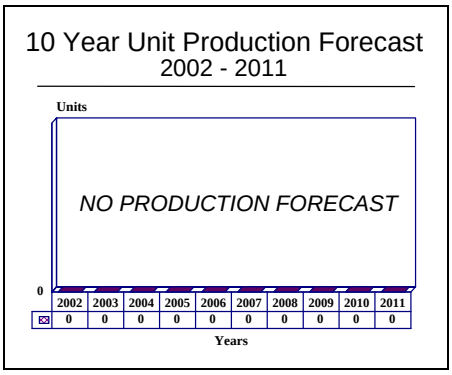
Embraer EMB-120 Brasilia – Archived 2/2003

Outlook

- Aircraft out of production, last two sales in 2000
- Modest market for cargo conversions, but these are of existing aircraft



Orientation

Description. Pressurized, 30-passenger, twin-turboprop regional/commuter transport aircraft.

Sponsor. The Brasilia is sponsored by Embraer, which in turn is entirely owned by the Brazilian government.

Contractors. Empresa Brasileira de Aeronautica SA (Embraer), Sao Jose dos Campos, Brazil.

Status. Limited production.

Total Produced. Through 2001, Embraer sold and delivered 352 aircraft.

Application. Short-range regional/commuter passenger transportation. Additional applications include corporate/business transportation, general light cargo and freight. Military and paramilitary uses include personnel transport, VIP, liaison, electronic warfare, and communications.

Price Range. $7.5 million (2000 US dollars).

Technical Data

(EMB-120/EMB-120ER)

Design Features. Cantilever low-wing monoplane with conventional T-tail unit, all in light alloy construction. Retractable tricycle landing gear.

	Metric	US
Dimensions (External)		
Length	20.0 m	65.62 ft
Height	6.35 m	20.84 ft
Wingspan	19.78 m	64.90 ft
Wing area	39.43 cu m	424.46 cu ft
Fuselage diameter	2.28 m	7.48 ft
Dimensions (Internal)		
Cabin length	9.38 m	30.77 ft

	Metric	US
Cabin width	2.10 m	6.9 ft
Cabin height	1.76 m	5.77 ft
Cabin volume	27.4 cu m	967 cu ft
Weight		
Equipped empty weight	7,101/NAV kg	15,655/NAV lb
Max take-off weight	11,500/12,000 kg	25,353/26,455 lb
Max payload	3,039/3,243 kg	6,700/7,150 lb
Max fuel	2,600/NAV kg	5,732/NAV lb
Max ZFW	10,500/NAV kg	23,148/NAV lb
Capacities		
Max usable fuel	3,312/NAV lit	875/NAV gal
Baggage volume	6.4 cu m	226 cu ft
Performance		
Max cruise speed	552 kmph	298 kt
Max level speed	583 kmph	315 kt
Long-range cruise speed	482 kmph	260 kt
Climb rate	646 m/min	2,120 ft/min
Service ceiling	9,085 m	29,800 ft
Take-off run to 15 m (50 ft)	1,390 m	4,560 ft
Range, 45 min reserves at 7,619 m (25,000 ft)[(a)]	926/1,667 km	500/900 nm

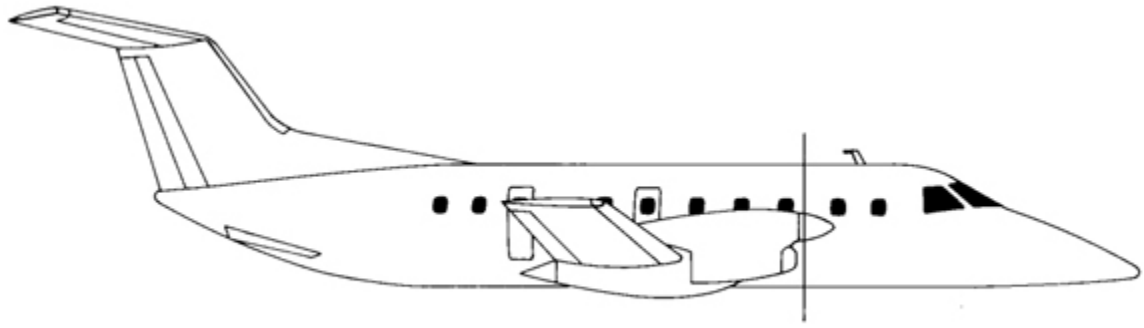
Propulsion

EMB-120/ER (2) UTC Pratt & Whitney Canada PW118A three-shaft, centrifugal-flow, turboprop engines rated 1,342 kW (1,800 shp); each driving a UTC Hamilton-Standard 14RF-9 four-blade, constant-speed, reversible pitch, featherable propeller.

Seating

Standard cabin seating for 30 passengers, three abreast at 31 inch pitch.

[(a)]With max 30-passenger payload.



EMBRAER EMB-120 BRASILIA

Source: Forecast International

EMBRAER EMB-120 BRASILIA

Source: Embraer

Variants/Upgrades

EMB-120RT (Reduced Take-off). Introduced in late 1986, this Brasilia is powered by PW118A engines capable of producing maximum power up to a temperature of ISA +15 degrees Celsius. First customer was Skywest Airlines of Utah, USA.

EMB-120ER Advanced. Standard production version from 1994, featured increased max take-off weight, greater range, and an increase in baggage/cargo compartment capacity. Design modifications aimed at reducing operational and maintenance costs while enhancing passenger comfort. Previous versions can be updated to ER standard, and several customers have elected this option.

