



AIRCRAFT PROFILE

Embraer's new family valued by appraisers

Appraisers look positively on Embraer's new aircraft family, but suggest there are risks associated with the Brazilian manufacturer's latest venture.



The launch of the second (E2) generation of Embraer's E-Jet family is a major addition to the commercial aircraft market in what is already a relatively crowded sector. Competition for orders will be strong, with direct competition from the new products of Mitsubishi and Bombardier. Add to this that an increase in size of its largest model (the E195-E2) means that the Brazilian manufacturer is encroaching into territory traditionally dominated by Airbus and Boeing, and success might seem far from guaranteed.

Airfinance Journal asked a selection of Istat appraisers for their views on the likely success of Embraer's new models.



Collateral Verifications (CV)
Gueric Dechavanne, vice-president, commercial aviation services

Since the launch of the E2 family Embraer has already taken orders for its new generation of aircraft in numbers that suggest the aircraft are attractive to the market. With an entry into service for the E190-E2 of 2018, and with the promise of 15% to 20% better economics compared to the existing fleet of regional aircraft, the E2 family should be well placed to start replacing some of the ageing 70- to 100-seat types currently in service.

Even in a somewhat crowded market space that includes offerings from Bombardier, Sukhoi and Mitsubishi, CV feels the success of Embraer with its existing products, its proven reliability and growing operator base bodes well for ensuring a large market share.

The E190-E2 should perform just as well as

the E190 it will be replacing. CV feels the current operator base of more than 45 airlines will most likely order the aircraft, either to grow or replace their in-service fleet, which will provide continuous demand for the type.

We also feel that airlines operating E170s may want to upgauge their fleet, which will strengthen demand for the new generation.

The E195-E2, which will start delivering in 2019, will most likely continue to be used for niche markets, as has occurred with the existing fleet. The additional capacity of the E195 may become attractive to operators looking for cabin flexibility, especially in the US where dual-class configurations have become much more popular to retain premium traffic.

The E175-E2 will be the last to be delivered in 2020 and will most likely continue to be the regional aircraft of choice for North American and European operators. With the potential requirements from operators wanting to replace existing 70-seat aircraft, as well as 50-seat regional jets, this aircraft should continue to perform well in its existing markets and in any newly created markets looking to grow.

Overall, we feel confident that the Embraer E2 family is well placed for continued success for the foreseeable future.



Oriol Olga Razzhivina, senior Istat appraiser

After developing the E-Jet family as a clean-sheet design, Embraer made a logical step of fine-tuning and re-engining the relatively young platform. The increased efficiency promised by the new geared turbofan (GTF) engine alone makes the new family



“The technological improvements are likely to command higher purchase prices, which bodes well for the residual values.”

Olga Razzhivina, senior Istat appraiser, Oriel

an attractive investment. Further efficiency improvements are achieved mainly through re-designing the wing with a higher aspect ratio. Mindful of the potential pilot shortage issues in the future, the cockpit, although upgraded, maintains operational commonality with the current generation.

The two engine variants powering the E2 family will be the Pratt & Whitney PW1700 and PW1900. Both variants will have been tried on different aircraft applications by the time of entry into service of the E2 family. This removes some of the new-entrant risk, although Pratt & Whitney's resources will be stretched supporting all the different aircraft platforms for which the GTF has been selected.

The E2 family, launched in 2013, shrinks to three members, shedding the smaller E170, which is no longer needed in order to comply with US pilot-union scope-clause regulations. Its place in the US regional fleets is taken by the E175, which will be enlarged by four seats to create the E2 version. The E175 will be the last model of the family to enter service, with the current-generation model having been the subject of an upgrade, including the addition of a fuel-saving wingtip.

The E190-E2 remains the same size and offers the best basis for one-to-one comparison with the current family. Embraer estimates a 16% fuel saving on a 600-nautical mile segment, which is an amount expected from any new entrant.

