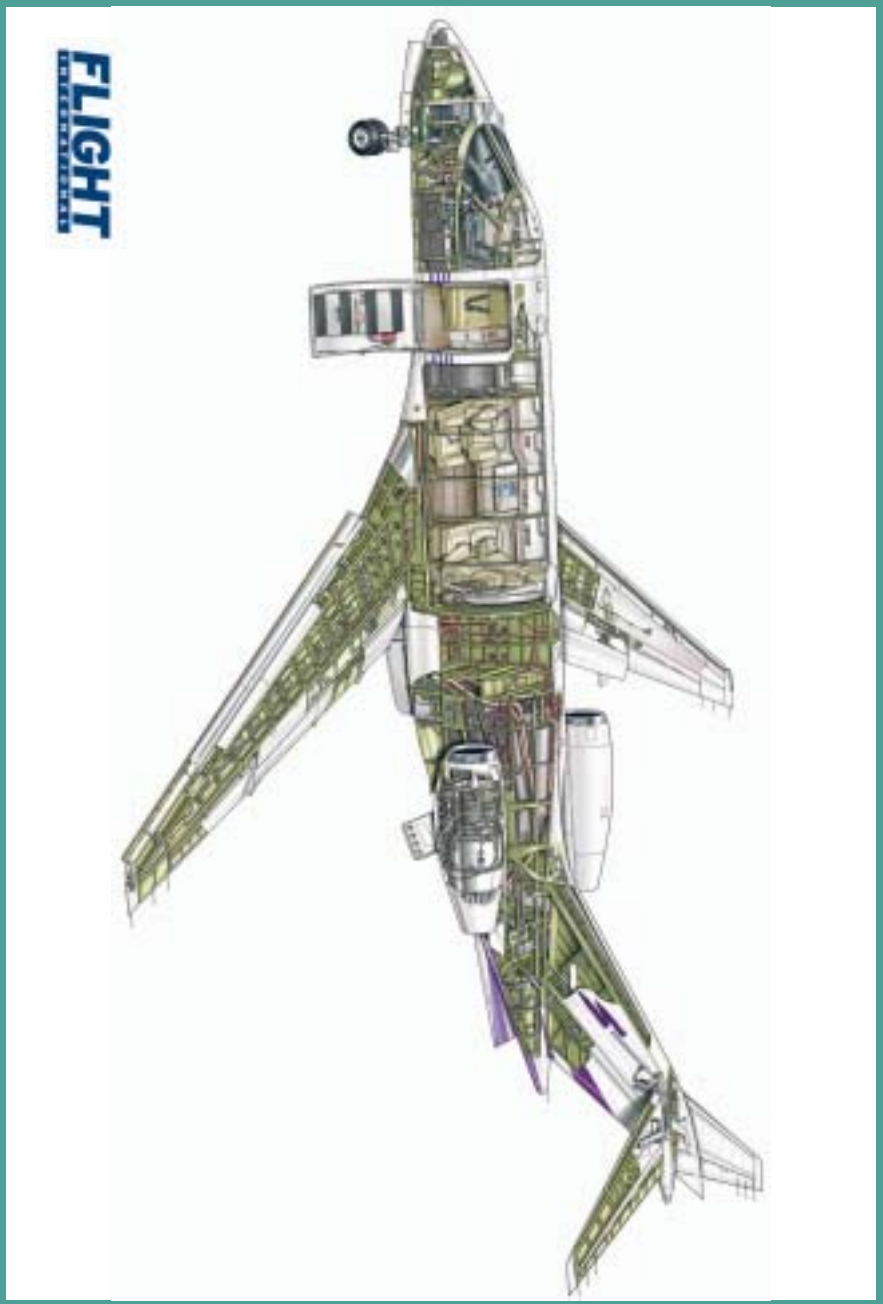


8

Light Jets

Honeywell's market forecast anticipates deliveries of more than 3,250 jets in these segments between 2006 and 2016, an increase of more than 12 percent compared with delivery expectations the previous year. Several new or proposed entrants to the category indicate the growth potential.

■ Sino Swearingen's SJ30 is one of the new kids on the block. Certified in 2005 the aircraft is already developing a reputation for breaking speed and distance records for the segment. Artist Tim Hall.

