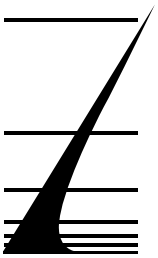
The Market for Regional Transport Aircraft

Product Code #F612

A Special Focused Market Segment Analysis by:



FORECAST INTERNATIONAL

Analysis 2
The Market for Regional Transport Aircraft 2010-2019

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Analysis 2

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PROGRAMS

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

Airbus A318
Airbus Military C-212
Aircraft Industries L 410/420
Antonov An-148
Antonov/PZL Mielec An-28/An-38
ATR Series
B-N Group Turbine Islander
Bombardier CRJ Regional Jets
Bombardier CSeries
Bombardier Q Series
COMAC ARJ21
Embraer 170/175/190/195
Embraer ERJ 135/140/145
Ilyushin Il-114
Mitsubishi Regional Jet
Pilatus PC-12
RUAG Aerospace 228 Next Generation
Sukhoi Superjet 100
Xi'an MA60/MA600

Introduction

The regional airline industry is undergoing profound changes. These changes have been spurred as much by the crisis into which the airline industry plunged in 2008 as by the still fragile recovery under way at present. The changes are comprehensive, especially in the large U.S. market, and cover everything from the type of aircraft utilized, to the business models under which carriers operate, to the very makeup of the industry itself.

U.S. regional airlines are operating in a market in which, compared to years past, opportunities are few to expand market share and profitability. European regionals face a tough competitive landscape as well, and also have to deal with a strict regulatory environment.

The airline market slump that began in the fourth quarter of 2008 hit regional airlines hard. In many previous downturns, regionals were often able to fill the service voids left in the market as the majors parked capacity and consolidated their route networks. As a way to cut costs, major carriers would download routes in their network to their regional partners, thus providing the regionals with considerable opportunities to grow and even thrive while the majors struggled.

This time around, though, regionals felt the pain nearly as much as the majors. Network carriers parked capacity and cut back service without shifting the work to regionals. They imposed capacity reductions throughout their networks, including reductions in capacity flown by their regional partners.

A recovery in the airline market is clearly under way, for mainline and regional carriers alike. Just as clearly, the recovery is still fragile and could easily be thrown into reverse.

In the midst of this unsettled environment, the majors are looking to redefine their relationship to the regional airlines. Increasingly, mainline carriers are viewing regionals as vendors (of capacity) rather than as true business partners. With many feeder contracts coming up for renewal over the next several years, the regional airline industry is coming to a crossroads. In certain key ways, the majors will be looking to alter the rules of the game.

The regionals, of course, put themselves in this situation years ago by trading their independence for the guaranteed revenue generated by network affiliation. But, for a long time, the network tie-ins made good business sense and provided years of prosperity for the regionals. However, within the present-day context of a very mature U.S. airline market characterized by high operating costs throughout the system, regionals no longer have the leverage with the majors that they once had.

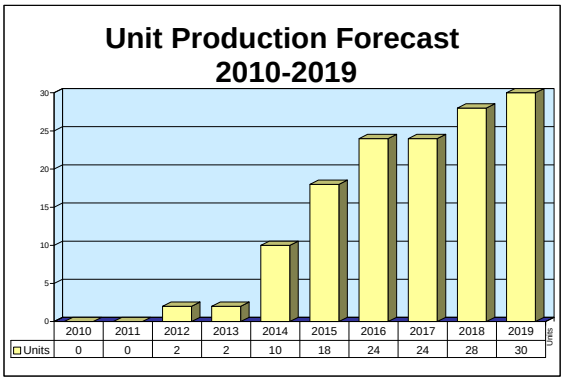
The future success of regional aircraft manufacturers will be determined by how well they respond to the needs of this changing and turbulent marketplace.

* * *

Mitsubishi Regional Jet

Outlook

- New 78-92 seat regional jet family from Mitsubishi
- Will compete with Bombardier and Embraer products, plus new Chinese and Russian regional jets
- Service entry is targeted for 2014



Orientation

Description. Twin-turbofan-powered regional transport aircraft.

Sponsor. Mitsubishi Aircraft Corp, a subsidiary of Mitsubishi Heavy Industries Ltd.

