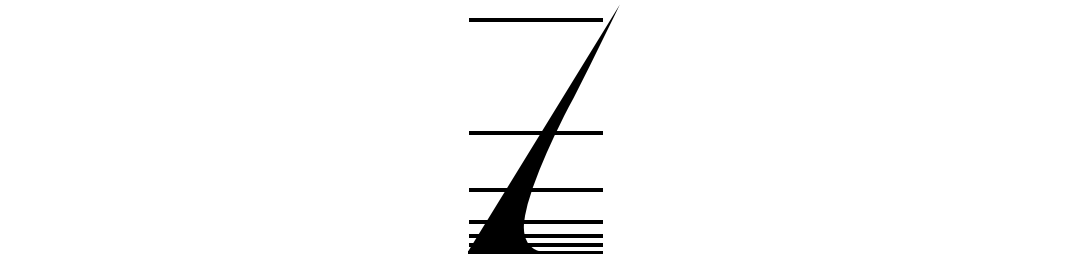
The Market for Business Jet Aircraft

Product Code #F613

A Special Focused Market Segment Analysis by:



Analysis 3
The Market for Business Jet Aircraft
2010-2019

Table of Contents

Executive Summary 5

Figure 1 - The Market for Business Jet Aircraft
By Market Segment - Units 2010 - 2019 (Bar Graph) 7

Figure 2 - The Market for Business Jet Aircraft
By Market Segment - Values 2010 - 2019 (Bar Graph) 7

Figure 3 - The Market for Business Jet Aircraft
By Market Segment - Units 2010 - 2019 (Pie Chart) 8

Figure 4 - The Market for Business Jet Aircraft
By Market Segment - Values 2010 - 2019 (Pie Chart) 8

Introduction 9

Trends 11

Competitive Environment 20

Table 1 - The Market for Very Light Jet Aircraft
Unit Production by Headquarters/Company/Program 2010 - 2019 27

Table 2 - The Market for Very Light Jet Aircraft
Value Statistics by Headquarters/Company/Program 2010 - 2019 28

Figure 5 - The Market for Very Light Jet Aircraft
Unit Production 2010 - 2019 (Bar Graph) 29

Figure 6 - The Market for Very Light Jet Aircraft
Value of Production 2010 - 2019 (Bar Graph) 29

Table 3 - The Market for Very Light Jet Aircraft
Unit Production % Market Share by Headquarters/Company 2010 - 2019 30

Table 4 - The Market for Very Light Jet Aircraft
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 31

Figure 7 - The Market for Very Light Jet Aircraft
Unit Production % Market Share 2010 - 2019 (Pie Chart) 32

Figure 8 - The Market for Very Light Jet Aircraft
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 32

Table 5 - The Market for Light Business Jet Aircraft
Unit Production by Headquarters/Company/Program 2010 - 2019 35

Table 6 - The Market for Light Business Jet Aircraft
Value Statistics by Headquarters/Company/Program 2010 - 2019 37

Figure 9 - The Market for Light Business Jet Aircraft
Unit Production 2010 - 2019 (Bar Graph) 39

Figure 10 - The Market for Light Business Jet Aircraft
Value of Production 2010 - 2019 (Bar Graph) 39

Table 7 - The Market for Light Business Jet Aircraft
Unit Production % Market Share by Headquarters/Company 2010 - 2019 40

Table 8 - The Market for Light Business Jet Aircraft
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 41

Figure 11 - The Market for Light Business Jet Aircraft
Unit Production % Market Share 2010 - 2019 (Pie Chart) 42

Figure 12 - The Market for Light Business Jet Aircraft
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 42

Table 9 - The Market for Light Medium Business Jets
Unit Production by Headquarters/Company/Program 2010 - 2019 44

Table 10 - The Market for Light Medium Business Jets
Value Statistics by Headquarters/Company/Program 2010 - 2019 45

Figure 13 - The Market for Light Medium Business Jets
Unit Production 2010 - 2019 (Bar Graph) 46

Figure 14 - The Market for Light Medium Business Jets
Value of Production 2010 - 2019 (Bar Graph) 46

