

# ARCHIVED REPORT

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## Diamond D-JET

### Outlook

- Diamond Canada and its Austrian parent firm are now both owned by China's Wanfeng Aviation
- Success of the Cirrus Vision Jet could revive interest in the D-JET

### Orientation

**Description.** Single-turbofan-powered, five-seat business/personal jet aircraft.

**Sponsor.** Diamond Aircraft Industries Inc.

**Status.** D-JET development was suspended in February 2013.

**Total Produced.** Through 2017, Diamond built three prototypes.

**Application.** Personal transportation; business / executive transportation; pilot training; air taxi/air limousine.

**Price Range.** \$1.89 million in 2009 U.S. dollars.



D-JET

Source: Diamond Aircraft

**Diamond D-JET****Contractors****Prime**

<b>Diamond Aircraft Industries Inc</b>	<a href="http://www.diamondaircraft.com">http://www.diamondaircraft.com</a> , 1560 Crumlin Sideroad, London, Ontario, Canada, Tel: + 1 (519) 457-4000, Fax: + 1 (519) 457-4021, Prime
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**Subcontractor**

<b>Garmin International Inc</b>	<a href="http://www.garmin.com">http://www.garmin.com</a> , 1200 E 151st St, Olathe, KS 66062 United States, Tel: + 1 (913) 397-8200, Fax: + 1 (913) 397-8282 (G1000 Avionics Suite)
<b>Mecaer America Inc</b>	<a href="http://www.mecaer.it">http://www.mecaer.it</a> , 3205 Delaunay, Laval, Quebec, Canada, Tel: + 1 (450) 682-0345, Fax: + 1 (450) 682-8152 (Landing Gear)
<b>Williams International</b>	<a href="http://www.williams-int.com">http://www.williams-int.com</a> , 2280 E West Maple Rd, PO Box 200, Walled Lake, MI 48390 United States, Tel: + 1 (248) 624-5200, Fax: + 1 (248) 669-0040 (FJ33-4 Turbofan Engine)

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.** The D-JET is constructed entirely of composite material. All flight surfaces feature one-piece damage-tolerant design. The wing of the aircraft is mounted low on the fuselage and is equipped with winglets. The aircraft has a T-tail with a vertical fin and a horizontal tailplane. A parachute recovery system is optional.

The aircraft is powered by a single Williams FJ33-5A turbofan engine. The engine is equipped with Full Authority Digital Engine Control (FADEC). Engine inlets are located in the wingroots.

The D-JET is equipped with the Garmin G1000 integrated avionics system. The system has dual 12-inch primary flight displays, a centrally located 15-inch multifunction display, the Garmin GFC 700 fully integrated automatic flight control system, a glareshield-mounted autopilot controller, and a center-console-mounted FMS controller. Other features include dual Attitude and Heading Reference Systems (AHRS), dual magnetometers, dual GPS, dual Com, dual Nav, a Mode S transponder, and dual audio panels. A weather radar is optional.

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Length	10.69 m	35.08 ft
Height	3.53 m	11.58 ft
Wingspan	11.43 m	37.50 ft
Cabin volume	4.67 cu m	165 cu ft
<b>Weight</b>		
Maximum ramp weight	2,581 kg	5,690 lb
Useful load	1,016 kg	2,240 lb
Maximum fuel	789 kg	1,740 lb
<b>Performance</b>		
Maximum cruise speed	583 km/h	315 kt
Ceiling	7,620 m	25,000 ft
Maximum range	2,500 km	1,350 nm

**Diamond D-JET****Propulsion**

D-JET (1) Williams FJ33-5A turbofan engine rated 8.45 kN (1,900 lbst).

**Seating**

The D-JET has seating for five, including the pilot(s), in a 2 + 3 configuration.

**Variants/Upgrades**

Prior to the program's suspension, Diamond's plans called for an initial focus on certification of a fully equipped version of the D-JET, which was called the Executive model. This model represented the configuration that had been most requested by Diamond's North American customers, and included as standard equipment several items originally available only as options.