Status. Development

Total Produced. None to date.

Application. Scheduled and non-scheduled regional passenger transportation.

Price Range. MRJ70, $34 million; MRJ90, $40 million. Both in 2009 U.S. dollars.

Mitsubishi Regional Jet

Source: Mitsubishi

Mitsubishi Regional Jet

Contractors

Prime

Mitsubishi Aircraft Corp	http://www.mrj-japan.com, 15, Oye-cho, Minato-ku, Nagoya, 455-8555 Japan, Tel: + 81 52 611 2210, Fax: + 81 52 611 2217, Prime

Subcontractor

Aerospace Industrial Development Corp (AIDC)	http://www.aidc.com.tw, No 111-X60, Lane 68, Fu-Hsing N Rd, Taichung, 40722 Taiwan, Tel: + 886 4 270 70001, Fax: + 886 4 228 42849 (Slats; Flaps; Belly Fairing; Rudder; Elevator)
Delta Kogyo Company Ltd	http://www.deltakogyo.co.jp, 1-14, Shinchi, Fuchu-cho, Aki-gun, Hiroshima-ken, Japan, Tel: + 81 082 282 8211, Fax: + 81 082 282 8221 (Passenger Seats)
Eurocopter Deutschland GmbH	http://www.eurocopter.com, Industriestrasse 4-6, Postfach 1353, Donauwörth, 86609 Germany, Tel: + 49 906 71 0, Fax: + 49 906 71 40 11 (Cargo Doors; Passenger Doors; Service Doors)
Goodrich Aerostructures	http://www.goodrich.com, 850 Lagoon Dr, Chula Vista, CA 91912-0878 United States, Tel: + 1 (619) 691-4111, Fax: + 1 (619) 691-3030 (Nacelle & Thrust Reverser System)
Goodrich Aircraft Wheels & Brakes	http://www.goodrich.com, 101 Waco St, PO Box 340, Troy, OH 45373-3872 United States, Tel: + 1 (937) 339-3811, Fax: + 1 (937) 440-3250 (Integrated Brake System)
Hamilton Sundstrand	http://www.hamiltonsundstrand.com, 4747 Harrison Ave, PO Box 7002, Rockford, IL 61125-7002 United States, Tel: + 1 (815) 226-6000 (Electrical Power System; Flap/Slat Actuation System)
Hamilton Sundstrand	http://www.hamiltonsundstrand.com, One Hamilton Rd, Windsor Locks, CT 06096-1010 United States, Tel: + 1 (860) 654-6000, Fax: + 1 (860) 654-2621, Email: hs.general@hsd.utc.com (Fire Detection and Suppression System; Air Management System; Auxiliary Power Unit; Engine Control System and Accessories)
Heath Tecna Inc	http://www.heath.com, 3225 Woburn St, Bellingham, WA 98226 United States, Tel: + 1 (360) 738-2005, Fax: + 1 (360) 715-3999 (Interior Components)
LMI Aerospace Inc	http://www.lmiaerospace.com, 411 Fountain Lakes Blvd, St. Charles, MO 63301 United States, Tel: + 1 (636) 946-6525, Fax: + 1 (636) 949-1576 (Tailcone)
Nabtesco Corp	http://www.nabtesco.com, 9-18, Kaigan 1-chome, Minato-ku, Tokyo, 105-0022 Japan, Tel: + 81 3 3578 7070, Fax: + 81 3 3578 7237 (Flight Control Actuators)
Parker Aerospace Hydraulic Systems Division	http://www.parker.com, 2220 Palmer Ave, Kalamazoo, MI 49001-4165 United States, Tel: + 1 (269) 384-3400, Fax: + 1 (269) 384-3862 (Hydraulic System)
Pratt & Whitney	http://www.pratt-whitney.com, 400 Main St, East Hartford, CT 06108 United States, Tel: + 1 (860) 565-4321, Email: info@pw.utc.com (PW1000G Geared Turbofan)
Rockwell Collins Inc	http://www.rockwellcollins.com, 400 Collins Rd NE, Cedar Rapids, IA 52498-0001 United States, Tel: + 1 (319) 295-1000, Fax: + 1 (319) 295-5429 (Pro Line Fusion Avionics System; Primary Flight Control Computers; Pilot Controls; Horizontal Stabilizer Trim System)
Spirit AeroSystems	http://www.spiritaero.com, 3801 S Oliver St, PO Box 780008, Wichita, KS 67278 United States, Tel: + 1 (316) 526-9000, Fax: + 1 (316) 526-1845, Email: communications@spiritaero.com (Engine Pylons)
Sumitomo Precision Products Co Ltd	http://www.spp.co.jp, 1-10, Fuso-cho, Amagasaki, Hyogo, 660-0891 Japan, Tel: + 81 6 6489 5936, Fax: + 81 6 6489 5889 (Landing Gear)