CESSNA CITATION BRAVO

HERITAGE

The Bravo first flew in April 1995. A development of the Cessna 550 Citation II, it flies to an altitude of 45,000ft (13,216m) and carries up to seven passengers. The aircraft is manufactured at Cessna's production facilities in Wichita, Kansas. The Citation II was a stretched version of Citation I (Cessna 500) and first built in 1976, entering service in 1978. Some 733 aircraft were sold before the Bravo replaced it when entering service in 1997.

SPECIFICATION

Length	47' 2"	14.39m
Wingspan	52' 2"	15.9m
Height	15'	4.57m
Cabin Length	20' 10"*	6.31m*
Cabin Width	4' 9"	1.47m
Cabin Height	4' 8"	1.45m
Max Range (4)	1,744nm	3,232km
Max Seating	2 + 7	
Typical Seating	1 + 7	
Powerplant	2x P&WC PW530A	2,887lbs/12.84kN each
Avionics	Honeywell Primus 1000	
Max Cruise Speed	402ktas	745km/h
Max Ceiling	45,000ft	13,216m
Rate of Climb	3,190fpm	972mpm
Take off Distance	3,600ft	1,097m
Landing Distance	3,180ft	969m
MTOW	14,800ft	6,713kg
Max Landing Weight	13,500ft	6,123kg
Useful load	5,560lbs	2,522g
Payload with full fuel	736lbs	334g
Price	$6.145m	€4.886m

*Forward Pressure bulkhead to aft pressure bulkhead

NETJETS decision to invest in the Citation Bravo reinforced Cessna's claim that the Citation Bravo offers the rarest of win-win outcomes – more power on less fuel. As a result the Bravo flies 20 knots faster, climbs to altitude far more quickly, and covers even more distance non-stop than its predecessor – the Citation II

But following the success of the CJ3, Cessna is ending production of this light jet and are delivering the final orders this year.

The aircraft - powered by two Pratt & Whitney PW530A engines each delivering 2,287lbs (12.84kN) of thrust - will be in service for many years to come.

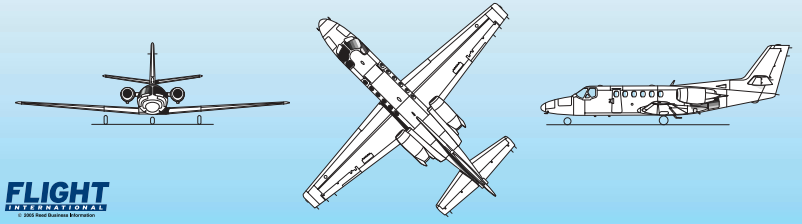
Bravo is certified for steep approach capability allowing it access to steep approach airports in Europe such as London City Airport in the UK, Lugano Airport in Switzerland and Seyer Airport in Germany.

The aircraft is equipped with Honeywell Primus 1000 integrated avionics system, with a Honeywell GNSX flight management system and an electronic flight information system, dual 7in x 8in screen primary flight displays and a 7in x 8in multi-function display.

The Honeywell navigation suite includes a VHF omni-directional ranger, distance measuring equipment and digital automatic direction finder, Honeywell VG-14A vertical gyroscopes and a C-14 compass set. The aircraft is fitted with a Honeywell Primus 660 colour weather radar.

The aircraft is fitted with single-wheeled hydraulically-retractable tricycle type landing gear. The trailing link system in the main landing gear gives smooth landing characteristics.

SPOTTER'S GUIDE



The Bravo aircraft is of similar construction to the Cessna CitationJet with tapered three-spar wings attached to the lower fuselage and the podded Pratt & Whitney engines mid-mounted to the rear fuselage. The T-tail has a tapered mid-set tailplane. There are six windows each side.

CESSNA CITATION CJ3

HERITAGE

The CJ3 first flew in April 2003. Flight testing of the engines began in August 2003. With a maximum take off weight of 13,870lb (6,290kg), the CJ3 was certificated for single-pilot operation under FAR 23 commuter-category rules, allowing a common type rating with the smaller CJ1 and CJ2 aircraft. It was certified by the FAA in October 2004 – just two years after it was launched at NBAA.

