The Market for General Aviation/Utility Aircraft

Product Code #F614

A Special Focused Market Segment Analysis by:



Analysis 4 The Market for General Aviation/Utility Aircraft 2010-2019

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PROGRAMS

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

Bombardier 415 Cessna 208 Caravan Daher-Socata TBM 700/850 Hawker Beechcraft King Air Series Maule M/MT-7-420 Piaggio P180 Avanti II Pilatus PC-6 Turbo Porter Pilatus PC-12 Piper Malibu Meridian Quest Kodiak Reims F406 Caravan II General Aviation Design, Development and Inactive Programs

Introduction

The U.S. Federal Aviation Administration (FAA) defines the general aviation segment of the aviation world to include all non-transport categories. In effect, the FAA defines the segment to include every aircraft that is not used in either commuter service or airline service, including rotorcraft.

Forecast International takes a different approach in its system of market analysis. Rather than lumping all "non-transport" fixed-wing aircraft and rotorcraft into the same segment, FI breaks rotorcraft and business jets into separate market segments and includes within its general aviation market segment only turboprop and piston-powered aircraft.

Within the piston market, Forecast International further breaks down the segment to include only those aircraft that are produced on a regular basis by major original equipment manufacturers (OEMs). Makers of kit planes and small manufacturers are not covered by the general aviation forecast. This approach excludes a number of U.S. and world manufacturers from the study, but the lack of information available on the sales and production of these lesser-known models from public sources makes forecasting their production a dodgy prospect at best. Further, the aggregate number of aircraft produced by these makers in any given year is small relative to the total size of the general aviation market.

Forecast International also excludes from its analysis of the GA market the new category of Light Sport Aircraft, including Cessna's new 162 Skycatcher and Piper's PiperSport. Although the FAA has forecast the production of thousands of Light Sport Aircraft in the coming years, the total value of the market for these low-priced aircraft is likely to be far smaller than the value of the market for larger aircraft. Numerous makers can be expected to enter and exit the market during this timeframe. At the current time, Forecast International is not extending coverage to the LSA market segment.

* * *

Outlook

- 100 PC-12s were delivered in 2009, yet another program record
- Production is forecast to decline in 2010, but should soon begin rising again
- Pilatus is working on a new civil aircraft model



Orientation

Description. Pressurized, single-turboprop-powered, corporate and utility transport aircraft.

Sponsor. The PC-12 is sponsored by Pilatus.

Status. Production

Total Produced. Through 2009, Pilatus produced 962 PC-12s, including 174 PC-12 NGs.

Application. Short-range transportation of passengers and/or cargo.

Price Range. Next Generation PC-12 (PC-12 NG), \$3.78-\$4.375 million in 2010 U.S. dollars.

Contractors

Prime

Pilatus Aircraft Ltd	http://www.pilatus-aircraft.com, PO Box 992, Stans, 6371 Switzerland,
	Tel: + 41 41 619 61 11, Fax: + 41 41 610 92 30, Prime

Subcontractor

ELDEC France	http://www.craneae.com, 18 Rue du 35eme Regiment d'Aviation, Activillage Hall 30, Bron, 69500 France, Tel: + 33 78 261010, Fax: + 33 72 377230 (Proximity Sensors; Fuel Gauging System)
Hartzell Propeller Inc	http://www.hartzellprop.com, One Propeller PI, Piqua, OH 45356-2656 United States, Tel: + 1 (937) 778-4200, Fax: + 1 (937) 778-4321 (Four-Blade Propeller)
Honeywell Aerospace Yeovil	http://www.honeywell.com/sites/aero/, Bunford Ln, Yeovil, BA20 2YD Somerset, United Kingdom, Tel: + 44 1935 457 181, Fax: + 44 1935 427 600, Email: sales.yeovil@honeywell.com (Air Conditioning)
Honeywell Bendix/King	http://www.bendixking.com, One Technology Center, 23500 W 105th St, M/D #19, Olathe, KS 66061 United States, Tel: + 1 (913) 782-0400, Fax: + 1 (913) 791-1302, Email: bendix.king@honeywell.com (Primus Apex Avionics System)