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Technical Data

(MRJ70STD/MRJ90STD)

Design Features. Low-wing design with twin underwing geared turbofan engines. The wing is swept back, and is fitted with winglets. The tail section includes a sweptback fin and horizontal stabilizer. Landing gear is retractable tricycle type, with twin wheels on each unit.

Carbon composites account for 10-15 percent of the aircraft structure, primarily in the tail section. The aircraft's wing and wing box are constructed of aluminum. The fuselage, which has a circular design, is all-metal.

The MRJ is fitted with a fly-by-wire flight control system. Rockwell Collins provides its Pro Line Fusion avionics suite as the aircraft's core avionics system. Delta Kogyo supplies slim-profile seats for passenger use.

	Metric	U.S.
Dimensions		
Length	33.40/35.80 m	109.58/117.44 ft
Height	10.44 m	34.25 ft
Wingspan	30.90 m	101.38 ft
Weight		
Maximum takeoff weight	36,850/39,600 kg	81,240/87,303 lb
Maximum landing weight	36,200/38,000 kg	79,807/83,776 lb
Performance		
Maximum operating speed	Mach 0.78	Mach 0.78
Takeoff field length (MTOW, SL, ISA)	1,400/1,430 m	4,590/4,690 ft
Landing field length (MLW, dry)	1,380/1,420 m	4,530/4,660 ft
Range (with full passenger load)	1,590/1,690 km	860/910 nm

Propulsion

MRJ70	(2)	Pratt & Whitney PurePower PW1000G geared turbofan engines rated 66.7 kN (15,000 lbst) each.
MRJ90	(2)	Pratt & Whitney PurePower PW1000G geared turbofan engines rated 75.6 kN (17,000 lbst) each.

Seating

Crew of two. The MRJ70 accommodates 78 in a typical single-class configuration. The MRJ90 accommodates 92 in a typical single-class layout. Seating configurations are four-abreast with 31-inch seat pitch.

Variants/Upgrades

MRJ70. Short fuselage model seating 78 passengers in a typical single-class layout. The MRJ70 is marketed in three versions. The standard MRJ70STD variant provides a range of 860 nautical miles with a full passenger load. Maximum takeoff weight is 36,850 kilograms (81,240 lb).

The MRJ70ER extended-range version is able to fly 1,500 nautical miles with a full passenger load. Its maximum takeoff weight is 38,995 kilograms (85,969 lb).

The MRJ70LR long-range version has a range with full passengers of 1,840 nautical miles. Maximum takeoff weight is 40,200 kilograms (88,626 lb).

All three versions of the MRJ70 are powered by two Pratt & Whitney PW1000G geared turbofan engines rated 66.7 kN (15,000 lbst) each.

MRJ90. The MRJ90 seats 92 passengers in a typical single-class configuration. It is intended to be the first of the MRJ models to appear. First flight is scheduled for the second quarter of 2012, with initial delivery in the first quarter of 2014.

As with the MRJ70, the MRJ90 is marketed in three versions. The standard MRJ90STD variant features a range of 910 nautical miles with a full passenger load. Maximum takeoff weight is 39,600 kilograms (87,303 lb).

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The MRJ90ER extended-range version can fly 1,300 nautical miles with a full passenger load. Maximum takeoff weight is 40,995 kilograms (90,378 lb).

The MRJ90LR long-range version has a range with full passengers of 1,780 nautical miles. Maximum takeoff weight is 42,800 kilograms (94,358 lb).

All three versions of the MRJ90 are powered by two Pratt & Whitney PW1000G geared turbofan engines rated 75.6 kN (17,000 lbst) each.