Table 11 - The Market for Light Medium Business Jets
Unit Production % Market Share by Headquarters/Company 2010 - 2019 47

Table 12 - The Market for Light Medium Business Jets
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 48

Figure 15 - The Market for Light Medium Business Jets
Unit Production % Market Share 2010 - 2019 (Pie Chart) 49

Figure 16 - The Market for Light Medium Business Jets
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 49

Table 13 - The Market for Medium Business Jets
Unit Production by Headquarters/Company/Program 2010 - 2019 52

Table 14 - The Market for Medium Business Jets
Value Statistics by Headquarters/Company/Program 2010 - 2019 54

Figure 17 - The Market for Medium Business Jets
Unit Production 2010 - 2019 (Bar Graph) 56

Figure 18 - The Market for Medium Business Jets
Value of Production 2010 - 2019 (Bar Graph) 56

Table 15 - The Market for Medium Business Jets
Unit Production % Market Share by Headquarters/Company 2010 - 2019 57

Table 16 - The Market for Medium Business Jets
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 58

Figure 19 - The Market for Medium Business Jets
Unit Production % Market Share 2010 - 2019 (Pie Chart) 59

Figure 20 - The Market for Medium Business Jets
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 59

Table 17 - The Market for Super Mid-Size Business Jets
Unit Production by Headquarters/Company/Program 2010 - 2019 62

Table 18 - The Market for Super Mid-Size Business Jets
Value Statistics by Headquarters/Company/Program 2010 - 2019 63

Figure 21 - The Market for Super Mid-Size Business Jets
Unit Production 2010 - 2019 (Bar Graph) 65

Figure 22 - The Market for Super Mid-Size Business Jets
Value of Production 2010 - 2019 (Bar Graph) 65

Table 19 - The Market for Super Mid-Size Business Jets
Unit Production % Market Share by Headquarters/Company 2010 - 2019 66

Table 20 - The Market for Super Mid-Size Business Jets
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 67

Figure 23 - The Market for Super Mid-Size Business Jets
Unit Production % Market Share 2010 - 2019 (Pie Chart) 68

Figure 24 - The Market for Super Mid-Size Business Jets
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 68

Table 21 - The Market for Large Business Jets
Unit Production by Headquarters/Company/Program 2010 - 2019 70

Table 22 - The Market for Large Business Jets
Value Statistics by Headquarters/Company/Program 2010 - 2019 71

Figure 25 - The Market for Large Business Jets
Unit Production 2010 - 2019 (Bar Graph) 72

Figure 26 - The Market for Large Business Jets
Value of Production 2010 - 2019 (Bar Graph) 72

Table 23 - The Market for Large Business Jets
Unit Production % Market Share by Headquarters/Company 2010 - 2019 73

Table 24 - The Market for Large Business Jets
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 74

Figure 27 - The Market for Large Business Jets
Unit Production % Market Share 2010 - 2019 (Pie Chart) 75

Figure 28 - The Market for Large Business Jets
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 75

Table 25 - The Market for Long-Range Business Jets
Unit Production by Headquarters/Company/Program 2010 - 2019 78

Table 26 - The Market for Long-Range Business Jets
Value Statistics by Headquarters/Company/Program 2010 - 2019 79

Figure 29 - The Market for Long-Range Business Jets
Unit Production 2010 - 2019 (Bar Graph) 80

Figure 30 - The Market for Long-Range Business Jets
Value of Production 2010 - 2019 (Bar Graph) 80

Table 27 - The Market for Long-Range Business Jets
Unit Production % Market Share by Headquarters/Company 2010 - 2019 81

Table 28 - The Market for Long-Range Business Jets
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 81

Figure 31 - The Market for Long-Range Business Jets
Unit Production % Market Share 2010 - 2019 (Pie Chart) 82

Figure 32 - The Market for Long-Range Business Jets
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 82

Table 29 - The Market for Corporate-Configured Airliners
Unit Production by Headquarters/Company/Program 2010 - 2019 85

Table 30 - The Market for Corporate-Configured Airliners
Value Statistics by Headquarters/Company/Program 2010 - 2019 86

