (10 ft 10 in)
Wheelbase	7.39 m (24 ft 3 in)
Passenger door: Height	1.83 m (6 ft 0 in)
Width	0.84 m (2 ft 9 in)
Baggage compartment door: Height	1.14 m (3 ft 9 in)
Width	0.89 m (2 ft 11 in)

DIMENSIONS, INTERNAL:

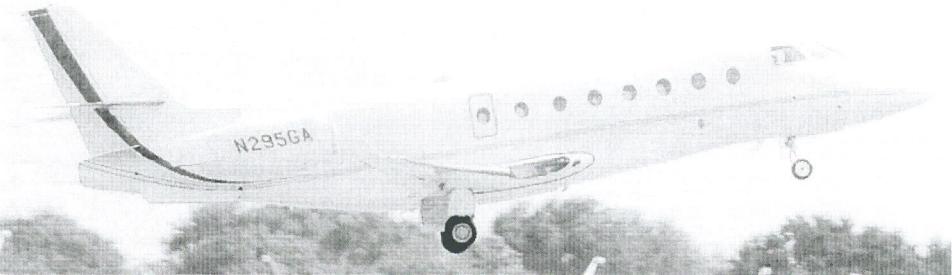
Cabin: Length: incl flight deck	9.30 m (30 ft 6 in)
excl flight deck	7.44 m (24 ft 5 in)
Max width	2.18 m (7 ft 2 in)
Max height	1.91 m (6 ft 3 in)
Volume, excl flight deck	24.6 m³ (868 cu ft)
Baggage compartment volume	3.5 m³ (125 cu ft)

AREAS:

Wings, gross	34.28 m² (369.0 sq ft)
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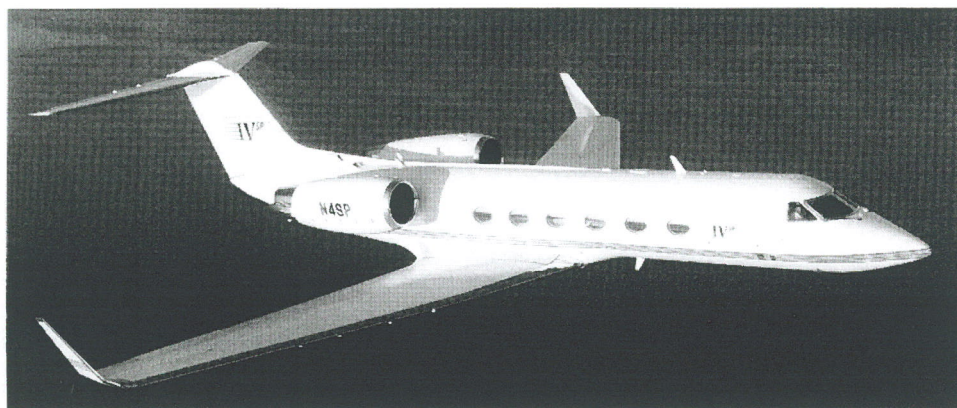
WEIGHTS AND LOADINGS:

Basic operating weight empty	8,981 kg (19,800 lb)
Max usable fuel weight	6,804 kg (15,000 lb)
Max payload	1,905 kg (4,200 lb)
Baggage compartment capacity	898 kg (1,980 lb)
Payload with max fuel	363 kg (800 lb)
Max ramp weight	16,148 kg (35,600 lb)
Max T-O weight	16,079 kg (35,450 lb)
Max landing weight	13,608 kg (30,000 lb)
Max zero-fuel weight	10,886 kg (24,000 lb)



Gulfstream G200 (formerly Galaxy) business jet (two PW306A turbofans) (Paul Jackson)

NEW/0567035



Gulfstream IV-SP (Special Performance)

0130573

Max wing loading	469.1 kg/m ² (96.07 lb/sq ft)
Max power loading	299 kg/kN (2.93 lb/lb st)
PERFORMANCE (estimated):	
Max operating Mach No. (Mmo)	0.85
Max operating speed (Vmo):	
S/L to FL100	310 kt (574 km/h; 356 mph) IAS
FL100-FL200	
310-330 kt (574-611 km/h; 356-379 mph) IAS	
FL200-FL250	360 kt (667 km/h; 414 mph) IAS
Max cruising speed (VMC) at FL310, mid-cruise weight	
of 12,247 kg (27,000 lb)	494 kt (915 km/h; 568 mph)
Typical cruising speed at FL390	
475 kt (880 km/h; 547 mph)	
Long-range cruising speed	430 kt (797 km/h; 495 mph)
Stalling speed, flaps and gear down, at MLW	
112 kt (208 km/h; 129 mph) IAS	
Max certified altitude	13,715 m (45,000 ft)
T-O distance (S/L, ISA)	1,855 m (6,080 ft)
Landing distance at MLW (S/L, ISA)	1,001 m (3,285 ft)
Range with four passengers, NBAA IFR reserves	
3,600 n miles (6,667 km; 4,142 miles)	
g limits, flaps and gear up	+2.63/-1.0
OPERATING NOISE LEVELS (FAR Pt 36 Stage 3):	
T-O	81.4 EPNdB
Sideline	85.8 EPNdB
Approach	90.9 EPNdB

UPDATED

GULFSTREAM, G300 and G400

Swedish Air Force designations: S 102B Korpen and Tp 102

US military designations: C-20F/G/H

JASDF designation: U-4

Engineering designation: G-1159C

TYPE: Long-range business jet.

PROGRAMME: Design of Gulfstream IV started March 1983; manufacture of four production prototypes (one for static testing) began 1985; first aircraft (N404GA) rolled out 11 September 1985; first flight 19 September 1985; first flight of second prototype 11 June 1986 and third prototype August 1986; FAA certification 22 April 1987 after 1,412 hours' flight testing; certificate is extension of original Gulfstream II, first approved on 19 October 1967. Westbound round-the-world flight from Le Bourget Airport, Paris, on 12 June 1987, covering 19,887.9 n miles (36,832.44 km; 22,886.6 miles), took 45 hours 25 minutes at average speed of 437.86 kt (811.44 km/h; 504.2 mph) and set 22 world records; eastbound round-the-world flight in N400GA from Houston, Texas, on 26 and 27 February 1988 covered 20,028.68 n miles (37,093.1 km; 23,048.6 miles) in 36 hours 8 minutes 34 seconds at average speed of 554.15 kt (1,026.29 km/h; 637.71 mph), setting 11 records.

In March 1993, Gulfstream IV-SP N485GA set new world speed and distance records in class, at 503.57 kt (933.21 km/h; 579.87 mph) and 5,139 n miles (9,524 km; 5,918 miles) respectively, on routine business flight from Tokyo, Japan, to Albuquerque, USA. Russian Federation and Associated States (CIS) certification achieved in June 1996. FAA approval for RVSM operation of Gulfstream IV series granted 11 August 1997. European JAA validation of FAA certification of Gulfstream IV and IV-SP achieved 16 October 2001. Gulfstream IV-SP holds 75 flight records; by September 2003 fleet had accumulated more than two million flying hours, with a 99.7 per cent dispatch reliability rate.

G300/G400 introduced from January 2003 on common production line; G400 completed to full specification; G300 as baseline aircraft, with only those avionics and

fittings specified by customer and lavatory location only at rear. G400 assembly includes 360 items installed on production line which previously were part of outfitting. JAA validation of FAA certification achieved for G300 and G400 in July 2003.

CURRENT VERSIONS: **Gulfstream IV:** Built until 1992. MTOW 33,203 kg (73,200 lb).

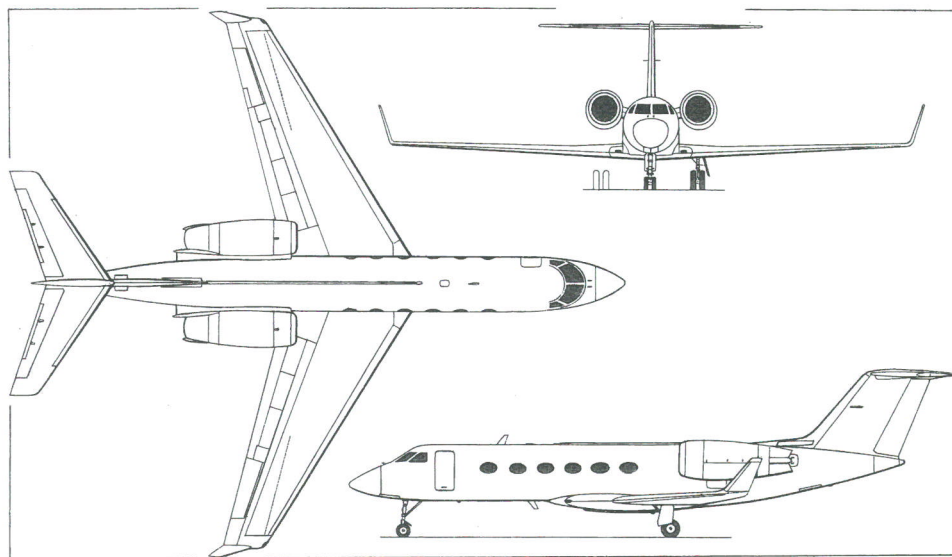
Gulfstream IV-SP: Improved (Special Performance), higher-weight version announced at NBAA Convention, Houston, in October 1991. Prototype (N476GA, converted from standard) first flown 24 June 1992; designation applied to all new IVs sold after 6 September 1992 (c/n 1214 and upwards); maximum payload increased by 1,134 kg (2,500 lb) and maximum landing weight increased by 3,402 kg (7,500 lb), with no increase in guaranteed manufacturer's empty weight. Payload/range envelope extended; expanded capability Honeywell SPZ-8400 flight guidance and control system. Production ended 3 December 2002 when 500th and final IV/IV-SP (N499GA; c/n 1499) rolled out.

Detailed description applies to Gulfstream IV-SP, except where otherwise indicated.

Gulfstream IV-MPA: Multipurpose Aircraft, announced September 1994; derived from US Navy C-20G Operational Support Aircraft (which see, below) to provide commercial operators with quick-change interior for up to 26 passengers in high-density shuttle layout, low-density executive configuration, 2,177 kg (4,800 lb) cargo capacity, or combination; large cargo door and larger/additional emergency exits standard.

Gulfstream G300: Mid-range (basic specification) version, announced on the eve of the NBAA Convention at Orlando, Florida, 8 September 2002; First aircraft A6-RJA (c/n 1503) delivered 6 August 2003 to Royal Jet of Abu Dhabi, which has ordered two, in multipurpose aircraft (MPA) configuration.

Gulfstream G400: New (full specification) version, announced on the eve of the NBAA Convention at Orlando, Florida, 8 September 2002. Generally as IV-SP except HUD standard. First aircraft N520GA (c/n 1500) exhibited at EBACE, Geneva, 7 to 9 May 2003 (as N400GA).



Gulfstream IV twin-turboprop business transport (Jane's/Dennis Punnett)

Gulfstream G450: Described separately.

CUSTOMERS: Total 500 Gulfstream IV and IV-SPs built by December 2002 (c/n 1000 to 1499), when production switched to G300/G400. Deliveries totalled 22 in 1997, 32 in 1998, 39 in 1999, 37 in 2000, 36 in 2001 and 17 in the first six months of 2002 (no further announcements).

COSTS: US\$31 million 'green' G400 (2003).

DESIGN FEATURES: Rear-engined, T-tail configuration, with all flying surfaces sweptback; wing mounted below cabin. Differences from Gulfstream III (1987-88 and earlier *Jane's All the World's Aircraft*) include aerodynamically redesigned wing, with winglets, contributing to lower cruise drag; wing also structurally redesigned with 30 per cent fewer parts, 395 kg (870 lb) lighter and carrying 544 kg (1,200 lb) more fuel; increased tailplane span; fuselage 1.37 m (4 ft 6 in) longer, with sixth window each side; Rolls-Royce Tay turboprops; flight deck with electronic displays; digital avionics; and fully integrated flight management and autoflight systems.

Advanced sonic rooftop aerofoil; sweepback at quarter-chord 27° 40'; thickness/chord ratio 10 per cent at wing station 50, 8.6 per cent at station 414; dihedral 3°; incidence 3° 30' at root, -2° at tip; NASA (Whitcomb) winglets.

FLYING CONTROLS: Conventional. Hydraulically powered flying controls with manual reversion; trim tab in port aileron and both elevators; two spoilers on each wing act differentially to assist aileron and, with third spoiler each side, act collectively as airbrakes and lift dumpers; single-slotted Fowler flaps; four vortilons and a single 'tripper' strip under leading-edge of each wing ensure inboard part of wing stalls before outboard section; variable incidence tailplane.

STRUCTURE: Light alloy airframe except for carbon composites ailerons, spoilers, rudder and elevators, some tailplane parts, some cabin floor structure, and parts of flight deck; winglets of aluminium honeycomb. Wing box manufactured by Aerostructures Corporation.

LANDING GEAR: Retractable tricycle type with twin wheels on each unit. Main units retract inward, steerable nose unit forward. Mainwheel tyres size 34x9.25-16 (18 ply) tubeless; pressure 12.07 bar (175 lb/sq in). Nosewheel tyres size 21x7.25-10 (10 ply) tubeless, pressure 7.93 bar (115 lb/sq in); maximum steering angle ±82°. Dunlop air-cooled carbon brakes; Aircraft Braking Systems anti-skid units and digital electronic brake-by-wire system. Dowty electronic steer-by-wire system. Turning circle about wingtip 14.43 m (47 ft 4 in); about nosewheel 12.04 m (39 ft 6 in).

