

# Among the Big Guns

**The CSeries and E2 put Bombardier and Embraer in markets closer to those dominated by Airbus and Boeing.**

Robert W. Moorman | ATW Plus

Apr 28, 2014



Where the new Bombardier CSeries and Embraer E2 jets fit in the air transportation business is an open question. Is this new breed of next generation small airliners considered to be at the top end of the regional jet market or the low end of the mainline narrowbody market, nudging into Airbus A320 and Boeing 737 territory?

For the E2s, “it’s a little bit of both,” Embraer Commercial Aviation president Paulo Cesar Silva said. “There is a big need from the airlines in the 70- to 130-seat market. And the idea is not to compete with the mainline narrow body family but to complement it.”

Silva added that the E175 E2 will be a good regional airliner, in part because of US union scope clauses that limit the size of regional airliners to 70 seats. The 190-195 E2s, meanwhile, are positioned at the low end of the mainline twinjet market.

Philippe Poutissou, VP marketing at Bombardier Commercial Aircraft, said the CSeries 300 is slightly larger than the 737-700, 737 MAX and the A319neo. “The CS300 is a head-to-head competitor with those models,” he said.

“Although we find ourselves in campaigns where airlines are considering the CSeries or the A320 or 737-800, the last two are quite a lot bigger than the CSeries. We believe the CSeries will complement the larger A320neo or 737-8 or -9 Max,” Poutissou said.

“The CSeries transcends both markets,” Raymond Jaworowski, senior aerospace analyst at Forecast International, said. It competes at the top end of the regional jet market with the CSeries 100 and the low end of the twinjet market with the CSeries 300, he believes. Bombardier, meanwhile, sees the CSeries as a great vehicle for opening new markets.

“The CSeries aircraft provides immense opportunities for established and new airlines to grow and develop new markets,” Bombardier Commercial Aircraft president Mike Arcamone said.

But some industry observers believe the E2 has advantages over the CSeries. “These include a large installed base of jets and many customers with existing training and logistics, a lower cost base and a well-established track record with third party finance providers,” Teal Group VP analysis Richard Aboulafia said. Equally important, the E2 doesn’t directly threaten Airbus and Boeing the way the CSeries does. “So Embraer is unlikely to encounter the same level of hyper-aggressive pricing in sales competitions,” Aboulafia added.

### **From design to flight**

Launched in 2013, the E2 family—a slightly larger next-generation version of the E170/175 and E190/195 aircraft—is still in the design phase, while Bombardier’s clean sheet design CSeries is in its flight-test program. The first two CSeries flight test vehicles, FTV1 and FTV2, are performing flight and ground tests in Wichita, Kan., while FTV3 has also begun its flight tests, which includes avionics testing. FTV4, the performance aircraft, was finishing final assembly in March, while FTV5, the first aircraft with an interior, was in final assembly. Ten CSeries aircraft are in various phases of assembly in Mirabel, Canada, according to Bombardier Commercial Aircraft VP and GM CSeries Rob Dewar.

The 110-seat CS100 entry-into-service (EIS) has been delayed from September 2014 to the second half of 2015. The 135-seat CS300 will enter revenue service six months later.

By mid-February, Bombardier had booked orders and commitments for 445 CSeries aircraft, including 201 firm orders. Seventeen customers and lessors have placed firm orders or options.

The E190-E2 program, meanwhile, is at the end of its joint definition phase with preliminary design reviews being conducted in the first half of this year, marking the transition to the detailed design phase. First metal cut is planned for the fourth quarter of 2014 and first flight in the second half of 2016. Four aircraft are scheduled for flight testing and certification, and EIS for the E190-E2 is scheduled for the first half of 2018.

The E195-E2 EIS is scheduled for 2019; the E175-E2 for 2020.

By early March, Embraer had received 100 firm plus 100 purchase rights for E175-E2s from St. George, Utah-based regional SkyWest Airlines; 50 firm orders plus 50 options for the E190-E2/195-E2 from lessor ILFC; and 50 firm orders plus 50 options for 25 E190-E2s and 25 E195-E2 from low-cost carrier startup Air Costa, the first E2 customer in the Indian market.

The E175-E2, E190-E2 and E195-E2 will have a seating range stretching from 70 to 130 passengers. Range for the E175-E2, the E190-E2 and E195-E2 is 1,920, 2,800 and 2,000 nautical miles respectively.

The CSeries and E2s share some common design features. Each aircraft has an all-new wing. Both are powered by new, quieter, more fuel efficient Pratt & Whitney geared turbofan engines (GTF). The E2 jets will have the PW1700G and PW1900G GTF powerplants, while the PW1500G powers the CSeries. Both airliners have upgraded avionics and new interiors and full fly-by-wire capability.

The CSeries is designed for the 100- to 149-seat market. The 2,950 nautical mile range of the C100 is a chief selling point, Bombardier believes. Yet some analysts question if such range is needed for a short- and medium-haul twinjet airliner. CSeries proponents argue that having longer range opens up whole new markets, particularly for domestic airlines.

### **Fuel efficiencies**

With oil now the top cost item for most airlines, fuel efficiency and savings are high priorities in boardrooms.

Bombardier says that the CSeries aircraft family will provide a 15% operating cost advantage and a 20% fuel burn advantage.

Embraer says the E2 will provide a 16% bump in fuel savings per flight, with 23% lower seat-mile costs on the E195-E2. In addition, the E2s also will provide a “15% estimated reduction in maintenance costs,” according to Claudio Camelier, VP market intelligence, Embraer Commercial Aviation.