Figure 33 - The Market for Corporate-Configured Airliners
Unit Production 2010 - 2019 (Bar Graph) 87

Figure 34 - The Market for Corporate-Configured Airliners
Value of Production 2010 - 2019 (Bar Graph) 87

Table 31 - The Market for Corporate-Configured Airliners
Unit Production % Market Share by Headquarters/Company 2010 - 2019 88

Table 32 - The Market for Corporate-Configured Airliners
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 89

Figure 35 - The Market for Corporate-Configured Airliners
Unit Production % Market Share 2010 - 2019 (Pie Chart) 90

Figure 36 - The Market for Corporate-Configured Airliners
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 90

Market Statistics 91

Table 33 - The Market for Business Jet Aircraft
Unit Production by Headquarters/Company/Program 2010 - 2019 92

Table 34 - The Market for Business Jet Aircraft
Value Statistics by Headquarters/Company/Program 2010 - 2019 96

Figure 37 - The Market for Business Jet Aircraft
Unit Production 2010 - 2019 (Bar Graph) 100

Figure 38 - The Market for Business Jet Aircraft
Value of Production 2010 - 2019 (Bar Graph) 100

Table 35 - The Market for Business Jet Aircraft
Unit Production % Market Share by Headquarters/Company 2010 - 2019 101

Table 36 - The Market for Business Jet Aircraft
Value Statistics % Market Share by Headquarters/Company 2010 - 2019 102

Figure 39 - The Market for Business Jet Aircraft
Unit Production % Market Share 2010 - 2019 (Pie Chart) 103

Figure 40 - The Market for Business Jet Aircraft
Value Statistics % Market Share 2010 - 2019 (Pie Chart) 103

Conclusion 104

* * *

PROGRAMS

The following reports are included in this section: (**Note:** a single report may cover several programs.)

Boeing 737 BBJ
Bombardier Challenger
Bombardier Challenger 300
Bombardier Global 5000
Bombardier Global Express
Cessna Citation Excel/XLS
Cessna Citation X
Cessna CJ1/CJ2/CJ3/CJ4
Cessna Encore
Cessna Mustang
Cessna Sovereign
Dassault Falcon 900/7X/SMS
Dassault Falcon 2000
Diamond D-JET
Eclipse Aviation 500
Embraer Legacy 450/500
Embraer Legacy 600/650
Embraer Phenom 100
Embraer Phenom 300
Grob SPn
Gulfstream G150/G200/G250
Gulfstream G350/G450
Gulfstream G500/G550
Gulfsteam G650
Hawker Beechcraft 750/850XP/900XP
Hawker Beechcraft Hawker 400XP/450XP
Hawker Beechcraft Hawker 4000
Hawker Beechcraft Premier IA
Honda Aircraft HondaJet
Learjet 40/45/60/85
Piper Aircraft PiperJet

Introduction

Despite a few hopeful signs to the contrary, the business jet market remains mired in a pronounced slump. The market experienced dramatic growth in the period between 2004 and 2008, as manufacturers aggressively ramped up production rates while order backlogs grew fat. However, the boom times came to a sudden halt in the second half of 2008, amidst general economic decline and collapsing financial markets.

Demand for business aircraft essentially evaporated in late 2008 and early 2009. Not only did new orders dry up, but customers canceled or deferred existing orders in droves. Once-healthy order backlogs, accumulated during the boom years, rapidly shrunk in size.

Manufacturers had been counting on those backlogs to act as a cushion against the ill effects of a market recession. And, indeed, they would have been a significant buffer against a normal cyclical industry downturn. However, the suddenness and severity of the downturn that hit in late 2008 resulted in a wave of cancellations that cut deeply into the mountain of unfilled orders on which the OEMs had been sitting.

In order to protect the dwindling order backlogs, manufacturers slashed production rates, reduced the size of their workforces, and postponed plans for facility expansion. Such retrenchment activity continued well into 2010. In October 2010, Cessna laid off an additional 700 employees; the company has cut its work force roughly in half since November 2008.

Also in October 2010, Hawker Beechcraft announced layoffs of 350 employees, taking the number of workers cut by the company since the start of 2009 past the 3,000 mark. Hawker Beechcraft added that 800 more jobs would be eliminated over the next six to 18 months.

