

ARCHIVED REPORT

For data and forecasts on current programs please visit
www.forecastinternational.com or call +1 203.426.0800

Bombardier CRJ Regional Jets

Outlook

- Mitsubishi closed on its acquisition of the CRJ program and Bombardier's regional jet support network in June 2020
- Bombardier delivered the last CRJ in December 2020

Orientation

Description. Family of twin-engine, single-aisle regional jet transports.

Sponsor. Sponsored privately by Bombardier Inc (Canadair Aerospace) with financial support from the Canadian Department of Science and Technology.

Status. Only the CRJ900 is still in production.

Total Produced. 1,909 CRJ series aircraft delivered through July 2021, excluding 90 Challenger 800 business jet variants.

Application. Short-haul, regional commercial passenger service and executive/corporate shuttle service.

Price Range. CRJ700, \$43.5 million; CRJ900, \$48.5 million; CRJ1000, \$50.5 million.

Bombardier CRJ Regional Jets



Bombardier CRJ900

Source: Bombardier Aerospace

Contractors

Prime

Bombardier Inc	http://www.bombardier.com , 800 René-Lévesque Blvd W, Montréal, Québec, Canada, Tel: + 1 (514) 861-9481, Fax: + 1 (514) 861-2420, Prime
-----------------------	---

Subcontractor

Bombardier Aerospace, Short Brothers plc	http://uk.bombardier.com/en/aerospace.html , Airport Rd, Belfast, United Kingdom, Tel: + 44 2890 458 444, Fax: + 44 2890 733 396 (Center Fuselage)
Collins Aerospace Systems, Avionics & Mission Systems	http://www.collinsaerospace.com , 400 Collins Rd NE, Cedar Rapids, IA 52498 United States, Tel: + 1 (319) 295-1000, Fax: + 1 (319) 295-5429 (Pro Line 4 Avionics System)
GE Aviation	http://www.geaviation.com , 1000 Western Ave, Lynn, MA 01905-2655 United States, Tel: + 1 (781) 594-0200 (CF34-3A1)
Honeywell Aerospace	http://www.honeywell.com , 1944 E Sky Harbor Circle, Phoenix, AZ 85034 United States, Tel: + 1 (602) 231-1000 (APU Generator)

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

Bombardier CRJ Regional Jets**Technical Data**

	<u>Metric</u>	<u>U.S.</u>
Dimensions (External)		
Length overall		
CRJ700	32.3 m	106.1 ft
CRJ900	36.2 m	118.9 ft
CRJ1000	39.1 m	128.4 ft
Height overall		
CRJ700	7.6 m	24.9 ft
CRJ900	7.6 m	24.6 ft
CRJ1000	7.5 m	24.5 ft
Wingspan		
CRJ700	23.2 m	76.3 ft
CRJ900	24.9 m	81.6 ft
CRJ1000	26.2 m	85.9 ft
Dimensions (Internal)		
Cabin width, maximum	2.55 m	8.3 ft
Cabin height	1.89 m	6.2 ft
Weight		
Maximum takeoff weight		
CRJ700	33,113 kg	72,750 lb
CRJ900	36,514 kg	80,500 lb
CRJ1000	40,824 kg	90,000 lb
Maximum payload		
CRJ700	8,190 kg	18,055 lb
CRJ900	9,907 kg	21,840 lb
CRJ1000	11,966 kg	26,380 lb
Performance		
Normal cruise speed	829 km/h	447 kt
Range (@225 lb/pax, IFR reserves)		
CRJ700	2,022 km	1,092 nm
CRJ900	1,982 km	1,070 nm
CRJ1000	2,639 km	1,425 nm
Propulsion		
CRJ700	(2)	GE CF34-8C5B1 turbofans rated 56.4 kN (12,670 lbst) at takeoff.
CRJ900	(2)	GE CF34-8C5 turbofans rated 59.4 kN (13,360 lbst) at takeoff.
CRJ1000	(2)	GE CF34-8C5A1 turbofans rated 60.6 kN (13,630 lbst) at takeoff.

