

GEARED UP FOR A FIGHT

The next-generation E-Jet gives Embraer an aircraft with new engine technology. But with service entry not expected for at least five years, the effect of its arrival into the regional market is still up for debate

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Prior to Embraer's decision to re-engine the E-Jet, Bombardier and Mitsubishi were sitting pretty in a market place where the dominant player no longer had a product that could effectively compete with newer rivals.

Embraer has established itself as the market leader in the large regional jet sector, delivering more than 940 E-Jets over the last decade and holding a backlog for some 220 more. However, it has faced a growing threat from the Canadian and Japanese manufacturers. Powered by the geared turbofan technology from Pratt & Whitney, the efficiency gains offered by the all-new Bombardier CSeries and Mitsubishi Regional Jet have seen them take both orders and market share from Embraer.

After evaluating an all-new five abreast design, Embraer decided last year to go down the re-engining route. Subject to a formal decision expected by mid year, it will replace the E-Jet's General Electric CF34s with that same GTF technology its rivals have (and in-

roduce other improvements), levelling the playing field.

Along with other revisions such as a new wing design, Embraer says its re-engined twin-jets will benefit from a double-digit improvement in fuel burn, maintenance costs, emissions and external noise over the current E-Jet. A stretched derivative is also being studied.

Entry into service is scheduled for 2018-19, around four to five years after the CS100 in 2014, and around three to four years after the MRJ, but aerospace consultant Richard Aboulafia of Teal Group believes Embraer will swiftly make up lost ground.

In the case of Mitsubishi, whose 70-seat MRJ70 and 90-seat MRJ90 aircraft will compete with the re-engined E-175 and E-190 respectively, he says delays are "eating further into the advantage they had over Embraer". The MRJ was originally expected to enter flight testing in late 2011, but that was delayed to the second quarter of 2012 and again, to late 2013. Nothing more is known about service entry, other than it is scheduled, for the time being, for some time in 2015.



Aboulafia believes that Embraer's decision to re-engine the E-Jet will prove the industry's real appetite for the MRJ. "Getting into the market was impressive, but since they were the only guy with the new generation of engines, they had a relatively easy job. This is a different story.... We'll see how much more traction they'll get," he says.

In his view the re-engining was announced later than necessary and had it been done ear-

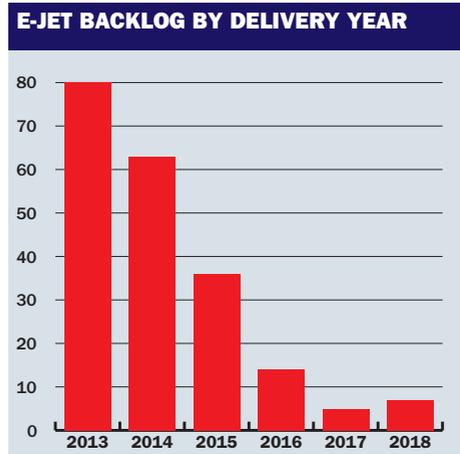
HOW THE RIVALS COMPARE

Aircraft type	Service entry	List price ³	Passengers	Engine	Range (nm)	MTOW (t) ³	Cabin	Backlog (delivered)
Bombardier CS100	Mid 2014	\$62m	100-125	P&W PW1000G	2,950	54.9	5 abreast	61 (0)
Bombardier CS300	End 2014	\$76m	130-160	P&W PW1000G	2,950	54.9	5 abreast	114 (0)
Embraer E-170¹	March 2004	\$38m	70-78	GE CF34-8E	2,100	37.2	4 abreast	10 (186)
Embraer E-175¹	July 2005	\$41m	78-88	GE CF34-8E	2,000	37.7	4 abreast	82 (164)
Embraer E-190¹	Sept 2005	\$45m	98-114	GE CF34-10E	2,400	50.3	4 abreast	105 (472)
Embraer E-195¹	Sept 2006	\$48m	108-124	GE CF34-10E	2,200	48.8	4 abreast	26 (116)
Embraer re-engined E-175	2018	TBA	78-88	P&W PW1000G	-	-	4 abreast	-
Embraer re-engined E-190	2018	TBA	98-114	P&W PW1000G	-	-	4 abreast	-
Embraer re-engined E-195	TBA	TBA	108-124	P&W PW1000G	-	-	4 abreast	-
Embraer re-engined E-195 stretch	TBA	TBA	116-132 ²	P&W PW1000G	-	-	4 abreast	-
Mitsubishi MRJ90	2015	\$42m	86-96	P&W PW1000G	1,790	39.6	4 abreast	165 (0)
Sukhoi Superjet 100	April 2011	\$35m	72-98	PowerJet SaM146	2,470	45.9	5 abreast	165 (15)

SOURCE: Flightglobal Ascend's online database and other sources NOTES: ¹ Embraer is introducing a package of upgrades which aims to deliver a 5% improvement in efficiency ² Estimated figure ³ Figures based on highest weight/longest-range versions



Level playing field: new E-Jets will compete with the MRJ and CSeries using similar engines



BACKLOG COMPARISON

Aircraft type	Backlog
Embraer E-Jet	223
Bombardier CSeries	175
Mitsubishi MRJ	165
GRAND TOTAL	563

SOURCE: Flightglobal's Ascend Online database

lier, Embraer “could have they prevented the MRJ getting its foot in the door at all”.