While it can legitimately be said that the worst of the industry downturn is over, real market improvement is not yet under way. The global economic recession is over, but the economic recovery is sluggish and halting, especially in the key business jet markets of North America and Europe. Corporate profits, normally a prime leading indicator of improved business jet sales, are on the rise. However, corporations are opting to hold onto their profits, as they are hesitant to make major expenditures in a time of economic instability and uncertain government policies.

Within the business jet market, the massive wave of order cancellations and deferrals experienced in late 2008 and the first half of 2009 appears to be over. Nevertheless, new order intake remains quite weak and, in some portions of the market, is nearly nonexistent.

The good news is that some market indicators are looking up. Business aircraft utilization is increasing, and the used business jet market is stabilizing, both of which are factors that point toward rising sales of new business jets.

Operator surveys indicate that considerable latent demand exists in the market for business jets. The purchase of a business jet is one of those major investments that corporations are unwilling to make in the current economic, regulatory, and tax environment. Continued economic improvement, though, will help free up some of the huge amounts of cash now being safeguarded in corporate coffers, with business jet sales being one of the beneficiaries. (On the other hand, a double dip back into economic recession, a possibility that cannot be entirely discounted, would wreak havoc on the business jet market.)

Meanwhile, the business jet industry has increasingly become a tale of two markets. In terms of sales and deliveries, large-cabin and long-range business jets are doing considerably better than light and mid-size business jets. Manufacturers have reduced production of all business jet types from 2008 levels, but build rates for light and medium jets have been slashed much deeper than those of larger jets. In addition, demand is already recovering for the larger types, but remains moribund for the smaller models.

The main reason for this disparity has to do with the different types of customers that typically purchase these aircraft. In general, the customer base for large-cabin and long-range jets is composed of wealthy individuals and large corporations. While these types of buyers have certainly been hurt by the economic downturn and its aftermath, their wealth and position mean that they are insulated from general economic and financial conditions to a much greater degree than are the types of customers that typically buy light and medium business jets. Buyers of smaller jets tend to be less wealthy individuals, small or mid-size companies, and fleet operators such as fractional providers, air taxi services, and charter outfits.

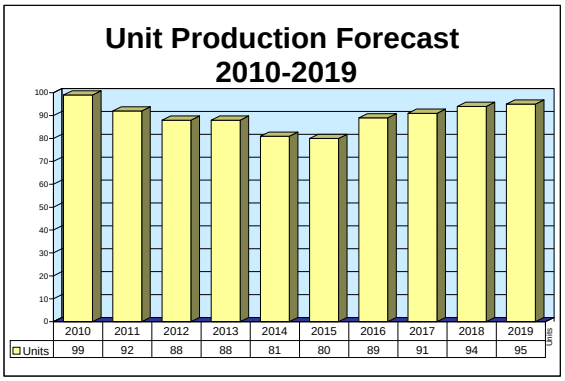
Another reason for the divergent fortunes of the top end and lower end of the business jet market is the fact that the customer base for the larger jets is much more geographically diverse than is the customer base for the smaller jets. The latter is heavily concentrated in the U.S. Regional economies are recovering from the global economic downturn at significantly varying rates, and a number of regions are recovering more quickly and

Continued…

Embraer Phenom 100

Outlook

- More than 100 Phenom 100s are now in service
- Embraer continues to develop new features for the Phenom 100



Orientation

Description. Twin-turbofan-powered, eight-seat business/personal jet aircraft.

Sponsor. The Phenom 100 is sponsored privately by Embraer.

Status. Production

Total Produced. Through 2009, Embraer produced 103 Phenom 100s.

Application. Business/executive aircraft; air taxi/air limousine; personal transport; flight training.

Price Range. $3.60 million to $3.68 million in 2009 U.S. dollars.