Seating

CRJ700 – 66 pax in dual-class layout, 70 in single-class, or 78 in a high-density configuration.

CRJ900 – 79 pax in dual-class layout, 88 in single-class, or 90 in a high-density configuration.

CRJ1000 – 93 pax in dual-class layout, 100 in single-class, or 104 in a high-density configuration.

Variants/Upgrades

CRJ100/ER/LR. Initial model. Max TOW of 47,450 pounds, range of 845 nautical miles at Mach 0.74 cruise speed. LR model certificated in April 1994 and launched in 1994. Carries 50 passengers up to 1,970 nautical miles. High-gross-weight ER model offered more range and less payload. Fuel capacity augmented by new center tank. Total of 226

delivered before production ended (including ER and LR variants).

Corporate RJ. A 15- to 50-seat shuttle with 2,100-nautical-mile range. First delivery in 1993.

CRJ200. Replaced CRJ100. Improved operating altitude, range, specific fuel consumption.

Bombardier CRJ Regional Jets

ER/LR versions have also replaced series 100 predecessors. 709 delivered.

CRJ440. CRJ200 configured to seat 44. Northwest Airlines ordered 75 in 2001 for deliveries from 2002-05. Total of 86 delivered.

CRJ550. Version of the 70-seat CRJ700 reconfigured with 50 seats in three classes for United Airlines. There are no significant changes to the existing airframe or engines, but the aircraft is recertificated with a reduced MTOW of 65,000 pounds (29,500 kg) to comply with scope clauses contained in Bombardier's contract with the Air Line Pilots Association International (ALPA) union that represents United's pilots. Bombardier plans to convert used CRJ700s to the new configuration for United, but presumably new aircraft could be ordered in this configuration.

CRJ701. 72-seater launched in 1997; first deliveries in February 2001. A modified CF34-8C5 engine became available for this model in early 2006.

CRJ700LR. In April 2005, Bombardier launched this CRJ700 variant with a range of 2,516 miles (4,048 km), increased maximum takeoff and landing weights, increased carrying and fuel capacities, and CF34-8C5B1 engines.

CRJ705. Announced in the spring of 2003, this is offered in 74-seat and 75-seat versions. A US Airways order launched the 75-seat version. Only 16 built.

CRJ900. Announced in 1999 as a lower cost alternative to the proposed 90-seat BRJ-X, the CRJ900 is a stretched 700 series derivative. Launched in 2000, first flew in 2001. First deliveries in February 2003. In 2005, Bombardier enhanced the CRJ900 with redesigned wings and winglets and improved payload and range capabilities while decreasing fuel consumption. The CRJ900LR, announced in 2006, is a long-range variant that can transport 88 passengers 1,553 nautical miles (2,876 km).

CRJ1000. Stretched version of the CRJ900 fuselage to allow 100-passenger configuration. Program launched in February 2007. The first CRJ1000 flew in September 2008. Deliveries began in December 2010. Variants include "Eurolite" (EL) and Extended Range (ER) models.

Challenger 800/850 Series. Corporate shuttle / business variants based on CRJ series models. The Challenger 850 is based on the CRJ200LR.

Program Review

Background. In 1986, Canadair, then owned by the Canadian government, began to assess the potential market for a 50-seat regional jet able to compete cost-effectively with the latest turboprop aircraft. The original design was known as the CL601RJ and was a 44-seater.

Talk of building a stretched model, the CRJ-X, began in 1995. Launch approval for what became the CRJ700 was given in January 1997. The design of the aircraft was frozen in 1998, followed by a first flight in May 1999. The aircraft received Canadian certification in December 2000, and the first delivery to a customer came two months later in February 2001. Four flying aircraft and two static test airframes were used by Bombardier during the certification program.

Bombardier announced in October 1999 that it was stretching the aircraft once again to offer the CRJ900. The program was formally launched at the Farnborough International Air Show in July 2000. The first flight of the aircraft, a prototype modified from the CRJ700 prototype with fuselage plugs, took place in February 2001. The first flight of a production aircraft followed in October 2001, followed by Canadian certification in September 2002 and approval from the U.S. Federal Aviation Administration (FAA) in

October 2002. The first delivery to a customer, Mesa Air, came in February 2003, with the type's entry into service following about two months later.