POWER PLANT: Two Rolls-Royce Tay Mk 611-8 turboprops, each flat rated at 61.6 kN (13,850 lb st) to ISA +15°C. Target-type thrust reversers. Fuel in two integral wing tanks, with total capacity of 16,542 litres (4,370 US gallons; 3,639 Imp gallons) in GIV/G400 and 15,141 litres (4,000 US gallons; 3,331 Imp gallons) in G300. Single pressure fuelling point in leading-edge of starboard wing. In 1999 Gulfstream considered re-engining of IV-SP as part of product improvement policy, possibilities including Rolls-Royce Deutschland BR710, and General Electric CF34; in May 2000 it placed an order for US\$1.4 billion with Rolls-Royce for improved Tays.

ACCOMMODATION: Crew of two plus cabin attendant. Standard seating for up to 19 passengers (typically 12 to 14 in

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jawa.janes.com

corporate configuration) in pressurised and air conditioned cabin. 'Quick Change' cargo/passenger version, certified for up to 26 passengers, announced 22 December 1993. Galley, lavatory and large baggage compartment, capacity 907 kg (2,000 lb), at rear of cabin. Integral airstair door at front of cabin on port side. Baggage compartment door on port side. Electrically heated wraparound windscreen. Six cabin windows, including two overwing emergency exits, on each side.

SYSTEMS: Cabin pressurisation system maximum differential 0.65 bar (9.45 lb/sq in) maintains 1,980 m (6,500 ft) cabin altitude at 13,715 m (45,000 ft); dual air conditioning systems. Two independent hydraulic systems, each 207 bar (3,000 lb/sq in). Maximum flow rate 83.3 litres (22 US gallons; 18.3 Imp gallons)/min. Two bootstrap-type hydraulic reservoirs, pressurised to 4.14 bar (60 lb/sq in). Honeywell GTC36-100G APU in tail compartment, flight rated to 12,500 m (41,000 ft) since s/n 1156. Electrical system includes two 36 kVA alternators with two solid-state 30 kVA converters to provide 23 kVA 115/200 V 400 Hz AC power and 250 A of regulated 28 V DC power; two 24 V 40 Ah Ni/Cd storage batteries and external power socket. Wing leading-edges and engine inlets anti-iced.

AVIONICS: *Comms:* Dual VHF/HF transceivers, transponders and cockpit audio systems; cockpit voice recorder; Calquest CD-400 satellite communications equipment optional.

Radar: Digital colour weather radar.

Nav: Dual VOR/LOC/GS with marker beacon receivers; dual DME; dual ADF; dual radio altimeters; optional MLS, GPS and VLF Omega. Optional Northstar Technologies CT-1000 flight deck organiser.

Flight: Honeywell SPZ-8400 digital AFCS; Honeywell SPZ-8000 flight management system (FMS); dual fail-operational flight guidance systems including autothrottles; dual air data systems; dual flight guidance and performance computers; dual laser IRS; AHRS; VNAV; flight data recorder. System integration is accomplished through a Honeywell avionics standard communications bus (ASCB). Optional TCAS and Honeywell EGPWS.

Instrumentation: Six 203 × 203 mm (8 × 8 in) colour CRT EFIS screens, two each for primary flight display (PFD), navigation display (ND) and engine instrument and crew alerting system (EICAS). Honeywell/BAE HUD 2020 head-up display received FAA approval for Cat. II operations in early 1997, with first installation in Gulfstream IV-SP completed in May 1997. Northstar Technologies CT-1000G flight deck organiser system optional. EVS system used on Gulfstream V received FAA certification for installation on IV-SP on 19 December 2002.

Self-defence: Optional BAE Systems AN/ALQ-204 Matador IRCM available at cost of US\$3.5 million.

Data applicable to both versions, except where stated.

DIMENSIONS, EXTERNAL:

Wing span over winglets	23.72 m (77 ft 10 in)
Wing chord: at root (fuselage c/l)	5.94 m (19 ft 5 3/4 in)
at tip	1.85 m (6 ft 0 3/4 in)
Wing aspect ratio	6.4
Length overall	26.92 m (88 ft 4 in)
Fuselage: Length	24.03 m (78 ft 10 in)
Max diameter	2.39 m (7 ft 10 in)
Height overall	7.44 m (24 ft 5 in)
Tailplane span	9.75 m (32 ft 0 in)
Wheel track	4.17 m (13 ft 8 in)
Wheelbase	11.61 m (38 ft 1 1/4 in)
Passenger door (fwd, port): Height	1.57 m (5 ft 2 in)
Width	0.91 m (3 ft 0 in)
Baggage door (rear): Height	0.90 m (2 ft 11 3/4 in)
Width	0.72 m (2 ft 4 1/2 in)

DIMENSIONS, INTERNAL:

Cabin:	
Length, incl galley, lavatory and baggage compartment	13.74 m (45 ft 1 in)
Max width	2.24 m (7 ft 4 in)
Max height	1.88 m (6 ft 2 in)
Floor area	22.9 m ² (247 sq ft)
Volume	43.2 m ³ (1,525 cu ft)



Gulfstream G450 has a longer fuselage and repositioned door, compared to G400

NEW/0567044

Flight deck volume	3.5 m ³ (124 cu ft)
Rear baggage compartment volume	4.8 m ³ (169 cu ft)

AREAS:

Wings, gross	88.29 m ² (950.4 sq ft)
Ailerons (total, incl tab)	2.68 m ² (28.86 sq ft)
Trailing-edge flaps (total)	11.97 m ² (128.84 sq ft)
Spoilers (total)	7.46 m ² (80.27 sq ft)
Winglets (total)	2.38 m ² (25.60 sq ft)
Fin	10.92 m ² (117.53 sq ft)
Rudder, incl tab	4.16 m ² (44.75 sq ft)
Horizontal tail surfaces (total)	18.83 m ² (202.67 sq ft)
Elevators (total, incl tabs)	5.22 m ² (56.22 sq ft)

WEIGHTS AND LOADINGS:

Manufacturer's weight empty	16,102 kg (35,500 lb)
Allowance for outfitting	3,175 kg (7,000 lb)
Typical operating weight empty (incl crew):	
G300	19,504 kg (43,000 lb)
G400	19,912 kg (43,900 lb)
Max payload: G300	2,722 kg (6,000 lb)
G400	2,313 kg (5,100 lb)
Payload with max fuel: G300	1,134 kg (2,500 lb)
G400	726 kg (1,600 lb)
Fuel: total: G300	12,249 kg (27,005 lb)
G400	13,429 kg (29,605 lb)
max usable: G300	12,202 kg (26,900 lb)
G400	13,381 kg (29,500 lb)
Max T-O weight: G300	32,658 kg (72,000 lb)
G400	33,838 kg (74,600 lb)
Max ramp weight: G400	34,019 kg (75,000 lb)
Max landing weight	29,937 kg (66,000 lb)
Max zero-fuel weight	22,226 kg (49,000 lb)
Max wing loading: G300	369.9 kg/m ² (75.76 lb/sq ft)
G400	383.2 kg/m ² (78.49 lb/sq ft)
Max power loading: G300	265 kg/kN (2.60 lb/lb st)
G400	275 kg/kN (2.69 lb/lb st)

PERFORMANCE:

Max operating speed (V _{MO} /M _{MO})	340 kt (629 km/h; 391 mph) CAS or M0.88
Max cruising speed at FL310	505 kt (936 km/h; 582 mph) or M0.85
Normal cruising speed at FL450	M0.80 (459 kt; 850 km/h; 528 mph)
Approach speed at max landing weight	149 kt (276 km/h; 172 mph)
Stalling speed at max landing weight:	
wheels and flaps up	130 kt (241 km/h; 150 mph)
wheels and flaps down	115 kt (213 km/h; 133 mph)
Max rate of climb at S/L	1,256 m (4,122 ft)/min
Rate of climb at S/L, OEI	314 m (1,030 ft)/min
Initial cruising altitude	12,500 m (41,000 ft)
Max certified altitude	13,715 m (45,000 ft)
Runway PCN	25
T-O run: G300	1,554 m (5,100 ft)
G400	1,384 m (5,450 ft)
FAA balanced T-O field length at S/L	1,662 m (5,450 ft)
Landing run	973 m (3,190 ft)
Range: with eight passengers and NBAA IFR reserves:	
G300	3,600 n miles (6,667 km; 4,142 miles)
G400	4,100 n miles (7,593 km; 4,718 miles)

OPERATIONAL NOISE LEVELS (FAR Pt 36):

T-O	77.5 EPNdB
Approach	92.0 EPNdB
Sideline	86.6 EPNdB
	UPDATED

GULFSTREAM G450

Proposed US military designation: RC-20

TYPE: Long-range business jet.

PROGRAMME: Development, then as GIV-X and unannounced, started 2001; first of four development aircraft (c/n 4001/N401SR) flew 30 April 2003, followed by c/n 4002/N442SR on 21 June, c/n 2003/N403SR on 22 June and c/n 4004/N450GA on 18 September; formal announcement and public debut (N450GA) at NBAA Convention in Orlando, Florida 6 October 2003; more than 400 hours of flight testing in 117 sorties completed by early 8 December 2003; FAA certification scheduled for third quarter 2004, followed by EASA validation in fourth quarter, and first customer deliveries in second quarter 2005. Selected 7 October 2003 as aerial platform for Northrop Grumman's submission for the US Army's Aerial Common Sensor (ACS) programme, with requirement for up to 38 aircraft and potential US Navy requirement for up to 20 aircraft.

COSTS: US\$33 million (2003).

DESIGN FEATURES: Combines wing and tail unit of G400 with a fuselage stretched by 0.30 m (1 ft 0 in), cabin door repositioned, G550 flight deck and nose section, and Rolls-Royce Tay Mk 611-8C turbofans housed in G550-type nacelles.

POWER PLANT: Two Rolls-Royce Tay Mk 611-8C turbofans, each rated at 61.6 kN (13,850 lb st), with FADEC. Thrust reversers standard.

SYSTEMS: Honeywell 36-150GIV APU, with air-start and run capability up to 11,280 m (37,000 ft). Pressurisation system maintains a 1,830 m (6,000 ft) cabin altitude to 12,500 m (41,000 ft).

AVIONICS: Honeywell Primus Epic PlaneView cockpit, as described for G550, with HUD and EVS standard.

DIMENSIONS, EXTERNAL:

Wing span	23.72 m (77 ft 10 in)
Length overall	27.23 m (89 ft 4 in)
Height	7.67 m (25 ft 2 in)

DIMENSIONS, INTERNAL:

Cabin: Length	13.74 m (45 ft 1 in)
Max width	2.23 m (7 ft 4 in)
Max height	1.88 m (6 ft 2 in)
Volume	43.2 m ³ (1,525 cu ft)
Baggage compartment volume	4.8 m ³ (169 cu ft)

WEIGHTS AND LOADINGS:

Basic operating weight	19,504 kg (43,000 lb)
Payload: max	2,722 kg (6,000 lb)
with max fuel	816 kg (1,800 lb)
Max fuel weight	13,381 kg (29,500 lb)
Max T-O weight	33,520 kg (73,900 lb)
Max landing weight	29,937 kg (66,000 lb)
Max zero-fuel weight	22,226 kg (49,000 lb)
Max wing loading	379.6 kg/m ² (77.76 lb/sq ft)
Max power loading	272 kg/kN (2.67 lb/lb st)



Fourth Gulfstream G450, which made the type's public debut in October 2003

NEW/0567043

PERFORMANCE:

Max operating Mach No. (Mmo)	M0.88
Normal cruising speed	M0.80 (459 kt; 850 km/h; 528 mph)
Time to climb to FL410	23 min
Initial cruising altitude	12,500 m (41,000 ft)
Maximum certified altitude	13,716 m (45,000 ft)
T-O run	1,661 m (5,450 ft)
Landing run	972 m (3,190 ft)
Range with eight passengers at Mach 0.80, NBAA IFR reserves	4,350 n miles (8,056 km; 5,006 miles)

NEW ENTRY

GULFSTREAM G500 and G550

US military designation: C-37

TYPE: Long-range business jet.

PROGRAMME: Study announced at NBAA Convention, Houston, in October 1991. Go-ahead commitment and engine selection (BR710) announced at Farnborough Air Show in September 1992. Risk-sharing agreement with wing designers/manufacturers (Vought and ShinMaywa) announced at Paris Air Show in June 1993, and with tail (and later floor panel) manufacturer (Fokker) at NBAA Convention in September 1993. Initially named Gulfstream V.

Prototype (N501GV) rolled out 22 September 1995; first flight 28 November 1995; second aircraft, c/n 502 (N502GV) was structural test article before completion as company demonstrator; c/n 503 (N503GV), first flown 10 March 1996, used for systems testing; c/n 504 (N504GV), first flown May 1996, for engine, flight loads and environmental trials and JAA certification testing; c/n 505 (N505GV), first flown August 1996, outfitted in standard production configuration for operational testing and HIRF evaluation. Public debut (N502GV) at NBAA Convention at Orlando, Florida, in November 1996.