MRJ100X. Proposed stretched variant accommodating 100 passengers. Not formally launched as of March 2010.

Program Review

Background. The Mitsubishi Regional Jet (MRJ) had its beginnings in 2003 as a technology development project conducted by Mitsubishi Heavy Industries (MHI) for Japan's New Energy and Industrial Technology Development Organization (NEDO). At the time, the effort was focused on the design of a small commercial aircraft seating 30-50 passengers. By 2006, however, the program's concentration had shifted to an aircraft aimed at the 70-90 seat market.

In June 2007, MHI displayed a full-size cabin mock-up of the MRJ at the Paris Air Show. In October 2007, the company announced its selection of Pratt & Whitney's new Geared Turbofan engine (currently known as the PW1000G) to power the aircraft. The Pratt powerplant was chosen for the MRJ over an improved version of the General Electric CF34-10 and a scaled-up variant of the Rolls-Royce RB282. Also in October, MHI formally decided to begin marketing the MRJ to potential customers. Two MRJ models were envisioned: the 70-80 seat MRJ70 and the 86-96 seat MRJ90.

MHI officially launched the MRJ program in March 2008. The launch customer for the new aircraft was the Japanese carrier All Nippon Airways (ANA), which placed firm orders for 15 MRJ90s and took options for an additional 10. Besides the ANA orders, MHI said that the launch was also based on positive responses to the MRJ from potential customers. The program schedule at the time of the launch called for first flight in 2011, followed by service entry in 2013.

In April 2008, MHI established a new subsidiary, called Mitsubishi Aircraft Corp, that assumed responsibility for MRJ development, certification, sales, and customer support. Manufacture and final assembly will be performed by MHI itself. Final assembly is to take place at the firm's Komaki South plant near Nagoya Airfield.

MHI currently holds a 64 percent stake in Mitsubishi Aircraft. Other shareholders include Mitsubishi Corp (10 percent), Toyota Motor Corp (10 percent), Mitsui & Company Ltd (5 percent), Sumitomo Corp (5 percent), JGC Corp (1.5 percent), Tokyo Marine & Nichido Fire Insurance Company Ltd (1.5 percent), Development Bank of Japan Inc (1 percent), Mitsubishi Electric Corp (1 percent), and Mitsubishi Rayon Company Ltd (1 percent).

Mitsubishi Aircraft finalized an agreement with Boeing in September 2008 under which the U.S. aerospace giant acts as a consultant on MRJ development, marketing, and post-sales activities. Under a December 2009 contract, Saab is supporting Mitsubishi in the development of technical manuals for the MRJ. Also assisting in the MRJ program is BAE Systems, which is providing Mitsubishi with design integration and certification services for the aircraft's propulsion-related systems.

In October 2008, Mitsubishi announced plans to set up a wholly owned subsidiary, called Mitsubishi Aircraft Corp America Inc, to conduct sales and marketing activities for the MRJ in North and South America. The new subsidiary is based in Addison, Texas.

Mitsubishi signed a Letter of Intent (LOI) with Trans States Holdings (TSH) in October 2009 for 50 firm orders for the MRJ plus 50 options. TSH can choose at a later time which MRJ model that it will acquire; the firm is leaning toward the MRJ70. As of March 2010, the LOI had not yet been converted into a formal order.

St. Louis, Missouri-based TSH is an airline holding company that owns and operates two regional airlines: Trans States Airlines and GoJet Airlines. TSH provides feeder services for United Airlines and US Airways.

The current MRJ program schedule calls for first flight in the second quarter of 2012, followed by service entry in the first quarter of 2014.

Related News

Goodrich to Supply MRJ Brake System – Goodrich Corp has been selected by Sumitomo Precision Products Company Ltd to supply the integrated brake system for the MRJ. The brake system will be part of Sumitomo's complete landing gear system for the aircraft. Sumitomo had previously been chosen by Mitsubishi to develop and integrate the MRJ landing gear system.

The work will be performed by Goodrich Aircraft Wheels and Brakes. The integrated brake system is composed of the main wheels and carbon brakes, the nose wheel, and the digital brake control and anti-skid system. The brake system will use Goodrich's DURACARB carbon brake heat sink material.