SPECIFICATION

Length	50' 2"	15.29m
Wingspan	53' 4"	16.26m
Height	15' 2"	4.62m
Cabin Length	15' 8"	4.78m
Cabin Width	4' 10"	1.47m
Cabin Height	4' 9"	1.45m
Max Range	1,875nm	3,475km
Max Seating	2 + 8	
Typical Seating	2 + 6	
Powerplant	2x Williams-Rolls FJ44-3A	2,820lb/12.54kN each
Avionics	Rockwell Collins Pro Line 21	
Max Cruise Speed	M 0.73	417KTAS/773km/h
Max Ceiling	45,000ft	13,716m
Rate of Climb	4,478fpm	
Take off Distance	3,180ft	969m
Landing Distance	2,770ft	844m
MTOW	13,870lb	6,291kg
Max Landing Weight	12,750lb	5,783kg
Useful load	5,370lb	2,436kg
Payload with full fuel	660lb	299kg
Price	$6.65m	€5.19m

TAKE a Citation CJ2 give it an extra 20 inches of cabin, add new engines and extend the wing and you have the CJ3 – the largest of the single pilot CJ series offered by Cessna.

The extra weight takes the CJ3 into the light jet category where its seven seat cabin is proving very competitive. While it is rated for single pilot operation it works well in the corporate environment – with two crew, four passengers and full fuel a range of 1,875nm (3,457km), including direct climb to 45,000ft in 27min is the norm.

The CJ3 had some difficulties with initial certification largely because of development problems with the aircraft's 2,780lbs (12.4kN) thrust Williams International FJ44-3A turbofan but early problems were ironed out and Cessna say the engines are proving to be very fuel efficient.

The CJ3 was very much a pioneering aircraft. As well as the new engines, Cessna introduced an expanded Rockwell Collins Pro Line 21 integrated avionics system. Becoming the first aircraft to have a file server as part of the standard avionics and the first to use electronic charts.

SPOTTER'S GUIDE

The aircraft has a 0.53m longer wing span, 0.3m taller vertical tail and a 0.15m longer tailcone to house the Goodrich full-authority digital engine control (FADEC) units. The aircraft is mainly of metal construction with low weight composite materials in the fairings, wing tips and tailplane tips. The CJ3 aircraft is of similar design to the original CitationJet with tapered three-spar wings attached to the lower fuselage and podded engines mounted above the rear fuselage. The T-tail has a tapered tailplane. It has seven windows on each side compared to four on the CJ1+ and six on the CJ2+.

NEW CESSNA CITATION ENCORE +

SPOTTER'S GUIDE

Encore is the largest of the straight wing Citations and also features the low swept tailfins with a large dorsal fin. It differs from the 550 series (Bravo) by the addition of a seventh window on either side. The two Pratt & Whitney engines are mid-mounted on the rear fuselage.

SPECIFICATION

Length	48' 11"	14.91m
Wingspan	54' 1"	16.48m
Height	15' 2"	4.62m
Cabin Length	17' 4"	5.28m
Cabin Width	4' 10"	1.47m
Cabin Height	4' 9"	1.45m
Max Range	1,760nm	3,262km
Max Seating	2 + 11	
Typical Seating	2 + 7	
Powerplant	2x P&WC PW535B	3,400lb/15.12kN
Avionics	Rockwell Collins Pro Line 21	
Max Cruise Speed	M 0.74	428KTAS/793km/h
Max Ceiling	45,000ft	
Rate of Climb	13,716m	
Take off Distance	3,590ft	1,094m
Landing Distance	2,770ft	844m
MTOW	TBD once Certified	
Max Landing Weight	TBD once Certified	
Useful load	6,430lb	2,917kg
Payload with max fuel	1,030lb	467kg
Price	$8.06m	€6.29m

CESSNA'S newest upgrade of the Citation 560 family – the Encore+ - was awaiting certification as this publication went to press. The Encore+ succeeds the Encore, offering increased efficiency, a new integrated avionics suite, increased payload capability, more standard equipment, and new interior styling features such as LED indirect cabin lighting.

Propulsion for the Encore+ is generated by twin Pratt & Whitney Canada PW535B engines equipped with dual-channel Full Authority Digital Engine Control (FADEC) and are rated at 3,400lbs (15.12kN) of thrust.

Maximum takeoff weight for the Citation Encore+ has been increased by 200lbs (90kg) over the Encore, enabling the typical operator to have a full fuel payload (in addition to two pilots) in excess of 1,100lbs (499kg). The Citation Encore+ is expected to be certified for single-pilot operation.

The avionics on the Encore+ are the most advanced available on this class of business jet. The integrated Collins Pro Line 21 avionics suite encompasses many of the same features as the Citation CJ3, CJ2+ and CJ1+. The heart of the integration resides in the File Server Unit (FSU) serving as a portal to display electronic charting, graphical weather, and enhanced mapping in the cockpit.