The E195-E2 receives the longest stretch, which means it slots it in between the CSeries variants, as well as pitching it against the smallest versions of the A320neo and 737 Max. With the longest stretch, the largest member of the family offers the best economy and could prove the most popular.

The introduction of the E2 family is a necessary step for Embraer in order to remain competitive with the all-new Mitsubishi MRJ and Bombardier CSeries into the 2020s. With a wider coverage of sizes than the competition, the E2 family has the potential to maintain its position in the market. The technological improvements are likely to command higher purchase prices, which bodes well for the residual values.



Fintech Aviation Services
Oliver Stuart-Menteth,
managing director

The launch of the E2 family, barely 10 years after the E170 first flew, demonstrates how serious Embraer is about retaining its claimed 52% share of orders in the 70- to 130-seat market in the

face of competing products that will be delivered within the next five years.

The new family is reduced to three variants, two with subtle capacity increases, and is scheduled to arrive in the second half of 2018 when the E190-E2 is delivered to ILFC.

The decision to eliminate the E170 from the family confirms Embraer's intention to leave this contracting segment and concentrate on satisfying demand in 90- to 130-seat market. Determining true capacity from a manufacturer's documentation is perilous; however, Embraer claims the E175-E2 will seat 88 passengers in a single-class configuration, the E-195 will accommodate 132, while the capacity of the E190-E2 remains unchanged at 106.

The E190 and E195 variants of the E2 family have so far attracted similar numbers of orders despite the E195 version being scheduled to enter service a year later than the smaller E190 model. However, it is Fintech's view that, in line with general industry trends, the larger E195 model is likely to prove the most popular variant in the longer term. The same effect can be seen in the main single-aisle market where the larger models in the A320neo and 737 Max families are prospering.

Significant investment in the family has been targeted specifically at those areas that will provide the greatest reduction in specific fuel consumption (SFC), namely the wings and the powerplant. A new wing profile with raked tips, a four-metre increase in wingspan and a higher aspect ratio with proportional reduction in induced drag will translate into lower SFCs. Embraer claims a collective reduction varying between 16% to 22% SFC per seat depending on the variant. A new cabin and fourth-generation fly-by-wire system are also introduced.

The departure from the CF34 powerplant to the Pratt & Whitney geared turbofan 1700/1900 models carries some risk, but offers the potential for a significant reduction in operating costs. As the in-service date of the engine precedes that of the first E2 model, there should be scope for the implementation of product improvements to increase reliability and on-wing times.

Given the market dominance of the current product, residual values for the new family will be strong and the E2 will be viewed as a popular but niche investment platform, with emphasis placed on the larger variant. Future residuals for the current family will be heavily dependent on the variant and installed operator base, with end-of-line variants experiencing a reduction in assumed economic life. ▲

AIRCRAFT CHARACTERISTICS

Seating/range

Max seating	114 at 29-inch pitch
Typical seating	106 at 31-inch pitch
Maximum range	2,800nm (5,186km) with 106 passengers at 100kg

Technical characteristics

MTOW	56,200kg (123,900lb)
MZFW	Not available*
Fuel capacity	Not available
Engines	PW1900G
Thrust	19,000lbf-22,000lbf

*The payload is 13,080kg (28,836lb).

Fuel burn

Embraer believes that at this stage of development it is more meaningful to provide relative numbers than estimated fuel burns. The E190-E2 has 16% lower block fuel for 500 nautical miles (nm) and the difference is almost constant along different flight sectors, varying not more than +/-1%.

Speed (time)

Block time 200nm	54 minutes
Block time 500nm	94 minutes
Block time 1,000nm	163 minutes

Note: Block time is same as current-generation E190.

Fleet data (E190 only)

Entry into service	2018
Orders	60 firm, plus 70 options (as of third-quarter 2014)
Customers	3 – Air Costa, ILFC, ICBC (as of third-quarter 2014)

Indicative maintenance reserves

Embraer does not have detailed data for the E2 maintenance reserves at this stage, but the estimated direct maintenance cost reduction compared to the current-generation E190 is 15%.