Poutissou said the PW1500G engines on the CSeries ground and flight tests “are performing well and will meet the fuel consumption targets.” He said Bombardier have calculated a projected 20% fuel burn advantage based on comparing the CSeries 100 with the A318, 737-600 and the Embraer E195 on a “typical” 500-to-700 nautical mile flight. The CS300 was compared to the 737-700 and the A319. The savings are also based on an average of all five aircraft, but there are some slight variations in fuel savings on a one-to-one comparison, he added.

The published 15% cash advantage considered the fuel burn, maintenance and any related fees, which are typically driven by takeoff weight.

The ultimate importance of the CSeries, however, is not whether it will be more fuel efficient relative to comparably-sized airliners. “The real importance is what critical role the CSeries plays in shaping the narrowbody market of the future,” Jaworowski said.

It is an important point. If not for the CSeries, and to some extent the E2s, the A320neo and the 737 MAX would likely not have been launched, several analysts agreed. The neo and the MAX allow Airbus and Boeing to wait several more years before having to launch clean-sheet twinjet commercial airliners.

One sign of value of the CSeries and E2s comes from aircraft lessors, which have placed orders for the CSeries and the E2s. LCI Corp. International (LCI) in March 2009 signed a firm order with Bombardier to purchase three CS100s and 17 CS300s, a deal valued at around \$1.4 billion.

International Lease Finance Corp. (ILFC) launched the E2 line with an order for the purchase of 50 E2s, including 25 E190-E2s and 25 E195-E2s. The order includes options for an additional 50 aircraft.

“We keep getting excellent feedback on the E2s from operators worldwide,” ILFC CEO Henri Courpron said. “I expect to see more E2s operating outside of the US. In that market, we believe that the E2 is the better solution.” ILFC’s endorsement is important to Embraer because the lessor typically acquires larger aircraft. At present, the A319 is the smallest airliner in ILFC’s portfolio.

“We think both the CSeries and E2s will be viable programs,” CIT Aerospace chief commercial officer Damon D’Agostina said. “We’re analyzing both programs and getting frequent updates on the design of the E2s and the flight tests of the CSeries.”

D’Agostino feels it’s too early to project the long-term success of the CSeries and E2s. Once they are in revenue service, the true performance of each jet will be more easily assessed and compared. Present and projected future market conditions will also affect the long-term success of both programs. “Airlines are more focused today on rationalizing capacity on certain routes where costs comes more into play,” D’Agostino said. “I think if you take that idea further, it builds the case for aircraft in the size category of the CSeries and E2 jets.”

“The market between 100-to-130-seats is either a great mirage or a land of endless opportunity,” said John Feren, EVP at the Aviation Capital Group, the aircraft leasing arm of Pacific Life Insurance Company. Feren believes both aircraft programs will be successful. “The litmus test for Bombardier is whether they can build a sizable operator base” to make the CSeries a long-term success, which is what Embraer has already done for its line of E jets, Feren said.

The addition of the CSeries and E2s is also viewed as further proof of the diminishing popularity of RJs. The 50-to-70-seat varieties are becoming operationally anachronistic, but that wasn’t always the case. For years they were the airlines’ vehicle of choice on medium-long thin routes, particularly in North America. But that ended when fuel prices skyrocketed and seat-mile costs of these small jets became much less competitive.

“I think the (50- and 70-seat) RJ is a nuisance, an American invention to satisfy airline management and pilots concerning scope clauses,” Courpron said. “It does not reflect any specific macro need for an aircraft in that size and cost.

“That is one reason why ILFC ordered 190-E2s and 195-E2s, not the the 175-E2s.”

ILFC's customers worldwide "don't care about scope clauses," he said. "They care about fundamental economics of the airplane."

Bombardier and Embraer, once at the top of their game as producers of those RJs, are now players on the mainline stage.

### **CSeries flight testing builds traction**

Bombardier continues flight-testing its new CSeries airliners toward a delayed entry into service that now aims for the second half of 2015 for the CS100. The CS300 will enter revenue service six months later.

"People have been skeptical about our schedules because we have missed a few targets, but we took our time this time before putting out our current schedule for the CSeries," Philippe Poutissou, VP marketing at Bombardier Commercial Aircraft, said. "We are very pleased that in the last few weeks we've had a lot of productivity from our flight test vehicles."

Bombardier has expanded its global sales force for the CSeries, with commercial offices in Shanghai, Singapore, Dubai, Moscow, Munich and elsewhere.

Poutissou, an engineer by training, said the delays were mostly related to software problems and are being corrected. "We need mature systems for our flight test program," he said. "The program schedule takes into account the software we need now. In some cases we have what we need and in some cases we expect to get additional software."

Poutissou declined to say when manufacturing of the center barrel advanced aluminum fuselage for the CSeries would return to the Shenyang Aircraft of China.

"Eventually, the entire cylindrical portion of the fuselage will be repatriated to Shenyang," he said.

There are some sections of the advanced aluminum fuselage that are made in China, he pointed out. Bombardier produces the cockpit and front fuselage in Montreal, while Alenia Aeronautica builds the empennage. The composite wing is made by Bombardier Belfast.

Poutissou said Bombardier opted for an advanced aluminum fuselage over composite because of the reduced maintenance costs and anti-corrosion properties of aluminum. Composite repair is often costly and time consuming.

Asked if Bombardier plans to tweak the design of the CSeries 100 or 300, Poutissou said, "We have a good design, but in all our designs we look for continuous improvement over time." — Robert W. Moorman

Source: <http://atwonline.com/airframes/among-big-guns>