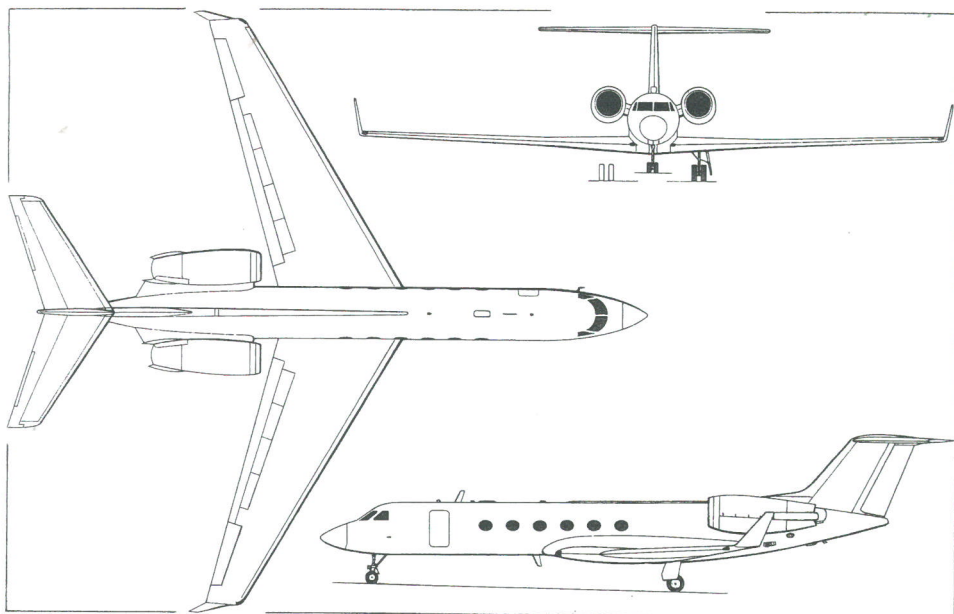
Provisional FAA certification achieved 16 December 1996 after more than 1,100 hours of flight testing in 550 sorties. Full FAA type certification (extension of Gulfstream II) granted on 11 April 1997, and FAA production certificate awarded on 11 June. First fully completed aircraft for a customer (c/n 507) delivered to Walter Annenberg, former US Ambassador to UK, on 1 July 1997. RVSM approval January 2000. JAA certification eventually granted on 31 October 2002.

From 2003, original versions discontinued and replaced by Gulfstream G500 and G550. Latter to full specification; former is baseline version with customer-specified additions only.

By 17 November 1997 company demonstrators had achieved 39 world records in time to climb and maximum altitude with payload, and city pair categories, including the first ever non-stop flights by a business jet between Los Angeles and London, London and Hong Kong, Tokyo and New York, and Washington, DC and Dubai; last-named 6,330 n mile (11,723 km; 7,284 mile) journey completed on 13 November 1997 in 12 hours 40 minutes 48 seconds with four crew and seven passengers. On 19 February 1998, N502GV became first business jet to fly non-stop from New York to Hawaii. On 4 March 2002 a Gulfstream V broke a 44-year-old record for speed over a recognised course, flying from Tokyo to Washington, DC, in 11 hours 54 minutes covering the 5,543 n miles (10,845 km; 6,739 miles) at an average speed of 492 kt (911 km/h; 556 mph). This record was previously held by a USAF KC-135 Stratotanker, which flew Tokyo to Washington, DC, in 13 hours 46 minutes in April 1958. By March 2002, the Gulfstream V held 70 world and national records. By that time the in-service fleet of 140 aircraft had flown more than 120,000 hours, with 99 per cent despatch reliability.

CURRENT VERSIONS: **Gulfstream V:** As described.

Gulfstream V-SP: Announced on eve of NBAA Convention, 8 October 2000; larger cabin, enhanced performance and better range by reason of aerodynamic refinement of existing V. First flight of GV-SP test article (N5SP; modified from 132nd GV) 31 August 2001, followed by first production GV-SP (c/n 5001, also N5SP)



Gulfstream V long-range business transport (Jane's/Dennis Punnett)

rolled out 19 June 2002 and first flown 18 July 2002, at which time the test article airframe had completed 100 flights totalling 185 hours. Redesignated as G550 (which see).

Gulfstream G500: Reduced-range version of Gulfstream V, announced on the eve of the NBAA Convention at Orlando, Florida, 8 September 2002; provisional type certificate granted by FAA 11 December 2002; followed by type certification 14 August 2003.

Gulfstream G550: New version of Gulfstream V-SP, announced on the eve of the NBAA Convention at Orlando, Florida, 8 September 2002; FAA certification 8 December 2003. First aircraft N702GA (c/n 5001); initial public appearance at EBACE, Geneva, 7 to 9 May 2003 by N812GA (c/n 5012).

Flight deck uses Honeywell Primus Epic suite with Gulfstream PlaneView cockpit, comprising four 360 mm (14 in) LCDs, including HUD and EVS, latter was certified in August 2001 and first became operational, on a USAF C-37A, on 15 May 2002. First customer is Executive Jets, which ordered 20 for delivery up to 2008, at cost of US\$800 million; unit cost with most popular options US\$24.9 million. Other customers include GATX Leasing (two).

Special Missions: Lockheed Martin, teamed with (then) GEC-Marconi Defence, Logica, Marshall Aerospace, MSI, Racal and CAE Electronics Montréal, chose the Gulfstream V as its platform for the UK's Airborne Stand-Off Radar (ASTOR) requirement, involving a Racal dual-mode, electronically scanned surveillance radar in a ventral fairing, with satcom antennas above and below the fuselage for real-time data transfer to ground stations, and provision for in-flight refuelling.

Additionally, when an upgraded version of the Joint STARS system was readmitted to the ASTOR competition in January 1998, the Gulfstream V was selected by Northrop Grumman as platform in preference to Boeing E-8 (707). Neither application was successful. Currently competing for NATO Ground Surveillance System programme.

Israeli Ministry of Defence ordered four G550s, plus two options, on 28 August for use as Compact Airborne early warning (CAEW) platforms, with deliveries beginning in 2005. Gulfstream will supply airframes with interior and exterior modifications for Elta Phalcon phased array radar and other mission equipment installation and

system integration to be carried out by Israel Aircraft Industries.

C-37A: Military version; two (plus four options, one of which converted to firm order in 1998, another in April 1999 and a third subsequently, with fourth converted in 2001) ordered by USAF as part of VCX requirement to replace Boeing VC-137s of 89th Airlift Wing, Andrews AFB, Maryland. Announced 5 May 1997. First (97-0400) delivered 14 October 1998; second in January 1999 and third (for C-in-C USAF) 21 February 2000. US Army's Priority Air Transport Squadron operates one example. Five C-37As leased by US Air Force for delivery between August 2001 and September 2003, first aircraft handed over 28 August 2001. Further contract awarded 13 March 2002 for up to 20 for delivery between 2002 and 2012; first firm order under this contract is for one C-37A for the USAF. US Navy requires five VC-37As as replacements for VP-3A Orions; deliveries began 2002 and extend to 2009. In December 2000 US Coast Guard ordered a C-37A which was delivered in May 2002.

EC-37A: Proposed airborne combat support aircraft; Gulfstream announced at RIAT 2000, Cottesmore, UK, that it was looking for funding during late 2000 and partner to develop systems. Aimed at two roles: standoff electronic jammer and intelligence gathering, using interchangeable underwing and underfuselage pods and in-flight workstation reconfiguration.

RQ-37A: Designation ascribed to Gulfstream candidate as surrogate UAV in US Navy Broad Area Maritime Surveillance (BAMS) competition; Gulfstream V N916GA undergoing conversion as testbed in mid-2003 to be capable of remote control from ground, though carrying an onboard safety pilot.

CUSTOMERS: Three produced in 1996, 29 in 1997, 25 in 1998, 31 in 1999, 34 in 2000, 35 in 2001 and 16 in the first six months of 2002. Executive Jet International took options on two aircraft in January 1995, for delivery to its Gulfstream Shares fleet in 1998-99. Recent customers include Nigerian government; Kuwait Airways, (three, first aircraft delivered November 1999); Brunei government (one); Time Warner (two); Chrysler Corporation (two) and Executive Jet International (10, for delivery by 2004, plus 12 options); Saudi Arabian Ministry of Defence and Aviation (first of two in medevac role, handed over 15 May 2000), and the US National Center for Atmospheric Research, which ordered one in January 2002 for service entry in 2005 as a high-performance



Gulfstream G550 company demonstrator (Paul Jackson)

NEW/0568402

instrumented airborne platform for environmental research (HIAPER). Japanese coast guard ordered two Gulfstream Vs on 14 November 2001 at cost of approximately US\$100 million.

Gulfstream delivered 100th aircraft in April 2000. Manufacture of Gulfstream V completed in 2003 with 193 aircraft (c/n 501 to 665, 667 to 693, and 699); G500/G550 followed immediately.

COSTS: US\$29.5 million (fixed price) for first 24 aircraft, then US\$30.5 million (fixed price) up to 39th aircraft; typically equipped price after outfitting, US\$35 million; aircraft sold on Internet during December 1999 in deal valued at US\$40 million. Cost of EVS system estimated at US\$1 million.

Contract for one C-37A valued at US\$43.4 million (2002).

DESIGN FEATURES: Gulfstream IV fuselage re-engineered to increase length by 2.13 m (7 ft 0 in); larger wing of same basic shape and interior structure, but 10 per cent more efficient than Gulfstream IV's; larger vertical and horizontal tail surfaces; flight deck volume increased by moving bulkhead 0.30 m (1 ft) aft to provide more space for pilots and to accommodate full-size jump seat; cockpit layout and instrumentation generally similar to Gulfstream IV-SP, but redesigned to incorporate human engineering changes in system control functions; airstair door moved aft by 1.52 m (5 ft); avionics bay relocated. Computational fluid dynamics and CATIA design system used extensively in development.

FLYING CONTROLS: As G300/G400.

LANDING GEAR: As G300/G400. Turning circle about wingtip 17.07 m (56 ft 0 in); about nosewheel 14.15 m (46 ft 5 in).

POWER PLANT: Two 68.4 kN (15,385 lb st) Rolls-Royce Deutschland BR710-48 turbofans with FADEC. Fuel capacity of G550 23,417 litres (6,186 US gallons; 5,151 Imp gallons) in integral wing tanks, of which 22,993 litres (6,074 US gallons; 5,058 Imp gallons) are usable. G500 capacity 19,957 litres (5,272 US gallons; 4,390 Imp gallons) usable.

ACCOMMODATION: Crew of two/three plus cabin attendant. Standard seating for 15 to 19 passengers in pressurised and air conditioned cabin. Rear windows, each side, are emergency exits. Customised interiors according to requirements.

SYSTEMS: Digitally controlled automatic cabin pressurisation system; maximum pressure differential 0.703 bar (10.2 lb/sq in). Hamilton Sundstrand electrical power generating system profile integrated with the flight management system (FMS), and will maintain equivalent of 1,830 m (6,000 ft). Honeywell RE220 APU, designed specifically for Gulfstream V, provides engine-starting capability up to 13,110 m (43,000 ft), 40 kVA of electrical power for ground and flight use up to 13,715 m (45,000 ft), and ground air conditioning, with almost twice the cooling airflow rate of the Gulfstream IV's APU.

AVIONICS: Honeywell SPZ-8500 as core system.

Flight: Three independent IRS integrated into FMS; GPS. Honeywell enhanced ground proximity warning system (EGPWS); TCAS; turbulence-detecting Doppler radar; Hamilton Sundstrand maintenance data acquisition unit; optional Northstar Technologies CT-1000 flight deck organiser system.

Instrumentation: Honeywell SPZ-8500 digital AFCS/FMS with six 20.3 × 20.3 cm (8 × 8 in) colour LCD EFIS

displays with EICAS; Honeywell/BAE Model 2020 HUD. Kollsman All Weather Window IR sensor flight testing began September 1999 to provide enhanced vision system (EVS) in conjunction with Honeywell 2020 HUD, facilitating operations in Cat. III weather on Cat. I runway, with decision height of 30 m (100 ft) and RVR of 220 m (722 ft). IR sensor flight is mounted beneath radome. Certification was due early 2001.

Mission: IBM satellite-based international communications system, including airborne voice, data, networking, fax and teleconferencing facilities, provides Gulfstream V with 'office in the sky' capability; optional Sanders AN/ALQ-204 Matador IRCM system.

Data applicable to both versions, except where stated.