EMB-120 Combi. Mixed passenger/cargo variant with quick-release seats; typical capacity of 30 passengers and 1,540 pounds of cargo, or 19 persons and 2,425 pounds of cargo.

EMB-120QC. The Quick Change model, convertible in 40 minutes from 30-passenger layout to 7,716-pound, all-cargo configuration complete with fire detection system, smoke curtain behind the flight deck, cargo restraint net, and 9*g* movable rear bulkhead. First ordered in May 1993.

EMB-120 Cargo. All-cargo version with 8,815-pound capacity.

Corporate Variant. Embraer offers a corporate version of the Brasilia. Customers include United Technologies Corp (which ordered the first of this version), Sony Corporation, Thyssen Steel of Mexico, and NatCom of the United Kingdom. UTC's order was delivered in 1986 and is used for executive transport in the eastern half of the US.

Military Variants. The Brazilian Air Force ordered 10 Brasilias, two for VIP and eight for general cargo and personnel duties. The VIP aircraft features the standard 30-seat configuration and is operated by the Grupo de Transporte Especial, based in Brasilia, for the transport of senior government and military personnel. The first two aircraft were delivered in early 1987, and another two followed in 1988. They are designated VC-97.

Embraer has also developed an EMB-120SA airborne early warning (AEW) variant for surveillance duties in the Amazon region under Brazil's SIVAM project. Fitted with the Ericsson Erieye radar, new nav/com systems, and additional fuel capacity, five such aircraft will monitor drug trafficking and other illegal activities.

The EMB-120RS sensor platform, described as a miniature US JSTARS, features a synthetic aperture radar, a TV/FLIR turret, an IR/UV mapping scanner, and a COMINT/ELINT package. This variant will also be integrated into SIVAM.

Program Review

Background. The Embraer EMB-120 Brasilia is one of the most successful medium-capacity commuter transports of the modern era. Only ATR, de Havilland, and SAAB have delivered more aircraft in the 30-50- seat classes. The PW100-powered aircraft took over for the 19-seat Bandeirante, which recorded a production run of 500 units.

The original EMB-120 design was a far cry from the current model. Embraer planned a simple upgrade of the 19-seat EMB-110 Bandeirante, adding pressurization, stretching the fuselage and, of course, incorporating one of several new turboprop engines then under development. In 1978, this modified Bandeirante, known as the Araquaia, was ultimately scrapped in favor of a completely new design, resulting in the current 30-passenger Brasilia.

Design Details. Compared with the Araquaia, the pressurized Brasilia sports a new wing and a new, swept T-tail. The final design revision to the EMB-120 called for replacement of the recessed aisle with a flat floor for easier conversion to a cargo configuration. In order to retain the same maximum cabin height, the fuselage diameter was increased by 3 inches. Other fuselage changes included a larger aft baggage compartment, with access through an exterior door on the left rear fuselage. An all-cargo version planned by Embraer would have had a large loading door in this same area; the fuselage would accommodate up to five cargo containers. However, this aircraft derivative has never been actively marketed.

Avionics. The Brasilia uses the Collins Pro Line II avionics package that includes the following as standard equipment: dual VHF-22 com transceivers, dual VIR-32 VHF nav receivers, one ADF-60A, one TDR-90 transponder, CLT-22/32/62/69 control heads, one DME-41, one WXR-270 weather radar, dual AHRS-85 digital strapdown AHRS, dual ADI-84, dual EHSI-74, dual RMI-36, one Dorne & Margolin DMELT-81 emergency locator transmitter, dual Avtech audio/ interphones, Matra/Weston voice recorder, and IET standby attitude indicator. Optional equipment includes one or two J.E.T. RNS-8000 3D navs, one or two Canadian Marconi CMA-771 Alpha VLF/Omegas, and Motorola Selcal. New cockpit data recorders and TCAS are now mandatory standard equipment on all Brasilias.

Funding

Embraer invested approximately $100 million in design and development of the Brasilia. The ER version cost an estimated $15 million to design and certify. Actual EMB-120 development cost allocations are not available.

Recent Contracts

None noted.

Timetable

Month	Year	Major Development
	1972	Design of Araquaia begins
Sep	1978	EMB-120 redesign announced
Late	1979	Engine selection announced
Jul	1983	Prototype first flight
May	1985	Brazilian certification
Jul	1985	US FAA certification
Aug	1985	Initial deliveries
Apr	1986	CAA certification
	1986	First deliveries of corporate variant

Month	Year	Major Development
Early	1987	First deliveries to Brazilian Air Force
Nov	1988	100th EMB-120 delivered
Aug	1990	200th EMB-120 delivered
Mar	1992	EMB-120ER certificated in Brazil
	2001	Final deliveries

Worldwide Distribution

Military/Government

Brazilian Air Force 5

Commercial

At the end of 2001, approximately 280 aircraft were in service worldwide. For more information, refer to World Airline Inventories in the Appendices.

Forecast Rationale

At the beginning of 2001 Embraer stated that the Brasilia was still available on a "build to order" basis. No sales have been reported since November 2000, and the manufacturer has since halted the line and is instead focusing on its very popular series of regional jets.

The aircraft has found favor as the subject of an all-cargo conversion. However, these are modifications of existing aircraft originally configured for 30 passengers.

Any further demand for the EMB-120 can be filled with used/refurbished aircraft. No additional production is forecast.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Aircraft	(Engine)	thru 01	02	03	04	05	06	07	08	09	10	11	Total 02-11
EMBRAER													
EMB-120	PW118/PW118A	352	0	0	0	0	0	0	0	0	0	0	0
Total Production		352	0	0	0	0	0	0	0	0	0	0	0