Other integrated avionics features include Pro Line 21 Communication, Navigation, and Surveillance (CNS) radios, and Collins FMS-3000 with performance database. The Encore+ is equipped with standard Terrain Collision Avoidance System (TCAS II), Mark VIII Enhanced Ground Proximity Warning System (EGPWS), and broadcast graphical weather including Next Generation Doppler Radar (NEXRAD) information, Meteorological Terminal Aviation Routine Weather Report (METARs), and textual Terminal Aerodrome Forecast (TAF).

HERITAGE

Citation Encore+ and Encore are part of the Citation 560 family developed from the Citation II which was first announced in 1987. The first production model was called the Citation V delivered to the launch customer in 1989; this was followed by the derivative Citation Ultra in 1993 fitted with EFIS and increased payload and performance and then in 1998 Cessna announced the addition of powerful PW315 turbofans and the designation Citation Encore. The Encore+ with the new engines first flew in March 2006 and is due to deliver to first customer early in 2007.

IN DEVELOPMENT

EMBRAER PHENOM 300

HERITAGE

The Phenom 300 is the second of the light jets being brought to market by Embraer – the first is the VLJ Phenom 100 which is due to be certified in 2008.
The 300 was announced at an investment analysts meeting in Washington on May 3rd 2005 and unveiled at EBACE a few weeks later.
The Phenom name was announced at NBAA in November 2005 and the aircraft is due to be certified and enter service in mid 2009.

SPECIFICATION

Length	50' 11"	15.5m
Wingspan	53' 2"	16.2m
Height	16' 4"	5m
Cabin Length	16'	4.9m
Cabin Width	5' 1"	1.55m
Cabin Height	4' 11"	1.5m
Max Range (6)	1,800nm	3,333km
Max Seating	2 + 7	
Typical Seating	1 + 7	
Powerplant	2x P&WC PW535E	3,200lbs/14.23kN each
Avionics	Embraer Prodigy	
Max Cruise Speed	450ktas	833km/h
Max Ceiling	45,000ft	13,716m
Rate of Climb		
Take off Distance	3,700ft	1128m
Landing Distance	2,920ft	890m
MTOW		
Max Landing Weight		
Useful load		
Payload with full fuel		
Price	$6.65m	€5.19m

A LATE entry into the light jet market, but Brazilian manufacturer Embraer is confident that there is room and will argue that it is preparing an aircraft that will lead the class.

The manufacturer is offering premium comfort, outstanding performance and low operating cost with range, baggage space and speed performance targets that compare well.

It will be powered by Pratt & Whitney Canada's PW535E engine, with 3,200lbs (14.23kN) of thrust.

Comfortably accommodating up to nine people, the Phenom 300 range will be 1,800nm (NBAA IFR reserves with 100nm alternate) with six people onboard, and will have a maximum operating speed of Mach 0.78.

Up front the cockpit features a Prodigy flight deck, based on Garmin´s G1000 avionics system.

The panel features three 12-inch displays, with two PFDs and one multi-function display. The cockpit is the same as in the Phenom 100.

SPOTTER'S GUIDE

As a derivative of the Phenom 100 the outline is similar but the Phenom 300 is clearly bigger. There is much greater sweep of the low wings with winglets.
There is a T-tail and highly swept tailplane.
There are five windows on the left of the aircraft and six on the right.