DIMENSIONS, EXTERNAL:

Wing span: basic	27.69 m (90 ft 10 in)
over winglets	28.50 m (93 ft 6 in)
Length overall	29.39 m (96 ft 5 in)
Height overall	7.87 m (25 ft 10 in)
Tailplane span	10.72 m (35 ft 2 in)
Wheel track (c/l shock-absorbers)	4.37 m (14 ft 4 in)
Wheelbase	13.72 m (45 ft 0 in)

DIMENSIONS, INTERNAL:

Cabin: Length, aft of flight deck	15.57 m (50 ft 1 in)
Max width	2.24 m (7 ft 4 in)
Max height	1.88 m (6 ft 2 in)
Volume	47.3 m ³ (1,669 cu ft)
Baggage compartment volume	6.4 m ³ (226 cu ft)

AREAS:

Wings, gross	105.63 m ² (1,137.0 sq ft)
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WEIGHTS AND LOADINGS:

Weight empty, 'green'	17,917 kg (39,500 lb)
Operating weight empty, incl crew:	
G500	21,682 kg (47,800 lb)
G550	21,909 kg (48,300 lb)
Allowance for outfitting	3,856 kg (8,500 lb)
Baggage capacity	1,134 kg (2,500 lb)
Payload: max: G500	3,039 kg (6,700 lb)
G550	2,812 kg (6,200 lb)
with max fuel: G500	1,134 kg (2,500 lb)
G550	816 kg (1,800 lb)
Fuel weight: max: G550	18,819 kg (41,489 lb)
usable: G500	15,966 kg (35,200 lb)
G550	18,733 kg (41,300 lb)
Payload with max fuel: G500	1,134 kg (2,500 lb)
G550	816 kg (1,800 lb)
Max T-O weight: G500	38,600 kg (85,100 lb)
G550	41,277 kg (91,000 lb)
Max landing weight	34,155 kg (75,300 lb)
Max wing loading: G500	365.4 kg/m ² (74.85 lb/sq ft)
G550	390.8 kg/m ² (80.04 lb/sq ft)
Max power loading: G500	282 kg/kN (2.77 lb/lb st)
G550	302 kg/kN (2.96 lb/lb st)

PERFORMANCE (at max T-O weight, except where indicated):

Max operating Mach No. (MMO)	M0.885
Cruising speed: max	499 kt (924 km/h; 574 mph)
normal	488 kt (904 km/h; 562 mph) or M0.85
long-range	459 kt (850 km/h; 528 mph) or M0.80
Initial cruising altitude: G500	13,105 m (43,000 ft)
G550	12,500 m (41,000 ft)
Max certified altitude	15,545 m (51,000 ft)
T-O run: G500	1,570 m (5,150 ft)
G550	1,801 m (5,910 ft)

Landing run	844 m (2,770 ft)
T-O balanced field length	1,862 m (6,110 ft)
Landing distance, S/L, max landing weight	841 m (2,760 ft)

Range, eight passengers and four crew, M0.80, NBAA IFR reserves:	
G500	5,800 n miles (10,741 km; 6,774 miles)
G550	6,750 n miles (12,501 km; 7,767 miles)

UPDATED

GULFSTREAM SBJ

TYPE: Supersonic business jet.

PROGRAMME: Gulfstream Aerospace and Lockheed Martin (which see) revealed at Farnborough on 7 September 1998 that they were jointly conducting an 18 to 24 month feasibility study into an SBJ. As then envisaged, the aircraft, similar in size to the Gulfstream II, would have featured a stand-up-headroom cabin accommodating eight passengers, and would cruise at M1.6 to M2.0 over a range of more than 4,000 n miles (7,408 km; 4,603 miles). Key design goals were the ability to operate out of existing business aviation airfields; take-off noise compatible with anticipated future emissions regulations; fuel-efficient operation at subsonic speeds; and an initial cruising altitude above that of subsonic traffic.

The feasibility phase of the project, completed in mid-2000, was followed by a further two years of wind-tunnel testing and project definition; studies carried out by the company confirmed that there is a market, but sonic boom suppression, engine emissions and noise present technological challenges. Gulfstream and Lockheed Martin, through its Advanced Development Projects division, defined the SBJ, and lobbied the US government for support via the Defense Advanced Research Projects Agency which received US\$15 million for its quiet supersonic aircraft technology (QSAT) budget. However, Lockheed Martin has since withdrawn from the programme. In 2000, patents were filed with different layouts including tailplane mounted at tail fin tip and drooping to attach to engine nacelles; further patents included one with large delta wing shape plus nose canard; in October Gulfstream displayed, at NBAA, the Quiet Supersonic Jet (QSJ) which had swept wing and wingtip-mounted swept tail.

By late 2003, the QSJ had evolved into a variable-geometry wing, T-tail aircraft with two pod-mounted engines on the rear fuselage, each side of the fin. Design goals include maximum take-off weight of 45,359 kg (100,000 lb), cruising speed of Mach 1.8, take-off field length of 1,981 m (6,500 ft), range of 4,800 n miles (8,889 km; 5,523 miles) and airport noise level 10 EPNdB quieter than Stage 4 requirements.

Estimated unit cost is in the region of US\$70 million to US\$80 million (2002), based on 200 produced. The proposed aircraft is not related to the abortive Gulfstream-Sukhoi SSB project from which Gulfstream withdrew in 1992. Executive Jet Aviation, which operates the NetJets fractional ownership programme, is reportedly interested in the concept of supersonic business jets.

UPDATED

HAWKER

RAYTHEON AIRCRAFT COMPANY

At the September 2002 NBAA Convention, held in Orlando, Florida, Raytheon Aircraft (which see for further details) announced its intention to revert to separate marketing of its Beech and Hawker lines of private and executive aircraft, reducing the emphasis on its corporate name.

Raytheon acquired British Aerospace's Corporate Jets division for US\$372 million on 6 August 1993; founded Raytheon Corporate Jets Inc at Little Rock, Arkansas, with responsibility for design, development, production and support of renamed Hawker family of corporate jets. Hawker name derived by Raytheon from Hawker Siddeley, parent company of de Havilland at conception of DH/HS/BAe 125 twin-jet, which forms basis of the current Hawker line. Raytheon Corporate Jets included in Raytheon Aircraft Company upon its foundation on 15 September 1994. Former Beechjet 400A added to Hawker line in May 2003.

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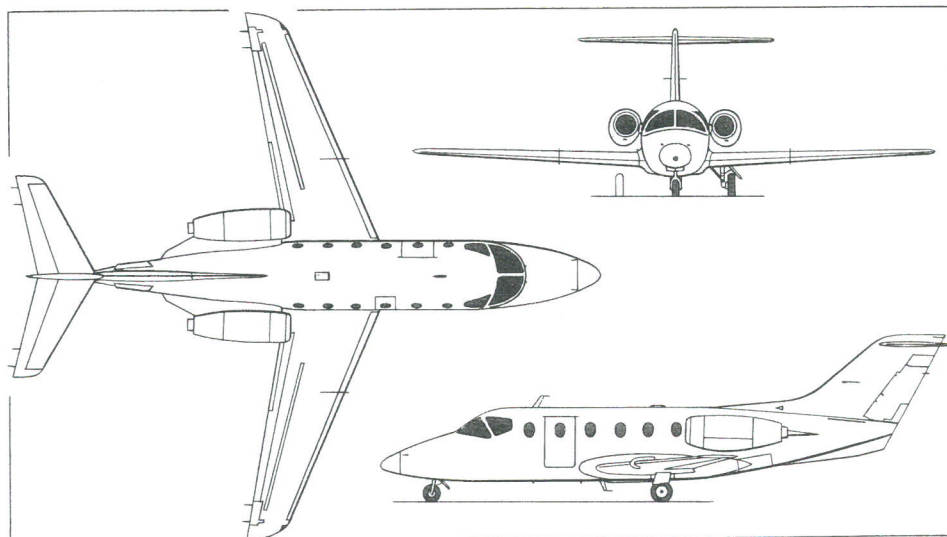
HAWKER 400

US Air Force designation: T-1A Jayhawk

JASDF designation: T-400

TYPE: Business jet.

PROGRAMME: Conceived as Mitsubishi MU-300 Diamond; first flight 29 August 1978; two prototypes; FAR Pt 25 certification awarded 6 November 1981; production aircraft fabricated in Japan and assembled at San Angelo, Texas; deliveries totalled 63 Diamond Is (JT15D-4 engines), 27 Diamond IAs (JT15D-4D) and one Diamond II (JT15D-5).

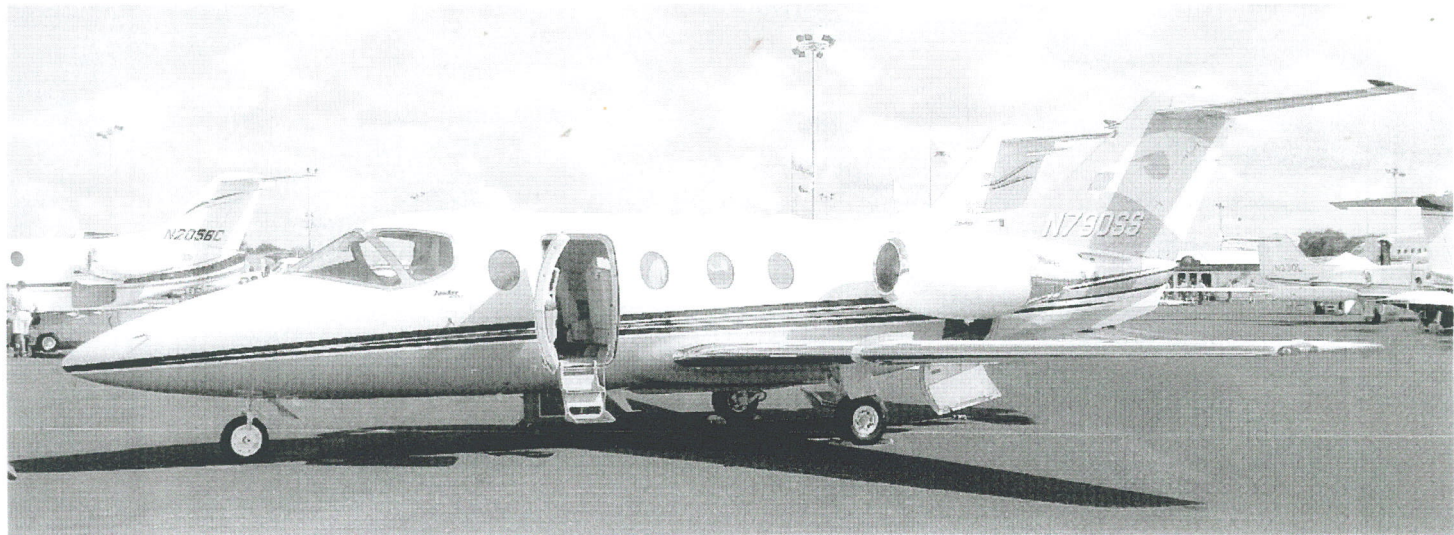


Hawker 400XP (two P&WC JT15D-5 turboprops) (Jane's/Dennis Punnett)

Beech acquired rights to Diamond II from Mitsubishi Heavy Industries and Mitsubishi Aircraft International, December 1985; made improvements to aircraft and renamed it Beechjet 400. First Beech-assembled Beechjet rolled out 19 May 1986; initial 64 used Japanese components. During 1989, Beech moved entire manufacturing operation to Wichita. Announced new

Beechjet 400A November 1989, featuring certification to 13,715 m (45,000 ft), larger and more comfortable cabin, all Collins avionics with digital EFIS; customer deliveries began November 1990. Transferred to Raytheon's Hawker marque in May 2003.

CURRENT VERSIONS: Beechjet 400: Initial production version (64 built; see earlier Jane's); superseded by 400A.



Hawker 400XP in new company colours (Paul Jackson)

NEW/0567009

Beechjet 400A: Announced at 1989 NBAA show; production 400A first flight 22 September 1989; FAA certification received 20 June 1990; deliveries began November 1990. Also certified by July 1993 in Australia, Canada, France, Germany, Italy and UK; Brazilian and Pakistani type approval April 1994; Civil Aviation Authority of China certification achieved in second quarter of 1999; superseded by Hawker 400XP.

Hawker 400XP: Current version (XP=eXtra Payload), announced at European Business Aviation Convention and Exhibition at Geneva 6 May 2003; first aircraft thus named was N400XP (c/n RK-356). Features 90.7 kg (200 lb increase in payload and thrust reversers, vapour-cycle air-conditioning, TCAS II and electronic ELT as standard; FAA certification granted in April 2003.

Description applies to Hawker 400XP, except where indicated.

Beechjet T-1A Jayhawk: US Air Force selected McDonnell Douglas, Beech and Quintron to supply Tanker Transport Training System (TTTS) on 21 February 1990, including requirement for 180 Beechjet 400Ts, valued at US\$755 million and designated T-1A Jayhawk; represents missionised version of 400A, sharing many components and characteristics with commercial counterpart; differences include cabin-mounted avionics, increased air conditioning capability, greater fuel capacity with single-point refuelling, and strengthened windscreen and leading-edges for low-level birdstrike protection. First production aircraft (90-0400) delivered 17 January 1992; deliveries at approximately three per month; final delivery 23 July 1997. By then total fleet time exceeded 182,000 flying hours, with 90 per cent operational availability, and more than 680 pilots had been trained on the Jayhawk.

IOC for USAF Jayhawks January 1993, for Air Education and Training Command Specialised Undergraduate Pilot Training (SUPT) programme at Reese AFB (52nd FTS/64th FTW) where establishment of 41 received by October 1993; Reese closed in 1997. Second recipient was 99th FTS/12th FTW at Randolph AFB, Texas, where 16 delivered for instructor training in 1993; third unit was 86th FTS/47th FTW at Laughlin AFB, Texas, from late 1993 with training courses beginning May 1994; fourth was 71st FTW at Vance AFB, Oklahoma (first aircraft December 1994); fifth was 14th FTW at Columbus AFB, Mississippi (early 1996). T-1A used for training crews for KC-10, KC-135, C-5 and C-17, with total fleet experience of more than 376,000 hours and more than 733,000 landings by October 1999.

In February 1997 Raytheon Aircraft and its subsidiary Raytheon Aerospace were awarded a contract, valued at US\$6.2 million, to retrofit 62 Jayhawks with GPS; two further options to retrofit the entire fleet would bring the total value of the GPS upgrade to about US\$25.3 million.

Beechjet 400T: JASDF T-400 version, featuring thrust reversers, long-range inertial navigation and direction-finding systems; interior changes. Meets TC-X trainer requirement; three, three, two and one ordered in 1992-95, plus one in 1998; first (41-5051) delivered 31 January 1994; 10th in 2000.