Phenom 100

Source: Embraer

Embraer Phenom 100

Contractors

Prime

Embraer - Empresa Brasileira de Aeronáutica SA	http://www.embraer.com, Av Brigadeiro Faria Lima, 2170, São José dos Campos, 12227-901 São Paulo, Brazil, Tel: + 55 12 3927 1000, Prime

Subcontractor

Astronics Corp	http://www.astronics.com, 130 Commerce Way, East Aurora, NY 14052 United States, Tel: + 1 (716) 805-1599 (Exterior Lighting)
Eaton Aerospace	http://www.aerospace.eaton.com, 9650 Jeronimo Rd, Irvine, CA 92618 United States, Tel: + 1 (949) 452-9500, Fax: + 1 (949) 452-9555 (Hydraulic Power Generation Package; Flap Drive System; Throttle Control Quadrant; Landing Gear Control Lever; Landing Gear Control Hydraulic Components; Secondary Power Distribution Unit; Cockpit Control Panel; Flap Selector Control Lever)
Garmin International Inc	http://www.garmin.com, 1200 E 151st St, Olathe, KS 66062 United States, Tel: + 1 (913) 397-8200, Fax: + 1 (913) 397-8282 (G1000 Avionics Suite)
Honeywell Aerospace	http://www51.honeywell.com/aero, 1944 E Sky Harbor Circle, Phoenix, AZ 85034 United States, Tel: + 1 (602) 231-1000, Fax: + 1 (602) 365-2075 (Cabin Pressure Control and Monitoring System)
L-3 Communications - Aviation Recorders	http://www.l-3ar.com, 6000 Fruitville Rd, Sarasota, FL 34232 United States, Tel: + 1 (941) 371-0811, Fax: + 1 (941) 377-5598 (Combination Voice & Data Recorder; Cockpit Voice Recorder; Flight Data Recorder)
Meggitt Aircraft Braking Systems	http://www.meggitt-mabs.com, 1204 Massillon Rd, Akron, OH 44306-4186 United States, Tel: + 1 (330) 796-4400, Fax: + 1 (330) 796-9805 (Brakes; Wheels)
Pratt & Whitney Canada	http://www.pwc.ca, 1000 Marie-Victorin Blvd, Longueuil, J4G 1A1 Quebec, Canada, Tel: + 1 (450) 677-9411, Fax: + 1 (450) 647-3620 (PW617F Turbofan Engine)
Saint-Gobain Aerospace Flight Structures Operation	http://www.radome.com, 335 N Diamond St, Ravenna, OH 44266 United States, Tel: + 1 (330) 298-4105 (Nose Radome)
Tactair Fluid Controls Inc	http://www.tactair.com, 4806 W Taft Rd, Liverpool, NY 13088 United States, Tel: + 1 (315) 451-3928, Fax: + 1 (315) 451-8919, Email: info@tactair.com (Emergency/Park Brake Control System; Passenger Door Damper)

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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

Design Features. Straight wing design. The wing is mounted low on the fuselage, and uses an Embraer-developed airfoil section designed to provide docile flying qualities for less-experienced pilots. The tail of the aircraft has a swept fin and swept horizontal stabilizers. The aircraft features tricycle type landing gear.

The Phenom 100 has the same cockpit and cabin cross-section as Embraer's Phenom 300 light business jet. Originally, the cabin cross-section of the two aircraft had a circular shape. However, the use of mock-ups revealed a need for more foot room for passengers. Embraer subsequently changed the cross-section to an egg-shaped design that added 5 inches of foot room without compromising other dimensions of the cabin. Composite materials account for 20 percent of the structure of the aircraft, not including the aircraft interior.

On the Phenom 100, twin Pratt & Whitney Canada PW617F turbofan engines are mounted in nacelles on the aft fuselage. The PW617F features Full Authority Digital Engine Control (FADEC).

The Phenom 100 is equipped with the Garmin G1000 all-glass, fully integrated avionics suite. The system has three interchangeable 12-inch displays, including two primary flight displays and one multifunction display. The G1000 installation on the aircraft is called the Prodigy Flight Deck.

The interior of the Phenom 100 was designed by BMW Group DesignworksUSA. The aircraft can be configured for six occupants with an enclosed aft lavatory, or for eight people with no lavatory.