Northrop Grumman LITEF GmbH	http://www.northropgrumman.litef.com, Loerracher Strasse 18, Freiburg, 79115 Germany, Tel: + 49 0761 4901 0, Fax: + 49 0761 4901 480 (LCR-92 Attitude Heading Reference System)
OGMA	http://www.ogma.pt, Alverca do Ribatejo, Alverca, 2615-173 Portugal (Assembly of Green Aircraft; Electrical Wiring; Various Composite Parts)
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 (PT6A-67P Turboprop Engine)
PZL-Swidnik SA	http://www.pzl.swidnik.pl, Aleja Lotnikow Polskich 1, Swidnik, 21-045 Poland, Tel: + 48 81 722 60 56, Fax: + 48 81 722 60 07 (Fuselage and Wing Assembly)
RUAG Aerospace	http://www.ruag.com, PO Box 301, Emmen, 6032 Switzerland, Tel: + 41 412 684 347, Fax: + 41 412 683 948, Email: marketing.aerospace@ruag.com (Horizontal Tail)

NOTE(S): The above contractors refer to the PC-12 NG model.

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800. 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

(PC-12 NG)

Design Features. Cantilever low-wing monoplane with T-tail and retractable tricycle type landing gear, and forward cabin passenger and aft cabin cargo doors.

	<u>Metric</u>	<u>U.S.</u>
Dimensions (External)		
Overall length	14.40 m	47.25 ft
Overall height	4.27 m	14.0 ft
Wingspan	16.28 m	53.41 ft
Dimensions (Internal)		
Cabin length	5.16 m	16.92 ft
Cabin width	1.52 m	5.0 ft
Cabin floor width	1.30 m	4.25 ft
Cabin height	1.47 m	4.83 ft
Cabin volume	9.34 cu m	330 cu ft
Cargo door	1.35 x 1.32 m	4.42 x 4.33 ft
Weight		
Basic operating weight	3,076 kg	6,782 lb
Maximum ramp weight	4,760 kg	10,495 lb
Maximum T-O weight	4,740 kg	10,450 lb
Maximum landing weight	4,500 kg	9,921 lb
Performance		
Maximum cruise speed	519 km/h	280 kt
Maximum range with three pax(a)	2,889 km	1,560 nm
Maximum operating altitude	9,144 m	30,000 ft
Rate of climb (MTOW)	585 m/min	1,920 ft/min
T-O to 15 m (50 ft)	808 m	2,650 ft
Landing from 15 m (50 ft)	558 m	1,830 ft

Propulsion

PC-12 NG

(1)

Pratt & Whitney Canada PT6A-67P turboprop engine flat-rated to 895 kW (1,200 shp), driving a Hartzell four-blade, constant-speed, fully feathering, reversible-pitch metal propeller.

Seating/Accommodation

Executive Combi

Standard

Up to nine passengers; nine-passenger layout is 1 x 1 with four on port side and five on starboard. Six to eight passengers.

Four or six passengers in the forward cabin.

(a) At 9,144 meters (30,000 ft); NBAA IFR reserves.

Variants/Upgrades

PC-12 NG. Pilatus announced the Next Generation PC-12 (PC-12 NG) in October 2006. Improvements incorporated into this model include a fully integrated Honeywell Primus Apex avionics system, a new cockpit designed by BMW Group DesignworksUSA, and the Pratt & Whitney Canada PT6A-67P engine. The PT6A-67P provides 15 percent more thermodynamic power than the PC-12's previous PT6A-67B powerplant, and includes single crystal CT blades and a new compressor configuration.

Other improvements in the PC-12 NG include a digital dual-zone environmental control system, a fully automatic digital cabin pressurization control system (which requires no pilot input), and a fully redundant electrical power generation and distribution system. The NG also provides increased performance, including faster climb rates and a 280-knot cruise speed.

The PC-12 NG received concurrent certification from the U.S. Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) in March 2008. Customer deliveries began in May 2008.

The PC-12 NG is marketed in standard, executive, combi, and all-cargo versions. The certificated type designation of the NG is PC-12/47E.