CUSTOMERS: The 500th Beechjet/Jayhawk (N500TH; 246th 400A) was delivered to Global Financial Services Group of Anderson, South Carolina, on 12 October 1999, during the NBAA Convention at Atlanta, Georgia. Total 30 delivered in 1995, 29 in 1996, 43 in both 1997 and 1998, 48 in 1999, 51 in 2000, 25 in 2001, 19 in 2002, and 17 (as 400XPs) in the first nine months of 2003. Recent customers include Hainan Airlines of China, which took delivery of one aircraft in February 1999. US Air Force 180 T-1As ordered, of which delivery completed 23 July 1997. JASDF had received 10 by December 1999 and ordered further two in 2000; operated by 41 Hikotai at Miho. By October 2002, 348 civil 400As had been registered, in addition to 64 Model 400s, 180 Jayhawks, 10 400Ts and 93 Diamonds, or 695 in all.

BEECHJET T-1A JAYHAWK PROCUREMENT

FY	Lot	Qty	First Aircraft	Delivery
89	—	1	89-0284	1991
90	1	14	90-0400	1992
91	2	28	91-0075	1992-93
92	3	34	92-0330	1993-94
93	4	36	93-0621	1994-95
94	5	35	94-0114	1995-96
95	6	32	95-0040	1996-97
Total		180		

COSTS: Jayhawk programme cost US\$1.3 billion; Beech contracts for 180 aircraft, US\$755 million. Hawker 400XP US\$6.7 million (2003).

DESIGN FEATURES: Typical low-wing, T tail, rear-engined small business jet, with sweptback wings and empennage, plus small underfin. Compared to Diamond, Beechjet has increased payload and certified ceiling, greater cabin volume achieved by moving rear-fuselage fuel tank forward under floor (balanced by moving lavatory to rear of cabin), improved soundproofing, and emergency door moved one window forward to facilitate forward club seating.

Wing has computer-designed three-dimensional Mitsubishi MAC510 aerofoil; thickness/chord ratio 13.2 per cent at root, 11.3 per cent at tip; dihedral 2° 30'; incidence 3° at root, -3° 30' at tip; sweepback 20° at quarter-chord.

T-1A Jayhawk features include student pilot in left seat, instructor on right and pupil/observer behind instructor; more bird-resistant windscreen and leading-edges; fewer cabin windows; strengthened wing carry-through structure and engine attachment points to meet low-level flight stresses; rails for four passenger seats in cabin for personnel transport; avionics relocated from nose to rack in cabin to facilitate nose installation of air conditioning; emergency door moved forward to position opposite main cabin door to allow straight-through egress; improved brakes; additional fuel tank; single-point pressure refuelling; Rockwell Collins five-tube EFIS; digital autopilot; weather radar; central diagnostic and maintenance system; Tacan with air-to-air capability.

FLYING CONTROLS: Conventional and manual. Variable incidence tailplane and elevators for pitch axis; lateral control by small ailerons and almost full semi-span, narrow chord spoilers used also as airbrakes and lift dumpers; rudder with trim tab; narrow chord Fowler-type flaps, double-slotted inboard and single-slotted outboard, occupy most of trailing-edges and are hydraulically actuated; mid-span leading-edge fences on wing; small horizontal strakes on fuselage at base of fin; small ventral fin.

STRUCTURE: Wings include integrally machined metal upper and lower skins joined to two box spars forming integral fuel tank; tailplane and fin similar. Wing, fuselage and tail unit certified fail-safe for unlimited life (with periodic inspections and maintenance).

LANDING GEAR: Retractable tricycle type, with single wheel and oleo-pneumatic shock-absorber on each unit. Hydraulic actuation, controlled electrically. Emergency free-fall extension. Main tyres 24×7.7 (16 ply) tubeless; nose tyre 18×4.4 (10 ply) tubeless. Nosewheel, which is steerable by rudder pedals, retracts forward; mainwheels retract inward into fuselage. Goodyear wheels and tyres; Aircraft Braking Systems brakes.

POWER PLANT: Two Pratt & Whitney Canada JT15D-5 turbofans, each rated at 13.19 kN (2,965 lb st) for take-off. Nordam thrust reversers standard on 400XP, but not fitted to T-1A. Total usable fuel capacity: 400XP 2,775 litres (733 US gallons; 610 Imp gallons); 400T 2,998 litres

(792 US gallons; 656 Imp gallons). One refuelling point in top of each wing, and one in rear fuselage for fuselage tank, capacity 1,158 litres (306 US gallons; 255 Imp gallons). (T-1A, single-point refuelling.) Oil capacity 7.7 litres (2.0 US gallons; 1.7 Imp gallons).

ACCOMMODATION: Crew of two on flight deck of 400XP on vertically and horizontally adjustable reclining seats with five-point safety harnesses; T-1A has seats for trainee pilot, co-pilot/instructor and observer. Improved interior introduced 1996, featuring redesigned trim panels, enhanced acoustic panels and vibration-damping engine mounts.

Standard 'centre club' layout of 400A seats eight passengers in pressurised cabin. Of these, seven are on tracking, 360° swivelling, reclining seats: four in facing pairs, two forward-facing and one aft-facing; each with integral headrest, armrest and shoulder harness. Fold-out writing table between each pair of seats. Private flushing lavatory at rear with sliding doors and optional illuminated vanity unit and hot water supply. With seat belts, this compartment can serve as eighth passenger seat.

Interior options for up to nine passengers; these include substitution of carry-on baggage compartment for one of the forward centre seats, and hot and cold service refreshment centre with integral stereo entertainment system. Independent temperature control for flight deck and cabin heating systems standard. In-flight telephone optional. Tailcone baggage compartment with external access. Optional four passenger seats in main cabin of T-1A. The 400T has an aft club arrangement with swivel chairs.

SYSTEMS: Pressurisation system, with normal differential of 0.63 bar (9.1 lb/sq in) maintaining sea level cabin environment to 7,315 m (24,000 ft) and 2,286 m (7,500 ft) cabin environment to 13,715 m (45,000 ft). Back-up pressurisation system, using engine bleed air, for use in emergency. Hydraulic system, pressure 103.5 bar (1,500 lb/sq in), for actuation of flaps, landing gear and other services. Each variable volume output engine-driven pump has a maximum flow rate of 14.76 litres (3.9 US gallons; 3.25 Imp gallons)/min, and one pump can actuate all hydraulic systems. Reservoirs, capacity 4.16 litres (1.1 US gallons; 0.9 Imp gallon), pressurised by filtered engine bleed air at 1.03 bar (15 lb/sq in). All systems are, wherever possible, of modular conception: for example, entire hydraulic installation can be removed as a single unit. Stick shaker as back-up stall warning device.

AVIONICS: Flight: GPS retrofitted to some T-1As.

Instrumentation: Standard avionics include pilot's integrated Rockwell Collins Pro Line 4 EFIS featuring three-tube (optional four-tube) colour CRT primary flight display (PFD) and multifunction display (MFD) units mounted side by side, and control/display unit. PFD displays airspeed, altitude, vertical speed, flight director, attitude and horizontal situation information, while MFD displays navigation, radar, map, checklist and fault annunciation information. Smaller, single or dual CRTs mounted on central console function as independent navigation sensor displays or back-up displays for main CRTs. EFIS installation features strapdown attitude/heating referencing system, electronic map navigation display, airspeed trend information and V-speeds on Mach airspeed display, TCAS II, ELT and solid-state Doppler turbulence detection radar.

DIMENSIONS, EXTERNAL:

Wing span	13.25 m (43 ft 6 in)
Wing aspect ratio	7.8
Length overall	14.75 m (48 ft 5 in)
Fuselage: Length	13.15 m (43 ft 2 in)
Max width	1.68 m (5 ft 6 in)
Max depth	1.85 m (6 ft 1 in)
Height overall	4.24 m (13 ft 11 in)
Tailplane span	5.00 m (16 ft 5 in)
Wheel track	2.84 m (9 ft 4 in)

Wheelbase	5.86 m (19 ft 3 in)
Crew/passenger door: Height	1.27 m (4 ft 2 in)
Width	0.71 m (2 ft 4 in)

DIMENSIONS, INTERNAL:

Cabin:	
Length: incl flight deck	6.32 m (20 ft 9 in)
excl flight deck	4.72 m (15 ft 6 in)
Max width	1.50 m (4 ft 11 in)
Max height	1.45 m (4 ft 9 in)
Volume: incl flight deck	11.3 m ³ (400 cu ft)
excl flight deck	8.6 m ³ (305 cu ft)
Baggage compartment volume	1.31 m ³ (46.4 cu ft)

AREAS:

Wings, net	22.43 m ² (241.4 sq ft)
Trailing-edge flaps (total)	4.22 m ² (45.40 sq ft)
Spoilers (total)	0.57 m ² (6.20 sq ft)
Fin, incl dorsal fin	5.91 m ² (63.60 sq ft)
Rudder, incl yaw damper	0.99 m ² (10.70 sq ft)
Tailplane	5.25 m ² (56.50 sq ft)
Elevators, incl tab	1.55 m ² (16.70 sq ft)

WEIGHTS AND LOADINGS:

Basic operating weight, incl crew, avionics and interior fittings	4,967 kg (10,950 lb)
Baggage capacity: total	431 kg (950 lb)
tailcone	204 kg (450 lb)
Max fuel weight	2,228 kg (4,912 lb)
Max T-O weight	7,393 kg (16,300 lb)
Max ramp weight	7,484 kg (16,500 lb)
Max landing weight	7,121 kg (15,700 lb)
Max zero-fuel weight	5,896 kg (13,000 lb)
Max wing loading	329.67 kg/m ² (67.52 lb/sq ft)
Max power loading	280 kg/kN (2.75 lb/lb st)

PERFORMANCE:

Max limiting Mach No.	0.78
Max level speed at FL270	468 kt (867 km/h; 539 mph)
Cruising speed:	
high, at FL390	450 kt (834 km/h; 518 mph)
intermediate, at FL410	420 kt (778 km/h; 483 mph)
long-range, at FL 430	414 kt (767 km/h; 476 mph)
Stalling speed, flaps down, idling power	

	93 kt (173 km/h; 107 mph) CAS
Max rate of climb at S/L	1,149 m (3,770 ft)/min
Rate of climb at S/L, OEI	218 m (1,714 ft)/min
Service ceiling	13,243 m (43,450 ft)
Service ceiling, OEI	6,279 m (20,600 ft)
Max certified altitude	13,715 m (45,000 ft)
FAA (FAR Pt 25) T-O field length at S/L, ISA	1,190 m (3,906 ft)

FAA landing distance at max landing weight	1,071 m (3,514 ft)
Range: with 100 n mile (185 km; 115 mile) reserves:	
with max fuel	1,557 n miles (2,883 km; 1,781 miles)
with max payload	874 n miles (1,618 km; 1,005 miles)

ferry	1,687 n miles (3,124 km; 1,941 miles)
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OPERATIONAL NOISE LEVELS: T-O 89.0 EPNdB

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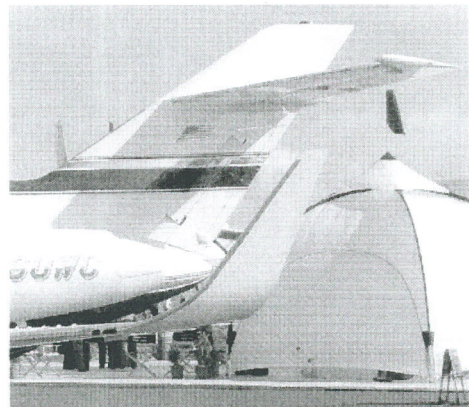
HAWKER 800

JASDF designation: U-125

TYPE: Business jet.

PROGRAMME: Derived from the de Havilland/Hawker Siddeley/British Aerospace 125, which was built in the UK from 1962 onwards, progressing through Srs 1 to 3 and 400 to 700. Prototype Srs 800 first flew (G-BKTF) 26 May 1983; type certificate gained 4 May 1984 and Public Transport Category C of A on 30 May 1984; FAA certification 7 June 1984; Russian certification May 1993; Canadian certification (800XP) awarded in third quarter of 1997. Adopted Hawker nomenclature when programme purchased by Raytheon in 1993, at which time some 850 aircraft had been sold in 44 countries.

Final assembly of Hawker 800XP gradually transferred to Wichita; first US-assembled aircraft flew on 5 November 1996, being N297XP, the 297th Series 800; second (N1105Z; No. 301) followed on 24 November 1996; transition complete with flight of last UK-assembled aircraft, No. 337, 29 April 1997; FAA production



Winglet-equipped Hawker 800SP (Paul Jackson) NEW/0567010



Hawker 800XP twin-turboprop business jet (Paul Jackson)

NEW/0567047

certificate awarded to Raytheon in May 1997. One thousandth 125/Hawker series aircraft, an 800XP, was delivered as the 'Millennium Hawker' to Gainey Corporation of Grand Rapids, Michigan (N984GC), October 1998. Winglets available as option on new aircraft, or as retrofit, from 2003.

CURRENT VERSIONS: **800:** Original version superseded by 800XP in late 1995; 275 built, of which last delivered December 1995.

800XP: (XP=eXtended Performance) Announced March 1995, when prototype (G-BVYW, modified from 800) completed; this and preproduction 800XP used in development programme, culminating in CAA and FAA certification in July 1995; first delivery (to Green Tree Financial of St Paul, Minnesota) October 1995 after public debut at National Business Aviation Association Convention in Las Vegas during previous month. First seven delivered in 1995, followed by 26, 33, 48 and 55 in 1996-99.

800SP: Winglet modification of 800/800XP devised by Aviation Partners Inc and shown at NBAA Convention, Orlando, Florida, September 2002; available from early 2003. Height 107 cm (3 ft 6 in); 7 per cent consequential drag reduction translates into M0.03 speed increase (18 kt; 33 km/h; 21 mph) and range extension of 180 n miles (333 km; 207 miles).