	Metric	U.S.
Dimensions		
Length	12.82 m	42.06 ft
Height	4.35 m	14.27 ft
Wingspan	12.30 m	40.35 ft
Cabin height	1.50 m	4.92 ft
Cabin width	1.55 m	5.08 ft
Cabin volume	7.99 cu m	282 cu ft
Weight		
Maximum takeoff weight (MTOW)	4,750 kg	10,472 lb
Performance		
Maximum operating speed	Mach 0.70	Mach 0.70
Maximum operating altitude	12,500 m	41,000 ft
Standard takeoff field length (ISA, MTOW, SL)	1,036 m	3,400 ft
IFR range(a)	2,182 km	1,178 nm

Propulsion

Phenom 100 (2) Pratt & Whitney Canada PW617F-E turbofan engines rated 7.53 kN (1,695 lbst) each.

Seating

The Phenom 100 can carry up to eight people, including crew.

(a) NBAA IFR reserves (35 minute) with 100-nautical-mile alternate; four occupants.

Program Review

Background. In May 2005, Embraer launched two new business jet programs. At the time of the launch, the company simply referred to the aircraft as the Very Light Jet and the Light Jet, respectively. These names denoted the segments of the business jet market at which the new models were aimed. The two aircraft shared the same cabin cross-section and cockpit.

For more than a year prior to the launch of the programs, Embraer had conducted various market surveys and studies regarding the business aviation market. The Very Light Jet and Light Jet designs resulted from these studies. In April 2005, the projects were approved by Embraer's board of directors.

In conjunction with the May launch announcement, Embraer also announced the selection of Pratt & Whitney Canada to supply engines for both aircraft. The new PW617F turbofan was chosen as the powerplant for the twin-engine Very Light Jet. The PW617F is essentially a scaled-up version of the PW610F that powered the Eclipse 500 and the PW615F that powers the Cessna Mustang.

Besides the PW617F, Embraer had also considered the General Electric/Honda HF118 and the Williams FJ33 to power the Very Light Jet.

In October 2005, Embraer selected BMW Group DesignworksUSA to design the interior of its two new business jets. Full-scale mock-ups of the interiors were displayed at the National Business Aviation Association (NBAA) convention in Orlando, Florida, in November 2005. Onboard amenities in the BMW design include a private lavatory, a refreshment center, an executive table, and passenger entertainment and communications systems. Also in November, Embraer selected Garmin to supply its G1000 integrated avionics suite for the two aircraft.

Embraer Phenom 100

Very Light Jet Becomes Phenom 100

Embraer took the occasion of the November 2005 NBAA convention to announce the new names of its two new business jets. The Very Light Jet was dubbed the Phenom 100, while the Light Jet was named the Phenom 300.

Program Schedule. Preliminary design of the Phenom 100 was completed by May 2005. Embraer began taking orders for its two new business jets in June 2005.

Initial flight of the Phenom 100 occurred in July 2007. Four Phenom 100s were utilized in the development program. The first two were built at Embraer's main plant in Sao Jose dos Campos, Brazil, while the third and fourth aircraft were completed at the company's new facility in Gaviao Peixoto.

In December 2008, the Phenom 100 was awarded certification by Brazil's Agencia Nacional de Aviacao Civil (ANAC) and by the U.S. Federal Aviation Administration (FAA). Entry into service also occurred that month. The aircraft received European Aviation Safety Agency (EASA) certification in April 2009.

Related News

Delivery of 100th Aircraft – In January 2010, Embraer delivered its 100th Phenom 100. The aircraft was delivered to JetSuite Air, a private jet charter company, and was the sixth Phenom 100 delivered to this customer.

Based in Long Beach, California, JetSuite serves the western United States with its fleet of new Phenom 100s. The company's major markets include the Los Angeles and San Francisco areas, Las Vegas, and Phoenix/Scottsdale. JetSuite can provide nonstop or one-stop service to nearly all U.S. destinations west of the Mississippi River. (Embraer, 2/10)

Funding

Combined development cost of the Phenom 100 and the Phenom 300 was an estimated $235 million.