PC-12/47 Series 10. Deliveries of this PC-12 version began in 2006 and ended in 2008. Compared to the earlier PC-12/45, the PC-12/47 featured increased payload/range, improved handling, and greater comfort. Maximum range of an executive-configured PC-12/47 with three passengers and NBAA IFR reserves was 1,467 nautical miles (at 26,000 ft and high-speed cruise).

The PC-12/47 was equipped with Ipeco crew seats and new LED lighting systems. The LED cabin lights are intended to last 20,000 hours. LEDs were also part of the PC-12/47's navigation lighting system, providing lower operating temperatures, longer operating life, and better visibility.

Maximum takeoff weight of the PC-12/47 was increased to 4,740 kilograms (10,495 lb), compared to

the 4,500-kilogram (9,920-lb) MTOW of the PC-12/45. Useful load was increased to 1,873 kilograms (4,130 lb) for a typically equipped, executive-configured aircraft.

The PC-12/47 was fitted with winglets, derived from technology developed for Pilatus' PC-21 military trainer, that reduced drag and improved crosswind control. The aircraft also had Flettner tabs added to its ailerons. Roll control forces were reduced by 60 percent at low speeds and 72 percent at high speeds.

The PC-12/47 Series 10 received FAA certification in December 2005.

PC-12/45. The PC-12/45 had an MTOW of 9,920 kilograms (4,500 lb), an increase from the 9,040-kilogram (4,100 lb) MTOW of the preceding standard PC-12 version.

PC-12 Spectre. In 2003, Pilatus introduced the PC-12 Spectre, a special mission version of the PC-12. First flight of the Spectre occurred in July 2003. Initial delivery, to the U.S. Bureau of Immigration & Customs Enforcement, took place in October 2003.

Pilatus currently markets a Spectre variant of the PC-12 NG. The PC-12 NG Spectre has a retractable sensor platform. The aircraft also has multiple expansion bays providing space to incorporate radios and datalinks should customer requirements dictate. An operator station is located in the aircraft's pressurized cabin.

PC-12F Freighter. An early all-cargo version, the PC-12F is no longer marketed. It was intended to produce exceptionally low cost per tonne-mile by virtue of cabin volume and payload capability, low fuel consumption, and high block speed. Its payload was to have been 1,400 kilograms (3,086 lb).

PC-12 DualPac. Pilatus once considered a Soloy DualPac twin-engine installation on a future PC-12 derivative. This would provide greater performance and safety. This configuration is no longer under consideration.



Program Review

Background. Pilatus began work on the PC-12 single-engine turboprop in 1986. However, the company did not announce the program until 1989, when it unveiled a full-scale mockup of the PC-12 at that year's National Business Aircraft Association (NBAA) convention in Atlanta, Georgia.

<u>Target Markets</u>. A key market segment targeted by Pilatus with the PC-12 was the small-package carriage market, where one of its main competitors would be the Cessna Caravan. The PC-12 provides some advantages over the Caravan, including a higher cruise speed, a faster climb rate, and a higher operating altitude.

Corporate aviation was not one of the initial primary target markets of the PC-12. Still, Pilatus took corporate use into consideration when it launched preliminary design. The PC-12 can be configured as an executive transport or as an inter-plant shuttle for midor high-level managers. An added plus for corporate customers is that the standard PC-12 commuter features the same cargo door as the combi version, meaning that business passengers and cargo can be carried on the same flight should operator needs dictate.

Program Schedule. After announcing the PC-12 at the 1989 NBAA show in Atlanta, Pilatus began a search for one or more major risk-sharing partners. A North American company was the preferred option since the bulk of PC-12 sales was expected to come from that region. Meanwhile, first prototype flight slipped from late 1990 to May 1991. Swiss certification was achieved in March 1994, and U.S. certification was received in July 1994.

In late 1991, Pilatus decided that a major risk-sharing partner was not necessary to the successful development and marketing of the PC-12. Potential major partners were in no hurry to invest in the PC-12 in the middle of what was then a soft market for general aviation/utility aircraft. Then, in March 1992, the management board of Pilatus committed to funding production of the first 35 aircraft.

<u>Suppliers</u>. OGMA of Portugal assembles the entire PC-12 green aircraft. This company also manufactures certain composite parts of the aircraft, and manufactures and assembles the electrical wiring.