Detailed description applies to this version.

800FI, SM, RA and SIG: Special missions versions; produced as required.

U-125A: Refer to KAC entry.

CUSTOMERS: By June 2003 643 Series 800/800XPs built including 55 delivered in 2001, 46 in 2002 and 28 in the first nine months of 2003. Largest contract for 125/Hawker placed in May 1997 when Executive Jet Inc ordered 20 800XPs, followed in September 1998 by order for a further 20, plus 16 options for NetJets fractional ownership scheme; deliveries between 1997 and 2004. Recent customers include National Air Service (NAS) of Jeddah, Saudi Arabia, which ordered 14 in November 1999 for its NetJets Middle East fractional ownership programme, five of these being delivered in 2000, including the first (HZ-KSRA) at the Farnborough International Air Show on 24 July 2000, and three per year thereafter until 2003; and Hainan Airlines of China, which took delivery of one aircraft on 19 July 1999. Contender for US Navy Undergraduate Military Flying Officer Training System (UMFOTS) requirement, for which 16 aircraft are required initially, with selection scheduled for first quarter 2004 and first delivery in January 2006.

COSTS: 800XP: US\$12.49 million (2001).

DESIGN FEATURES: Classic small business jet; sweptback wing mounted below cabin floor; podded engines on rear fuselage sides; and high tailplane.

Improvements of baseline Series 800, compared with earlier 700 variant, include curved windscreen, sequenced

nosewheel doors, extended fin leading-edge, larger ventral fuel tank, and increased wing span which reduces induced drag, enhances aerodynamic efficiency and carries extra fuel; outboard 3.05 m (10 ft) of each wing redesigned.

In XP version, TFE731-5BR-1H turboprops boost performance, including 14 kt (26 km/h; 16 mph) increase in cruising speed at 11,800 kg (26,015 lb) at 11,890 m (39,000 ft); 225 kg (496 lb) payload increase with eight passengers; 15 to 23 per cent reduction in time to cruising altitude, to reach 11,280 m (37,000 ft) in 23 minutes at maximum take-off weight in ISA + 10°C conditions; and enhanced take-off performance. Other improvements include installation of vortilons in place of wing fences, permitting lower V-speeds and reducing drag; enhanced TKS de-icing system with increased fluid capacity; improved high-energy brakes; restyled cabin interior to maximise use of available volume; and improved environmental control system; and redesigned interior, with increased headroom by relocating oxygen dropout units to sidewall panels, and 12.2 cm (4.8 in) extra width at shoulder level by sculpturing sidewall panels around fuselage frame. Interior further improved in 1998 – see Accommodation paragraph.

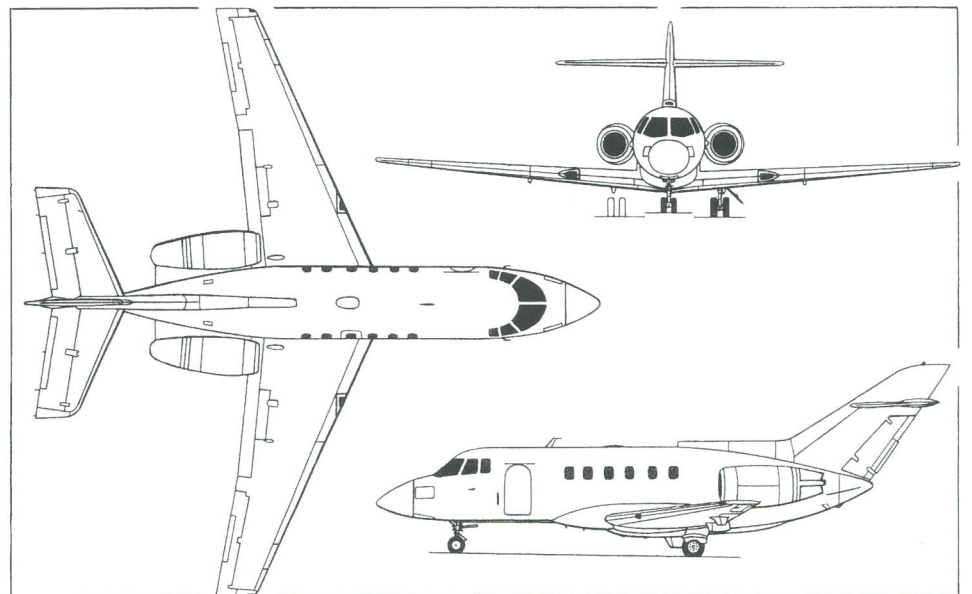
Wing thickness/chord ratio 14 per cent at root, 8.35 per cent at tip; dihedral 2°; incidence 2° 5' 42" at root, -3° 5' 49" at tip; sweepback 20° at quarter-chord; small fairings on tailplane undersurface eliminate turbulence around elevator hinge cutouts.

FLYING CONTROLS: Conventional and manual. Each control surface with geared tab; port aileron tab trimmed manually via screw-jack. Hydraulically actuated four-position double-slotted flaps; mechanically operated hydraulic cutout prevents asymmetric flap operation; upper and lower airbrakes, with interconnected controls to prevent asymmetric operation, form part of flap shrouds and provide lift dumping. Fixed incidence tailplane.

STRUCTURE: All-metal. One-piece wings, dished to pass under fuselage and attached by four vertical links, side link and drag spigot; two-spar fail-safe wings, with partial centre spar of approximately two-thirds span, to form integral fuel tankage; single-piece skins on each upper and lower wing semi-spans; detachable leading-edges; fail-safe fuselage structure of mainly circular cross-section, incorporating Redux bonding.

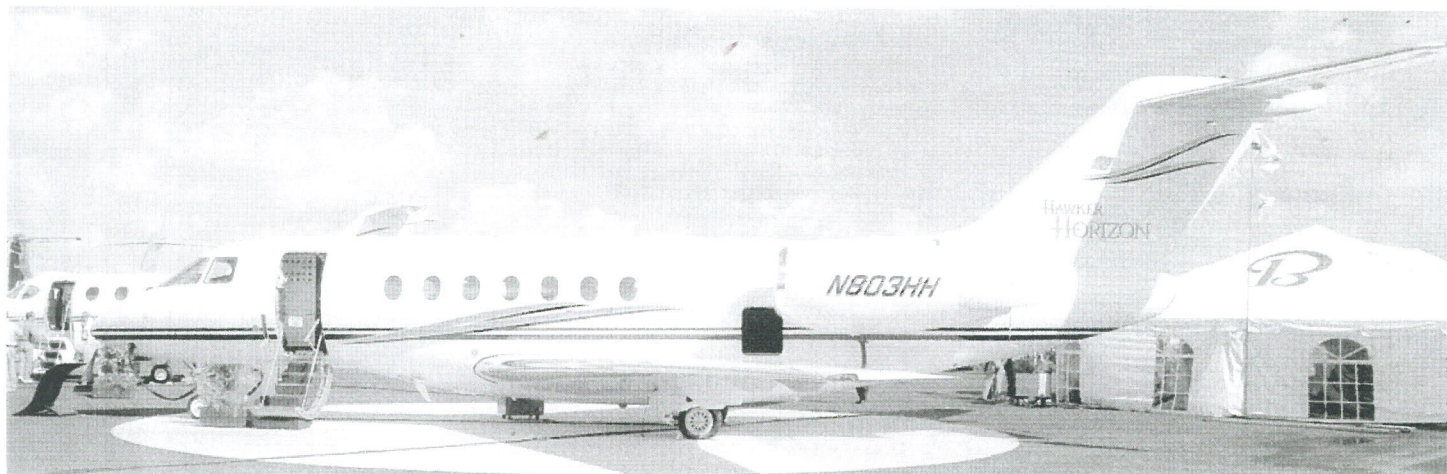
LANDING GEAR: Retractable tricycle type, with twin wheels on each unit. Hydraulic retraction: nosewheels forward, mainwheels inward into wings. Oleo-pneumatic shock-absorbers. Fully castoring nose unit, steerable ±45°. Dunlop mainwheels size 23x7-12 (12 ply) tubeless tyres. Dunlop nosewheels size 18x4.25-10 (6 ply) tubeless tyres. Dunlop triple-disc hydraulic brakes with Maxaret anti-skid units on all mainwheels. Minimum ground turning radius about nosewheel 9.14 m (30 ft 0 in).

POWER PLANT: Two 20.73 kN (4,660 lb st) Honeywell TFE731-5BR-1H turboprops, mounted on sides of rear



Hawker 800XP (two Honeywell TFE731-5BR-1H turboprops) (Jane's/Dennis Punnett)

0084005



Third Hawker Horizon, on show at the NBAA Convention, Orlando, Florida, in October 2003 (Paul Jackson)

NEW/0567011

fuselage in pods designed and manufactured by Northrop Grumman. Thrust reversers developed by Dee Howard fitted as standard. Integral fuel tanks in wings, with combined capacity of 4,818 litres (1,273 US gallons; 1,060 Imp gallons). Rear underfuselage tank of 882 litres (233 US gallons; 194 Imp gallons) capacity, giving total capacity of 5,700 litres (1,506 US gallons; 1,254 Imp gallons). Single pressure refuelling point at rear of ventral tank. Overwing refuelling point near each wingtip.

ACCOMMODATION: Flight deck crew of two. Dual controls standard. Seat for third crew member. Executive layout has forward baggage compartment, forward galley comprising automatic coffee maker, microwave oven, and miscellaneous storage. Seats swivel through 360°. Seating for eight passengers, with club four seating at the front of the cabin, three-place settee on the right side rear cabin and single seat opposite. Airliner style lavatory at rear with external servicing as standard. Maximum seating for 14. Interior options include differing seating layouts; microwave oven; entertainment system including CD player and video LCD screen. New interior introduced at National Business Aviation Association Convention at Las Vegas, Nevada, in October 1998 features oval internal window frames, additional sidewall lighting and restyled side panels and work tables.

SYSTEMS: Honeywell air conditioning and pressurisation system. Maximum cabin differential 0.59 bar (8.55 lb/sq in). Oxygen system standard, with dropout masks for passengers. Hydraulic system, pressure 186 to 207 bar (2,700 to 3,000 lb/sq in), for operation of landing gear, mainwheel doors, flaps, spoilers, nosewheel steering, mainwheel brakes and anti-skid units. Two accumulators, pressurised by engine bleed air, one for main system pressure, other providing emergency hydraulic power for wheel brakes in case of main system failure. Independent auxiliary system for lowering landing gear and flaps in event of main system failure.

DC electrical system utilises two 30 V 12 kW engine-driven starter/generators and two 24 V 23 Ah Ni/Cd batteries. A 24 V 4 Ah battery provides separate power for standby instruments. AC electrical system includes two 1.25 kVA static inverters, providing 115 V 400 Hz single-phase supplies, one 250 VA standby static inverter for avionics, and two engine-driven 208 V 7.4 kVA frequency-wild alternators for windscreen anti-icing. Ground power receptacle on starboard side at rear of fuselage for 28 V external DC supply. Honeywell 36-150 W APU. TKS liquid system de-icing/anti-icing on leading-edges of wings and tailplane. Engine ice protection system supplied by engine bleed air. Kidde-Graviner triple FD Firewire fire warning system and two BCF engine fire extinguishers. Stall warning and stick pusher system fitted.

AVIONICS: Collins Pro Line 21 as core system.

Comms: Dual Collins VHF-422C com with 8.33 kHz frequency spacing; dual TFR-94D transponders; Collins HF-9000 HF com with Coltech CSD-714 Selcal; dB Systems Dual Model 700 cockpit audio system; Universal Avionics CVR-120 cockpit voice recorder; and Artex C406-2 satellite-capable ELT, all standard. Second HF-9000; Honeywell Airborne Flight Information System, and Magnastar C2000 terrestrial-based flight phone or Universal Avionics Aero M or Aero I satcom phone, all optional.

Radar: Collins TWR-850 colour weather radar with turbulence detection as standard.

Flight: Dual Collins FMS-6000 flight management systems; dual AHC-3000 quartz AHRS; dual ADC-3000 digital air data systems; FGC-3000 ADFCS; dual GPS-4000A; dual VIR-432 VOR/ILS/marker receivers; ADF-462; dual DME-442; ALT-4000 radio altimeter; TCAS-4000 TCAS II (Change 7 compliant); MDC-3000 maintenance diagnostic system; and SafeFlight AoA system, all standard. Second ADF-462, and L3 Communications F1000 FDR or JAR-OPS compliant Honeywell FDR with Teledyne FDAU, optional.

Instrumentation: Four 203 × 254 mm (8 × 10 in) active matrix LCDs for PFD, MFD and EICAS functions; and

Meggitt Avionics Mark II secondary flight display system, standard. Options include 3-D mapping for MFDs; Goodrich WX-1000 lightning detection system with display on AMLCDs; Collins CDU-6200 graphics capable display; and Airshow 400 or Airshow Network cabin display systems.