The Executive version might have been followed by a lower-cost, less-equipped, and lower-weight version of the D-JET, which would have been aimed primarily at the European market.

Diamond also had plans for a military trainer version of the D-JET.

**Program Review**

**Background.** Diamond Aircraft Industries GmbH was originally founded in 1981 in Austria as Hoffmann Flugzeugbau GmbH. In 1985, the company was acquired by Simmering-Graz-Pauker AG, and was renamed Hoffman Aircraft Ltd. Following a management buyout in 1989, the company became known as HOAC-Austria Flugzeugwerk. In 1996, the firm assumed its present name of Diamond Aircraft Industries GmbH. It is headquartered in Wiener Neustadt, Austria.

Through the majority of its history, Diamond mostly manufactured piston-powered general aviation aircraft. In January 2003, the firm announced the D-JET, a five-seat, single-engine jet with a price then projected by Diamond at "well under \$1.0 million." The aircraft's specifications at the time included a maximum takeoff weight of 2,132 kilograms (4,700 lb) and a speed of 315 knots. The target date for first flight was mid-2004, and initial deliveries were planned for early 2006.

By the spring of 2003, Diamond had begun taking \$20,000 customer deposits for the D-JET, whose U.S. price was now quoted as \$850,000. In September 2003, Diamond selected the Williams FJ33-4 turbofan as the aircraft's engine over the Pratt & Whitney Canada PW615. In June 2005, Diamond chose the Garmin G1000 integrated avionics system for the D-JET over the Honeywell Apex system and the Avidyne Entegra suite.

Since it was first announced in 2003, the D-JET design grew in cabin volume, engine thrust, useful load, fuel capacity, and equipment configuration. Meanwhile, development responsibility for the aircraft shifted from Austria to Diamond's Canadian subsidiary in London,

Ontario. This brought the program headquarters closer to the U.S., which Diamond believed would be the main market for the new aircraft. The Canadian entity is known as Diamond Aircraft Industries Inc. Program plans called for D-JET production to occur in London.

Diamond deliberately limited the D-JET's maximum altitude to 7,620 meters (25,000 ft). The company believed this to be a practical altitude for private pilots, affording greater ease of operability and enhanced safety, as well as less burdensome certification and insurance requirements. In addition, cabin pressure at 25,000 feet requires only 5.5 psi pressure differential. Lower pressure differential allows for a lower-weight airframe and increased useful load.

***First Flight***

A D-JET prototype (S/N 001) made its initial flight in April 2006. This aircraft did not fully conform aerodynamically to the production configuration. In July 2007, a conforming prototype (S/N 002) was rolled out, and it flew for the first time in September 2007. It was used to validate the aerodynamic configuration, as well as handling qualities and stability and control performance. A third D-JET (S/N 003) joined the flight test program in April 2008.

In July 2006, Diamond announced that it would initially concentrate on certifying a fully equipped D-JET version (which was known as the Executive variant), incorporating several equipment items previously sold as optional equipment. The price of this version was announced as \$1.38 million in July 2006 U.S. dollars. This price took into account design changes (increased thrust and useful load), inflation, and the additional

## Diamond D-JET

standard equipment. The price of the aircraft later rose to \$1.89 million in March 2009 U.S. dollars.

### *New Engine*

In March 2008, Diamond selected a new, higher-nominal-thrust engine from Williams International for the D-JET. The new engine variant was originally known as the FJ33-4A-19, but is now called the FJ33-5A. Diamond subsequently refitted S/N 003 with the FJ33-5A, and this aircraft flew for the first time with the new engine in October 2008.

Diamond indicated that the advantages of the FJ33-5A included better bleed air handling and improved specific fuel consumption. The engine provides 1,900 pounds nominal thrust, compared to 1,564 pounds for the FJ33-4A-15 version that was initially planned to power the D-JET. The FJ33-5A also allows for a potential performance and utility upgrade path for delivered aircraft that the FJ33-4A-15 did not.