Other Goodrich content on the MRJ includes the nacelle and thrust reverser system for the aircraft's PW1000G engines. (Goodrich, 2/10)

Funding

The development cost of the MRJ has been estimated at $1.5 billion.

Contracts/Orders & Options

(As of March 2010)

Operator	Designation	Quantity	Phase
All Nippon Airways	MRJ90	15	On Order
All Nippon Airways	MRJ90	10	Option

Timetable

Month	Year	Major Development
Oct	2007	MRJ marketing to potential customers begins
Mar	2008	Official launch of MRJ program
Oct	2008	Plans announced for U.S.-based sales subsidiary
Sep	2009	MRJ configuration finalized
	2012	First flight
	2013	JCAB certification
	2014	FAA certification and initial deliveries

Forecast Rationale

The MRJ configuration was finalized by Mitsubishi in September 2009. The new configuration, however, incorporated a number of changes from the originally envisioned aircraft. The revisions, according to Mitsubishi, were the result of feedback from airlines. The company intends to freeze the design of the MRJ in the third quarter of 2010.

The new design features an aluminum wing box, replacing the composite structure of the earlier MRJ iteration. Mitsubishi said that the use of composite material resulted in less weight savings than had been expected, plus the use of aluminum will make it easier to manufacture an optimal wing structure. According to the firm, the aluminum wing box will allow for a shorter

Mitsubishi Regional Jet

lead time to make structural changes, and the wings can now be optimized to match the attributes of each MRJ model.

The new MRJ configuration also features a wider cabin with more head clearance. Cabin height was raised by 1.5 inches, translating into 12 percent more space in the overhead bin. In addition, the aircraft's forward and aft cargo compartments were combined into a single aft cargo compartment. Total cargo volume remains unchanged at 18.2 cubic meters (644 cu ft) but is now located in one area, with the intention of simplifying baggage handling and improving stacking efficiency.

In conjunction with the changes, Mitsubishi adjusted the MRJ program schedule, sliding the timetable several months to the right. First flight is now scheduled to take place in the second quarter of 2012. Certification by the Japan Civil Aviation Bureau (JCAB) is targeted for late 2013, followed by U.S. Federal Aviation Administration (FAA) approval in early 2014. Deliveries are to begin in the first quarter of 2014.

The MRJ90 is slated to be the first MRJ model to appear. The MRJ70 is to enter service in early 2015, one year after service entry of the MRJ90. The two models directly compete for sales with similar-sized products from Bombardier and Embraer. These two companies have dominated the regional jet market for several years, and will pose formidable competition to a newcomer such as Mitsubishi. Airlines will watch closely to see if Mitsubishi is able to deliver on the MRJ's promised operating efficiencies, much of which the company expects to come from lower fuel burn. Mitsubishi claims that the MRJ will have a reduction in fuel consumption of more than 20 percent compared to current regional jets.

In order to fully compete with Bombardier and Embraer, Mitsubishi will also have to establish an extensive customer support structure. Boeing's participation in the MRJ effort should help greatly in this regard.

The MRJ also competes with two other newcomers to the regional aircraft market: the Comac ARJ21 and the Sukhoi Superjet 100.

Meanwhile, Mitsubishi is considering the addition of a stretched, 100-passenger version to the MRJ family. The company says that development of this new variant, which is known as the MRJ100X, is contingent on the appearance of "sufficient market demand to trigger a full-scale launch." Mitsubishi is so far finding particular interest in the MRJ100X among potential European customers.

Though not forecast by us, launch of a stretched, 100-seat version of the MRJ could be a natural progression for this new aircraft family, especially given the trend in the regional jet market toward aircraft of ever greater seating capacity. The engineering limit of the MRJ design is 112 seats, though Mitsubishi is reluctant to exceed 100-seat capacity. This is due to the fact that many major carriers require one flight attendant for every 50 passengers, thus narrowing the profitability of operating an aircraft seating 101-112 passengers.

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**
Mitsubishi Aircraft Corp												
Mitsubishi Regional Jet <> PW1000												
	0	0	0	2	2	10	18	24	24	28	30	138
Total	0	0	0	2	2	10	18	24	24	28	30	138

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