DIMENSIONS, EXTERNAL:

Wing span	15.66 m (51 ft 4½ in)
Wing chord, mean	2.29 m (7 ft 6¼ in)
Wing aspect ratio	7.1
Length overall	15.60 m (51 ft 2 in)
Height overall	5.36 m (17 ft 7 in)
Fuselage max diameter	1.93 m (6 ft 4 in)
Tailplane span	6.10 m (20 ft 0 in)
Wheel track (c/l of shock-absorbers)	2.79 m (9 ft 2 in)
Wheelbase	6.41 m (21 ft 0½ in)
Passenger door (fwd, port): Height	1.30 m (4 ft 3 in)
Width	0.69 m (2 ft 3 in)
Height to sill	1.07 m (3 ft 6 in)
Emergency exit (overwing, stbd): Height	0.91 m (3 ft 0 in)
Width	0.51 m (1 ft 8 in)

DIMENSIONS, INTERNAL:

Cabin (excl flight deck): Length	6.50 m (21 ft 4 in)
Max width	1.83 m (6 ft 0 in)
Max height	1.75 m (5 ft 9 in)
Floor area	5.11 m² (55.0 sq ft)
Volume	17.1 m³ (604 cu ft)
Baggage compartments: forward	0.93 m³ (33.0 cu ft)
rear	0.74 m³ (26.0 cu ft)
pannier (optional)	0.79 m³ (28.0 cu ft)

AREAS:

Wings, gross	34.75 m² (374.0 sq ft)
Ailerons (total)	2.05 m² (22.10 sq ft)
Airbrakes: upper (total)	0.74 m² (8.00 sq ft)
lower (total)	0.46 m² (5.00 sq ft)
Trailing-edge flaps (total)	4.83 m² (52.00 sq ft)
Fin (excl dorsal fin)	6.43 m² (69.20 sq ft)
Rudder	1.32 m² (14.20 sq ft)
Horizontal tail surfaces (total)	9.29 m² (100.00 sq ft)

WEIGHTS AND LOADINGS:

Basic weight empty	7,380 kg (16,270 lb)
Typical operating weight empty	7,303 kg (16,100 lb)
Max payload	989 kg (2,180 lb)
Max ramp weight	12,755 kg (28,120 lb)
Max T-O weight	12,701 kg (28,000 lb)
Max zero-fuel weight	8,369 kg (18,450 lb)
Max landing weight	10,591 kg (23,350 lb)
Max wing loading	365.5 kg/m² (74.86 lb/sq ft)
Max power loading	306 kg/kN (3.00 lb/lb st)

PERFORMANCE:

Max limiting Mach No.	0.87
Max level speed and max cruising speed at FL290	456 kt (845 km/h; 525 mph)
Econ cruising speed at FL131 to FL430	400 kt (741 km/h; 461 mph)
Stalling speed in landing configuration at typical landing weight	92 kt (170 km/h; 106 mph)
Max rate of climb at S/L	945 m (3,100 ft)/min
Time to FL390 at max T-O weight	28 min
Max certified altitude	13,100 m (43,000 ft)
T-O balanced field length at MTOW	1,533 m (5,030 ft)
Landing run at MLW	808 m (2,650 ft)
Range: with max payload	2,280 n miles (4,222 km; 2,623 miles)
with max fuel, NBAA VFR reserves	2,955 n miles (5,472 km; 3,400 miles)

UPDATED

HAWKER HORIZON

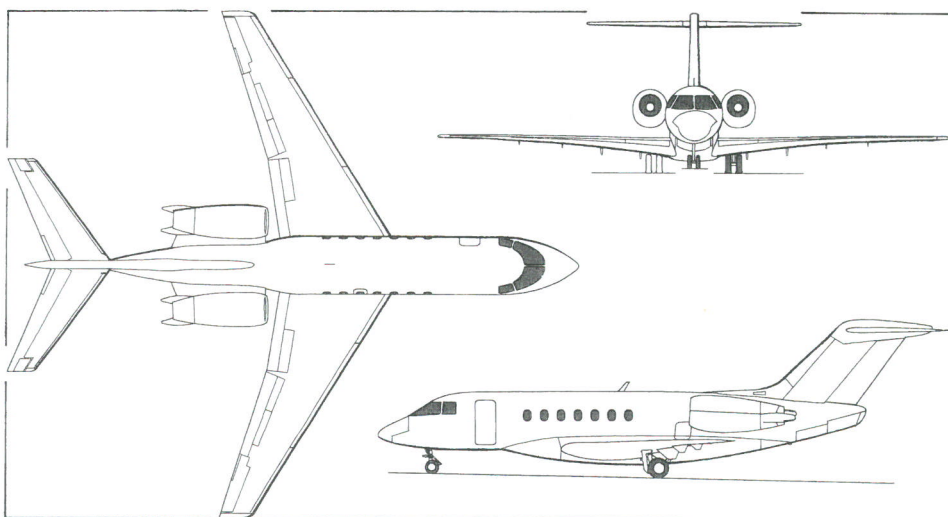
TYPE: Business jet.

PROGRAMME: Design started in 1993; initially thought to have had preliminary designation PD1000Y, but now known to have been PD376; briefly identified as Horizon 1000; announced at NBAA Convention, Orlando, Florida, 19 November 1996; full-size cabin mockup exhibited at NBAA Convention, Dallas, Texas, September 1997. First production wing delivered to Wichita from Fuji Heavy Industries in December 1998; first three fuselage sections mated in October 2000 and mated to wing on 16 January 2001. Prototype (c/n RC-1/N4000R) rolled out 17 April 2001; first flight 11 August 2001; second aircraft (c/n RC-2/N802HH) first flew 10 May 2002; public debut (c/n RC-3/N803HH) at NBAA Convention, Orlando, Florida, 10 September 2002; three aircraft had completed 700 hours of test flying by September 2003. FAA certification anticipated in mid-2004 and first customer deliveries scheduled for end of 2004 following a four-aircraft test and certification programme; production target 36 per year.

CUSTOMERS: More than 30 ordered by September 2003, including 27 for Raytheon Travel Air, and one for the Jordan Grand Prix racing team, for delivery in 2004.

COSTS: US\$17.8 million (2002).

DESIGN FEATURES: All-new design sharing only slight family resemblance with the BAe 125-derived Hawker 800 and (discontinued) 1000. An 'advisory council' of business jet operators assisted RAC in defining the aircraft, a major requirement being a flat-floor stand-up cabin. Conventional swept-wing, T-tail design with small



Hawker Horizon business aircraft (two P&WC PW308A turboprops) (Paul Jackson)

NEW/0568984

'overfin' housing antenna for optional satellite communications system. Wing of supercritical, aft-loaded aerofoil section designed using computational fluid dynamics (CFD) techniques; CFD also used to design area-ruled aft fuselage to minimise engine nacelle drag and to reprofile Hawker 1000-based nose section.

Wing sweepback 28° 22' at 25 per cent chord; dihedral 4°; tailplane sweepback 33° 30' at 25 per cent chord.

FLYING CONTROLS: Supercritical section ailerons and elevators, manually operated via pushrods and cables. Pitch trim via electrically actuated, variable incidence tailplane; geared trim tabs on ailerons, fly-by-wire hydraulically powered rudder with boost for asymmetric thrust. Electrically signalled, hydraulically powered, three-segment spoilers on upper surface of each wing augment aileron roll control; outboard and middle panels provide roll and speed brake functions, with maximum deflection 35°; lift dump function provided by all spoilers at 60° deflection. Four-segment, electrically controlled and powered double-slotted flaps, deflections 0, 12, 20 and 35°. Dual controls standard.

STRUCTURE: Fuselage of graphite/epoxy laminate and honeycomb core sandwich; 25 mm (1 in) thick shell is formed by Cincinnati Milacron Viper automatic fibre-placement machines over aluminium mandrel in three sections: nose, centrebody and tailcone, including dorsal fairing and engine pylons mated using aluminium splice plates in a Nova-Tech Engineering Inc fuselage automated splice tool which automatically seals the joints and installs some 1,800 hi-shear fasteners. Wing, designed using CFD, has a supercritical aerofoil and is manufactured by Fuji Heavy Industries at Utsunomiya, Japan, as a complete unit including all systems, integral fuel tanks and leading-edge bleed-air anti-icing, and shipped to Wichita for final assembly. Horizontal stabiliser is of light alloy, two-spar construction with graphite/epoxy composites sandwich skins; vertical stabiliser has three alloy spars and graphite/epoxy composites sandwich skins.

Risk-sharing partners include: Eaton Corporation (hydraulic system); Fokker Elmo BV (wiring harness); Fuji Heavy Industries (wing); Honeywell (avionics integration); Meggitt Avionics (fire and overheat protection and standby instrumentation); Messier-Dowty (landing gear); Moog (flight controls and flap actuators); Pratt & Whitney Canada (propulsion system); Smiths Industries (fuel system); and Hamilton Sundstrand Corporation (utility systems management integration).

LANDING GEAR: Retractable tricycle type by Messier-Dowty; landing gear electrically signalled and hydraulically actuated, with free-fall emergency extension system; twin wheels on each unit. Trailing-link suspension on main units, which retract inwards; nosewheel forwards. Steer-by-wire nosewheel, maximum deflection 70°, with disconnect for towing. Mainwheel size 26x6.6 (14 ply), nosewheel size 18x4.4 (10 ply). Hydraulic carbon disc brakes with digital brake-by-wire and electric anti-skid systems.

POWER PLANT: Two pod-mounted Pratt & Whitney Canada PW308A turbofans with FADEC, each flat-rated at 30.7 kN (6,900 lb st) at ISA + 20°C. Nordam target-type thrust reversers. Fuel in two integral wing tanks, maximum capacity 8,078 litres (2,134 US gallons; 1,777 Imp gallons). Single point fuelling/defuelling; gravity filler ports in top of each wing.

ACCOMMODATION: Crew of two, plus eight passengers in double 'club four' arrangement on reclining and side

tracking seats, each pair having stowable writing table. Observer's seat on flight deck optional. Two closets and a galley immediately aft of flight deck; lavatory and flight accessible (via secondary pressurised bulkhead up to FL410) baggage compartment at rear of cabin with external door on port side aft of wing. Accommodation is air conditioned and pressurised (FL60 equivalent altitude) and includes Airshow entertainment system. Door on port side aft of flight deck; single plug-type emergency exit on starboard side over wing; Four-panel windscreens; seven cabin windows per side.

SYSTEMS: Digitally controlled pressurisation system, maximum pressure differential 0.66 bar (9.64 lb/sq in), maintains an effective cabin altitude of 1,830 m (6,000 ft) to 13,715 m (45,000 ft). Engine bleed air anti-icing for wing leading-edges and engine inlet lips; electromagnetic expulsive de-icing of tailplane, none on fin leading-edge; electrically heated pitot and static masts, AoA and TAT probes; windscreens anti-icing and demisting and cabin window demisting via electrically conductive transparent film embedded between panels. Automatically controlled electrical power generation and distribution system (EPGDS) comprises two high-speed, variable frequency, engine-driven AC generators, one APU-driven AC generator and two 43 Ah lead acid batteries. AC/DC external power receptacles standard. Two independent hydraulic systems, operating pressure 206.85 bar (3,000 lb/sq in), for normal and emergency landing gear operation, braking, thrust reversers, spoilers, rudder, nosewheel steering and emergency electrical generation. Two-bottle oxygen system, total capacity 4,080 litres (144 cu ft), with quick-donning diluter-demand masks for crew and auto-deploy constant flow masks in overhead boxes for passengers. Tailcone-mounted Honeywell AE-36-150(HH) APU approved for in-flight operation from sea level to 10,670 m (35,000 ft) and for main engine starting from sea level to 7,925 m (26,000 ft).

AVIONICS: Honeywell Primus Epic lightweight modular avionics system based on Virtual Backplane Network architecture, which combines the cabinet-based modular capabilities of Honeywell's 777 AIMS system with the aircraft-wide network capabilities of its Primus 2000 system and built-in maintenance recording with portable access terminal. The system has 'point and click' capability via two Cursor Control Devices (CCDs) which include touchpad, numeric control and on-screen 'soft keys'. Voice Command will be a future option for some Epic functions.

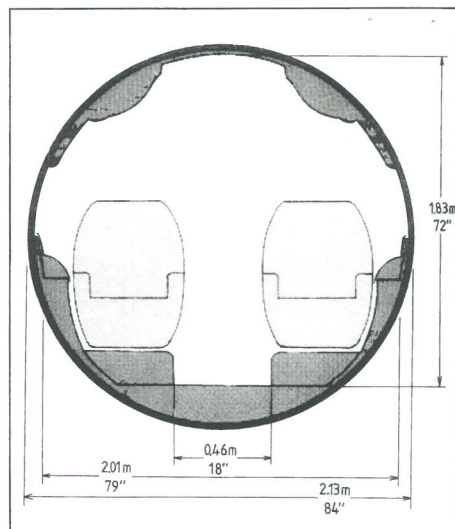
The Horizon's avionics system provides functions which Raytheon states have never previously been offered in a super-mid-size business jet, including digital circuit breaker control, automatic refuelling control, and full-authority autothrottle. All avionics boxes are installed in a cabinet behind the co-pilot's seat, in an environmentally controlled, pressurised area with easy access for maintenance.

Comms: Dual VHF comms; single Collins HF-9000 HF with Selcal; dual Mode S Diversity transponders; dual audiophone/interphone/PA systems; airborne telephone.

Radar: Primus 880 colour weather radar.

Flight: Primus Epic AFCS and FMS with integrated performance computer; dual VHF nav VOR/LOC/GS/Markers; dual DME; dual IRU; dual GPS; EGPWS; TCAS II; solid-state FDR and CVR.

Instrumentation: Five 203 x 254 mm (8 x 10 in) colour, active, flat panel LCD screens comprising two PFDs, two



Hawker Horizon cabin cross-section (Paul Jackson)

MFDs and one EICAS, plus two smaller multifunction control and display units (MCDUs).