Diamond's plans called for not using all of the available thrust of the FJ33-5A, at least initially. The engine was to be flat-rated to a lower takeoff thrust for certification. Should it have later been decided to take advantage of more of the engine's available thrust, owners of previously delivered D-JETs would have been able to upgrade to the new engine configuration through a service bulletin.

## Funding

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As of February 2013, a total of \$188 million had been spent on D-JET development. Besides utilizing internal company funds, Diamond also received some funding for the D-JET program from the Canadian government and the Ontario provincial government. In February 2007, Diamond received a CAD19.6 million (\$15.2 million) strategic, repayable investment from the government of Canada for D-JET research and development. The Canadian government's investment was funded from its Strategic Aerospace and Defence Initiative (SADI), which supports strategic industrial research and pre-competitive development projects in the aerospace, defense, space, and security industries. SADI is managed by the Industrial Technologies Office, an agency of Innovation, Science and Economic Development Canada.

In June 2006, Diamond received a CAD10 million repayable loan from the Ontario provincial government to support D-JET development. In March 2007, the Ontario government decided to invest an additional CAD975,000 to assist preparations for D-JET production.

In early 2010, Diamond received a cash injection of \$110 million from an unidentified European investor. Diamond planned to use the funds to help finance the certification process for the D-JET.

In June 2011, Diamond obtained a commitment for a "significant investment," from an unidentified source that was to be exclusively dedicated to D-JET development. With this funding, the company was able to resume D-JET flight testing in September 2011.

### *Program Suspensions*

In March 2011, Diamond suspended D-JET development as it looked to secure a loan from the Canadian government (which was eventually denied). However, the company was able to secure funding from another source and resumed D-JET flight testing in September 2011.

In February 2013, Diamond again suspended the D-JET development program, pending the availability of additional funding. At the same time, the firm also announced a restructuring of its London-based operations, citing continuing low piston aircraft sales as well as the cost of D-JET development.

Contributing to Diamond's difficulties was the collapse of a deal announced in 2011 whereby the Dubai-based investment firm Medrar Financial Group was to acquire a majority stake in Diamond Aircraft Canada (as Diamond Aircraft Industries Inc was then known). According to Diamond Aircraft Canada CEO Peter Maurer, funding from Medrar never materialized and the deal ultimately collapsed.

In December 2016, Wanfeng Aviation Industry Company Ltd acquired a 60 percent stake in Diamond Aircraft Industries Inc. In December 2017, Wanfeng acquired Diamond's Austria-based parent firm Diamond Aircraft Industries GmbH.

**Diamond D-JET****Timetable**

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Jan	2003	D-JET announced
Spring	2003	Diamond begins taking D-JET orders
Sep	2003	Williams FJ33-4 selected to power the D-JET
Jun	2005	Garmin G1000 avionics suite selected for D-JET
Apr	2006	First flight of D-JET prototype
Mar	2008	Higher-thrust FJ33-4A-19 (FJ33-5A) selected to power the D-JET
Mar	2011	D-JET development suspended
Sep	2011	D-JET flight testing resumed
Feb	2013	D-JET development again suspended

**Forecast Rationale**

In December 2017, Wanfeng Aviation Industry Company Ltd acquired Austria-based Diamond Aircraft Industries GmbH. One year earlier, in December 2016, Wanfeng had purchased a 60 percent stake in Diamond's Canadian subsidiary Diamond Aircraft Industries Inc, a deal that included the rights to the D-JET program. Wanfeng is a division of the Chinese industrial conglomerate Wanfeng Auto Holding Group Company Ltd.

Work on the D-JET was suspended in early 2013, but Diamond never formally canceled the program. At the time of the suspension, the company had 200 orders for

the aircraft. Development of the D-JET is approximately 70 percent complete.

The Cirrus Vision Jet, a single-engine entry-level jet similar in size and performance to the D-JET, entered service in late 2016. Should the Vision Jet continue to be a success in the future, this could spark renewed interest in the D-JET and possibly lead to a revival of the program. Diamond is watching with interest the market progress of the Vision Jet.

Pending further developments, we are not issuing a forecast for D-JET production at the present time.

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