“Mitsubishi has no track record of selling, supporting or financing jets. That represents a certain degree of risk for customers,” he says.

Naturally the Japanese manufacturer has a different view. Its vice-president of business planning, Hank Iwasa, says: “We’re confident that the newly developed MRJ will have a lot of technological advantages, and is designed to extract the best GTF engine performance against the [re-engined] E-Jet even if Embraer revamps their existing E-Jet system.”

Iwasa says that the advantage of the MRJ is not only based on the GTF engine, but the fact that the aircraft also incorporates next-generation engineering technology and an aerodynamic design that “sets it apart from the competitors”.

STIFF COMPETITION

Bombardier, whose CS100 version of the CSeries has 108-125 seats depending on configuration, competes with the two largest E-Jets, the 114-seat E-190 and 124-seat E-195. Its big brother, the 130-160-seat CS300, competes more with the smaller variants of Airbus and Boeing’s A320 and 737 families. So Bombardier has a product that straddles the regional and mainline aircraft markets.

If Embraer goes ahead with a re-engined E-195 stretch seating around 130 passengers, it could impact the Canadian manufacturer’s aspirations in the regional marketplace, says Aboulafia. If the E-195 stretch happens he does not envisage Bombardier winning many more sales for the CS100 beyond those it has already achieved.

“In the 110-seat zone the CSeries is living on borrowed time.” He says while some customers will require the additional range that the CS100 would likely offer over a re-engined stretch E-195, most will opt for the E-Jet, which will be a cheaper aircraft that also costs less to operate.

Yet Rob Morris, a senior aviation analyst with Flightglobal advisory service Ascend, says: “It’s one thing saying we’re going to put a GTF on, but what is important is the variant and how optimised it is for the design of the aircraft.” He says the CS100 is a new design targeted at a market, while its E-Jet rival would be a stretch version. He adds not enough is known about the GTF engines to be used on the new E-Jets to say whether they’ll be properly optimised.

“In a sense, right now if you look at the variants of the GTF that are being developed, you’ve got one that is being developed for the CSeries and a different engine being developed for the MRJ,” he says. “That’s effectively

engines developed for the 110-130 seat market and the 70-90 seat market... but when the E-Jet comes along, we need to understand whether the engines for each product, the E-175 and the E-190/195, are common or different and how optimised they are.”

As such Morris feels it’s “quite early to understand just how the E-Jet will stack up in competitive terms”.

Bombardier’s vice-president of marketing for the commercial aircraft division, Philippe Poutissou, also says that a newly designed aircraft will be superior in a number of areas to “a new engine on an in-production airframe”.

“The CSeries aircraft clean-slate approach means that we are able to develop the only aircraft specifically designed for the 100- to 149-seat market segment with unbeatable economics and passenger comfort,” he says. Poutissou also points out that “the CS100 aircraft is the only five-abreast narrowbody compared to the competition’s four-abreast smaller cabin”.

While it might be too early to assess in detail the impact of Embraer’s re-engining decision on Bombardier’s CS100, Morris believes it does raise serious questions over the existing E-Jet family.

“If you look at the history of re-engining projects, inevitably after a couple of years of the entry into service of the new engine

TOP FIVE REGIONAL CUSTOMERS 2012

Rank	Operator	Deliveries
1	Azul	27
2	Alitalia Cityliner	13
3	China Southern Airlines	10
4	Tianjin Airlines	9
5=	Lufthansa CityLine	8
5=	Aeromexico Connect	8
5=	SpiceJet	8
5=	Eurolot	8

TOTAL NUMBER 2012 DELIVERIES: 224

NOTE: Data for ATR, Bombardier, Embraer and Sukhoi. Excludes corporate and military operators.
SOURCE: Flightglobal Insight analysis using Ascend Online database.

» variant, the old engine variant ends production,” he says.

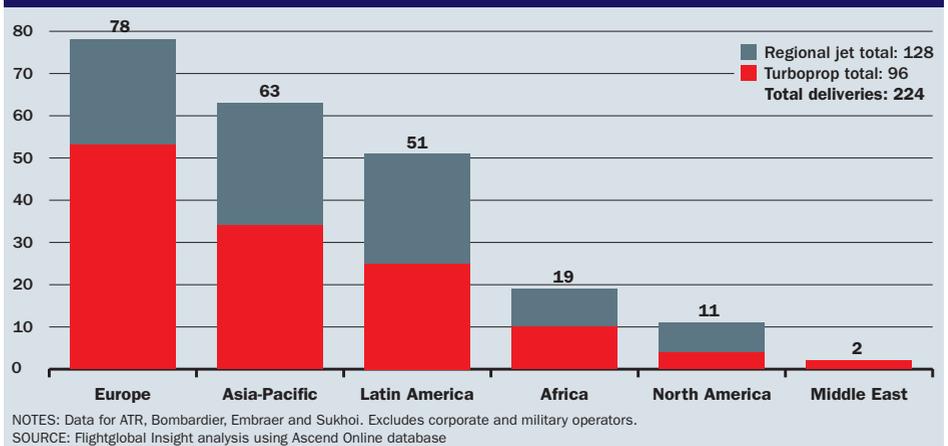
Morris says that if the market proposition of the new E-Jet is correct, “it’s hard to see any logic in the older variant remaining in production”. However he says it is a surprise “that there’s such a gap between potential launch and first delivery” of the new E-Jet, with a relatively large intervening period. “If you look at their backlog, it’s just over a couple of hundred airplanes. At current production rates they’ve only got two years of production in the bank, but they’ve got four and a half years in between now and the new product,” he says.