IN DEVELOPMENT

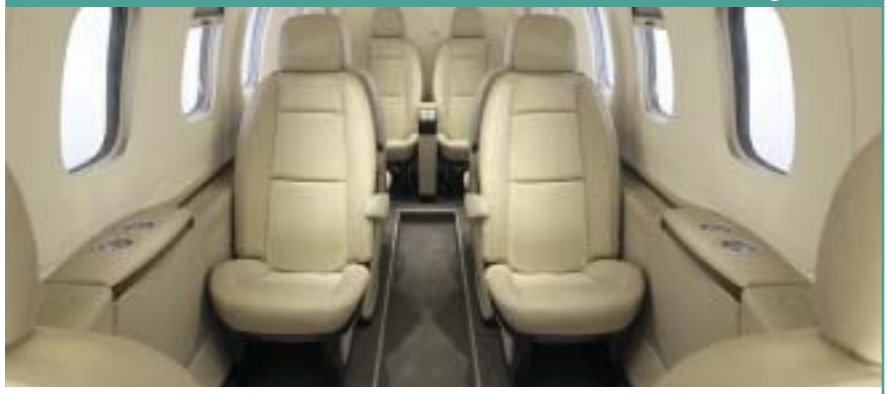
GROB SPn

SPOTTER'S GUIDE

The Grob SPn is an all-composite structure aircraft powered by two rear-mounted FADEC controlled Williams FJ44-3A turbofan engines. It low straight wings with winglets. A swept tailfin with mid-set swept tailplane. It has six windows on each side and features an exceptionally large cabin door with spyhole window.

SPECIFICATION

Length	48' 7"	14.81m
Wingspan	48' 9"	14.86m
Height	16' 10"	5.12m
Cabin Length	16' 9"	5.10m
Cabin Width	5'	1.52m
Cabin Height	5' 5"	1.64m
Max Range (6)	1,800nm	3,334km
Cabin Volume	406 cu.ft	11.5m3
Max Seating	1 + 9 / 2 + 8	
Typical Seating	1 + 6	
Powerplant	2x Williams FJ44-3A	2,820lbs/12.5kN each
Avionics	Honeywell Apex	
Max Cruise Speed	407ktas	754km/h
Max Ceiling	41,000ft	12,497m
Rate of Climb	4,360fpm	1,320mpm
Take off Distance	3,000ft	914m
Landing Distance	2,670ft	814m
MTOW	13,889lbs	6,300kg
Max Landing Weight	13,448lbs	6,100kg
Useful load	4,861lbs	2,205kg
Payload with full fuel	451lbs	205kg
Price	$7.43m	€5.8m



COMBINING the performance and passenger comfort of a light business jet with the operational versatility of a turboprop, German trainer manufacturer stunned the aviation world when it created a new class of "Utility Jet" aircraft behind closed doors and revealed an actual aircraft at the Paris air show.

The Grob SPn offers excellent range payload capability, robust short field performance, exceptional cabin volume and cargo conversion capability through its wide passenger door which is large enough to take a Euro-container.

With double club seating configuration (eight passengers in standard configuration) the cabin has 405 cu. ft. (11.5m^3) of space. Quick change capabilities allow this aircraft to accommodate cargo, passengers or both to a maximum payload of 2,491 lbs (1,130kg). A full lavatory is located forward in the standard configuration.

The Grob SPn sits high off the ground allowing easy ongoing operation from "unimproved" runways which are usually the exclusive domain of turboprops and are often comprised of gravel or grass surfaces. It will be certified for single-pilot operation.

The spacious cockpit features a Honeywell Apex suite. The Grob SPn comes fully equipped with state-of-the-art systems such as TCAS II with change 7 (Traffic Collision Avoidance System), EGPWS (Enhanced Ground Proximity Warning System) and FADEC (Full Authority Digital Engine Control).

HERITAGE

The Grob SPn was revealed to the world at the Paris Airshow in June 2005 as a fully assembled aircraft – including a full interior concept mock-up. The first flight followed in July 2005 with the second prototype appearing at EBACE, Geneva in May 2006. EASA certification is expected mid 2007 with FAA certification and first deliveries later in the year. The Grob SPn will be type certified in the "commuter category" for single-pilot operation under EASA CS 23 and FAA Part 23 regulations. The aircraft will be compliant for single-pilot operation under both VFR day/night, IFR and known icing conditions. It also will meet RVSM, MNPS and P-RNAV requirements. With a total of more than 3,500 aircraft produced and delivered globally, Grob Aerospace claims to be the world's largest and most experienced manufacturer of composite aircraft.

HAWKER 400XP

SPOTTER'S GUIDE

The Hawker 400XP has five windows on each side with a low swept wing and swept T-tail and tailplane. It also has a small ventral fin. The pair of Pratt & Whitney Canada JT15D-5 engines are mounted on the rear fuselage.