Timetable

Month	Year	Major Development
May	2005	Embraer launched Very Light Jet program
Jun	2005	Embraer began accepting Very Light Jet orders
Nov	2005	Embraer Very Light Jet named Phenom 100
Jul	2007	First flight
Dec	2008	Brazilian ANAC and U.S. FAA certification; Service entry
Apr	2009	EASA certification

Forecast Rationale

Phenom 100 deliveries began in December 2008, and two of the aircraft were delivered by the end of that year. Embraer set itself a goal of delivering 110 Phenom 100s in 2009, a considerable task in a badly depressed business jet market. The company started the year slowly, delivering only six Phenom 100s in the first quarter. After three quarters, Embraer had delivered only 43 of the aircraft since the start of the year. Company CEO Frederico Curado said at the time that Embraer had no difficulties in ramping up production, but that "commercial issues" were hampering deliveries. These issues mainly involved an inability on the part of some customers to accept aircraft deliveries, due to financial reasons.

Nevertheless, Embraer persevered and managed to deliver an impressive 54 Phenom 100s in the fourth quarter, for an overall 2009 delivery total of 97 aircraft.

In 2010, Embraer plans to deliver 120 Phenoms, including both 100s and 300s. The company declines to specify the numerical split between the two models within this total, though the vast majority are to be 100s.

Fleet operators, such as air taxi services and other commercial operators, have been among the hardest hit entities in the present market downturn. In March 2010, the start-up European air taxi operator JetBird canceled orders for 50 Phenom 100s, due to funding problems. JetBird is negotiating a new contract with Embraer, however.

Phenom 100 final assembly takes place at Embraer's facility in Gaviao Peixoto, where interior completion work is also performed. Components and subassemblies are built at Embraer's Botucatu plant.

Embraer is constructing a new aircraft assembly plant at Melbourne International Airport in Melbourne, Florida. This plant will house a final assembly line for Phenom 100s and 300s, as well as a paint shop and a delivery and customer design center. Phenom deliveries from the plant are scheduled to begin in 2012. Up to eight Phenoms per month are to be assembled at the Melbourne facility, supplementing output from the Gaviao Peixoto plant. Combined, the two plants will have a total capacity of 22 Phenoms per month.

Meanwhile, product improvement efforts regarding the Phenom 100 are ongoing. New cabin seats for the aircraft were certified in late 2009. The seats, which are now standard on production Phenom 100s, are designed to provide improved seating comfort. They also incorporate retractable armrests and a partial foldover capability, and provide more aisle room. Owners of existing Phenom 100s can have the new seats retrofitted into their aircraft free of charge. The seats are produced by DeCrane Aerospace Aircraft Seating.

New avionics features have also been developed for the Phenom 100, including an improved menu layout, improved synoptic pages, an electronic checklist, and TCAS I and TCAS II traffic collision avoidance systems.

An improvement now under development is a belted lavatory seat. This seat will increase the aircraft's passenger capacity by permitting a passenger to take off and land while seated there.

The customer base for the Phenom 100 includes individual owner/operators as well as fleet operators. As of April 2010, Embraer had an order backlog for some 600 Phenoms, including both 100s and 300s. The company does not break down the total between the two models.

VLJ Plus

In general, the Phenom 100 competes in the Very Light Jet (VLJ) segment of the business jet market, albeit at the very top of the category. Its most direct sales competitor is Honda Aircraft's new HondaJet, which is slated to enter service in 2011. In terms of price, performance, and cabin size, these two aircraft stand out from the rest of the VLJ class, and can even be said to constitute their own market class.

Indeed, much of the sales competition to the Phenom 100 and the HondaJet comes from light business jets such as the Cessna CJ1+ and the Hawker Beechcraft Premier IA. The Cessna Mustang is the only VLJ that poses any real sales competition to the Embraer and Honda aircraft.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		**High Confidence**				**Good Confidence**			**Speculative**			
	Thru 2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Embraer - Empresa Brasileira de Aeronáutica SA												
Phenom 100 <> PW617F												
	103	99	92	88	88	81	80	89	91	94	95	897
Total	103	99	92	88	88	81	80	89	91	94	95	897

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Binder	$90	$170
DVD	$50	$95
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Binder	$90	$170
DVD	$50	$95
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