Embraer’s strategy to deal with this gap became clear in February when it announced a mid-life update of the E-Jet design. The aerodynamic makeover, including redesigned winglets and a longer wingspan, will result in roughly a 5% reduction in fuel burn. American Airlines’ regional partner Republic Airways will be the first to receive the new improved E-Jet in 2014. The update is referred to as “E-Jet with improvements”.

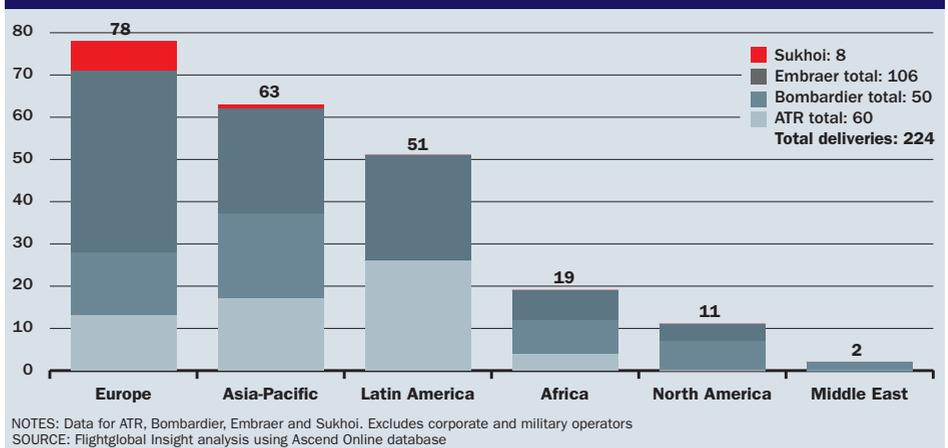
TOO MUCH CHOICE

Another aircraft for airlines to assess when making their fleet planning decisions could well prove too much competition for Chinese manufacturer Comac’s ARJ21, which might not even be invited for evaluation. Morris says the ARJ21 is “clearly a product to prove the Chinese can build and certificate a jet aircraft”. As such, he says, “it’s hard to see any

2012 REGIONAL AIRCRAFT DELIVERIES BY CATEGORY



2012 REGIONAL AIRCRAFT DELIVERIES BY MANUFACTURER



additional sales outside China, beside those already made”.

With the attention and resources of regional manufacturers concentrated on GTF aircraft, Aboulafia says the possibility of a big turbo-prop aircraft “is an afterthought”, while he feels “they [manufacturers] should be prioritising... which is too bad as I think there’s a market”.

When making fleet planning decisions, Aboulafia says, airlines “will go for the guy that offers the total package, good track record of product support and new-generation engines”. However Embraer’s switch to P&W for its second-generation E-Jet breaks the link with GE

and will likely result in less financial support from GE Capital Aviation Services.

GECAS – 100% owned by General Electric – is the world’s largest aircraft lessor and the majority of aircraft in the lessor’s portfolio and order book are equipped with GE powerplants.

GECAS accounts for 10.2% of the total E-Jet family fleet, 13.3% of the stored base and 3.6% of outstanding orders, according to Flightglobal’s Ascend Online database. The lessor also holds 13% of all E-Jet options.

“This is significant considering these figures exclude any financing or leases done by the General Electric group,” says Bert van Leeuwen, DVB Bank’s managing director of aviation research.

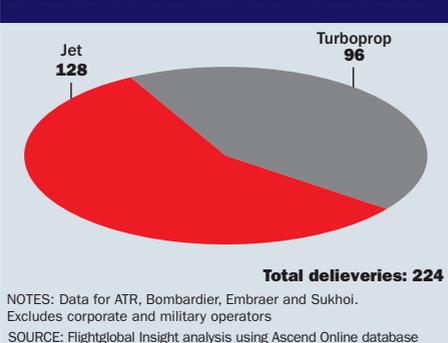
Despite this, Aboulafia feels Embraer’s decision to re-engine the E-Jet will see it improve its position in the regional marketplace. “It’s Embraer’s market to lose. They’ve finally realised what to do and if they play their cards right, they’re likely heading for around a 70% share of the regional jet market,” he says. ■

Additional reporting by Mavis Toh in Singapore and Laura Mueller in London

To read more about the history behind the regional jet phenomenon, visit: flightglobal.com/sunsetjet



2012 REGIONAL AIRCRAFT DELIVERIES



REGIONAL AIRCRAFT BACKLOG