In February 2007, Bombardier announced the launch of the 100-seat CRJ1000 variant of the CRJ series. The initial schedule called for the aircraft to enter service in 2009, but the deadline was later pushed back during the testing phase. The CRJ1000 achieved certification in December 2010, and Bombardier delivered the first three customer aircraft before the end of the year.

In February 2019, Bombardier announced a new variant of the CRJ family, the CRJ550 (see **Variants/Upgrades**, above). Certification of the new variant, which initially will be a used CRJ700 reconfigured to a new three-class 50-seat layout that complies with pilot union scope clauses at United Airlines, is scheduled to occur before the end of 2019.

Earlier in the year, Bombardier's management announced publicly that it is evaluating "all strategic options" for the CRJ program, corporate-speak for determining whether it should sell or shut down the CRJ production line. The manufacturer needs to cut supplier costs to be able to profitably produce the aircraft at a low rate.

Bombardier CRJ Regional Jets

Mitsubishi Acquisition

In June 2019, Bombardier and Mitsubishi Heavy Industries Ltd announced a new deal under which Mitsubishi will acquire the rights to the CRJ program, including the type certificates of all models and Bombardier's regional aircraft support assets. Mitsubishi will pay \$550 million in cash and assume approximately \$200 million in debt.

The deal includes maintenance, support, refurbishment, marketing, and sales activities for the CRJ family, including the related services and support network located in Montréal, Québec and Toronto, Ontario and

service centers located in Bridgeport, West Virginia and Tucson, Arizona. Also, Bombardier's net beneficial interest in the Regional Aircraft Securitization Program (RASPRO), valued at approximately \$180 million, will be transferred to MHI.

The deal closed in June 2020. Bombardier's CRJ production facility in Mirabel, Québec, was not part of the deal. Instead, Bombardier completed assembly of the existing CRJ backlog on behalf of MHI after the deal closed, rolling out the final CRJ in December 2020. Bombardier will continue to supply components and spare parts for the CRJ program under the deal.

Funding

Canadair spent just over CAD14 million on the CRJ design and market research effort. Canada's Department of Science and Technology added CAD6.8 million to complete the design phase. Parent company Bombardier has secured CAD275 million for development over a 10-year period, CAD90 million of which was made available immediately after official launch. CRJ700 development costs are estimated at \$476 million, with \$325 million provided by Bombardier. CRJ900 development costs are estimated at \$150 million. Development of the CRJ1000 cost an estimated \$300 million.

Contracts/Orders & Options/Inventories

For a complete list of CRJ orders and options and details on inventories, see Appendix VI, Major Civil Transport Orders and Options, and Appendix VII, Major Civil Transport Inventories.

Forecast Rationale

Bombardier announced in June 2019 that it had agreed to sell the CRJ program to Japan's Mitsubishi Heavy Industries. The deal includes the CRJ services and support network, which has facilities in Montréal and Toronto and service centers in Bridgeport, West Virginia and Tucson, Arizona. It also includes the type certificates for all of the CRJ models.

However, the deal did not include the CRJ production facility in Mirabel, Quebec. This facility continued to assemble the CRJ family on behalf of MHI until Bombardier's backlog was exhausted in December 2020.

We do not expect production of the CRJ to resume. At the time the two manufacturers announced the deal,

MHI refused to say whether it would restart production of the CRJ family at a new site once production ends at Mirabel. The deal gives MHI ownership of Bombardier's regional airliner support network, something that MHI will eventually need in order to support its own regional jet models in North America. In the meantime, it can operate the facilities profitably by supporting the large CRJ fleet in operation.

Creating a new facility to build new CRJs would require a substantial investment by MHI, and it would need to see a potential upside for the CRJ family over the long term to justify the expense. That's not likely to happen.

* * *