DIMENSIONS, EXTERNAL:

Wing span	18.82 m (61 ft 9 in)
Mean aerodynamic chord	2.92 m (9 ft 7 in)
Wing aspect ratio	7.2
Length overall	21.11 m (69 ft 3 in)
Height overall	5.97 m (19 ft 7 in)
Tailplane span	7.90 m (25 ft 11 in)
Wheel track	2.79 m (9 ft 2 in)
Wheelbase	8.46 m (27 ft 9 in)
Passenger door: Height	1.58 m (5 ft 6 in)
width	0.76 m (2 ft 6 in)

DIMENSIONS, INTERNAL:

Cabin (excl flight deck):	
Length: excl baggage	7.62 m (25 ft 0 in)
inc baggage	8.99 m (29 ft 6 in)
Max width	1.97 m (6 ft 5 1/2 in)
Width at floor	1.27 m (4 ft 2 in)
Max height	1.83 m (6 ft 0 in)
Volume excl baggage	25.8 m³ (912 cu ft)
Baggage compartment volume	2.83 m³ (100 cu ft)

AREAS:

Wings, gross	49.3 m² (531.0 sq ft)
Horizontal tail surfaces	13.01 m² (140.00 sq ft)
Vertical tail surfaces	10.26 m² (110.40 sq ft)
Ailerons (total)	1.35 m² (14.52 sq ft)
Horizontal surfaces (total)	13.01 m² (140.00 sq ft)
Fin, excl dorsal fairing	10.26 m² (110.40 sq ft)
Rudder	2.40 m² (25.87 sq ft)

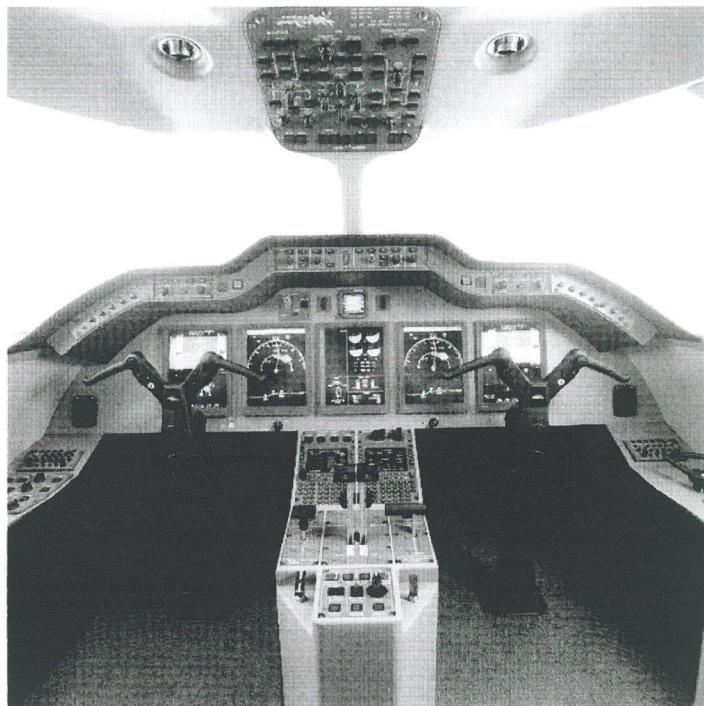
WEIGHTS AND LOADINGS:

Basic operating weight (incl crew)	9,777 kg (21,555 lb)
Max fuel weight	6,486 kg (14,300 lb)
Max zero fuel weight	11,340 kg (25,000 lb)
Max T-O weight	17,010 kg (37,500 lb)
Max ramp weight	17,100 kg (37,700 lb)
Max landing weight	15,195 kg (33,500 lb)
Max wing loading	344.8 kg/m² (70.62 lb/sq ft)
Max power loading	277 kg/kN (2.72 lb/lb ft)



Hawker Horizon cabin

0130567



Hawker Horizon flight deck

0130566

PERFORMANCE (estimated):

Max operating speed:
S/L to FL80 280 kt (519 km/h; 322 mph)
FL80 to FL200 350 kt (648 km/h; 403 mph)
Max operating Mach No. at FL350 M0.84

Time to FL370 13 min
Max certified altitude 13,715 m (45,000 ft)
T-O field length 1,495 m (4,900 ft)
Landing run 713 m (2,340 ft)
Max range 3,400 n miles (6,297 km; 3,912 miles)

Range at cruising speed of M0.82, six passengers, NBAA IFR reserves 3,147 n miles (5,828 km; 3,621 miles)

UPDATED

HENSLEY

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Web: http://www.hensleyaircraft.com

CEO: Robert Hensley

VICE-PRESIDENT: Joe Penaz

The H-1 Wolf is Hensley's initial offering with final funding for construction and testing of the prototype put in place during 2003.

UPDATED

HENSLEY H-1 WOLF

TYPE: Four-seat kitbuilt twin.

PROGRAMME: Design began in 1991, initially as part-time venture. Construction of prototype started in 1998; exhibited, unflown, at AirVenture, Oshkosh, July 2001; maiden flight then scheduled for December 2001 and kit deliveries for second quarter of 2002; this has slipped and first flight had not taken place by October 2003.

CURRENT VERSIONS: **Wolf**: Baseline version.

Wolf GT: Higher-powered, long-range version, with two cabin doors and increased MTOW.

CUSTOMERS: First aircraft sold October 2001.

COSTS: Wolf US\$124,900 including engines (2003).

DESIGN FEATURES: Intended as manoeuvrable twin, able to operate into remote, short airstrips; affordable; easy to build and maintain.

Low-drag fuselage; constant-chord, low-mounted wings, with winglets; pusher engines located close inboard and above wings.

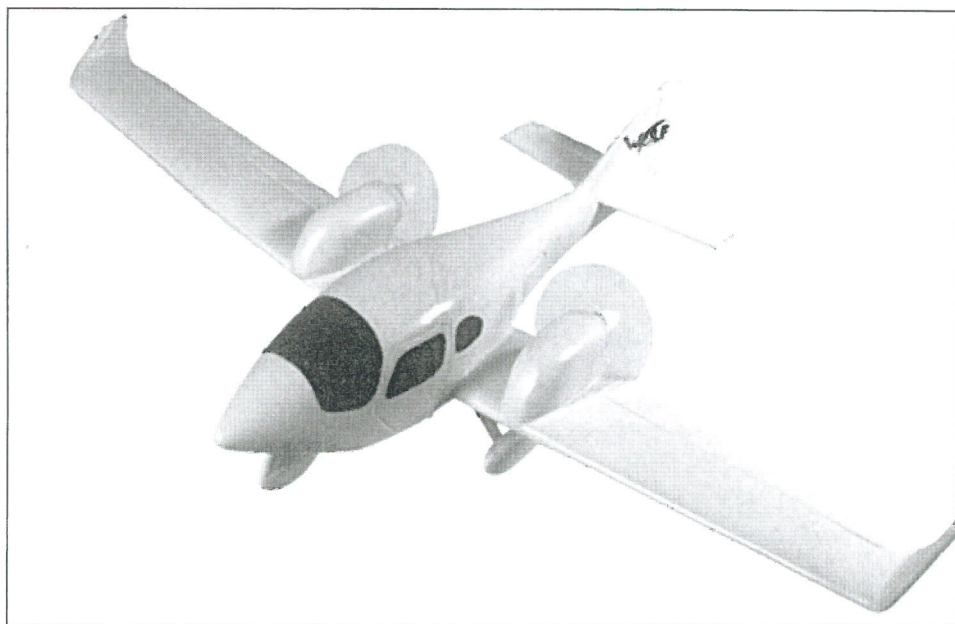
Wing section VH-1 Twin Turbo, purpose developed by Jeff Viken for high lift, low drag laminar flow.

FLYING CONTROLS: Conventional and manual. Fowler flaps immediately outboard of engines. Horn-balanced rudder and elevator.

STRUCTURE: Composites throughout.

LANDING GEAR: Tricycle type; fixed. Mainwheels, 6.00-6, on aluminium sprung legs; trailing-link nosewheel, 11x4.00-5, with rubber-in-compression suspension. Hydraulic brakes on mainwheels. Speed fairings on all wheels.

POWER PLANT: Initially, prototype was due to be powered by two Quantum Powermills engines (based on Honda VTEC) with pusher propellers and dual fuel system with baseline aircraft having 101 kW (135 hp) Q-135s; this changed in second quarter 2003 to two 101 kW (135 hp)



Model of Hensley H-1 Wolf

0110977

Thielert Centurion turbocharged Diesel engines driving three-blade MT propellers. Fuel capacity 189 litres (50.0 US gallons; 41.6 Imp gallons). Wolf GT to have 123 kW (165 hp) Q-165Ts, MT constant-speed propellers and 662 litres (175 US gallons; 146 Imp gallons).

ACCOMMODATION: Four persons in back-to-back pairs. Door, port side. Dual sidestick controls. Two doors on GT version.

SYSTEMS: Dual electrical system.

DIMENSIONS, EXTERNAL:

Wing span 10.36 m (34 ft 0 in)
Wing aspect ratio 9.6
Length overall 6.81 m (22 ft 4 in)
Height overall 2.68 m (8 ft 9 1/2 in)

DIMENSIONS, INTERNAL:

Cabin max width 1.22 m (4 ft 0 in)

AREAS:

Wings, gross 11.15 m² (120.0 sq ft)

WEIGHTS AND LOADINGS (A: Wolf, B: Wolf GT):

Weight empty: A 907 kg (2,000 lb)
B 953 kg (2,100 lb)

Max T-O weight: A 1,360 kg (3,000 lb)

B 1,587 kg (3,500 lb)

Wing loading: A 122.1 kg/m² (25.00 lb/sq ft)

B 142.4 kg/m² (29.17 lb/sq ft)

Power loading: A 6.76 kg/kW (11.11 lb/hp)

B 6.46 kg/kW (10.61 lb/hp)

PERFORMANCE (A, B as above):

Normal cruising speed at 75% power:

A 161 kt (298 km/h; 185 mph)

B 196 kt (362 km/h; 225 mph)

Stalling speed: A 57 kt (105 km/h; 65 mph)

B 66 kt (121 km/h; 75 mph)

Max rate of climb at S/L: A 427 m (1,400 ft)/min

single engine: A 91 m (300 ft)/min

T-O run: A 270 m (885 ft)

Landing run: A 206 m (675 ft)

Range: A 651 n miles (1,207 km; 750 miles)

B 2,281 n miles (4,224 km; 2,625 miles)

g limits: A +6.0/-3.0

B +5.0/-2.5

UPDATED

HILLBERG

HILLBERG HELICOPTERS

PO Box 8974, Fountain Valley, California 92728-8974

Tel: (+1 909) 279 56 78

e-mail: RoterMouse@earthlink.com

PRESIDENT: Don Hillberg

Company founded 1990 to provide maintenance and modification services to helicopter operators, and moved into kit and experimental fields to help builders.

Hillberg has also developed the four-seat 1-04, which awaits funding for production. Produces a retrofit kit for the RotorWay Exec (which see), upgrading it to turbine power with a Solar T62-T32 of 112 kW (150 shp) and reducing empty weight to 340 kg (750 lb); at least 13 delivered by October 2003.

UPDATED

HILLBERG EH 1-01 ROTERMUSE and EH 1-02 TANDEMMOUSE

TYPE: Single-seat helicopter kitbuilt; two-seat helicopter kitbuilt.

PROGRAMME: Design and construction of prototype began in August 1990; first flew (N10TE) August 1992. Construction of first production aircraft began in September 1996. Type is currently certified as experimental by FAA.

CURRENT VERSIONS: **EH 1-01 RoterMouse**: Single-seat version.

Description applies to EH 1-01 except where indicated.

EH 1-02 TandemMouse: Tandem two-seat version; under development; was due to fly 1999; this date slipped, but this version is believed to have flown by early 2001. Powered by 112 kW (150 shp) Solar T62-T32 turbine engine. Provisional figures appear below.



Hillberg EH 1-01 RoterMouse (one Honeywell 36-55-C)

EH-1-02A: Development of EH 1-02; has 313 kW (420 shp) Rolls-Royce 250-C20B with 681 litre (180 US gallon; 150 Imp gallon) fuel tank.

CombatMouse: Proposed military version.

CUSTOMERS: By June 2002, 31 had been ordered, of which at least four had been built.

COSTS: Kit: EH-1-01 US\$68,000 (2003) ex-works US\$100,000; EH 1-02 US\$120,000; all prices encompass everything bar radio equipment (2003).

DESIGN FEATURES: Forward fuselage resembles Bell AH-1 HueyCobra. Stub-wing behind cockpit for carriage of external loads. Main rotor speed 510 rpm; tail rotor 3,250 rpm.

FLYING CONTROLS: Auto-governed hydromechanical flying controls. Optional rotor brake.

STRUCTURE: Aluminium alloy (2024-T3) monocoque fuselage, bulkheads and keel; stainless steel engine deck and firewall. Rotor has Gyrodyne QH-50 modified blades of NACA 1200 aerofoil section with 8° twist and block tip caps. Modified Robinson R22 hub and transmission. Conventional tail rotor using aluminium-skinned blades.

LANDING GEAR: Fixed steel cross-tube skid type; floats optional.

POWER PLANT: One 108 kW (145 shp) Honeywell 36-55-C turboshaft engine driving a non-folding, two-blade, semi-rigid wood-laminated main rotor. Engines in range 108-186 kW (145-250 hp) are suitable. Single 125 litre (32.9 US gallon; 27.4 Imp gallon) crash-resistant bladder fuel tank around transmission; refuelling point behind main