In March 2010, Pilatus selected the Polish firm PZL-Swidnik as a second source for the assembly of PC-12 fuselages and wings.

Pratt & Whitney Canada is responsible for the engine of the PC-12. RUAG Aerospace builds the aircraft's horizontal tail.

Design Details. The PC-12 has a low, cantilever supercritical wing, plus a highly swept T-tail. The aircraft is pressurized, giving it marketability beyond the small-package carrier segment. The aircraft is able to accommodate various types and sizes of cargo containers, and other mission-specific equipment such as that required for air ambulance duties, border patrol, agricultural chemical spraying, and parachuting. The PC-12 has austere field capability, and it can be configured with several different passenger interiors. The flight deck is equipped for single-pilot operation.

Related News

First Finnish AF PC-12 – In July 2010, Pilatus handed over a PC-12 NG multipurpose liaison aircraft to the Finnish Air Force. The aircraft was the first of six PC-12 NGs ordered by the service. Delivery of the five remaining aircraft was to be completed by the end of August 2010.

The Air Force intends to use the PC-12 NGs to transport service personnel and cargo. Ultimately, the aircraft are to replace Piper PA-31-350 Chieftains in the Air Force fleet.

The procurement contract for the PC-12 NGs, worth EUR22.5 million (\$28.3 million), was signed in April 2009. Type conversion training of a first tranche of Finnish Air Force pilots and maintenance personnel was conducted at the Pilatus factory in Stans, Switzerland, during the second quarter of 2010. (Pilatus, 7/10)

Partnership With PZL-Swidnik – In March 2010, Pilatus selected PZL-Swidnik SA to assemble PC-12 fuselage and wing cells. The contract between Pilatus and PZL-Swidnik was signed for a 10-year period.

Pilatus will continue to produce detail parts for the PC-12 in Switzerland. These components will then be made available to PZL-Swidnik for assembly work. The Polish firm is to deliver its first complete PC-12 structures in the second half of 2011.

Located in Poland, PZL-Swidnik is a subsidiary of AgustaWestland. Pilatus' selection of PZL-Swidnik followed indepth and detailed assessments of various potential suppliers. The Portuguese company OGMA has long performed PC-12 assembly work, and this role will continue. However, Pilatus had been searching for an additional assembly source with a view to safeguarding and expanding PC-12 production rates in the future. (Pilatus, 3/10)

BLM Selects PC-12 – In November 2009, the U.S. Department of the Interior's Bureau of Land Management (BLM) took delivery of its first PC-12. The aircraft is to be used in multiple roles, including cargo, passenger, smokejumper, air tactical, aerial supervision, and lead plane firefighting missions.

The BLM PC-12 is equipped with the Utility Door option. Capable of being opened in flight, this inward-opening door is mounted within the PC-12's standard cargo door. It enables the aircraft to depressurize and perform specialist parachute work or drop supplies or relief materials, and later repressurize and return to high-speed cruise at altitude.

The PC-12 is to be based at BLM's Fire and Aviation Directorate and the National Interagency Fire Center in Boise, Idaho. BLM is responsible for the management and conservation of resources on 256 million surface acres in the U.S. These public lands make up about 13 percent of the total land surface of the country, and more than 40 percent of all land managed by the U.S. government. (Pilatus, 11/09)

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Funding

The cost of PC-12 design, engineering, and development (through certification), plus the financing of inventory buildup, was approximately \$75 million.

Timetable

Month Mid- May Mar Jul Sep Mar	<u>Year</u> 1986 1989 1990 1991 1992 1994 1994 1994 2008	Major Development Pilatus begins work on PC-12 Pilatus announces PC-12 Go-ahead to start advanced development First flight Pilatus board approves production of PC-12 Swiss certification U.S. FAA certification Initial PC-12 delivery FAA/EASA certification of PC-12 NG
Mar	2008	FAA/EASA certification of PC-12 NG
May Beyond	2008 2010	Initial PC-12 NG delivery Production to continue