SPECIFICATION

Length	48' 5"	14.76m
Wingspan	43' 6"	13.26m
Height	13' 11"	4.24m
Cabin Length	15' 6"	4.72m
Cabin Width	4' 11"	1.50m
Cabin Height	4' 9"	1.45m
Max Range (4)	1,482nm	2,744km
Max Seating	2 + 9	
Typical Seating	2 + 7	
Powerplant	2x P&WC JT15D-5	2,965lb/13.19kN each
Avionics	Rockwell Collins Pro Line 4	
Max Cruise Speed	M0.78	450KTAS/833km/h
Max Ceiling	45,000ft	13,716m
Rate of Climb		
Take off Distance	3,906ft	1,191m
Landing Distance	3,514ft	1,071m
MTOW	16,300lbs	7,394kg
Max Landing Weight	15,700lbs	7,121kg
Useful load	5,550lbs	2,517kg
Payload with full fuel	638lbs	289kg
Price	$7.14m	€5.57m

XP for Hawker – the larger jet brand for Raytheon Aircraft – stands for "Extended Performance" allowing the manufacturer to offer an extra seat or extra fuel for more range.

The Hawker 400XP is a key part of the NetJets fleet and typical layouts are for an eight-seat configuration with private lavatory compartment and refreshment facilities. The cabin length is 15'6" (4.72m) with a width of 4'11" (1.50m) and a height of 4'9" (1.45m).

Maximum range with a four-person payload is more than 1,476nm (2,734km) with IFR reserves and cruise speed is 465ktas (860km/h).

It is equipped with two Pratt & Whitney Canada JT15D-5 axial flow turbofan engines with standard Nordan thrust reversers. The engines are each rated at 2,965lb (13.19kN) take-off power.

HERITAGE

The aircraft is derived from the Mitsubishi MU-300 Diamond which first flew in 1978. Beech entered an agreement with Mitsubishi in 1985 to acquire the rights to the Diamond II and made a number of design modifications to improve the performance of the aircraft. It first flew in 1990 as the Beechjet 400A and in May 2003 was renamed the Hawker 400XP thanks to its increase in gross weight of 200lb (90kg). The aircraft also operates in a defence role as a military trainer for Japan and as a tanker trainer for the USAF where it is designated Beechjet T1A Jayhawk.

LEARJET 40 XR

SPECIFICATION

Length	55' 6"	16.93m
Wingspan	47' 8"	14.56m
Height	14' 1"	4.31m
Cabin Length	17' 7"	5.39m
Cabin Width	5' 1"	1.56m
Cabin Height	4' 9"	1.50m
Max Range	1,824nm	3,378km
Max Seating	2 + 7	
Typical Seating	2 + 6	
Powerplant	2x Honeywell TFE31-20BR	3,500lbs/15.56kN
Avionics	Honeywell Primus 1000	
Max Cruise Speed	M 0.81	465ktas/860km/h
Max Ceiling	51,000ft	15,545m
Rate of Climb	1,869fpm	569mpm
Take off Distance	4,680ft	1,426m
Landing Distance	2,660ft	811m
MTOW	21,000lb	9,525kg
Max Landing Weight	19,200lb	8,709kg
Useful load	7,285lb	3,304kg
Payload with full fuel	2,160lb	978kg
Price	$8.75m	€6.83m

THE first Learjet 40XR was delivered in December 2005 as a higher-performance variant of Bombardier's entry-level Learjet. The Learjet 40 is itself a derivative of the cutting-edge of the Learjet 45. The aircraft brings real hot and high-performance characteristics to the light market.

The XR's upgrade to Honeywell's TFE731-20BR powerplants from the original -20AR version on the Learjet 40, gives increased range out of high altitude, short runway destinations such as Aspen, Colorado and Jackson Hole, Wyoming.

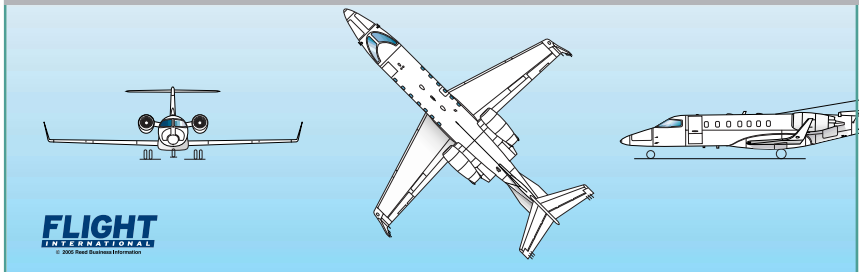
Weighing in at 21,250lbs (9,639kg), the 40XR boasts a cabin 17' 7" (5.39m) long with space for up to seven passengers.