Forecast Rationale

Record Deliveries - Again

In the midst of a severely depressed market for business and general aviation aircraft, Pilatus set a PC-12 delivery record in 2009 with 100 aircraft deliveries. The old record was 97 deliveries, set just one year prior in 2008. Indeed, 2009 marked the fifth consecutive year that Pilatus had established a delivery record for the PC-12 program. The news was not all positive for Pilatus in 2009, though. Order intake for the PC-12 dropped substantially during the year. Pilatus' General Aviation business unit, which is responsible for marketing the PC-12, garnered only 21 orders for the aircraft in 2009. (This total excludes orders placed through the company's Government Aviation business unit, such as the Finnish Air Force order for six PC-12s.) Taking



cancellations into account, the General Aviation unit posted a net loss of 72 PC-12 orders in 2009. Pilatus had recorded 164 orders for the PC-12 in 2008 and 130 in 2007.

An Eye on the Future

Thus, even the popular and successful PC-12 has not been immune to the effects of a prolonged market slump. The company expects to deliver about 85 PC-12s in 2010, which would make 2010 the first year since 2002 that PC-12 deliveries had declined. Nevertheless, PC-12 output will be reduced in 2010. This is underscored by the fact that Pilatus delivered only 12 PC-12s in the first quarter of the year, compared to 18 in the initial quarter of 2009.

Pilatus does have its focus set firmly on the future, however, when recovering sales will result in a need to raise production rates. The company's March 2010 selection of PZL-Swidnik as a second source (to OGMA) for PC-12 fuselage and wing assembly is a move to add capacity for just such a time when PC-12 production will need to increase. It is also intended as a cost containment measure.

PZL-Swidnik's initial PC-12 fuselage is scheduled to be delivered to Pilatus in September 2011. The Polish company intends to assemble 50 PC-12 fuselages per year, with full capacity achieved four years after the start of production.

The current production version of the PC-12 is the PC-12 NG model. All 100 PC-12s delivered in 2009 were NGs, as production of the earlier PC-12/47 had

given way to the NG in mid-2008. Some operators of previous PC-12 models are already trading in their aircraft for the NG.

The primary market for the PC-12 remains the business aviation sector, a segment that accounts for some 85 percent of PC-12 sales. Unfortunately, this sector has been hit hard by the economic downturn, and many business operators are delaying aircraft purchase decisions. Consequently, Pilatus has been expanding its marketing efforts in other arenas, such as the utility and military markets.

The main sales competitors to the PC-12 NG are other single-engine turboprops such as the Daher-Socata TBM 850, the Piper Meridian, and the Cessna Caravan. The PC-12 NG beats all three of these aircraft on range, and all but the Caravan on cabin size. Meanwhile, Hawker Beechcraft is rumored to be looking at development of a turboprop single.

The PC-12 NG also faces competition from Hawker Beechcraft's King Air B200GT twin turboprop and, to some extent, the Cessna CJ1+ light business jet. Very Light Jets (VLJs) also pose some competition for the NG, especially the larger models in the VLJ category such as the Embraer Phenom 100 and the HondaJet.

Pilatus has acknowledged that it is working on a new aircraft for the civil market, but it has been quite tightlipped regarding details. The company has said that the new aircraft will not compete with the PC-12 NG, but will rather be aimed at a "higher market segment."

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or F	Designation or Program High Confidence Good Confidence Speculative											
	Thru 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
			Pil	atus A	ircraft	Ltd						
Next Generation	PC-12 <> (General /	Aviation	<> PT6	A -67P							
	157	76	78	82	87	92	92	95	96	99	98	895
Next Generation	PC-12 <> F	Regional	Commu	iter <> P	T6 A -67	Έ						
	17	9	8	9	10	10	13	14	14	15	13	115
Subtotal	174	85	86	91	97	102	105	109	110	114	111	1010
Total	174	85	86	91	97	102	105	109	110	114	111	1,010

Ten-Year Outlook

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RETURNS OR REFUNDS

Due to the nature of our products, no returns are accepted and no refunds are provided. $\ensuremath{\mathsf{P}}$

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We accept VISA, MasterCard, American Express, or a company check drawn on a U.S. bank in U.S. dollars. Wire Transfer Details: Contact customerservice@forecast1.com or call 203.270.0633.

Please ensure bank charges are not deducted from the total amount due. Note: Include the quotation or invoice number with your payment.

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