However, normal operations are more likely to be four passengers and two crew where nominal cruise range will exceed 1,800nm (3,378km) with NBAA IFR reserves and the capability of achieving 51,000ft maximum operating altitude.

HERITAGE

Learjet is the Granddaddy of business jets, Bill Lear's first Learjet 23 launched in 1963 revolutionised the industry carrying seven passengers and outperforming the US Airforce frontline fighter aircraft (the F100) which could reach 40,000ft in just over seven minutes.
The phrase "jet set" was coined for people who would make use of this new form of transportation.

SPOTTER'S GUIDE



The Learjet 40 is a straightforward shrink of the 45. To pare the super light design down to fit the light jet niche, 24.5in (62cm) of fuselage was removed forward of the wing, along with three of the original 16 cabin windows. Six or seven windows will tell you the difference between the 40 and its big sister.

NEW

SINO SWEARINGEN SJ30

HERITAGE

Named the SJ30 because it was founder Ed Swearingen's thirtieth design it was conceived in 1986 but due to funding setbacks and the crash of the prototype in 2003 the project took longer than expected. However FAA certification was awarded in October 2005, icing and cabin certification were awarded in April 2006 and EASA certification is expected late 2007.

SPECIFICATION

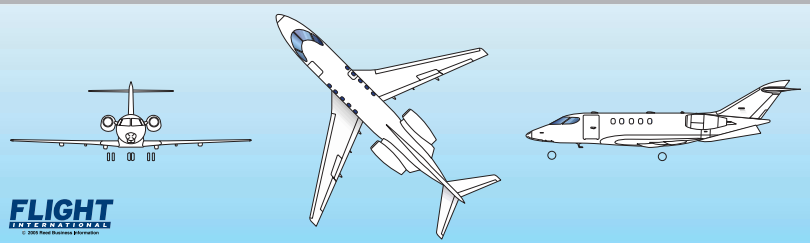
Length	46' 11"	14.95m
Wingspan	42' 4"	12.89m
Height	14' 3"	4.33m
Cabin Length	12' 6"	3.81m
Cabin Width	4' 10"	1.47m
Cabin Height	4' 4"	1.32m
Max Range	2,500nm	4630km
Max Seating	1 + 6	
Typical Seating	1 + 5	
Powerplant	2x Williams FJ44-2A	2,300lbs / 10.23kN each
Avionics	Honeywell Epic	
Max Cruise Speed	486ktas	900km/h
Max Ceiling	49,000ft	14,935m
Rate of Climb	3,700fpm	1,127mpm
Take off Distance	3,515ft	1,071m
Landing Distance	2,555ft	868m
MTOW	13,950lbs	6,340kg
Max Landing Weight	12,725lbs	5,784kg
Useful load	5,400lbs	2,454kg
Payload with full fuel	550lbs	249kg
Price	$6.195m	€4.83m

THE SJ30 is touted by Sino Swearingen as the world's fastest and longest-range light business jet available. It has a maximum cruise speed of 486ktas (900km/h) – 2kts slower than the Gulfstream G450 and a long range cruise of 2,500nm (4,630km). The SJ30 offers sea-level cabin pressurisation up to 41,000ft, at its ceiling of 49,000ft the cabin altitude is only 1,800ft. The cabin is a club four arrangement and the rear seats can be folded down to create a double bed. It is the only aircraft in its class to have leading edge slats which help to generate lift at slower speeds, thereby reducing stall speed and the approach speed – the slats compensate for the reduced efficiency of the swept wing which has optimum efficiency at high speed.

The two fuel efficient Williams FJ44-2A provide 2,300lbs (10.23kN) each and power the aircraft to a range of 2,500nm. Honeywell Epic avionics are the standard fit with three large 8-by-10-inch flat panel displays, with two primary flight displays (PFD), one for each pilot and a multi-function display in the centre.

The first aircraft was delivered in September 2006, and currently the programme is undertaking production ramp up. The SJ30 was shown at Farnborough in July 2006 having established a world record for a light business jet by flying from its US base in San Antonio, Texas to Farnborough in 10h 24min, including a 42min refuelling stop at Goose Bay, Canada, The jet flew Goose Bay-Farnborough direct, setting a speed and range record.

SPOTTER'S GUIDE



The SJ30 has a highly swept wing (32°) with five windows each side and a T-tail. The podded Williams engines are mid-mounted to the fuselage and similar to the LearJet, it has a single vertical fin under the tail.